

The 2022-23 Budget: Zero-Emission Vehicle Package

Summary

Governor Proposes \$6.1 Billion for Zero-Emission Vehicle (ZEV)-Related Activities.

The Governor proposes a total of \$6.1 billion from various fund sources over five years for a package of proposals related to ZEVs. Most of the proposed funding would continue and/or expand existing programs, such as heavy-duty and off-road programs, ZEV fueling infrastructure programs, and programs focused on cleaner vehicles and mobility for low-income households and disadvantaged communities (also known as transportation equity programs).

Mix of Spending Depends on Legislative Priorities. Ultimately, budget allocations will depend on how the Legislature prioritizes different policy goals:

- **Near-Term Greenhouse Gas (GHG) Reductions.** Truck and bus vouchers are one of the most cost-effective GHG reduction mobile source incentive programs. However, overall, the GHG costs for mobile source incentive programs are relatively high. The Legislature might want to consider relying on other programs if the goal is to achieve the most cost-effective, near-term GHG reductions.
- **Near-Term Local Air Pollution Reductions.** Heavy-duty retirement and replacement programs—such as Carl Moyer, Funding Agricultural Replacement Measures for Emission Reductions (FARMER), and AB 617 incentives—are relatively cost-effective programs for reducing air pollution.
- **Advancing ZEV Technologies.** Programs that focus on advancing ZEV technologies in their early stages of market development—such as heavy-duty pilots, demonstrations, and vouchers—could help achieve long-term GHG and air pollution goals.
- **Air Quality Benefits in Disadvantaged Communities.** To improve air quality in disadvantaged communities, the Legislature could support programs that reduce local air pollution cost-effectively *and* where the vast majority of the spending benefits low-income and disadvantaged communities, such as AB 617 incentives.

Unclear How State Funding Will Be Used to Leverage Federal Funds. The Legislature might want to require the administration to develop a plan for how state funds can be used to complement federal charging infrastructure funds, including a description of how state funding can be used to leverage federal funding or fill in the major gaps in federal funding.

Consider Trade-Offs of Multiyear Funding Commitments. On the one hand, multiyear commitments can provide market certainty and make it easier for departments to design and administer programs. On the other hand, they have the potential to reduce future legislative oversight and create General Fund pressures in future years.

BACKGROUND

State Has Ambitious Climate Change and Air Quality Goals. California has a variety of goals related to reducing greenhouse gas (GHG) emissions, as well as regional and local air pollution. For example:

- **GHG Limit.** Chapter 249 of 2016 (SB 32, Pavley) established a statewide GHG limit of 40 percent below 1990 levels by 2030. (The Governor also has an executive order establishing a goal of statewide carbon neutrality by 2045, but this target is not in state law.)
- **Federal Air Quality Standards.** California has two areas with the most critical air quality challenges in the nation—the South Coast Air Basin and the San Joaquin Valley. Substantial reductions in criteria pollutants from all sources—specifically, nitrous oxides (NOx) and fine particulate matter (PM2.5)—are needed to meet increasingly stringent federal air quality standards in the coming years.
- **AB 617 Community Emissions Reduction Plans.** Pursuant to Chapter 136 of 2017 (AB 617, C. Garcia), some of the communities with the worst air quality in California have adopted plans that identify five- and ten-year targets to reduce air pollution exposure from various sources.

Mobile Sources Represent a Large Portion of Emissions. Emissions that come from vehicles and other types of mobile equipment are also known as “mobile sources.” Mobile sources include several different types of vehicles and equipment, such as:

- **Light-Duty Vehicles.** This includes passenger cars and smaller pick-up trucks. Currently, most of these vehicles have gasoline-powered internal combustion engines.
- **Medium-Duty Vehicles.** This includes vehicles that weigh more than 8,500 pounds up to 14,000 pounds, such as larger pick-up trucks and neighborhood delivery vans. Currently, these vehicles are primarily fueled by gasoline or diesel.

- **Heavy-Duty Vehicles.** This includes large trucks (such as long-haul trucks), garbage trucks, some port equipment (such as drayage trucks), and buses. Currently, most of these vehicles are powered by diesel engines, or in some cases the vehicles use hybrid technologies or engines powered by natural gas.
- **Off-Road Equipment.** This includes a wide range of equipment types, including locomotives, ocean-going vessels, commercial harbor craft, portable generators, agricultural equipment, construction equipment, lawn and garden equipment, forklifts, aircrafts, and recreational boats. Currently, most of this equipment is powered by diesel engines.

