

**Appendix E: 2023 Senate Bill 1403 School Bus Incentive Program
Report**

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Introduction

California has been a leader in cleaning the air and the fight against climate change for decades. Most recently, California passed Assembly Bill (AB) 1279 (Muratsuchi, Chapter 337, Statutes of 2022). This bill establishes the State's science-based policy to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative greenhouse gas emissions thereafter; and to ensure that by 2045, statewide anthropogenic greenhouse gas emissions are reduced at least 85% below 1990 levels. The California Air Resources Board's (CARB) 2022 Scoping Plan Update¹ lays out a comprehensive path to achieve the targets set in AB 1279 and acknowledges that transitioning the transportation sector to zero-emission is pivotal to achieving the mandate in AB 1279. The urgent need to address emissions from the transportation sector is further emphasized in Governor Newsom's Executive Order N-79-20,² which directs the on-road medium and heavy-duty fleet to transition to zero-emission by 2045 wherever feasible. Within the broader transportation sector, transitioning school buses to zero-emission has been a top priority for the State due to the adverse health effects of diesel particulate matter and children's increased vulnerability.

California has administered incentive programs to support the replacement of the State's aging school bus fleet for decades, and the State has made significant progress in cleaning up the school bus fleet. CARB, the California Energy Commission, local air districts, utilities, school buses manufacturers, school districts, and communities continue to work collaboratively to turn over older diesel buses in favor of zero-emission and other cleaner buses.

Senate Bill (SB) 1403 (Lara, Chapter 370, Statutes of 2018) requires that CARB, in consultation with the California Energy Commission provide an annual report outlining the State's school bus incentive programs and progress made towards cleaning the State's school bus fleet as part of the broader Heavy-Duty Investment Strategy. In the following sections, the report will provide an overview of the existing state school bus fleet, the funding committed to date and the need for funding, and the State's strategy to transition the school bus fleet to zero-emission by 2045.

State School Bus Fleet

Defining the California school bus fleet has been an ongoing and extensive project and it is critical to understand the school bus fleet composition in order to project the funding needs

¹ California Air Resources Board (2022). 2022 Scoping Plan for Achieving Carbon Neutrality.
<https://ww2.arb.ca.gov/resources/documents/2022-scoping-plan-documents>

² Executive Order N-79-20: <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>

for cleanup. There is no single data source that gives a complete picture of the State's school bus population. To provide this update, staff compiles data from the California Highway Patrol (CHP) School Bus Inspection Program, the current Department of Motor Vehicles (DMV) Vehicle registration database, and data from the various State funding programs that have replaced or plan to replace school buses. The 2023 CHP school bus inspection data served as the primary data source to determine the school bus population because CHP requires an inspection every 13 months for a school bus to legally transport children.³ This data was used to help update the school bus fleet database from last year. Staff ensured that all the school buses in this analysis have had a CHP safety inspection in the previous two years.

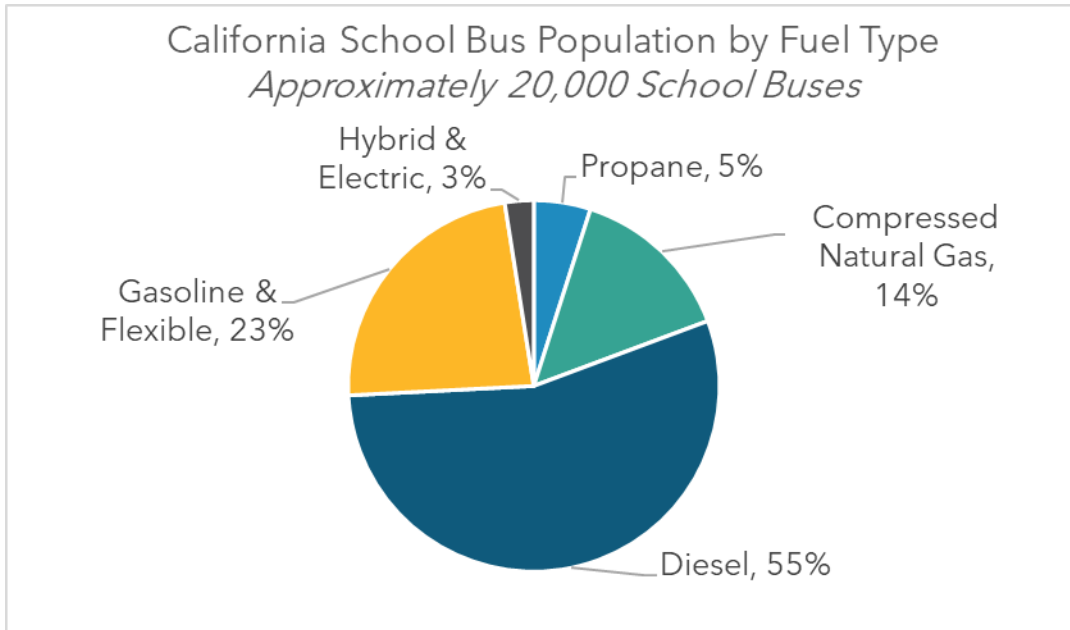
Staff estimates there are approximately 20,000 school buses operating in California. This number represents approximately a 16% decrease compared to the 23,800 school buses reported last year. Staff believe that the decrease in reported numbers is mostly attributable to changes in the methodology used by staff to determine if a school bus is operating. Notably, this year if a school bus's registered owner was listed as a financial institution or leasing company, the vehicle was not included in the inventory as there was insufficient information available to determine if that vehicle was being operated as a school bus. Additionally, any buses reported by transit agencies to Innovative Clean Transit Reporting tool were removed from the analysis as these buses are considered transit buses rather than school buses. While the change in methodology resulted in a decrease in estimated total number for school buses operating in the state, staff estimates that the total number of publicly operated school buses in the state is 15,500. This is the same as the number of publicly owned school buses reported in the 2022 SB 1403 Report.

Fuel Type

Understanding the fuel type of the school bus fleet is critical to determine which buses are in greatest need of replacement as certain fuel types emit more pollution, with diesel as the highest concern. Figure E-1 depicts the California School Bus Population by fuel type.

³ California Vehicle Code, Section 2807

Figure E-1: California School Bus Population by Fuel Type



The bus population by fuel type is similar to the 2023 distribution. Approximately 55% of the fleet is diesel. The rest of the school bus fleet is made up of gasoline and flexible fuel (a gasoline blend with up to 85% ethanol), compressed natural gas (CNG), propane, and hybrid and battery electric. The percentage of CNG buses is 14%. Hybrid and battery electric school buses currently make up approximately 3% of the inventory.

Of the publicly owned buses, over 9,600 are diesel fueled, or approximately 62% of the public fleet.

Age of Fleet

Age also represents a key variable for understanding which school buses need to be replaced. Staff found 68 diesel school buses in the oldest category with bus model years of 1978-1988 in the inventory, and 91% of those are publicly owned. These are the school buses of greatest concern that need to be turned over since they were designed to meet the less stringent, higher-emitting, emission standard that existed at the time. Considering only the public school buses in that age category, about 73% have census tracts identified as disadvantaged communities. Staff found 232 publicly owned diesel school buses in the next oldest category of concern which includes bus model years of 1989-1991. Table E-1 illustrates the number of publicly owned diesel school buses by bus model year and engine model year.

