2025 Senate Bill 1403 School Bus Incentive Program Report

Fiscal Year 2025-2026

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Introduction

California has made notable progress in deploying zero-emission school buses to advance the State's air quality and climate goals, yet thousands of children still ride older internal combustion school buses that emit harmful particulate matter and pose significant health risks. To address this, the California Air Resources Board's (CARB) strategy prioritizes replacing the oldest, highest-emitting school buses first and funding zero-emission school buses whenever possible to maximize health and climate benefits. However, sustaining this progress depends on continued financial support. Ongoing funding from state legislation, along with local, federal, and air district programs, remains essential to ensure school districts can continue accessing the cleanest school buses available.

Assembly Bill (AB) 1279[1] sets science-based targets for achieving carbon neutrality as soon as possible and additional future carbon reductions. CARB's 2022 Scoping Plan Update[2] lays out a comprehensive path to achieve the targets set in AB 1279 and acknowledges that advancing the transportation sector to zero-emission is pivotal to doing so. Governor Newsom's Executive Order N-79-20[3] further underscored the urgent need to address emissions from the transportation sector by directing heavy-duty vehicles to become zero-emission, and his subsequent Executive Order N-27-25[4] reaffirms California's commitment to accelerate deployment of zero-emission technologies. This commitment is further supported by AB 579, which strengthens the State's long-term focus on advancing zero-emission school buses.[5]

California continues to lead the nation in zero-emission school bus funding and deployments, building on decades of investment through a range of incentive programs designed to replace aging school buses with cleaner models. This long-standing commitment has driven steady progress in modernizing the State's school bus fleet. Agencies including CARB, the California Energy Commission (CEC), local air districts, utilities, manufacturers, school districts, and communities continue to collaborate on

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[1] AB 1279 (Muratsuchi, Chapter 337, Statutes of 2022): https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB1279

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

[3] Executive Order N-79-20: https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf

[4] Executive Order N-27-25: https://www.gov.ca.gov/wp-content/uploads/2025/06/CRA-Response-EO-N-27-25_-bl-formatted-GGN-Signed-6-11-954pmFinal.pdf

[5] AB 579 (Ting, Chapter 445, Statutes of 2023): https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240AB579

expanding zero-emission and other clean school bus deployments. Senate Bill (SB) 1403 (Lara, Chapter 370, Statutes of 2018) directs CARB, in consultation with the CEC, to publish an annual report on California's progress, funding needs, and strategy for school bus programs. As part of the broader Heavy-Duty Investment Strategy, this report provides an overview of California's school bus fleet, summarizes funding to date and unmet needs, and outlines the pathway to achieving a fully zero-emission school bus fleet 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 to project the funding needs for cleanup. According to a comprehensive assessment by the Legislative Analyst's Office in 2014[6], State and federal incentives remain the primary mechanism by which school districts obtain funding to replace aging school district vehicles. This methodology provides a clear understanding of the State's school bus fleet and establishes a foundation for measuring progress in replacing aging school buses with new zero-emission or other cleaner options.

Staff compiled data from multiple sources to develop this update, as no single dataset provides a complete picture of the school bus population in the State. These sources include the California Highway Patrol (CHP) School Bus Inspection Program, the Department of Motor Vehicles registration database, and various State funding programs that have replaced or plan to replace school buses. Staff completed the most recent and comprehensive inventory this year, using 2024 CHP inspection data as the primary source. CHP requires inspections at least every 13 months for a school bus to legally transport students[7], making this dataset the most reliable baseline.

Despite these efforts, the figures may not reflect every school bus currently in operation. Fleet data may change over time as vehicles enter and leave the fleet. Continued analysis and a flexible approach remain essential to maintaining an accurate, up-to-date understanding of the statewide school bus fleet.

2025 School Bus Inventory

In this update, staff identified approximately 22,300 public and private school buses in California. The number of publicly operated school buses remains about 15,500, consistent with totals reported in previous updates.

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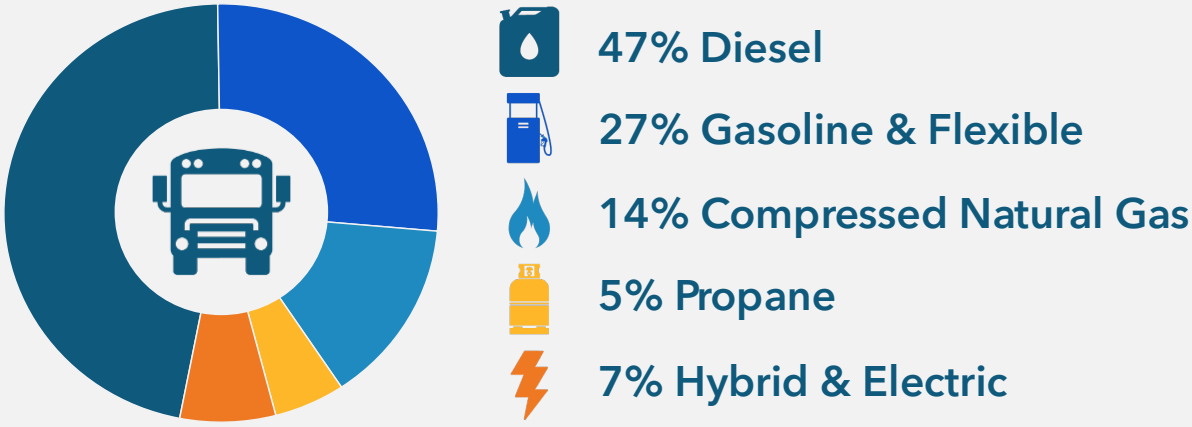
[6]Legislative Analyst's Office (2014). Review of School Transportation in California. https://lao.ca.gov/reports/2014/education/school-transportation/school-transportation-022514.pdf