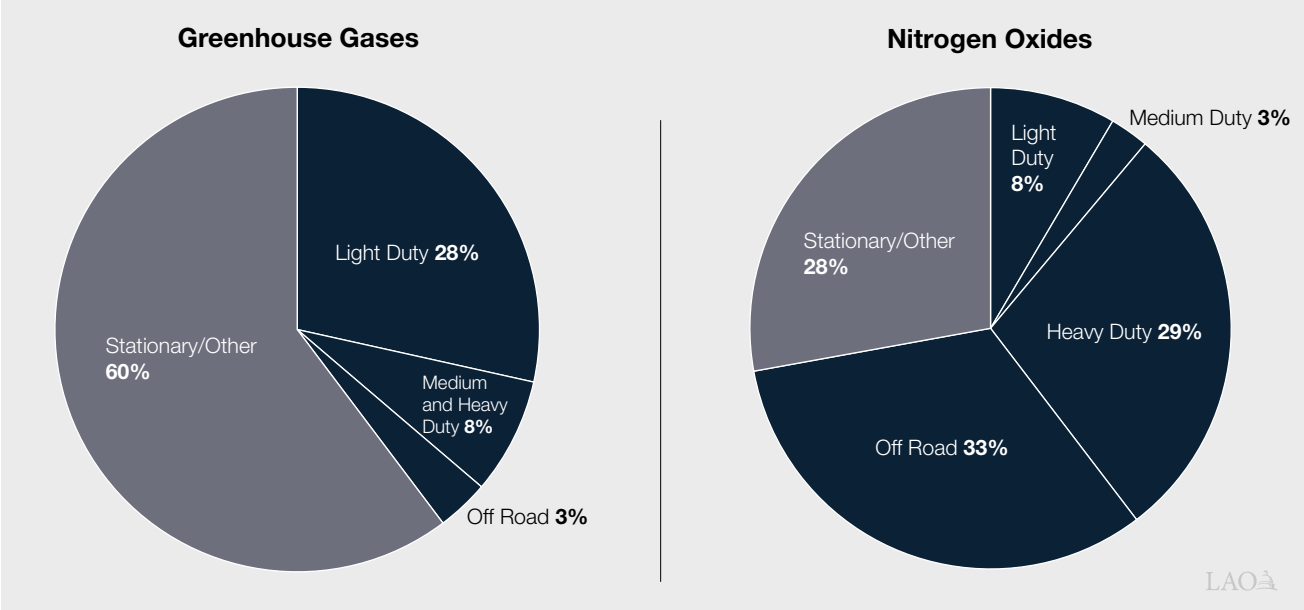
As shown in **Figure 1**, mobile sources represent a substantial share of California’s GHGs and air pollution. In particular, these sources represent about 40 percent of GHGs and over 70 percent of statewide NOx emissions. (This does not include “upstream” GHG emissions, such as emissions related to producing or refining crude oil.) Light-duty vehicles make up the largest share of mobile source GHG emissions, while heavy-duty vehicles and off-road equipment make up the majority of mobile source NOx. Heavy-duty vehicles and off-road equipment are also primary sources of diesel particulate matter, which the California Air Resources Board (CARB) estimates is the source of 70 percent of total known cancer risk related to air toxics in California.

Air Pollution Differs Between Regions and Communities. Certain regions—such as the Central Valley and South Coast—and communities—such as those near ports, highways, and freight corridors—are disproportionately impacted by air pollution from mobile sources. In addition, as shown in **Figure 2**, research supported by CARB found that PM2.5 exposure from on-road sources is 53 percent higher in disadvantaged communities (as defined by the California Environmental Protection Agency) than the statewide average. The higher exposure in disadvantaged communities is at least partially because of the way disadvantaged communities are defined, which is—in part—based on estimated exposure to PM2.5. This research also found

Figure 1

Mobile Sources Are Major Contributors to Climate Change and Air Pollution

2019 Statewide Share of Emissions by Source



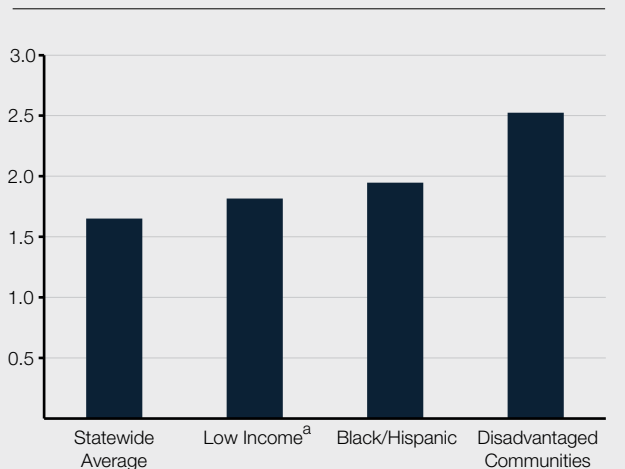
that PM2.5 exposure from on-road sources was 10 percent higher for low-income households and 18 percent higher for Black and Hispanic populations. Policies that reduce PM2.5 exposure from on-road sources could have disproportionate benefits for these communities.

State Has A Variety of Programs to Reduce Emissions and Promote ZEVs. The state administers a wide variety of programs intended to reduce mobile source emissions, including programs that promote zero-emission vehicles (ZEVs). This includes funding for light-duty vehicles, heavy-duty vehicles, off-road equipment, and ZEV fueling infrastructure. For example, the 2021-22 budget agreement provided \$3.9 billion over three years for various programs to reduce emissions and promote ZEVs. (For more detail, see our post, [The 2021-22 California Spending Plan: Natural Resources and Environmental Protection](#).) In addition, the state has a wide range of regulatory programs that are meant to encourage ZEVs, including a ZEV mandate requiring a certain number of light-duty vehicles sales be ZEVs. (For more information about some of the key state programs intended to reduce transportation GHG emissions, see our 2018 report [Assessing California’s Climate Policies—Transportation](#).)

Figure 2

California PM2.5 From On-Road Sources Disproportionately Affects Certain Populations and Areas

Population-Weighted Average Exposure Concentration (Micrograms Per Square Meter)



^a Lowest 20 percent of household income distribution.
Source: Apte et al. (2019)
PM2.5 = fine particulate matter.