Table E-1: Publicly Owned Diesel-Fueled School Buses

Bus Model Year (Engine Model Year)*	Number of Buses	Percent of Buses Operated in Disadvantaged Communities
1978 - 1988 (1977 - 1987)	62	73%
1989 - 1991 (1988 - 1990)	232	61%
1992 - 1994 (1991 - 1993)	217	59%
1995 - 2007 (1994 - 2006)	4,099	69%
2008 - 2010 (2007 - 2009)	973	59%
2011 & Newer (2010 & Newer)	4,050	70%

** Note, the model year of a vehicle is typically one year ahead of the engine model year. For example, a bus with a model year of 1988 will most likely be equipped with a 1987 model year engine.*

The average publicly owned school bus is model year 2010, however there is some variation in age by geographic location. Table E-2 below provides a breakdown of the distribution of the school bus fleet by air district, and provides additional data on the average age of the school bus fleet operating within each air district. About 68% of the diesel buses in the state are operated by school districts that serve disadvantaged communities. Within each age category the percent of the diesel buses that are operated in disadvantaged communities ranges from 59% to 73%.

Table E-2: Publicly Owned School Bus Fleet Distribution by Air District

Air District	Average Bus Model Year	Approximate Number of Buses
South Coast Air Quality Management District	2010	4,610
San Joaquin Valley Air Pollution Control District	2009	3,010
Bay Area Air Quality Management District	2011	1,420
San Diego Air Pollution Control District	2007	1,380
Sacramento Metropolitan Air Quality Management District	2010	780
Medium Air Districts	2010	1,980
Small Air Districts	2010	2,290
Totals	2010	15,470

While the public school bus fleets in most air districts have a model year close to the statewide public school bus fleet average of model year 2010, the average bus age in San Diego appears to be lower, with an average model year of 2007.

Replacing the oldest buses diesel buses shown in Table E-1 remains a top priority for the State, and geographic comparisons such as in Table E-2 are useful for determining funding and outreach needs. Further details describing the rationale for focusing on the oldest diesel buses are contained in the following section.

The Need for Replacement

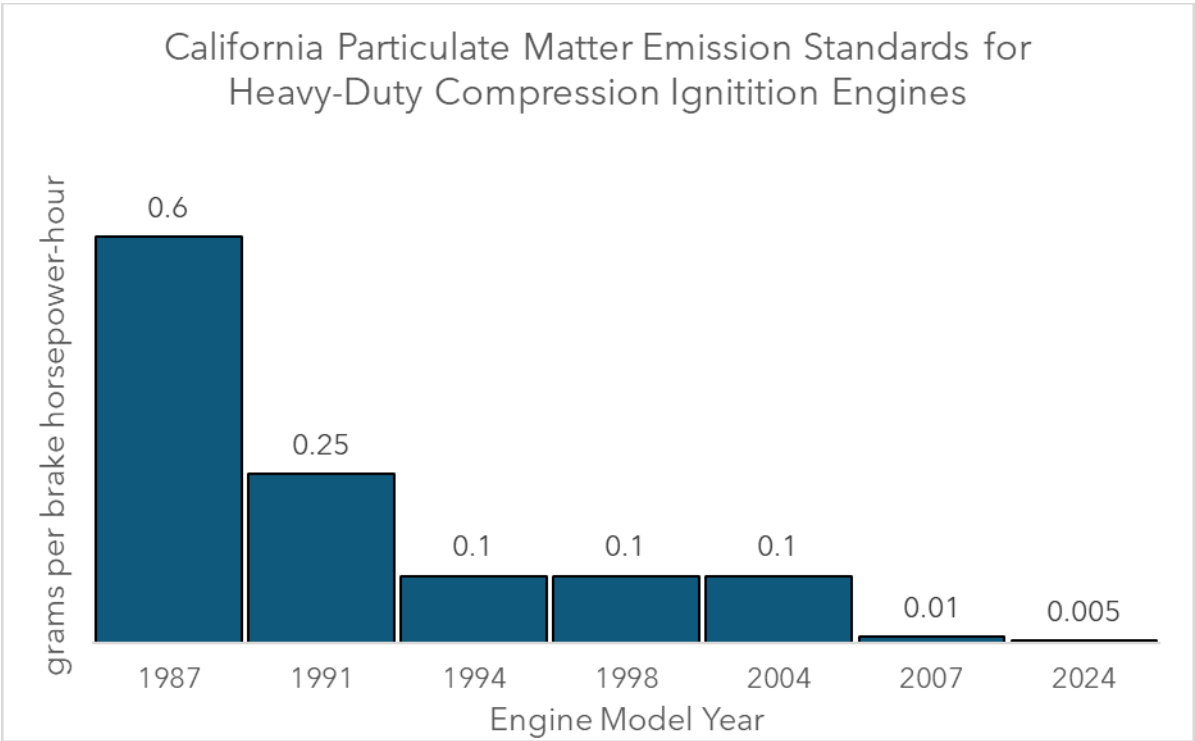
Amongst California school buses, the diesel-fueled vehicles are CARB’s main area of focus because diesel particulate matter (PM) is a toxic air contaminant and children are particularly vulnerable to health impacts. Toxic air contaminants may have health impacts at any amount, so reducing diesel PM exposure is a primary goal of efforts to clean up the school bus fleet.

Actions taken by the State to reduce children’s exposure to vehicle-related pollutants include smoke opacity testing and idling restrictions. Diesel-fueled school bus fleets must

be regularly tested for excessive smoke.⁴ These periodic smoke inspections will be replaced by periodic testing of the school bus’s emission control system beginning in mid-2024.⁵ School buses of any type are restricted from idling at or near public or private schools.⁶ Drivers must turn off engines immediately after arriving at a school and restart no more than 30 seconds before departure.

Additionally, engine emission standards and in-use regulations can help reduce children’s exposure to harmful pollutants. Engine emissions standards play a major role in reducing harmful exposure to particulate matter. Figure E-2 illustrates how emission standards have become more stringent over time.

Figure E- 2: Heavy-Duty Particulate Matter Emission Standard by Engine Model Year



The current PM standard of 0.01 grams per brake horsepower-hour (g/bhp-hr) has been the standard since 2007. This is significantly cleaner than previous standards. For example, prior to the 1991 engine model year, engines were required to meet a standard of 0.60 g/bhp-hr, which is 60 times higher than the current PM standard. Recently adopted standards will reduce emissions from new school buses even further. The Heavy-Duty Omnibus

⁴ Title 13, California Code of Regulations, Section 2180-2819
⁵ Title 13, California Code of Regulations Sections 2195- 2199
⁶ Title 13, California Code of Regulations, Section 2480

Regulation,⁷ which took effect December 22, 2021, phases in even more stringent emission standards with a new PM standard of 0.005 g/bhp-hr starting with 2024 model year engines. This shows why it is most important to turn over the oldest buses as the emission standards of the past are much more polluting than buses meeting the current emission standards.

The presence of PM exhaust filters reduces PM emissions by at least 85%. Nearly all engines that have an engine model year of 2007 or newer come assembled from the manufacturer equipped with a PM exhaust filter. Under the Truck and Bus Regulation,⁸ CARB requires diesel-fueled school buses over 14,000 pounds gross vehicle weight rating to be equipped with a PM exhaust filter (retrofitted or original equipment), or they must operate less than 1,000 miles per year.

Older diesel school buses are more polluting with higher deterioration of the engines and PM filters due to aging, and these buses expose children, a sensitive population group, to more emissions. Turnover of the oldest and dirtiest school buses is essential for reducing exposure to pollutants. Turning over the oldest buses also has the added benefits of supporting California's air quality, climate change, and petroleum reduction goals. Replacing the oldest buses in the state with zero-emission technologies will maximize benefits and progress towards these goals.