[7] California Vehicle Code, Section 2807

Fuel Type

Understanding the fuel type of the school bus fleet is critical to determine which school buses are in greatest need of replacement, as diesel PM is a toxic air contaminant. Figure E-1 depicts the California School Bus Population by fuel type.

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



Approximately 22,300 School Buses

Approximately 47% of the combined public and private school bus fleet is diesel-fueled, which is a decrease from 55% in 2023. The rest of the fleet is made up of gasoline and flexible fuel, which accounts for 27%, compressed natural gas (CNG) at 14%, propane at 5%, and hybrid and battery electric at about 7%. Since 2023, hybrid and battery electric buses have more than doubled their share of the inventory, increasing from 3% to approximately 7% of the overall fleet.

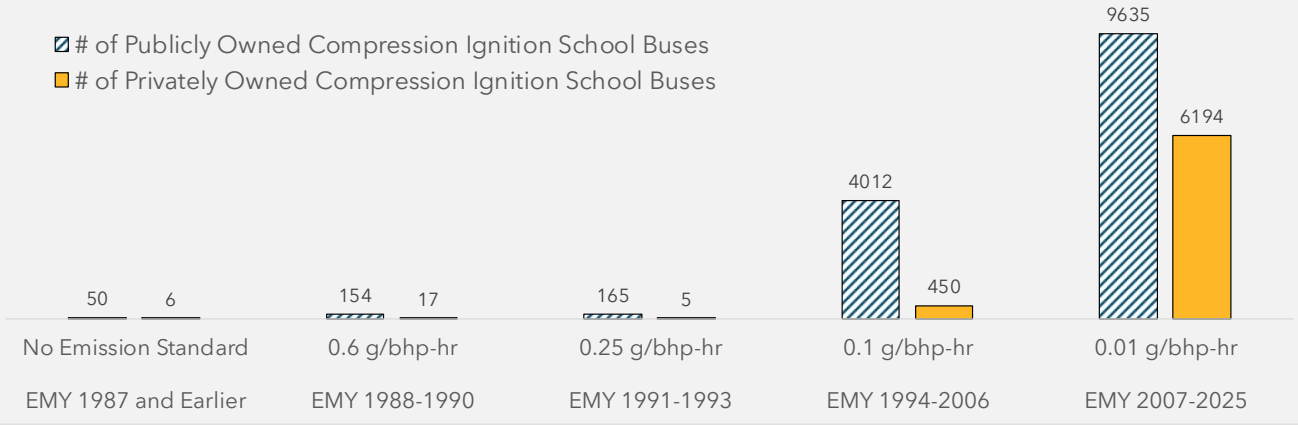
Age of Fleet

22% of publicly owned school buses are more than 18 years old

While California has made steady progress in replacing the oldest school buses operating in the State, many school buses in California are quickly approaching, or have exceeded the industry standard turnover age. Typically, school buses are expected to have a lifespan of 12 to 15 years. In California, the average publicly owned school bus is 13 years old (model year 2012), and many are significantly older. More importantly, a large portion of the fleet does not meet the State's cleanest emission standards. Of approximately 15,500 publicly owned school buses, about 3,400, or roughly 22%, fall short of State's cleanest emission standards.

Figure E-2 shows the age and emissions distribution of the internal combustion school bus fleet as determined through the 2025 school bus inventory.

Figure E-2: Comparison of Publicly and Privately Owned School Buses with Compression Ignition Engines
Grouped by California Particulate Matter Emission Standard for Heavy-Duty Compression Ignition Engine



Acronym Key: grams per brake horsepower hour (g/bhp-hr), engine model year (EMY). 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.

Replacing the oldest diesel school buses is a top priority for the State because they produce more pollution and have fewer safety features than newer models. The following section provides further detail on the rationale for focusing on these school buses.

The Need for Replacement

Diesel-fueled school buses have long been a priority for CARB because diesel PM is a toxic air contaminant, and children are especially vulnerable to its health impacts. Findings from the Children's Health Study show that chronic exposure to these pollutants can slow lung development, increase the risk of asthma and bronchitis, and contribute to more school absences due to respiratory illness. While toxic air contaminants may cause health effects at any level, high concentrations of PM can have immediate impacts, and prolonged exposure can lead to lasting health consequences later in life.[8]

Emission standards adopted at both the State and federal levels have played an important role in reducing children's exposure to harmful pollutants such as particulate matter (PM) and oxides of nitrogen (NOx). AB 579 requires that, beginning in 2035, all newly purchased or contracted school buses be zero-emission where feasible, with limited extensions for

[8]California Air Resources Board (2004). "The Children's Health Study Final Report". https://ww2.arb.ca.gov/resources/documents/childrens-health-study

certain terrain or route challenges. However, these standards and purchase requirements apply only to new buses and do not mandate upgrades to existing fleets, which means they do not directly address pollution from the thousands of vehicles that remain in service for decades in California. To reduce emissions from vehicles already on the road, in-use regulations require fleets to take additional measures targeting school buses and equipment currently in operation.