PROPOSAL

Governor Proposes Additional \$6.1 Billion for ZEV-Related Activities. The Governor proposes a total of \$6.1 billion from various fund sources (General Fund, Greenhouse Gas Reduction Fund [GGRF], and federal funds) over five years for a package of proposals related to ZEVs. **Figure 3** summarizes the Governor’s proposed ZEV package, as well as the ZEV package adopted as part of last year’s budget. In 2022-23, most of the proposed \$2.7 billion is for school buses (\$1.5 billion), and heavy-duty vehicle and infrastructure incentives (\$700 million).

Mostly Expands Existing Programs, but Creates Some New Programs. Most of the proposed funding would continue and/or expand existing programs, such as heavy-duty and off-road programs, ZEV fueling infrastructure programs, and programs focused on cleaner vehicles and mobility for low-income households and disadvantaged communities (also known as transportation equity programs). The most significant new programs and programmatic changes proposed by the Governor include:

Figure 3

Summary of Approved and Proposed ZEV Packages

General Fund, Unless Noted Otherwise (In Millions)

Program	Department	2021-22 Package	Proposed 2022-23 Package				Total
		Total	2022-23	2023-24	2024-25	2025-26	
Light-Duty Vehicles							
Clean Vehicle Rebate Project	CARB	\$525	—	—	—	—	—
Clean Cars 4 All and Other Equity Projects	CARB	400	\$171 ^a	\$50	\$35	—	\$256
Transportation Equity, Mobility, and SCS Pilots	CARB, CalSTA	—	65	130	134	\$90	419
ZEV Fueling Infrastructure Grants	CEC	300	100	220	210	70	600
Equitable At-Home Charging	CEC	—	60	100	90	50	300
Transportation Package ZEV ^b	CalSTA	407	77	77	77	76	383 ^c
Heavy-Duty and Off-Road Vehicles							
Drayage Trucks & Infrastructure	CARB, CEC	\$535	—	\$200	\$170	\$105	\$475
Transit Buses and Infrastructure	CARB, CEC	290	—	200	160	100	460
School Buses and Infrastructure	CARB, CEC, CDE	450	\$1,500	—	—	—	1,500
Clean Trucks, Buses, and Off-Road Equipment	CARB, CEC	700	700 ^d	200	165	35	1,100
Ports	CARB, CEC	—	—	100	200	100	400
Near-Zero Heavy-Duty Trucks	CARB	45	—	—	—	—	—
Emerging Opportunities	CARB, CEC	—	20	50	86	44	200
Other							
ZEV Consumer Awareness	GO-Biz	\$5	—	—	—	—	—
ZEV Manufacturing Grants	CEC	250	—	—	—	—	—
Totals		\$3,907	\$2,693	\$1,327	\$1,327	\$746	\$6,093

^a Includes \$76 million Greenhouse Gas Reduction Fund.

^b Includes federal funds.

^c Includes \$76 million in 2026-27.

^d Includes \$600 million Greenhouse Gas Reduction Fund.

ZEV = zero-emission vehicle; CARB = California Air Resources Board; SCS = Sustainable Communities Strategies; CalSTA = California State Transportation Agency; CEC = California Energy Commission; CDE = California Department of Education; and GO-Biz = Governor’s Office of Business and Economic Development.

- **School Bus Program (\$1.5 Billion Proposition 98 General Fund).** This program would provide competitive grants to school districts to replace nonelectric school buses with electric buses and purchase related infrastructure.
- **ZEV Fueling Infrastructure Grants (\$600 Million General Fund).** The proposal includes a total of \$600 million over four years—with \$100 million in 2022-23—for electric vehicle (EV) charging infrastructure. Unlike last year’s ZEV package, this proposal would prioritize fast chargers.
- **Federal Funding for ZEV Infrastructure (\$383 Million Federal Funds).** The proposal includes federal funding available to California through the federal Infrastructure Investment and Jobs Act (IIJA) enacted in November 2021. Specifically, it includes \$383 million for five years from the National Electric Vehicle Infrastructure Formula Program, which is intended to support fueling infrastructure along designated alternative fuel corridors, such as along the Interstate Highway System.
- **Equitable At-Home Charging (\$300 Million General Fund).** The proposal includes a total of \$300 million over four years—with \$60 million in 2022-23—for EV charging infrastructure at multi-unit dwellings and low-income, single-family homes. The funds would be used for Level 2 charging stations and electrical panel upgrades. (Level 2 charging stations provide about 14-35 miles of driving range per hour of charging.)
- **Potential Sustainable Communities Strategies (SCS) Pilots.** As part of the proposed funding for SCS pilots and other equity programs, CARB would consider creating a new pilot program that would incentivize transportation agencies to prioritize projects that reduce vehicle miles traveled (VMT), rather than roadway expansion projects. The proposed budget does not provide funding explicitly for this pilot project, but CARB would consider it as part of its typical Low Carbon Transportation Investment Plan process after the budget is adopted.

ASSESSMENT

In this section, we provide our assessment of the Governor’s proposed ZEV package, except the \$1.5 billion proposal for electric school buses which we discuss in our recent brief, *The 2022-23 Budget: Green School Bus Grants*.

Package Funds Different Types of Vehicles and Prioritizes Heavy-Duty ZEVs

Funding Expected to Support a Variety of Vehicle Types and Fueling Infrastructure. As shown in **Figure 4**, the proposed funding would support a variety of vehicles, EV charging stations, off-road equipment, and other projects. The estimated amounts are subject to uncertainty because (1) the final allocations will depend on decisions made by departments about how to allocate the funding to specific subprograms or projects and (2) actual deployment amounts could also depend on which technologies are actually purchased. For example, the number of vehicles supported through the clean truck and bus vouchers depends on which technologies businesses and governments ultimately choose to purchase with the vouchers.