Improving Safety Standards - Turnover Means Safer Buses on the Road

Besides reducing PM emissions, another reason to turn over the oldest school buses in the inventory is the improvement of school bus safety standards, including seatbelt safety laws and the child safety alert systems. California law requires school buses manufactured on or after July 1, 2005 with a rated seating capacity of 16 or more passengers to be equipped with three-point seat belts and on all other school buses manufactured on or after July 1, 2004.⁹ It is not required to retrofit old seats with seat belts. Staff found that just over a quarter of the buses in the publicly owned school bus fleet are model year 2003 and earlier and were not subject to current seat belt safety standards. Updated safety features such as seatbelts are a positive outcome of replacing the oldest school buses.

Funding Committed to Date

Together, CARB and the California Energy Commission (CEC) have made significant progress over the last year to make it easier for school districts to access zero-emission school bus and charging/fueling infrastructure incentives in a coordinated, streamlined manner. The State has spent or allocated \$686 million to school bus cleanup since last year's update, bringing the total to date to \$1.9 billion. In addition, the Legislature has indicated its

⁷ Title 13, California Code of Regulations, Section 1956.8

⁸ Title 13, California Code of Regulations, Section 2025

⁹ California Vehicle Code CVC, Section 27316

intent to appropriate another \$1 billion for zero-emission school bus replacement and infrastructure incentives over the next two fiscal years. Figure E-3 illustrates the newly spent or allocated funding reported in each SB 1403 Report and the cumulative amount.

Figure E-3: Senate Bill 1403 Report Spent or Allocated Funding

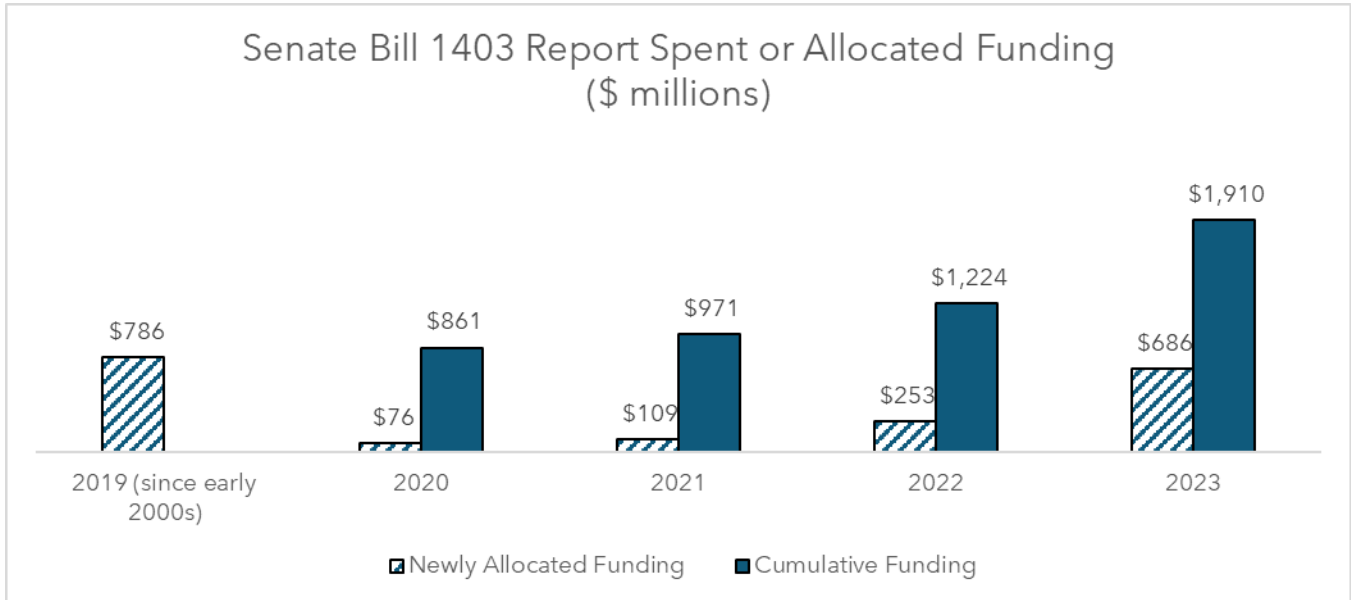


Figure does not include any funding from federal sources such as Diesel Emissions Reduction Act Funding

In the FY 2022-23 State Budget, the Legislature provided \$300 million from the State General Fund for zero-emission school bus and infrastructure incentives and \$1.5 billion in onetime Proposition 98 General Funds to support grants to local educational agencies to replace internal combustion school buses with new zero-emission school buses over five FYs, beginning in FY 2023-24. However, as a result of a downturn in revenues and the Legislature’s prudent fiscal approach to the 2023 budget, the \$1.5 billion appropriation of Proposition 98 funds was reduced to \$500 million. However, the Legislature has signaled its intent to keep the funding of the program whole by appropriating \$375 million to CARB and \$125 million to CEC both in FY 2024-25 and FY 2025-26, which would ultimately still appropriate a total of \$1.5 billion. The 2023 newly allocated funds in Figure E-3 reflects the adjustments made in the FY 2023-24 budget. This allocation of \$686 million to school bus funding reflects historic and necessary investments made in 2023.

Table E-3 breaks down the past and current State school bus funding that has gone to school bus cleanup to support exhaust retrofits, full vehicle replacements, and supporting infrastructure.

Table E-3: Summary of State School Bus Incentive Programs – Through May 2023

Funding Source	Amount Spent/ Allocated	Projects	Zero- Emission School Buses
Clean Truck and Bus Vouchers (HVIP) Public School Bus Set-Aside ^{a, b, c} (CARB and CEC) <i>since 2021</i>	\$300 million	297 school buses and infrastructure in the first round	297
Local Education Agency School Bus Replacement Grants ^{a, b, c} (CARB and CEC) <i>since 2022</i>	\$500 million	Funding to launch in 2024	0
Carl Moyer Program & Carl Moyer State Reserve ^{b, c} <i>since 1998</i>	\$17 million	140 school buses 42 infrastructure projects	16
HVIP ^{b, c} <i>since 2010</i>	\$181 million	1,103 school buses	1,046
Clean Mobility in Schools Pilot Project ^{b, c} <i>since 2018</i>	\$34.6 million	38 school buses & infrastructure	38
Community Air Protection Incentives ^{b, c} <i>since 2017</i>	\$78 million	340 school buses, 35 infrastructure projects	216
Volkswagen Mitigation Trust <i>since 2018</i> ^{b, c}	Up to \$65 million	81 school buses for first installment	81
Assembly Bill 923 <i>since 2008</i> ^{b, c}	\$250.7 million	Retrofits, school buses, natural gas tanks, & infrastructure	NA
Lower-Emission School Bus Program ^a <i>since 2001</i>	\$310 million	7,456 retrofits, 1,642 school buses	0

Funding Source	Amount Spent/ Allocated	Projects	Zero- Emission School Buses
Supplemental Environmental Projects for School Buses ^a <i>since 2012</i>	\$5.1 million	11 retrofits, 20 school buses, 297 recalled filter replacements	0
Clean Transportation Program (CEC) <i>since 2012</i>	\$19.8 million	25 natural gas school buses, 5 natural gas & 228 electric infrastructure projects	0
Rural School Bus Pilot Project ^{a,b} <i>since 2016</i>	\$62 million	194 school buses	124
Sacramento Regional Zero-Emission School Bus Deployment Project <i>since 2017</i>	\$14.5 million (State & match contribution)	28 school buses & infrastructure	28
School Bus Replacement Program (CEC) ^a <i>since 2019</i>	\$72 million	228 battery electric school buses	228
Total**	\$1.9 billion	-	1,949^d

^a Represents funding sources that are dedicated to school bus cleanup

^b Represents funding sources and figures that have been updated since the 2022 SB 1403 State School Bus Incentive Programs Report

^c Represents funding sources that are ongoing, opened funding opportunities in the past 12 months or are expected to have additional funding available in the future

^d About 250 school buses were co-funded by projects listed above, so 125 was subtracted from the total to avoid double-counting them.