California has implemented several in-use regulations that apply to school buses and school districts. Idling restrictions limit school bus idling at or near schools to essential safety or operational needs only[9]. The Truck and Bus Regulation mandates high-level PM filters on diesel-fueled school buses over 14,000 pounds and prohibits the operation of buses manufactured before 1977[10]. The Clean Truck Check program requires most heavy-duty school buses over 14,000 pounds to undergo periodic emissions testing and make any needed repairs[11]. Together, these regulations work to improve air quality, reduce harmful emissions, and support the deployment of cleaner school transportation across the state.

Older diesel school buses are more polluting. With higher deterioration of the engines and PM filters due to aging, these school buses expose children, a sensitive population group, to more emissions. The turnover of the oldest and dirtiest school buses is essential for reducing exposure to pollutants.

Improving Safety Standards

In addition to reducing emissions, replacing the oldest school buses also addresses updated safety standards, including seat belt laws and child safety alert system requirements. California law requires three-point seat belts on Type 1 school buses (more than 16 passengers) manufactured on or after July 1, 2005, and on Type 2 school buses (fewer than 16 passengers) manufactured on or after July 1, 2004. While older school buses were not originally required to be retrofitted, AB 1798 (Chu, Chapter 206, Statutes of 2018) mandates that all school buses transporting students must be equipped with seat belts by July 1, 2035. Retrofitting must be done at the school district's expense, creating an added financial burden to keep operating older vehicles. Today, many of the school buses still on the road do not have seat belts, and just over a fifth of the publicly owned fleet are model year 2003 or older, meaning they likely need either replacement or retrofitting to comply with the law.

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[9] School Bus Idling and Idling at Schools:https://ww2.arb.ca.gov/resources/documents/school-bus-idling-and-idling-schools

[10] CARB Truck and Bus Regulation: https://ww2.arb.ca.gov/our-work/programs/truck-bus-regulation/truck-and-bus-regulation-regulation-advisories

[11] SB-210 Heavy-Duty Vehicle Inspection and Maintenance Program https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB210

Prioritizing Overburdened Communities

63% of recent and ongoing zero-emission school bus projects serve or are in 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. For example, only projects that benefited disadvantaged communities as defined in SB 535 (De León, Chapter 830, Statutes of 2012) were eligible for Clean Mobility in Schools.[12] Other programs, such as the Zero--Emission School Bus and Infrastructure Project (ZESBI), prioritized funding for disadvantaged and low-income communities. Of the ongoing and in-progress incentive programs, roughly 63% of zero-emission public school bus projects have supported projects located in or directly serving overburdened communities.[13]

Community Air Protection Program Communities

To further target priority populations, the Community Air Protection Program (CAP Program) was created by the passage of AB 617[14]. AB 617 established one of the most important mechanisms for CARB and local air districts to reduce air pollution and limit exposure in the communities most affected by it. Under this law, CARB and air districts are required to collaborate closely with community members, local governments, environmental justice groups, community-based organizations, regulated industries, and other key stakeholders to design and carry out Community Emission Reduction Programs (CERP) tailored to each community in the CAP Program.

Of the 19 selected CAP Program Communities in the program, San Bernardino/Muscoy and the Eastern Coachella Valley have some notable school bus replacement components in their CERPs. San Bernardino/Muscoy was selected for the CAP Program due to its extreme concentration of warehouses, rail yards, and truck routes, which generate high levels of diesel emissions and contribute to elevated asthma rates in nearby low-income neighborhoods. In 2019, the community released its CERP, identifying the replacement of

[12] Additional information on the designation of disadvantaged communities is available at *https://calepa.ca.gov/envjustice/ghginvest/*

[13] Statistic includes zero-emission buses funded by HVIP Standard, HVIP Public School Bus Set-Aside Clean Mobility in Schools, Moyer, Community Air Protection Incentives, Volkswagen Mitigation Trust, CEC's School Bus Replacement Program, and Rural School Bus Pilot Project

[14] AB 617 (C. Garcia, Chapter 136, Statutes of 2017): https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB617

older diesel school buses with near-zero or zero-emission models as one of their priorities[15]. To support this goal, in December 2021, the South Coast Air Quality Management District (South Coast AQMD) Governing Board approved $8.9 million in funding for 33 school bus projects in San Bernardino County, resulting in estimated reductions of 14.1 tons per year of NOx and 2.9 tons per year of PM[16].

Eastern Coachella Valley was selected as a CAP Program community due to persistent air quality challenges, including exposure to dust, pesticide drift, and agricultural emissions in this rural, farmworker-dominated region with limited infrastructure. Their 2021 CERP similarly included the replacement of older diesel school buses with near-zero or zero-emission models as a key goal[17]. In December 2021, South Coast AQMD allocated $1.6 million through the Lower-Emission School Bus Program to replace six school buses in the region, resulting in estimated annual reductions of 1.6 tons of NOx and 0.1 tons of PM[18].