Two-Thirds of New Funding for Heavy-Duty Vehicle Programs. Over two-thirds of the proposed funding would support heavy-duty vehicle programs, as shown in **Figure 5**. (This includes the \$1.5 billion for electric school buses.) A majority of the funding in the 2021-22 ZEV package was also targeted at such programs. Under the Governor’s plan, about 62 percent of the combined \$10 billion total from both ZEV packages would go to heavy-duty vehicle programs. Funding for light-duty vehicles would be targeted to transportation equity and mobility programs, as well as fueling infrastructure. No new funding would be allocated to the state’s main ZEV rebate program, the Clean Vehicle Rebate Project (CVRP), but \$100 million would be available to support higher CVRP rebate amounts for low- and moderate-income households. We note that the \$525 million allocated to CVRP in the 2021-22 budget was intended to cover three years of funding for the main CVRP program.

Figure 4

Estimated Number of Vehicles, Chargers, and Projects Supported With Proposed Funding

(In Millions)

Program	Amount	Estimated Deployment
Light-Duty		
ZEV Fueling Infrastructure	\$600	5,000 DC fast chargers
Transportation Equity, Mobility, and SCS Pilots	419	100 projects ^a
Equitable At-Home Charging	300	28,000 Level 2 MUD chargers; 50,000 home chargers
Vehicle Rebates for Low-Income Consumers	100	20,400 vehicles
Financing Assistance for Low-Income Consumers	80	12,300 vehicles
Clean Cars 4 All	76	6,600 vehicles
Heavy-Duty and Off-Road		
Clean Trucks, Buses, and Off-Road Equipment	\$600	4,100 vehicles and equipment
Transit Buses and Infrastructure	320	1,600 buses
Ports	250	860 pieces of off-road equipment
Drayage Trucks and Infrastructure	225	1,000 trucks
Emerging Opportunities	100	10 projects ^a

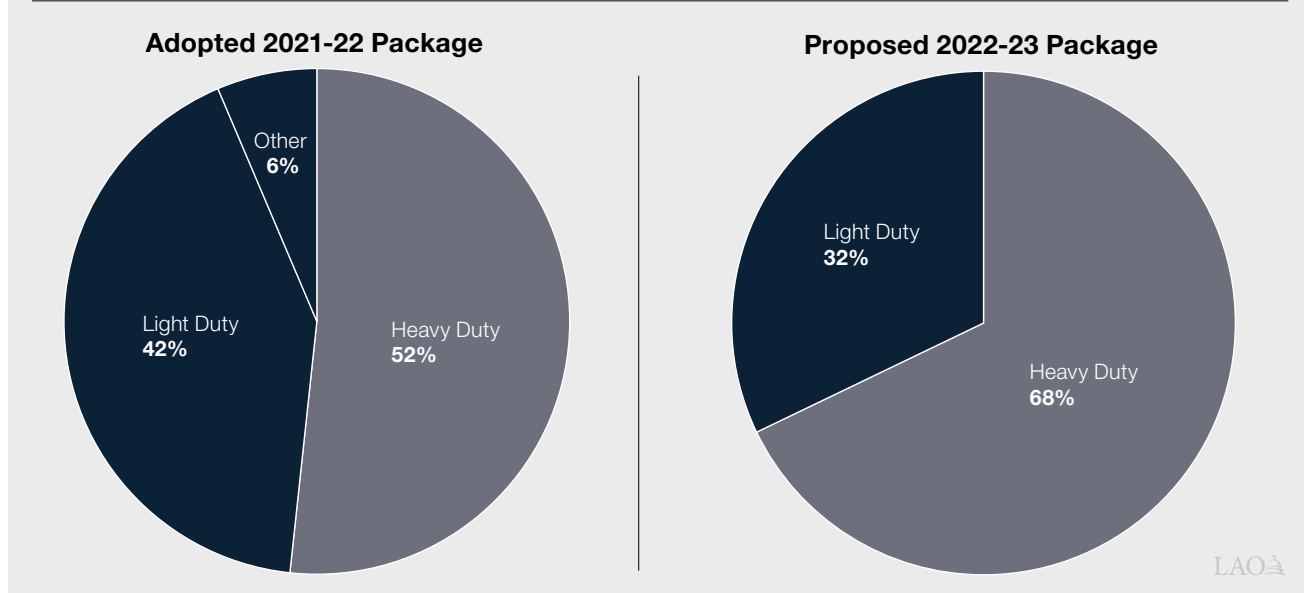
^a Each project may fund multiple vehicles and equipment.

Source: California Air Resources Board and Energy Commission.

SCS = Sustainable Communities Strategies; ZEV = zero-emission vehicle; and MUD = multi-unit dwellings.

Figure 5

Over 60 Percent of Total Funding Would Go to Heavy-Duty Vehicles and Equipment



Programs Target Different Policy Goals With Varying Levels of Effectiveness

Mobile Source Emission Programs Aim to Achieve Different Policy Goals... The state has a wide variety of mobile source incentive programs. These programs aim to achieve one or more different policy goals, including: (1) near-term GHG reductions; (2) near-term air pollution reductions; (3) advancements in zero-emission technologies, which could have longer-term GHG and air quality benefits; and/or (4) ensuring program benefits are distributed equitably across different areas and populations, often with a focus on reducing pollution in areas that are disproportionately low-income and/or have poor air quality. All four of these are reasonable policy goals. However, in many cases, the Legislature will have to balance the trade-offs between these goals when determining how to prioritize funding across different programs. In addition, some programs might have other policy goals, such as increasing mobility.