Many of the zero-emission school buses represented in Table E-2 are presented in an online [dashboard](#) that shows zero-emission trucks and bus deployments that were funded in full or in part by CARB incentive programs. The CEC also has the [Zero-Emission Vehicle dashboard](#) which displays all CEC funded zero-emission school buses and chargers.

Federal and Local Funding

While not reflected in Table E-3, new federal programs are worth noting because they are oriented to help replace old school buses with cleaner buses with a heavy focus on zero-emission buses.

In the first round of rebate funding offered by the Clean School Bus Program in 2022, the U.S. Environmental Protection Agency (U.S. EPA) awarded a total of \$913 million to school bus replacement projects. Over \$66 million was awarded to 21 California school districts to support the purchase of 172 zero-emission school buses. In April 2023, U.S. EPA opened applications for approximately \$400 million in competitive grant funding, and applications are under review. U.S. EPA expects to open another round of rebate funds in the fall of 2024. The Diesel Emission Reduction Act, a long-standing incentive program administered by U.S. EPA to replace diesel engines with cleaner alternatives, has also provided over \$6 million in federal funding for school bus replacement projects.

Additionally, many of California's air districts offer funding for school bus replacements using local dollars, such as Assembly Bill 923 funds. For example, South Coast Air Quality Management District (AQMD) has funded 117 electric school buses through their Lower Emission School Bus Program using local dollars. The Bay Area AQMD has supported the replacement of over 780 buses with nearly \$63 million in funding from their local Transportation Fund for Clean Air Regional Fund and the Mobile Source Incentive Fund. The Bay Area AQMD projects include replacements of old school buses with new diesel buses, natural gas buses, and electric buses. The statistics above for Bay Area AQMD's funding represent bus projects that only received local funding and do not include buses that were co-funded with State funding sources. The Sacramento Metropolitan AQMD has partnered with the Sacramento Area Council of Governments to administer the Sacramento Emergency Clean Air Transportation Program. The program is expected to support the purchase of 20 zero-emission school buses in the Sacramento Federal Nonattainment Area for a total of \$2 million.

Funding Needs

Public school districts often do not have the funding to replace their aging school bus fleet. Based on a comprehensive assessment of funding for home-to-school transportation conducted by the Legislative Analyst's Office in 2014,¹⁰ school districts primarily receive transportation funding through the State legislative process. Investing in California's school bus fleet is a collective effort amongst agencies on the local, state, and federal level. Incentives will continue to play a critical role to achieving the goal of fully transitioning

¹⁰ Legislative Analyst's Office (2014). Review of School Transportation in California.
<https://lao.ca.gov/reports/2014/education/school-transportation/school-transportation-022514.pdf>

California's school bus fleet to zero-emission by 2045. The federal funding approved in 2022 and recently committed State funding will help the state make significant progress in reducing the emissions of the school bus fleet.

There are approximately 20,000 school buses in the statewide fleet, about 15,500 of which are publicly owned and equipped with internal combustion engines. Of those 15,500 publicly owned school buses, about 500 are slated to be scrapped and replaced by zero-emission buses through recently awarded State grants to local educational agencies. To align the turnover of the remaining combustion school buses with the State mandate that all operations of medium- and heavy-duty vehicles to be zero-emission by 2045, it would take 22 years at a rate of 5% turnover per year, or approximately 680 school buses per year, to replace all the publicly owned internal combustion school buses. To fund the replacement of these school buses it would cost approximately \$270 million annually for zero-emission battery electric technology, and this figure does not include infrastructure costs, total cost of ownership savings, or additional training/support. Additionally, this figure does not take into account any potential increases in the number of school buses operating in the state or account for the cost of repairs or replacements of zero-emission buses once they are deployed. The second year of the HVIP Public School Bus Set-Aside (\$135 million) and the first year of the new local educational agency school bus replacement grants program (\$375 million) are anticipated to support the replacement of more than 1,200 buses with zero-emission school buses. Additionally, staff estimates the \$750 million committed by the Legislature to fund zero-emission buses over the next two fiscal years will support the replacement of old school buses with more than 1,800 zero-emission school buses. In total, this recently appropriated or committed funding will enable replacement of about 20% of the school bus fleet with zero-emission school buses. Additional funding from federal programs and for infrastructure will further advance California's zero-emission school bus fleet. In recent budget cycles CEC has been appropriated \$35 million to support zero-emission school bus infrastructure through the Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles (EnergIIZE) Program, as well as \$125 million to support infrastructure for local educational agency school bus replacement grants with an additional \$125 million expected in FY 2024-25 and FY 2025-26. This funding will support zero-emission school bus charging or fueling infrastructure and related activities including equipment, site design, construction and related infrastructure upgrades. New funding will build on zero-emission deployment successes and provide the next steps on the road to achieving a full transition to zero-emission school buses by 2045.

With tight budgets, limited resources, and competing requests for funding, replacing California's school bus fleet continues to occur enthusiastically, but gradually. Ongoing funding is necessary to continue turning over the school bus fleet.

California's Funding Strategy

There are over 1,000 public school districts in California, each with their own unique school transportation strategies and challenges. Recognizing that a one-size-fits-all approach does

not work for such a diverse set of public school districts, the State maintains a portfolio of funding opportunities to address the unique needs of school districts across the state. While each program within the portfolio of public school bus funding has its own unique guidelines and requirements, every program aims to transition California's school bus fleet to cleaner technologies, and encourages the use of zero-emission school buses wherever possible. The portfolio is designed to ensure that all school districts across the state have access to funding for the cleanest fuel type available that meets their needs, to allow for fleet expansion while encouraging the retirement of older buses, and to provide opportunities for innovative financing mechanisms.

Table E-4 provides a brief comparison of these key elements for many of the main, ongoing school bus funding programs.

Statewide Access to Funds

A primary goal of the State's portfolio of school bus funding is to ensure that each school district within the state has an opportunity to apply for funding to support the replacement of their school bus fleet. Now at 25 years old, the Carl Moyer Memorial Air Quality Standards Program (Moyer) represents the oldest source of incentive funding for school bus replacements within California. Moyer funds are administered by local air districts. As larger air districts receive larger funding allocations since allocations are in part determined by population size, they often have outsized access to other local funding sources as well, whereas school districts located within smaller air districts have historically had fewer funding opportunities. Recognizing this inequity, CARB began the Rural School Bus Pilot Project in 2016 to replace old combustion school buses with newer cleaner options, with a focus on rural school districts. After successful implementation of this program for four years, CARB expanded the program to create the Public School Bus Set-Aside within HVIP (Public School Bus Set-Aside). The Public School Bus Set-Aside adopts many of the same principles of the Rural School Bus Pilot Project such as requiring the scrapping of an old school bus, and it limits the eligibility to only school districts located within small and medium air districts.

The Cleanest Fuel Possible

Reflecting California's clear commitment to transition the transportation sector to zero-emission, many of the State's ongoing incentive programs focus on zero-emission technologies.

While CARB incentives are designed to prioritize zero-emission buses whenever possible, there are tradeoffs to consider when it comes to school bus replacement. Considerations include the lower upfront costs of conventional fueled school buses and immediate short-term emissions benefits versus the long-term emissions benefits of upgrading to zero-emission school buses. Some of the school buses operating in the state are more than 30 years old, so even a diesel-to-diesel replacement represents an immediate reduction of

emissions and PM exposure, and a safety improvement. However, diesel vehicles have a long operational lifespan. Therefore, replacing older school buses with diesel could prolong eventual turnover to zero-emission school buses.