These examples underscore a shared commitment to advancing environmental justice by prioritizing communities overburdened with air pollution—ensuring that clean transportation investments directly support the self-identified needs of communities most burdened by air pollution.

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 greenhouse gas emissions that will simultaneously reduce air pollutants to protect public health. These include a mandate to reduce greenhouse gas emissions to at least 85% below 1990 levels by 2045.[19] The *2022 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 being zero--emission- by 2035.[20]

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[15] San Bernardino, Muscoy, CERP, September 2019: https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/san-bernardino/cerp/carb-submittal/final-cerp.pdf?sfvrsn=9

[16] South Coast AQMD AB 617 CERPS: https://experience.arcgis.com/experience/b89ca66d41d442ae9baf9609f47aacff/page/English-SBM/

[17] Eastern Coachella Valley CERPS July 2021: https://experience.arcgis.com/experience/b89ca66d41d442ae9baf9609f47aacff/page/English-ECV/

[18] South Coast AQMD AB 617 CERPS: https://experience.arcgis.com/experience/b89ca66d41d442ae9baf9609f47aacff/page/English-SBM/

[19] AB 1279 (Muratsuchi, Chapter 337, Statutes of 2022: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB1279

[20] Executive Order N-79-20: *https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf*

Reaffirming Commitment to Clean Transportation

In June 2025, Governor Newsom signed Executive Order N-27-25[21], reaffirming the state's commitment to zero-emission technologies, including heavy-duty vehicles. Paired with public stakeholder engagement led by CARB and partner agencies, the order marks the next phase of California's clean transportation leadership. Despite ongoing federal challenges, the State remains firmly committed to bold climate action, supporting clean vehicle innovation, improving air quality, and advancing the deployment of sustainable transportation.

Zero-Emission Cost of Ownership Challenges

Upfront Costs

To help meet California's climate goals, understanding the upfront costs educational agencies face when adopting zero-emission school buses is critical. While these buses are improving in performance and reliability, higher purchase and infrastructure costs remain a significant barrier compared to diesel models. While operational savings from zero--emission school buses can help offset expenses over time, costs are not consistently declining and may rise due to supply chain, inflation, tariffs, or technical factors. Continued State funding, incentives, and regulatory support are essential to ensure this shift is equitable and sustainable.

Data from the World Resources Institute (WRI) shows that the upfront cost of owning a new zero-emission school bus remains significantly higher than that of a new diesel school bus[22]. According to WRI data, all zero-emission school bus models tend to be more expensive, with manufacturers' suggested retail prices ranging from $300,000 to $440,000 for a new zero-emission school bus, compared to $98,000 to $154,000 for a diesel model. Insurance adds to these costs, averaging $17,000 to $32,000 annually for a zero-emission school bus versus $10,000 to $20,000 for a diesel school bus. These differences make targeted funding and grant programs essential for helping school districts, especially under-resourced ones, manage high up-front purchase and insurance costs and successfully deploy zero--emission school buses.

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[21] Executive Order N-27-25: https://www.gov.ca.gov/wp-content/uploads/2025/06/CRA-Response-EO-N-27-25_-bl-formatted-GGN-Signed-6-11-954pmFinal.pdf

[22] Recommended total cost of ownership parameters for electric school buses: Summary of methods and data: https://files.wri.org/d8/s3fs-public/2025-01/recommended-total-cost-ownership-esb-summary-methods-data-v2.pdf?VersionId=kis.ODd5set5XDgaP57.6QeA1kPf9UBH

Charging Infrastructure

Infrastructure installations are another upfront cost that significantly impacts the total cost of ownership. There are two main cost components of installing charging infrastructure for battery-electric buses: the cost of the charger itself and the cost of upgrading the site to deliver power to the charger. Battery-electric zero-emission school buses require investments in vehicle charging infrastructure and site -specific installation work. These expenses depend on the charger type, power level, and project scale. Understanding these cost factors is essential for accurate fleet planning and budgeting, especially as infrastructure becomes a key variable in the financial viability of zero-emission school bus adoption.

Taxes

Taxes play a significant role in the upfront cost of acquiring a zero-emission school bus, as they are generally calculated based on the vehicle's purchase price. Since zero-emission school buses tend to have a higher manufacturer's suggested retail price than traditional diesel buses, the associated taxes are proportionally higher. In California, the State sales tax on such purchases ranges from 7.25% to 10.50%[23], depending on the local jurisdiction. These tax-related expenses are important considerations when evaluating the overall cost effectiveness of deploying clean school transportation and underscore the ongoing need for continued funding to help offset the higher upfront costs.

Tariffs

Fluctuations in tariffs on imported materials and components contribute to uncertainty in the pricing and availability of school bus parts. This volatility particularly affects upfront costs for zero-emission school buses, which rely on complex, globally sourced components. Unpredictable changes in trade policy can lead to price increases or supply delays, making it challenging for school districts to plan and budget for new bus purchases or fleet upgrades. In response to this evolving landscape, CARB remains receptive and continues to actively engage with stakeholders to support the deployment of zero-emission school buses while maintaining its long-term environmental goals.