...And Degree of Effectiveness Varies Between Programs. As shown in [Figure 6](#) on the next page, the degree to which mobile source incentive programs achieve each policy goal varies by program. For example, some programs are more cost-effective at reducing GHGs, while other

programs are more cost-effective at reducing air pollution. Furthermore, some programs do more to promote zero-emission technological advancements that can help meet long-term emissions goals, while others do more to target funding in ways that benefit low-income and disadvantaged communities. We discuss these key differences in more detail in the remainder of this section. (For more detail on the methods used to determine the measurements identified in [Figure 6](#), see the box on page 9.)

Notably, [Figure 6](#) does not include an evaluation of the state's main vehicle rebate program (CVRP) or ZEV infrastructure funding. As discussed in the box on page 10, evaluating the net effects of mobile source programs on GHGs and air pollution can be especially challenging and a more rigorous analysis is likely needed to provide reliable information on program cost-effectiveness compared to other programs.

Mobile Source Emission Reduction Programs Are Relatively Costly Approaches to Near-Term GHG Emission Reductions. Of the programs listed earlier in [Figure 6](#), the most cost-effective program for reducing near-term GHGs is the Clean Truck and Bus Voucher Program with estimated costs of \$350 per ton. The other incentive programs have costs close to or exceeding \$1,000 per ton.

Figure 6

Mobile Source Program Effectiveness Varies Between Program and Policy Goal

Program	GHG Cost-Effectiveness (\$/Ton) ^a	Air Pollution Cost-Effectiveness (\$/Weighted Ton) ^a	Technology Advancement ^b	Benefiting Priority Populations ^c
Transportation Equity				
Low-Income Financing Assistance	\$830	\$538,000	Low-Medium	84%
Clean Cars 4 All	920	438,000	Low-Medium	97
Clean Mobility in Schools	2,450	235,000	Low-Medium	100
Clean Mobility Options	11,400	4,122,000	Low-Medium	100
Sustainable Transportation Equity Project	5,050	4,845,000	Low-Medium	100
Heavy-Duty and Off-Road ZEVs				
Clean Truck and Bus Vouchers (HVIP)	\$350	\$96,200	Medium	63%
Off-road Equipment Vouchers (CORE)	1,710	481,000	Medium	73
Demo/Pilots	18,800	110,000	Medium-High	100
Heavy-Duty Retirement and Replacement				
FARMER	\$1,679	\$8,979	Low	70%
Carl Moyer	1,670 ^d	11,700	Low	N/A
AB 617 Incentives	1,661	12,486	Low-Medium	94

^a CARB estimate.

^b LAO estimate.

^c Administration's estimate.

^d LAO estimate based on average of FARMER and AB 617 incentives.

GHG = greenhouse gas; ZEV = zero-emission vehicle; HVIP = Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project; CORE = Clean Off-Road Equipment; FARMER = Funding Agricultural Replacement Measures for Emission Reductions; N/A= not available; CARB = California Air Resources Board; and AB 617 = Chapter 136 of 2017 (AB 617, C. Garcia).

By comparison, other state programs are likely more cost-effective. For example, current cap-and-trade allowance prices are about \$30 per ton and Low Carbon Fuel Standard credits are about \$150 per ton. (In our view, these allowance and credit prices are a reasonable proxy for the marginal costs of near-term GHG emission reductions from these programs.) Also, according to the administration's estimates, other GGRF funded incentive programs, such as methane reduction programs, cost less than \$100 per ton.

Heavy-Duty Retirement and Replacement Programs Are Relatively Cost-Effective Approach for Air Pollution Reductions. The most cost-effective programs for reducing near-term local criteria pollutants appear to be the Funding Agricultural Replacement Measures for Emission Reductions (FARMER) Program, the Carl Moyer Program, and AB 617 incentives (also known as Community Air Protection incentives). Estimated costs to reduce a weighted ton of criteria pollution ranges from \$8,979 to \$12,486 per ton in these programs, compared to costs ranging from the

hundreds of thousands of dollars to millions of dollars per ton for most other programs. These programs largely provide funding to retire older, high-polluting engines and replace them with cleaner fossil fuel engines (such as natural gas), rather than focusing on zero-emission technologies such as battery electric and fuel cells. Each of these programs would receive funding under the Governor's budget, but they would not receive additional funding as part of the proposed ZEV package.

The cost-effectiveness estimates for GHGs and air pollution reductions illustrate some of the important trade-offs the Legislature faces when determining its budget priorities for programs intended to reduce emissions. For example, **Figure 7** on page 11 shows the estimated GHG reductions and local air pollution reductions associated with providing \$1 million in funding to each program. Of the programs analyzed in this report, the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) would achieve the greatest GHG reductions, but the

Measuring Impact of Mobile Source Incentive Programs

We provide information below on how we determined the different measurements included in Figure 6 regarding the impact of various mobile source incentive programs.

Greenhouse Gas Cost-Effectiveness. This is based on estimates from the California Air Resources Board (CARB) on the average program spending per ton of carbon dioxide equivalent reduced over the life of the projects. These estimates include only projects implemented in the last few years.

Air Pollution Cost-Effectiveness. This is based on CARB estimates of average program spending per ton of weighted criteria pollutant reductions over the life of the projects. Weighted criteria pollutant reductions are calculated by adding tons of nitrogen oxide emissions, reactive organic gases, and particulate matter. For heavy-duty vehicles and equipment, particulate matter reductions are multiplied by 20 to account for the toxic health hazards associated with diesel particulate matter. (This is consistent with weighting that has historically been used in the Carl Moyer Program.) These estimates include only projects implemented in the last few years.