Because school buses can have such a long life, it's important to replace older buses with the cleanest possible new buses. As a result, some programs that require scrappage such as the Carl Moyer Program, allow for replacement with internal combustion vehicles. In Moyer the replacement school bus can be any engine certified to the 2010 emissions standards or cleaner, including zero-emission, hybrids, alternative fuels, and new diesel buses.

Replacing the Aging Fleet

As discussed in the previous sections, there are substantial air quality, climate, and safety benefits to retiring the oldest school buses and replacing them with new models. To maximize these benefits, many of the programs within the State's school bus funding portfolio require scrappage of an old bus, and there are often requirements specifying the minimum age of the bus to be replaced.

Another method to clean up the state's public school bus fleet is to repower or convert the engine and drivetrain of an old combustion bus to zero-emission or other cleaner engine. While staff recognize the benefits of repowers, they are not allowed in all programs since some programs are focused on the replacement of the oldest school buses within the fleet. Generally, upfitters repower school buses that are between 5 and 7 years old. On average, school buses operating in California are approximately 12 years old and it is usually not cost effective or technologically feasible to repower buses that old. Additionally, for the oldest school buses in the state, scrapping and replacing with a new bus improves safety by ensuring that the bus is equipped with modern safety features such as seatbelts.

The State recognizes that a school district may need to expand their fleet and offers incentives to ensure that those school districts receive funds to support a zero-emission bus purchase. For example, HVIP offers funding to cover the incremental cost of purchasing a zero-emission bus compared to a conventional diesel. The incentive offered for fleet expansion projects is generally lower than for incentives that require scrappage.

Prioritizing Overburdened Communities

Many communities across California experience disproportionately high levels of air pollution and the resulting adverse health effects. In order to address these inequities, the State has adopted approaches to ensure that funding programs, including many of the school bus funding programs, prioritize overburdened communities for funding opportunities. Programs like the Clean Mobility in Schools Pilot Project are only open to projects that benefit disadvantaged communities as defined in SB 535 (De León, Chapter

830, Statutes of 2012).¹¹ Other programs such as the HVIP School Bus Set-Aside and Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles (EnergIIZE) School Bus Infrastructure Funding Lane prioritize funding for disadvantaged and low-income communities, and finally, some programs such as HVIP offer higher incentive amounts for school districts with buses domiciled in disadvantaged communities.

Opportunities for Innovative Models

For some school districts, the use of a third-party school transportation provider that owns and operates the school buses provides a cost-effective method of providing transportation services. New third-party school transportation providers with “zero-emission bus-as-a-service” models have entered the market in recent years. These school transportation providers often bring technical expertise and can provide full-service pricing or an all-inclusive lease that incorporates the cost of the bus, infrastructure and energy. Many third-party school transportation providers and bus-as-a-service models are able to take advantage of better pricing through bulk purchases and in some cases are able to install infrastructure that serves multiple school districts at a single charging hub.

While utilizing third-party school transportation providers is a popular choice among some school districts, the majority of public school districts own their own buses. As mentioned previously, of the 20,000 school buses operated in the state, 15,500 are owned by public school districts. Approximately 63% of school districts operate at least 1 school bus. The remaining school districts may partner with local transit authorities or contract with third-party school transportation providers to provide transportation services. Third-party school transportation providers generally operate newer bus fleets. According to staff’s analysis of the State school bus fleet, the average bus in the publicly owned school bus fleet is model year 2010, compared to a model year 2014 for privately owned school buses. Additionally, publicly owned buses make up nearly 93% of the diesel buses that are model year 2007 or older, making them a priority for replacement. To ensure sufficient incentives are available to those public school districts operating the oldest buses in the state, some funding programs are exclusively available to public school districts. While third-party operators are excluded from some funding programs, there is still a significant amount of funding available to third-party school transportation providers. For example, third-party transportation providers serving public school districts may request vouchers of up to \$198,000 per bus from HVIP, which, as of August 2023, had over \$300 million of available funding. Third-party transportation providers have frequently utilized these programs. To date, third-party transportation providers have received over \$19 million to support the replacement or purchase of over 600 buses, including over 100 zero-emission buses.

¹¹ Additional information on the designation of disadvantaged communities is available at <https://calepa.ca.gov/envjustice/ghginvest/>

Updates on Recent and Ongoing Funding Programs

Clean Truck and Bus Voucher Incentive Project (HVIP)

The Clean Truck and Bus Voucher Incentive Project (HVIP), also referred to as HVIP Standard, offers funding to help offset the incremental cost of zero-emission medium- and heavy-duty truck and bus purchases, including school buses. HVIP is designed to be easy to use; HVIP approved dealers complete the application on behalf of the fleet, and fleets are not required to scrap an existing vehicle. HVIP Standard is available statewide on a first-come, first-served basis, and all public school districts and third-party school transportation providers that serve public school districts are eligible for funding.

HVIP Public School Bus Set-Aside and EnerglIZE School Bus Funding Lane

The HVIP Public School Bus Set-Aside and EnerglIZE School Bus Infrastructure Funding Lane are coordinated efforts by CARB and CEC to promote the deployment of zero-emission school buses and complementary infrastructure. The HVIP Public School Bus Set-Aside offers funding intended to cover nearly, if not all, of the cost of new zero-emission school buses for public school districts and other qualifying entities located in small-sized air districts and medium-sized air districts. EnerglIZE provides incentives for zero-emission vehicle infrastructure related costs associated with those school buses.

The programs supported the replacement of just under 300 school buses at 74 school districts and public charter schools in the first year of funding in 2022. The second round of funding opened in June 2023 and the use of a joint application allowed school districts to apply for funds for school buses and infrastructure simultaneously. Awarded applicants are expected to be notified in late October 2023.

Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Moyer) is a voluntary grant program that reduces air pollution from vehicles and equipment by providing incentive funds to private companies and public agencies to purchase cleaner-than-required engines, equipment, and emissions reduction technologies. Moyer is implemented as a partnership between CARB and California's 35 local air districts. By funding emissions reductions that are surplus—earlier and/or beyond what is required by regulation—Moyer complements California's regulations. Moyer provides funding for eligible school bus replacement, repower, and conversion projects. Replacement engines certified to the 2010 emissions standards or cleaner are eligible. Local air districts administer the program and may prioritize funds based on local community needs.

Community Air Protection Incentives

Community Air Protection incentives projects support the Community Air Protection Program. Local air districts select projects to reduce emissions exposure in overburdened

communities and communities selected to participate in the program, according to guidance from members of those communities. School bus replacements, infrastructure, and other clean mobility projects for schools are eligible project categories, among many others, and community groups have consistently voiced priority for school bus projects when describing community needs.

Clean Mobility in Schools

Clean Mobility in Schools funds clean transportation and mobility strategies, including zero-emission vehicles and zero-emission vehicle supply equipment in schools (K-12); car sharing for staff at schools to use zero-emission vehicles; curriculum development; workforce training; and outreach to students, parents, and the community. Building off lessons learned from previous pilot projects and to further CARB's equity initiatives, Clean Mobility in Schools opened a new solicitation for projects in summer 2023.

U.S. EPA Clean School Bus Program

The [*Clean School Bus Program*](#) provides \$5 billion in funding over 5 years from 2022 to 2026 for the replacement of existing school buses with low- and zero-emission school buses. Clean school buses include those that reduce emissions and operate entirely or in part using alternative fuels. U.S. EPA may cover up to 100% of the vehicle cost and infrastructure through grants, rebates, or contracts. The Clean School Bus Program allows U.S. EPA to prioritize applications that will replace buses serving high-need local education agencies, tribal schools, and rural or low-income areas.