Given that upfront costs remain a major barrier to adopting zero-emission school buses, CARB emphasizes the importance of continued incentive funding. Programs such as the Clean Truck and Bus Voucher Program (HVIP) and ZESBI help offset higher expenses, making zero-emission school buses more affordable and accessible. These initiatives are critical to ensure all school districts can equitably deploy cleaner zero-emission transportation.

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[23] California City & County Sales & Use Tax Rates (effective July 1, 2025): https://cdtfa.ca.gov/taxes-and-fees/rates.aspx

Total Cost of Ownership Benefits

While zero-emission school buses come with higher upfront costs compared to diesel models, they offer a range of long-term advantages that make them a compelling option for school districts. Over time, districts may see cost reductions through less expensive fuel use and decreased maintenance needs. Additional benefits, such as potential revenue opportunities from programs like California's Low Carbon Fuel Standard (LCFS), can also help ease the financial burden over the life of the vehicle.

These potential advantages are reflected in the performance and cost characteristics of zero-emission school buses. According to the World Resources Institute, zero-emission school buses generally have lower operational costs compared to diesel models[24]. Maintenance costs for a new Type C zero-emission school bus average $0.35 per mile, while a comparable diesel school bus averages $0.69 per mile. In addition, zero-emission school buses avoid expenses associated with diesel exhaust fluid, which adds about $0.04 per mile across all diesel-powered school bus types. While upfront costs for zero-emission school buses remain high, these operational savings can improve affordability over time.

Continued state incentive funding is essential to help school districts afford to deploy zero-emission vehicles and begin realizing their long-term financial and environmental benefits. Without this support, many districts, especially those in underserved communities, may be unable to overcome the high upfront costs and infrastructure challenges associated with adopting cleaner transportation.

Funding Committed to Date

The State reached a major milestone in cleaning up the school bus fleet with the May 14, 2024, launch of ZESBI, the single largest investment in zero-emission school bus replacements to date. Funded with $500 million from SB 114[25], ZESBI is expected to replace about 1,000 school buses and provide the necessary charging infrastructure. Applications for this funding opportunity are currently under review.

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[24] Recommended total cost of ownership parameters for battery-electric school buses: Summary of methods and data: https://files.wri.org/d8/s3fs-public/2025-01/recommended-total-cost-ownership-esb-summary-methods-data-v2.pdf?VersionId=kis.ODd5set5XDgaP57.6QeA1kPf9UBH

[25] Senate Bill No. 114, Committee on Budget and Fiscal Review, Chapter 48, Statutes of 2023: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB114

California has invested over **$1.39 billion** in zero-emission school buses

While ZESBI marks a significant scale-up, CARB and the CEC have run school bus replacement programs for over a decade. To date, the State has spent or allocated $2.08 billion for school bus replacements, of which $1.39 billion has supported zero--emission school bus programs, supporting the purchase of more than 3,400 zero-emission school buses and the associated infrastructure. Although no new funding was appropriated in the 2024–25 budget, previously allocated funds are being implemented. Since the 2023 SB 1403 report, an additional $99 million in State incentives—primarily through broader programs such as AB 923 and the CAP Program—has been reported for clean bus and truck projects, including school buses.

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 *(Millions)*

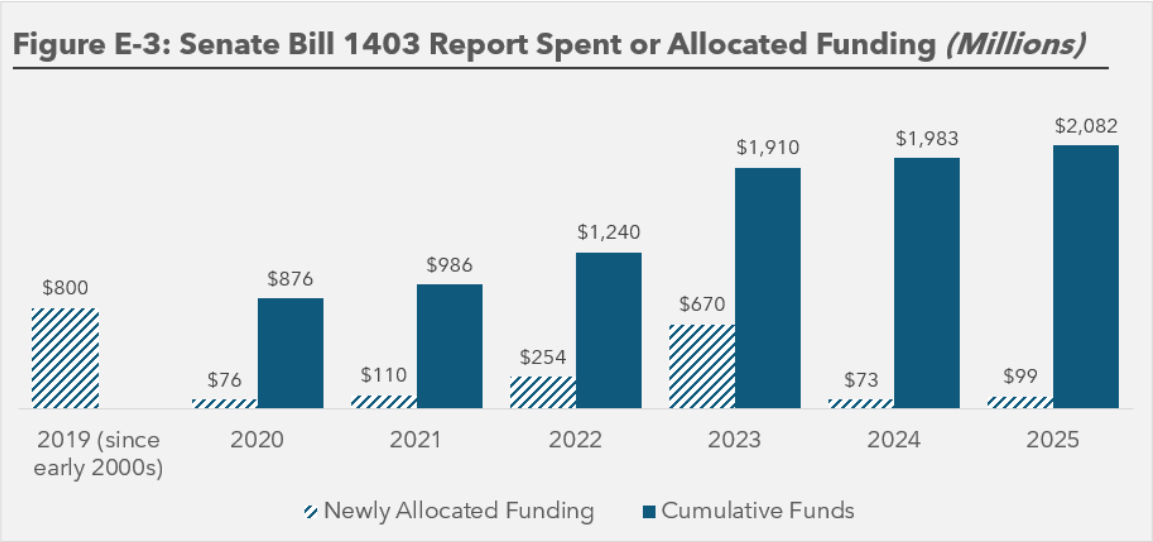


Figure does not include any funding from federal sources such as Diesel Emissions Reduction Act Funding or United States Environmental Protection Agency Clean School Bus Funding