Technology Advancement. This is based on our assessment of the degree to which each program could help promote zero-emission technologies. Programs that primarily focus on promoting cleaner fossil fuel engines (such as natural gas) and/or widely available zero-emission vehicle (ZEV) technologies (such as light-duty ZEVs) generally score low. Programs that focus on promoting ZEV technologies that are in the early stages of commercial availability (such as truck and bus vouchers) generally score medium. Programs that focus on pilots and demonstrations for new technologies generally score high. These assessments are based on our best judgement, but state departments and other researchers might have different, yet reasonable, assessments.

Benefiting Priority Populations. We use the administration's estimates of the portion of Greenhouse Gas Reduction Funds that have been allocated to projects that benefit disadvantaged communities and/or low-income households and communities (also known as "priority populations"), as reported in the administration's *2021 Annual Report to the Legislature on California Climate Investments*.

heavy-duty retirement and replacement programs would achieve the greatest air pollution reductions. Notably, in the near term, none of the programs would cost-effectively reduce both GHGs and air pollution.

Programs Promoting Technological Advances Could Help Achieve Long-Term Emission Reductions. Some programs aim to help advance ZEV technologies, which could help achieve long-run GHG and air pollution reduction goals. Also, in our view, policies that attempt to promote research, development, and demonstration of new technologies is a reasonable role for government. This is because, without such support, the private sector would tend to underinvest in these activities and cleaner technologies might not reach the commercial market in a timely manner (or at all).

Unfortunately, it is difficult to assess these technology benefits quantitatively. In general, heavy-duty and off-road technologies are farther behind in technological and market development than light-duty ZEVs, so there is greater potential for technological advancement. In our view, pilot and demonstration projects generally have the most potential technological benefits because they are supporting early stage technologies and projects that very likely would not otherwise be funded by the private sector.

Role of Transportation Equity Programs in Achieving Policy Goals Is Unclear. Compared to other mobile source programs, it is unclear whether the transportation equity programs achieve any of the Legislature's policy goals effectively. First, transportation equity programs appear to be a

Light-Duty Vehicle Rebate and Infrastructure Programs Difficult to Evaluate

Evaluating cost-effectiveness can be challenging for many mobile source programs, but especially certain light-duty, zero-emission vehicle (ZEV) programs. Below, we describe some of the key challenges for two main programs: the Clean Vehicle Rebate Project (CVRP) and light-duty ZEV public fueling infrastructure.

CVRP. The CVRP program interacts with other programs in ways that make it difficult to determine how much of ZEV adoption is related to CVRP versus other ZEV programs. For example, one recent analysis found that light-duty vehicle subsidies have relatively little effect on ZEV adoption in California after accounting for the state's ZEV mandate that requires car manufacturers to sell a certain percentage of ZEVs. The CVRP largely shifts who pays the costs for the ZEVs, not how many ZEVs are ultimately purchased. Current CVRP estimates provided by the California Air Resources Board (CARB) do not take either of these interactions into account when estimating cost-effectiveness. As a result, we do not include these estimates in our cost-effectiveness analysis.

It is worth noting that similar methodological issues have been identified in previous reports by our office and the California State Auditor. In response to the auditor's report, CARB has entered into a contract with researchers to improve its data collection and help develop evaluation strategies to disentangle the effects of overlapping programs.

Light-Duty ZEV Public Fueling Infrastructure. So far, much of the funding provided to the California Energy Commission to support ZEV fueling infrastructure has been used for fueling and charging infrastructure in public and shared locations, such as parking lots, workplaces, and multi-unit dwellings. As we have noted in previous reports, we think there is a reasonable rationale for government support of public fueling infrastructure as a strategy to promote ZEVs. However, it is difficult to measure the degree to which additional public infrastructure influenced a household's decision to purchase a ZEV, compared to other programs and factors. As a result, we do not include estimates of fueling infrastructure cost-effectiveness in our analysis.

relatively costly way to reduce both local pollution and GHGs. Second, most of these programs focus on light-duty vehicle and mobility programs which, in our view, only have modest potential to drive technological advancements—likely less than some of the heavy-duty ZEV programs. Finally, although the vast majority of funding from these programs goes to projects that benefit low-income and disadvantaged communities, the percentage is not significantly more than some of the other programs. For example, the AB 617 incentive program allocates 94 percent of funds to projects that benefit priority populations and achieves criteria pollutant reductions much more cost-effectively than the transportation equity programs.

New Programs Raise Several Key Implementation Questions

Some of the funding proposed by the Governor would go to new programs where key program design and implementation details are unclear. Below, we identify several questions about the implementation of two new programs—the Equitable At-Home Charging program and the potential SCS pilots.

Equitable At-Home Charging Program. At the time of this brief, the administration has not provided information on some of the key design features for this program. This includes:

- How is this program different from other efforts to fund EV charging infrastructure for low- and moderate-income households? Currently, the state, local air districts, and utilities administer programs that offer financial incentives for

charging infrastructure, including infrastructure for multifamily dwellings and single-family households. For example, the Clean Cars 4 All program in the South Coast offers low- and moderate-income households financial support for home EV charging infrastructure.

- What is the program outreach strategy? For example, will incentives for charging infrastructure be provided at the car dealership upon purchase of the ZEV, or will households access this program in some other way?
- How will this program target renters? Low-income households are more likely to rent their homes. As a result, an effective infrastructure program targeted at low-income households will likely need to focus on rental properties.