Volkswagen Environmental Mitigation Trust

The Volkswagen Environmental Mitigation Trust was established through a settlement to mitigate the excess oxides of nitrogen emissions caused by Volkswagen's illegal actions. California's plan designated up to \$65 million for zero-emission school bus replacements, which is administered by the San Joaquin Valley Air Pollution Control District. The second installment of funding opened in fall 2022 with up to \$32.5 million available for zero-emission school bus replacements. The program was oversubscribed, with approximately \$215 million requested by school districts to replace over 530 school buses.

Local Education Agency School Bus Replacement Grants (AB 181 and SB 114)

The 2022 State Budget appropriated \$1.5 billion to CARB and CEC to support school bus replacement grants for local educational agencies through Assembly Bill (AB) 181 (Committee on Education, Chapter 52, Statutes of 2022). Senate Bill (SB) 114 (Committee on Budget and Fiscal Review, Chapter 48, Statutes of 2023) revised the 2022 State budget to shift the timeline for appropriation of the \$1.5 billion to span 3 fiscal years with an initial

appropriation of \$500 million in fiscal year 2023-24.¹² The funds support grants to local educational agencies to replace internal combustion school buses with new zero-emission buses along with supporting infrastructure. Additionally, per Legislative direction, grants may also provide funding for cleaner combustion technologies in cases where the school district can demonstrate that zero-emission buses are not feasible for the unique routes and operational needs of their district. The first round of funding is anticipated to open by summer 2024.

In preparation for the opening of funds and to secure competitive pricing for zero-emission school buses, CARB and CEC have worked with the California Department of General Services to develop a statewide procurement contract for zero-emission school buses. The Department of General Services opened a request for proposals soliciting proposals from dealers and manufacturers to establish the statewide procurement contract in May 2023.¹³

¹² Only the initial \$500 million in FY 2023-24 is guaranteed, though the Legislature has expressed its intent to ultimately appropriate \$1.5 billion by appropriating \$375 million to CARB and \$125 million to CEC in both FY 2024-25 and in FY 2025-26.

¹³ CaleProcure, Event 0000026881, Zero-Emission School Buses https://caleprocure.ca.gov/pages/Events-BS3/event-details.aspx?Page=AUC_RESP_INQ_DTL&Action=U&AUC_ID=0000026881&AUC_ROUND=1&BIDDER_ID=BID0000001&BIDDER_LOC=1&BIDDER_SETID=STATE&BIDDER_TYPE=B&BUSINESS_UNIT=77601

Table E-4: Comparison of On-Going Public School Bus Incentive Funding Programs*

Program Requirement	HVIP Standard	Public School Bus Set-Aside & Energize School Bus Lane	Moyer & Community Air Protection incentives**	Clean Mobility in Schools	U.S. EPA Clean School Bus Program
Zero-emission school bus incentive amount range	\$99k-\$198k	\$285k-\$395k	Up to \$400k	Up to the full cost of the bus	\$145k-\$345k
Eligible fuel types	ZE	ZE	ZE, Hybrids, Alt. Fuels, Diesel	ZE	ZE, CNG, Propane
Requires scrappage of an existing bus		√	√		√
Gross vehicle weight rating requirement for bus to be scrapped		≥14,001 lbs	≥14,001 lbs		≥10,001 lbs
Model year/age requirement for bus to be scrapped		2010 or older	Any		2010 or older for CNG and Propane, Any for ZE
Repowers of old buses are eligible	√		√		√
Program includes or can include infrastructure funding		√	√	√	√
3 rd party transportation providers that contract with public schools are eligible	√		√		√
Funding can support driver and mechanic training				√	√
Funding available for other medium- and heavy-duty vehicles (white fleet)	√		√	√	

Acronym Key: Zero-Emission (ZE), Compressed Natural Gas (CNG), Alternative (Alt.)

*Comparison of program requirements as of October 2023. Individual program requirements are subject to change. Refer to the program website for the current version of requirements.

**Requirements depicted align with the Moyer and AB 617 Incentive Guidelines developed by CARB. Local Air Districts implementing the program may implement additional requirements or focus funding toward other community priorities.

Zero-Emission by 2045

Recognizing the need to take decisive action to combat the threat of climate change, California has set multiple aggressive mandates to reduce air pollutants to protect public health. These include a 40% reduction in greenhouse gases by 2030 and an 80% reduction in greenhouse gases by 2050. The AB 32 Climate Change Scoping Plan also reflects California's goal to achieve carbon neutrality by 2045. Governor Newsom's Executive Order N-79-20 states that all operations of medium- and heavy-duty vehicles shall be zero-emission by 2045 where feasible, with all drayage trucks zero-emission by 2035.¹⁴ In addition, the Advanced Clean Fleets Regulation, approved on April 28, 2023, requires all new medium- and heavy-duty vehicles sold in California be zero-emission beginning with the 2036 model year.¹⁵ Replacing existing school buses with zero-emission school buses will further support the transition of the California fleet overall and move the State closer to its goals.

Zero-Emission School Bus Deployments in California

Zero-emission school buses are available and being deployed throughout California and the country. Battery electric school buses are the only zero-emission school bus technology commercially available today. Approximately 230 school districts and public charter schools in California have ordered or deployed at least 1 battery electric school bus. Over 600 battery electric school buses are operating in the state.¹⁶

Battery electric school buses can drive between 100-155 miles per trip when fully charged, which is enough for most school bus routes. Increased battery storage capacity continues to expand and develop. At least 1 battery electric school bus is available in all the same types and classes as conventional school buses. These can be viewed in the [Zero-Emission Technology Inventory \(ZETI\)](#) tool, an interactive online resource developed by CALSTART that shows all commercially available offerings of zero-emission medium- and heavy-duty vehicles. According to ZETI, there were 11 manufacturers with 17 available school bus models as of May 2023.¹⁷

¹⁴ Executive Order N-79-20: <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>

¹⁵ California Air Resources Board (2023). Advanced Clean Fleets. <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>

¹⁶ California Zero-Emission Vehicle Population Dashboard (2023). <https://californiahvip.org/cazevdashboard> and "CEC School Bus Delivery Tracker" (2023). <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/cec-funded-school>

¹⁷ CALSTART (2022). Drive to Zero's Zero-Emission Technology Inventory Data Explorer. Version 1.0. Available online at: <https://globaldrivetozero.org/zeti-data-explorer/>

Zero-Emission School Bus Infrastructure

Successful and cost-efficient charging/fueling infrastructure results from extensive pre-planning, starting with determining both immediate and future infrastructure needs. It is also important to align with the servicing utility and to involve the utility early in the process. There is no standard approach to infrastructure as each school district and site are unique. Due to lack of funding, school districts often do not have resources to future-proof their charging/fueling infrastructure for future expansion. CALSTART has developed the [School Bus Fleet Infrastructure Planning Tool](#), which provides important considerations for school districts planning to install infrastructure, a systematic installation timeline, and an infrastructure-planning checklist. Additionally, the World Resources Institute maintains an [Electric School Bus Toolkit](#) with resources including a [Step-By-Step Guide for School Bus Electrification](#), and an "All About Series" on a number of school bus electrification topics, including charging infrastructure and working with electric utilities.