Table E-1 summarizes State school bus funding that has gone to school bus clean up to support exhaust retrofits, full vehicle replacements, and supporting infrastructure through incentive programs that are ongoing, in progress, and have concluded. Incentive programs are defined as ongoing if they currently have funding available or are expected to reopen in the future. Incentive programs that are in progress are not currently accepting new applications and at this time are not expected to reopen for applications again in the future. Recipients of funding from those incentives deemed in progress may be at various stages of the application process, and in some cases final awards may not have yet been announced. Finally, the concluded incentive programs category represents historic incentive programs

that are now fully completed and are not expected to receive additional funding in the near future.

Table E-1: Summary of State School Bus Incentive Programs - Through May 2025

Funding Source	Amount Spent/ Allocated	ZE School Buses Funded	Amount Allocated/Spent on ZE School Buses & Infrastructure
Ongoing incentive programs	$717.8 million	1,533	$369.4 million
Incentive programs in progress	$1.034 billion	1,899	$1.015 billion
Concluded incentive programs	$329.6 million	28	$7.5 million
Total	**$2.081 billion**	**3,460**	**$1.392 billion**

Acronym Key: Zero-emission (ZE)

Table E-2 describes the incentive programs that are ongoing, Table E-3 describes the in progress incentive programs that are no longer accepting applications but still have active projects, and Table E-4 describes concluded incentive programs. Many of the zero-emission school buses represented in Tables E-2 through E-4 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.

Ongoing School Bus Incentive Funding

In recent years, California has increased investments in school bus replacement and other zero-emission technology incentive programs. However, there is still no dedicated or sustained funding stream for school buses, and public schools generally lack their own funding to purchase or replace them. As a result, local educational agencies must compete for limited resources through broader programs, such as the Carl Moyer Memorial Air Quality Standards Attainment Program (Moyer), and Community Air Protection Incentives, which fund a wide range of vehicle types and emission-reduction projects. While these programs remain important, the lack of dedicated school bus funding creates uncertainty, limits long-term fleet planning, and underscores the need for additional sustained

investment in zero-emission school bus replacement to meet the State's equity, climate, and air quality goals.

The investments from currently available programs are described in Table E-2, followed by descriptions of each individual program.

Table E-2: Ongoing State School Bus Incentive Programs—Through May 2025

Funding Source	Amount Spent/ Allocated	Projects	ZE School Buses	Amount Allocated/Spent on ZE School Buses & Infrastructure
AB 923[a] *since 2008*	$284.2 million	Retrofits, school buses, natural gas tanks, & infrastructure	NA	NA
HVIP *since 2010* *(not including the Public School Bus Set-Aside)*	$203.5 million	1,240 school buses, 216 infrastructure projects	1,183	$201.1 million
Community Air Protection Incentives[b] *since 2017*	$168.7 million	543 school buses, 73 infrastructure projects	386	$137.7 million
Moyer & Carl Moyer State Reserve *since 1998*	$58.7 million	235 school buses, 66 infrastructure projects	94	$27.9 million
EnergIIZE *since 2021 (not including the Public School Bus Set-Aside)*	$2.7 million	94 chargers for ZE school buses	0	$2.7 million
Total**	**$717.8 million**		**1,533[c]**	**$369.4 million**

Acronym Key: Zero-emission (ZE), Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles (EnergIIZE), Clean Truck and Bus Voucher Incentive Project (HVIP)

[a] Data reported to CARB by local air districts as of July 30, 2025

[b] Statistics are through November 30, 2024

[c] 130 zero-emission school buses were co-funded by projects listed above, so 130 was subtracted from the total to avoid double counting

AB 923

AB 923 (Firebaugh, Chapter 707, Statutes of 2003) authorizes local air districts to receive funding through a surcharge on motor vehicle registration fees for vehicles registered within that air district. These funds, commonly referred to as AB 923 funds, may only be used in certain ways laid out in the statute that helps reduce air pollution within the air district. Air districts may utilize AB 923 dollars to fund school bus replacements in accordance with the Lower Emission School Bus Program guidelines or Moyer guidelines, but they may choose to fund other project types such as agricultural projects or early vehicle retirement projects, depending on local needs, at the air districts' discretion.

Clean Truck and Bus Voucher Incentive Project (HVIP)

The Clean Truck and Bus Voucher Incentive Project (HVIP), referred to as HVIP, has historically provided funding to help offset the incremental cost of purchasing zero-emission medium- and heavy-duty trucks and buses, including school buses. Designed for ease of access, HVIP allows approved vehicle dealers to submit applications on behalf of fleets, with no requirement for scrapping an existing vehicle. When HVIP reopened for voucher request applications on September 9, 2025, all available funds were exhausted within just seven days. School buses were the most popular by vocation, representing 30% of all voucher requests under HVIP standard. This strong demand highlights both the strong interest in zero-emission school buses and the urgent need for sustained program funding.