Potential SCS Pilots. The administration might use some of the funding for transportation equity programs to pilot SCS intended to reduce VMT. We find that piloting potential strategies to reduce VMT could have merit, especially given the lack of progress the state has made in this policy area over the past several years. However, there are very few details about how these pilots would be structured and how they would be different from other state programs targeted at reducing VMT, such as the Active Transportation Program administered by the California Department of Transportation (Caltrans) and the Clean Mobility Options program administered by CARB.

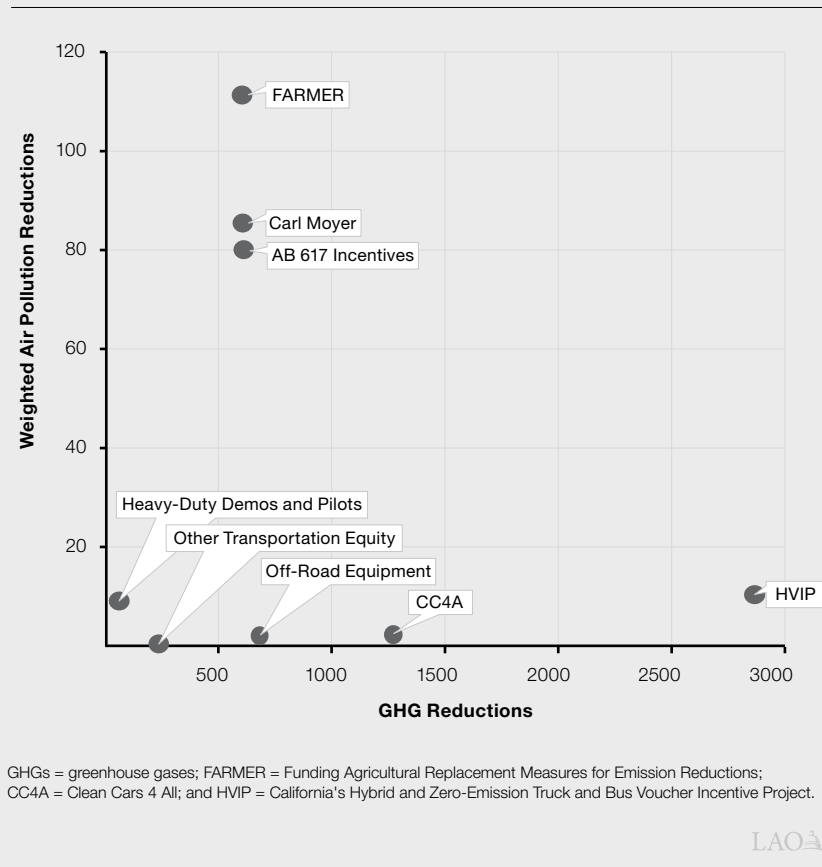
Plan for Complementing Federal ZEV Infrastructure Funding Unclear

As shown in **Figure 8** on the next page, the federal IIJA established three main ZEV infrastructure programs. Funding for one of the programs—\$383 million to Caltrans through the

Figure 7

Air Pollution and GHG Benefits Per Dollar Spent

Estimated Tons Reduced Per \$1 Million of Funding



National Electric Vehicle Infrastructure Formula Program—is already part of the Governor’s proposed budget. According to recently released federal guidance, the state must submit a plan to the federal government describing how funding will be used. At the time this brief was written, the administration has not provided detail on how the \$383 million will be used. The other two charging and fueling infrastructure grant programs are competitive programs and detailed federal guidance is not yet available. For all programs, the federal government will only pay for a portion of the costs, with the remainder coming from other private or public sources.

Given the limited detail, it is unclear how the proposed state funding for ZEV infrastructure—ZEV infrastructure grants and Equitable At-Home Charging—will be used to best complement federal funding. For example, will any state funding be needed to leverage federal funding? How do these state funding proposals help fill key gaps in federal funding?

Multiyear Funding Approach Presents Trade-Offs

Multiyear Funding Can Be Helpful for Market Certainty and Program Administration.

The Governor’s proposal includes \$3.4 billion in new out-year funding commitments—mostly from the General Fund. Multiyear funding commitments can have programmatic benefits. First, for programs that aim to advance newer technologies, a long-term funding commitment can help provide a market signal to businesses making long-term investment decisions. For example, a long-term state funding commitment to heavy-duty ZEV programs could provide greater certainty to businesses or government that are deciding whether to shift their vehicle fleet to ZEVs. Second, long-term funding can help state and local agencies design programs. For example, it could help CARB make program design decisions (such as rebate levels and eligible technologies) that help avoid the need to implement waitlists.

...But Reduces Legislative Oversight and Creates Future General Fund Pressures.

Multiyear funding comes with some potential downsides too. First, since funding would be built into the “base” budget, the administration would not submit budget change proposals for this spending in future years. This could reduce future legislative oversight by eliminating a process that is often used to assess program implementation

and outcomes prior to committing additional funding. One potential solution to this would be to require the administration to report annually on the progress of how funding has been spent, key outcomes, key challenges, and plans for spending in future years. Second, multiyear funding commitments can create out-year General Fund pressure, which could limit the Legislature’s ability to fund other priorities in future years.