In its role as the State's primary energy policy and planning agency, CEC is leading efforts to ensure that school districts have the infrastructure needed to support their zero-emission school bus fleets and that California's power grid is reliable and resilient. In April 2021, CEC approved the EnergIIZE Project to accelerate the deployment of infrastructure needed to fuel zero-emission trucks, buses, and equipment and the project opened its first round of funding in April 2022. The EnergIIZE team has held meetings with stakeholders to better understand the best ways to incentivize the installation of infrastructure, and facilitated webinars to provide information about installation of zero-emission fueling infrastructure and funding opportunities. EnergIIZE offers funding through four primary lanes: 1) the Electric Vehicle (EV) Fast Track Lane for fleets with battery electric vehicles already on order or delivered; 2) the EV Jump Start Funding Lane for fleets who are located in disadvantaged and low income communities, or are small businesses; 3) the EV Public Charging Station Funding Lane for fleets or station owners interested in deploying publicly accessible charging infrastructure; and 4) the Hydrogen Funding Lane for fleets and station owners seeking to deploy hydrogen refueling infrastructure. Through May 2023, between the EV Fast Track Lane and EV Jump Start Lane, EnergIIZE has offered \$1.9 million in preliminary awards for school district infrastructure projects.

Additionally, funding from the FY 2021-22 budget was allocated to CEC and CARB to fund additional electric school buses and associated charging/fueling infrastructure. In total, \$30 million is available for electric school bus infrastructure through this funding lane and applications are being processed as they are received. These funds are administered through a dedicated funding lane for public school buses infrastructure in EnergIIZE and is closely coordinated with the HVIP Public School Bus Set Aside.

In November 2020, the CEC released GFO-20-601 entitled *Blueprints for Medium- and Heavy-Duty Zero-Emission Vehicle Infrastructure* to accelerate the deployment of medium- and heavy-duty zero-emission vehicles and infrastructure with a holistic and futuristic view of transportation planning. From this solicitation, 2 projects were completed that focused on

electrifying the school bus fleet for Twin Rivers Unified School District (Twin Rivers USD) and Berkeley Unified School District (Berkeley USD). Results from the blueprint analysis show that school districts have inherent challenges when it comes to logistical/technical issues, site constraints, workforce development, and human/financial capacity. While Berkeley USD decided to hold off on electric fleet conversion due to site and capacity constraints, Twin Rivers USD leaned into these challenges with strong leadership alignment and supportive stakeholders, helping them gain the confidence and fundraising needed to successfully deploy 47 electric school buses. With the help from this blueprint and other funding opportunities, Twin Rivers USD plans to secure 75 more electric school buses over a 10-year period.

The Clean Energy and Pollution Reduction Act requires the California Public Utilities Commission to direct the investor-owned electric utilities to invest in infrastructure for transportation electrification. The California Public Utilities Commission has approved projects that support infrastructure development for school buses. *Southern California Edison*, *Pacific Gas and Electric*, and *San Diego Gas and Electric* have no-cost, make-ready infrastructure programs. Many of California's publicly-owned utilities (such as Sacramento Municipal Utility District, Los Angeles Department of Water and Power and other municipal utilities) also have programs to provide low- or no-cost infrastructure and favorable EV rates. Others can provide infrastructure and support services on an ad hoc basis.

Vehicle to Grid

Battery electric school buses that have vehicle to grid (V2G) capability can improve community resilience, by providing on-site back-up energy. V2G capability is the bidirectional flow of energy between an EV and the grid. Batteries on board vehicles can boost grid reliability by returning electricity to the grid during times of high energy demand. Battery electric school buses have been determined to be a good application for V2G because of their large batteries, predictable duty-cycles, and long down times throughout the day when energy demand is greatest. This capability allows the battery electric school bus to export power stored in its battery packs to any islanded load and to the grid if an interconnection agreement is in place with the local utility. One benefit is on-site resiliency in the case of an emergency power shut-off by the utility or during a catastrophic event. Schools may also recognize some financial benefits through either on-site power offset using vehicle-to-building (V2B) or participating in the energy market using V2G and selling electricity back to the grid. This has the potential to accelerate zero-emission adoption by adding an additional revenue stream to lower the total cost of ownership.

Multiple pilot projects studying both V2B and V2G are underway in California and throughout the country. CEC's Electric Program Investment Charge (EPIC) program has invested in technology demonstrations focused on advancing and validating the performance of bidirectional charging technologies with battery electric school buses. For example, in June 2023, eIQ Mobility broke ground on a demonstration project in Richmond, CA, in which they will develop and demonstrate managed and bidirectional

charging software on a fleet of 20 battery electric school buses to explore different use cases including providing resilient back-up power and minimizing charging costs.

In April 2023, the CEC also released GFO-22-612 Electric School Bus Bi-Directional Infrastructure solicitation, which announced the availability of \$15 million in grant funds for projects that will install bi-directional direct current fast charging stations at key building sites throughout California that support school districts. The initial phase is intended to assist school districts by developing charging infrastructure blueprints to plan for the installation of V2G infrastructure. Applicants are eligible for up to \$3,000,000 for projects, and a notice of proposed awards is anticipated by September 2023. Additionally, San Diego Gas & Electric recently partnered with Cajon Valley Union School District to conduct a V2G pilot program with 5 battery electric school buses. The buses will discharge excess energy to the grid during peak demand hours with the goal of reducing grid impacts and demand costs for the school district.¹⁸ Although V2G adds additional upfront cost to the price of the vehicle and infrastructure, it has the potential to be an attractive option to help school districts build a stronger business case for zero-emission battery electric school bus adoption while supporting grid resiliency and security. In 2018, CEC required awarded battery electric school buses to have V2G capabilities in their School Bus Replacement Program. This was required to assist in standardizing vehicle charging as well as providing added resiliency and emergency capabilities for school bus recipients. Following CEC's lead, CARB also began to phase in V2G requirements for school buses in HVIP starting with the Public School Bus Set-Aside. In 2024 the V2G requirement will be expanded to encompass all school buses funded by HVIP.

Low Carbon Fuel Standard Credits

The Low Carbon Fuel Standard (LCFS) credits can also reduce operational costs for both public and privately owned electric fleets. The LCFS regulation is designed to reduce the carbon intensity (CI) associated with the lifecycle of transportation fuels in California and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits. For example, a fleet operating a battery-electric or hydrogen fueled school bus may generate credits for the quantity of electricity charged or hydrogen consumed on the buses. For battery-electric buses, additional credits are generated by charging with renewable or low-CI electricity.

The number of credits generated is tied to total fuel consumption; therefore, the more the vehicles or school buses operate on low carbon fuels, the greater the credit generation and cost savings potential. The average credit price for the last 12 months is about \$89 per

¹⁸ San Diego Gas and Electric (2021). "Vehicle-to-Grid Pilot: Leveraging Big Batteries on Electric School Buses to Support the Grid". <https://www.sdgenews.com/article/vehicle-grid-pilot-leveraging-big-batteries-electric-school-buses-support-grid>

credit.¹⁹ LCFS credit value depends on a few variables, including the LCFS credit price, the annual CI target, the CI of the fuel dispensed, and the vehicle type. For 2023, LCFS credit revenue may be worth approximately 12 cents/kilowatt hour (kW-h) when charging school buses with California average grid electricity²⁰ and 14 cents/kW-h with zero-CI electricity, assuming a credit price of \$89. LCFS staff has developed a *credit value calculator*²¹ that is available on the *LCFS dashboard*²² which can help estimate the LCFS value for different fuels. The fleet has the option to sell the credits directly to LCFS regulated parties or opt-in entities, or sell them using a broker. Additional regulatory flexibility took effect in 2019 to allow fleets to delegate fuel transaction reporting, credit generation, and trading of credits to a third-party aggregator. While the credits cannot be used to generate revenue, the fleet can use the money toward electric vehicle purchases, infrastructure, operating costs, or associated LCFS program administration costs.²³

While some fuels generate credits in the LCFS program and are optional for reporting, others (typically fossil fuels) generate “deficits” in the program and may need to be reported to CARB. The reporting requirements are based on the date of school bus purchase, station owner through which fuel is dispensed for transportation use, and the fuel type used, such as propane or CNG by school bus fleets.