Carl Moyer Memorial Air Quality Standards Attainment Program

The Moyer Program 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 emission reduction technologies. Moyer is implemented as a partnership between CARB and California's 35 local air districts. By funding emission 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, as well as funding for other vehicle types. Replacement engines certified to the 2010 emission standards or cleaner are eligible. Local air districts administer the program and may prioritize funds based on local community needs.

Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles (EnergIIZE) Project

The Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles (EnergIIZE) Project accelerates deployment of charging and refueling infrastructure

for medium- and heavy-duty vehicles. Since its launch in 2022, EnergIIZE has funded projects through four lanes: Electric Vehicle (EV) Fast Track, EV Jump Start (equity-focused), EV Public Charging, and Hydrogen Refueling. Local educational agencies were eligible under all four lanes, and by May 2025 had received nearly $2.7 million in infrastructure awards.

In May 2025, the program consolidated these lanes into a single Fast Track lane to reduce application barriers and speed deployment. Under this model, local educational agencies remain eligible for incentives to build public, private, or shared EV charging and hydrogen refueling stations, with applications evaluated on project readiness to ensure timely commissioning.

In Progress School Bus Incentive Funding

In addition to the ongoing incentive projects, there are several incentive projects that, while still in progress, are not expected to re-open for additional applications. In some cases, these incentive projects will not re-open because their funding source was a one-time appropriation or investment and they are now fully subscribed, while in other cases these incentives served as preliminary pilots and have now been streamlined into other ongoing incentive programs. These incentive programs are summarized below, and additional updates on the status of these programs are provided in the following sections.

Table E-3: In Progress State School Bus Incentive Programs—Through May 2025

Funding Source	Amount Spent/Allocated	Projects	ZE School Buses	Amount Allocated/Spent on ZE School Buses & Infrastructure
ZESBI (CARB and CEC) since 2024[a]	$500 million	Application review is in progress—expected to fund 1,000 ZE school buses	1,000	$500 million
HVIP and EnergIIZE Public School Bus Set-	$300 million	363 zero-emission school buses and 263	363	$300 million

Funding Source	Amount Spent/Allocated	Projects	ZE School Buses	Amount Allocated/Spent on ZE School Buses & Infrastructure
Aside (CARB and CEC)[a] *since 2021*		infrastructure projects		
Clean Transportation Program (CEC) *since 2012*	$19.8 million	25 natural gas school buses, 5 natural gas & 228 electric infrastructure projects	0	$17 million
School Bus Replacement Program (CEC)[a] *since 2019*	$75.1 million	228 zero-emission electric school buses	228	$75.1 million
Volkswagen Mitigation Trust *since 2018*	Up to $65 million	159 school buses	159	$62.9 million
Rural School Bus Pilot Project *since 2016*	$57.5 million	198 school buses	111	$43.3 million
Clean Mobility in Schools Pilot Project *since 2018*	$16.8 million	38 ZE school buses & infrastructure	38	$16.8 million
Total**	**$1.034 billion**		**1,899**	**$1.015 billion**

Acronym Key: Zero-emission (ZE)

[a] Represents funding sources that are dedicated to school bus cleanup

Zero-Emission School Bus and Infrastructure Incentive Project

ZESBI provides grants to local educational agencies to replace heavy-duty, internal combustion school buses with new zero-emission models and the supporting

infrastructure needed to operate them. Created by CARB and the CEC, ZESBI launched in May 2024 with $500 million from SB 114, prioritizing small and rural agencies and those serving high percentages of foster youth, students receiving free or reduced-price meals, or English learners. In addition to vehicle purchases, grant funds may be used for transportation programs, infrastructure upgrades, fleet planning, workforce training, and related activities.

As of August 2025, 166 local educational agencies applied, requesting support for 1,482 zero-emission school buses. Demand exceeded available funding, leaving 33 agencies on the waitlist. Of the applicants, about 76% serve disadvantaged communities and nearly 96% serve low-income communities, underscoring the program's strong reach into the districts with the greatest need. Applications are currently under review, and agencies are moving through the award process. Funding agreements are expected to be signed by the end of 2025. To support implementation and track deployment milestones, CARB, in conjunction with the CEC and CALSTART, launched the ZESBI public-facing website to track program progress and deployment milestones.

HVIP and EnergIIZE Public School Bus Set-Aside

The HVIP Public School Bus Set-Aside and the EnergIIZE Public School Bus Infrastructure Funding Lane were coordinated by CARB and the CEC to support the deployment of zero-emission school buses and the infrastructure needed to operate them. HVIP funding covered nearly all of the cost of new zero-emission school buses for school districts and charter schools in small- and medium-sized air districts, while EnergIIZE supported related charging infrastructure. In total, $265 million was appropriated for vehicles and $35 million for infrastructure.

Launched in 2022 and expanded in 2023, the program supported the replacement of nearly 400 school buses across 105 school districts and charter schools. As of May 2025, the EnergIIZE Public School Bus Set-Aside has provided over $14.6 million in infrastructure awards. Although closed to new applications, some previously submitted applications remain under review. Lessons learned from this effort, combined with new state funding, informed the creation of the ZESBI Project mentioned above.