Some Proposed Spending Is Excluded From State Spending Limit

The California Constitution imposes a limit on the amount of revenue the state can appropriate each year. The state can exclude certain spending—such as on capital outlay projects—from the state appropriations limit (SAL) calculation. The Department of Finance estimates that \$260 million of the proposed 2022-23 spending in the Governor’s ZEV package is for activities that are excludable from the SAL. In constructing its final ZEV package, the Legislature will want to be mindful of SAL considerations. For example, if the Legislature were to approve a lower amount of spending on the proposed activities that the administration excludes from SAL, it would generally need to repurpose the associated funding for other SAL-related purposes, such as tax reductions or an alternative excluded expenditure.

Figure 8

Major ZEV Infrastructure Funding in IJJA (In Millions)

Federal Program	Description	Total Funding 2022-26	Award Type	Total California Funding
National Electric Vehicle Infrastructure Formula Program	Install EV charging infrastructure along designated alternative fuel corridors, such as highways.	\$5,000	Formula	\$383
Charging and Fueling Infrastructure Grants (Community Charging)	Install public EV charging and alternative fuel on public roads, schools, parks, and publicly accessible parking facilities. Priority given to rural and low- and moderate-income neighborhoods, and communities with more multi-unit dwellings.	1,250	Competitive	N/A
Charging and Fueling Infrastructure Grants (Corridor Charging)	Install EV charging and alternative fueling infrastructure along designated alternative fuel corridors and in communities.	1,250	Competitive	N/A

ZEV = zero-emission vehicle; IJJA = Infrastructure Investment and Jobs Act; EV = electric vehicle; N/A = Not available

RECOMMENDATIONS

Consider Whether Different Mix of Spending Better Achieves Legislative Priorities.

Ultimately, budget allocations for mobile source programs will depend on how the Legislature prioritizes different policy goals. In determining its priorities, we recommend the Legislature consider such factors as:

- ***Near-Term GHG Reductions.*** To the extent near-term GHG reductions are a priority, HVIP is one of the most cost-effective mobile source incentive programs. However, overall, the GHG reduction costs for mobile source incentive programs are relatively high, and the Legislature might want to consider relying on other programs for the most cost-effective GHG reductions, including regulatory programs (such as cap-and-trade) or other spending programs that have lower costs (such as methane reduction programs).
- ***Near-Term Local Air Pollution Reductions.*** To the extent total near-term reductions in local air pollution are a priority, then heavy-duty retirement and replacement programs such as Carl Moyer and FARMER are most cost-effective.
- ***Technology Advancement.*** To the extent *long-term* GHG and air pollution reductions are a priority, then the Legislature could target funding to programs that focus on advancing ZEV technologies in their early stages of market development. For example, it could prioritize funding for heavy-duty pilots and demonstration projects and vouchers for heavy-duty vehicles and off-road equipment.
- ***Air Quality Benefits in Disadvantaged Communities.*** If a priority is ensuring air quality improvements mostly accrue to disadvantaged and low-income communities, then the Legislature could target funds to programs that reduce criteria pollutants cost-effectively *and* where the vast majority of the spending benefits low-income and disadvantaged communities, such as the AB 617 incentive program.

Direct Administration to Provide More Detail on New Programs.

We recommend the Legislature direct the administration to report at budget hearings on the details of the new programs that are being proposed, including the Equitable At-Home Charging program and potential SCS pilots. For example, how will the Equitable At-Home Charging program target renters? How will the potential SCS pilots be different from other programs aimed at reducing VMT? Additional detail could help the Legislature better evaluate the merits of the proposed programs.

Consider Delaying Funding for Infrastructure Until Administration Develops Plan to Best Leverage Federal Funds.

We recommend the Legislature direct the administration to report this spring on its plan for ensuring state funding for EV charging infrastructure will complement new federal funding. This includes a description of how, if at all, state funding can be used to leverage federal funding for EV charging infrastructure or fill in the major gaps in federal funding. So far, there is limited detail available from the federal government about how some of the new programs will be implemented. If there is still insufficient detail at the time the Legislature needs to adopt a budget to meet its constitutional requirement to pass a budget, the Legislature could delay additional state funding for light-duty ZEV infrastructure until more details are available and the administration develops a clear strategy.

Direct Administration to Report on Program Evaluation Strategies.

To ensure the Legislature has good information about the net effects of its mobile source programs, we recommend the Legislature direct the administration to report at budget hearings about current efforts to improve its program evaluation efforts. This report should include an update on efforts to more accurately assess the effects of individual programs in light of the interactions and overlap between regulatory and incentive programs. To the extent the Legislature authorizes funding to create new programs or expand existing programs, we recommend requiring the administration to

develop a plan for program evaluation prior to implementing the program and awarding the funds. We recognize that this would likely delay project implementation slightly, but would greatly improve the quality of information available to the Legislature in future years to help inform future budget and policy decisions.

Consider Trade-Offs of Multiyear Funding Commitments. We recommend the Legislature consider the trade-offs associated with over \$3 billion in multiyear General Fund commitments proposed by the Governor. On the one hand, these commitments can provide market certainty

and make it easier for departments to design and administer programs. On the other hand, they have the potential to reduce future legislative oversight and create General Fund pressures in future years. It is also worth noting that the 2021-22 budget package already included 2023-24 funding commitments for many of these same ZEV-related programs. To the extent the Legislature provides additional multiyear funding, we recommend it prioritize out-year funding for programs that can help provide market signals to businesses making long-term investment decisions, such as heavy-duty and off-road voucher incentives.

LAO PUBLICATIONS

This report was prepared by Ross Brown and reviewed by Anthony Simbol. The Legislative Analyst's Office (LAO) is a nonpartisan office that provides fiscal and policy information and advice to the Legislature.

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