As of January 1, 2021, the school districts that operate fossil propane school buses purchased after January 1, 2020, or other propane-operated vehicles, are required to report fuel transaction quantities to LCFS and purchase credits to balance the deficits they incur from use of these fuels. The school districts operating CNG buses purchased after January 1, 2020, are also subject to reporting requirements under the regulation. However, buses purchased prior to January 1, 2020, are exempt from reporting requirements under the regulation, for both propane and CNG. In addition, CNG fueling stations dispensing less than 150,000 gasoline gallons equivalent of fossil CNG per year are exempt through December 31, 2023. A LCFS Frequently Asked Questions document titled *Reporting*

¹⁹ California Air Resources Board (2023). LCFS Credit Transfer Activity Reports.

<https://ww2.arb.ca.gov/resources/documents/lcfs-credit-transfer-activity-reports>

²⁰ California Air Resources Board (2022). “2023 Carbon Intensity Values for California Average Grid Electricity Used as a Transportation Fuel in California and Electricity Supplied Under the Smart Charging or Smart Electrolysis Provision.” Page 2.

https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/2023_elec_update.pdf

²¹ California Air Resources Board (2019). Credit Value Calculator

<http://ww3.arb.ca.gov/fuels/lcfs/dashboard/creditvaluecalculator.xlsx>

²² California Air Resources Board (2023). LCFS dashboard: <https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard>

²³ California Air Resources Board (2021). Guidance 20-03: Electricity Credit Proceeds Spending Requirements, for more details on eligible uses for electricity credit proceeds

https://ww3.arb.ca.gov/fuels/lcfs/guidance/lcfsguidance_20-03_ADA.pdf

*Requirements for School Buses*²⁴ describes these requirements in detail, as well as opportunities for credit generation for using low-carbon fuels to power school buses.

Lastly, unlike the requirement for propane and natural gas, school districts are not required to report consumption of gasoline or diesel, as liquid fuel reporting is conducted by the producer or importer of the fuel, rather than the owner of the dispensing equipment.

Workforce Training

Workforce training is critical to successfully incorporate zero-emission school buses into fleets, support a positive user experience, and prepare school fleet technicians and bus operators for transportation electrification. The need to expand training commensurate with bus deployments is growing and will continue to grow. As advanced technologies for buses and infrastructure come to market, there is a learning curve, skills development, and operational adjustments the school district must make to maximize the benefits of these technologies. There are differences in zero-emission school bus maintenance and operations when compared to conventional-fueled school buses. For example, battery electric school buses have fewer moving parts, do not have an exhaust system, or require oil changes, and their braking systems last longer.

In addition, contractors must be certified to complete certain State funded infrastructure installations. AB 841 (Ting, Chapter 372, Statutes 2020) added Section 740.20 to the Public Utilities Code, which requires electrical infrastructure contractors installing electric vehicle charging infrastructure and equipment on the customer side of the electrical meter to hold an Electric Vehicle Infrastructure Training Program certification if the project is funded or authorized by CARB, CEC, or the California Public Utilities Commission. The certification includes training on site assessment, load calculations, National Electric Code, jobsite safety, personal protection equipment, and other installation and maintenance best practices. Training and certification requirements such as this will be especially important as more school districts incorporate zero-emission school buses.

The unique traits of zero-emission vehicles and certification requirements associated with certain funding programs create a clear need to continue to support the community colleges, universities, vocational programs at high schools, and zero-emission school bus manufacturer training programs that develop training curriculum and train technicians on the maintenance and operation of advanced technology vehicles and equipment. Specific curricula and training should include safety practices, high voltage awareness and handling, infrastructure charging/refueling, diagnostics, communication protocols, and bus operation/driving.

²⁴ California Air Resources Board (2021). Frequently Asked Questions: Reporting Requirements for School Buses. <https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/guidance/schoolbus exemptions.pdf>

Currently, there are several resources and training options available for mechanics, school bus drivers, and fleet managers. All major zero-emission vehicle manufacturers provide some level of fleet technician and driver training to new zero-emission school bus owners. Training is offered to support customers throughout the purchase and initial deployment of zero-emission school buses as well as training programs for both technicians and drivers. Trainings are offered both on-site at school district locations and via online training platforms. The recently released request for proposals for the statewide procurement contract for zero-emission school buses included training requirements to ensure that manufacturers and dealers provide adequate training to local educational agencies that purchase zero-emission buses through the contract. Additionally, the California Department of Education has also developed a supplemental module to their Behind-The-Wheel curriculum that state-certified instructional personnel may use in the training of bus drivers on battery electric school bus operations. The World Resources Institute also offers free one-on-one technical support and peer learning sessions for school districts in all stages of procuring and deploying zero-emission school buses.²⁵

State agencies and stakeholders recognize the need for significant support and workforce training for successful zero-emission school bus deployment. CARB and CEC, in collaboration, developed a new, innovative project to provide funding for zero-emission vehicle workforce training and development in the state's most overburdened communities. The project is called the Inclusive, Diverse, Equitable, Accessible, and Local Zero-Emission Vehicle Workforce Pilot (*IDEAL ZEV Workforce Pilot*). On February 22, 2022, the *notice of proposed awards* was released and a total of 14 proposals were awarded, requesting nearly \$6.6 million in funds. IDEAL ZEV Workforce Pilot complements CARB's Clean Transportation Program Investments, such as the Clean Mobility in Schools Pilot, by providing funding for educational curriculum for students and promoting workforce training and career development partnerships.

Sunline Transit Agency was one of the IDEAL ZEV Workforce Pilot awardees. Sunline is planning on incorporating the school bus fleet types into its safety, maintenance, and operations courses. These courses focus on the deployment and maintenance of zero-emission fleets. The funding from HVIP and the IDEAL ZEV Workforce Pilot will assist with the development of the course materials, transporting vehicles, and developing the Subject Matter Experts to deliver the training. Sunline hosted the first of 12 planned workshops in April 2023. Held over a 4-day period, the workshop included 6 courses, including hands-on training using zero-emission buses. Future course offerings will be posted on the West Coast Center of Excellence in Zero-Emissions and Alternative Fuels section of Sunline's *website*. The program will be integral to developing a blueprint for zero-emission training for school districts in California.

²⁵ World Resources Institute (2023). "Talk to an Expert". <https://electricschoolbusinitiative.org/talk-expert>

In 2019, CEC approved a contract for \$1 million with Cerritos College to develop and deliver the “Electric School Bus Training Project.”²⁶ The project developed curriculum and training modules with bus manufacturers, industry, and college automotive faculty that provides training and skills development needed to operate and maintain the battery electric school buses funded through CEC’s School Bus Replacement Program. Training is available for both school district maintenance technicians and school bus operators. Course subjects include high-voltage safety, proper operation, and maintenance of battery electric school buses and charging. Through the initial contract training, Cerritos College provided training to over 70 school bus technicians. In 2023, the CEC approved an additional \$1 million augmentation to the contract with Cerritos College to expand in order to offer the training to all public schools that receive public funding for zero-emission school buses. The CEC and Cerritos College will offer annual informational webinars and conduct training in different areas of the state.

Conclusion

The State continues to make significant progress in cleaning up California’s school bus fleet. Since last year’s update, the State has allocated \$686 million, bringing the total to date to \$1.9 billion. This funding has supported the purchase of over 1,900 zero-emission school buses across over 230 public school districts and charter schools, and of these approximately 600 are already on the road.

²⁶ Advanced Transportation and Logistics (2023). “The Electric School Bus Training Project”.
<https://atleducation.org/cec/the-electric-school-bus-training-project/>