Clean Mobility in Schools

Clean Mobility in Schools funds clean transportation and mobility strategies in public K–12 schools, including zero-emission vehicles and charging equipment. Eligible projects include car sharing, active transportation, curriculum development, workforce training, and community outreach. So far, 8 projects, totaling $62.14 million, are supporting initiatives such as zero-emission car share, bike share,

mechanic workshops, and route optimization for rural and tribal school bus fleets. Of those funds, $16.8 million went toward zero-emission school buses and supporting infrastructure.

Volkswagen Environmental Mitigation Trust

The *Volkswagen Environmental Mitigation Trust* was established through a settlement to mitigate the excess NOx 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 school bus category of the program is oversubscribed and is no longer accepting applications.

Rural School Bus Pilot Project

Launched in 2016, the *Rural School Bus Pilot Project* provided grants for the purchase of commercially available cleaner school bus technologies such as zero-emission and low carbon fuel options (renewable fuels). The project focused on supporting school bus replacements for local educational agencies located in small air districts, as small air districts often had less access to incentive funding. After several years of successful implementation, the Rural School Bus Pilot Project transitioned from a pilot to a full-scale project administered as the HVIP Public School Bus Set-Aside and then ZESBI. Over $61.6 million has been administered through the Rural School Bus Pilot Project to support the replacement of about 200 school buses, 56% of which will be replaced with zero-emission school buses.

School Bus Replacement Program

SB 110 (Committee on Budget and Fiscal Review, Chapter 55, Statutes of 2017) appropriated funds to the CEC to establish the School Bus Replacement Program. SB 110 provided $75 million in one-time funding from Proposition 39 for the replacement and scrap of old diesel school buses in disadvantaged and low-income communities throughout California. CEC prioritized battery electric school buses that were ready for vehicle-to-grid (V2G) integration with this funding. In total, CEC awarded 62 school districts funding to purchase 228 battery electric school buses. As of June 2024, all the school buses were delivered. As of May 2025, 46 grantees have successfully completed their projects, and 16 grantees are in the final stages of project implementation and data collection.

Clean Transportation Program

CEC allocated over $6 million from *Clean Transportation Program* funds for 25 CNG school bus replacements and supporting fueling infrastructure. All the CNG school buses were delivered by December 2020, and all the supporting CNG infrastructure has been completed. Additionally, CEC utilized funding from the Clean

Transportation Program to fund infrastructure for the 228 battery electric school buses funded through the School Bus Replacement Program. All school buses have now been delivered, and grantees are in the final stages of data collection.

Concluded School Bus Incentive Funding

Several of California's earliest school bus incentive programs and pilots of zero-emission school bus replacements have now fully concluded. The *Lower Emission School Bus Program*, funded with money from the Proposition 1B bond act, which authorized $200 million for replacing and retrofitting zero-emission school buses, was fully expended by June 2014. Similarly, the *Sacramento Regional Zero-Emission School Bus Deployment Project*, one of the earliest large-scale deployments of zero-emission school buses in the State, was completed in 2021. While the projects in this category are no longer active, they provided important lessons and a foundation for the recent larger scale zero-emission incentive projects. For example, local air districts may use the Lower Emission School Bus Program guidelines to fund projects using AB 923 dollars.

Table E-4: Concluded State School Bus Incentive Programs—Through May 2025

Source	Amount Spent/Allocated	Projects	ZE School Buses	Dollars Spent on ZE School Buses & Infrastructure
Lower-Emission School Bus Program *since 2001*[a]	$310 million	7,456 retrofits, 1,642 school buses	0	$0
Sacramento Regional Zero-Emission School Bus Deployment Project *since 2017*[a]	$14.5 million (State & match contribution)	28 school buses & infrastructure	28	$7.5 million
Supplemental Environmental Projects for School Buses *since 2012*[a]	$5.1 million	11 retrofits, 20 school buses, 297 recalled filter replacements	0	$0
Total**	**$329.6 million**		**28**	**$7.5 million**

Acronym Key: Zero-emission (ZE)

[a] Represents funding sources that are dedicated to school bus cleanup

Federal and Local Funding

While not reflected in Table E-1, federal programs and local programs are worth noting because they help replace old school buses with cleaner school buses, with a heavy focus on zero-emission school buses.

Clean School Bus Program

The *Clean School Bus Program,* administered by the United States Environmental Protection Agency (U.S. EPA), provides $5 billion in funding over five 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 school buses serving high need local education agencies, tribal schools, and rural or low-income areas. The program structure has varied between funding rounds and has historically offered both rebates and grant programs.

As of August 2025, the U.S. EPA has awarded about $1.7 billion in Clean School Bus Program rebates. From 2022–2023, California received roughly $146 million, supporting the replacement of more than 500 older school buses with new zero-emission models statewide[26]. The 2024 funding-year rebate program application period closed in January 2024, and the U.S. EPA anticipates awarding $965 million for new zero-emission and clean school buses.

The 2023 Clean School Bus Grant Program was the second funding opportunity under the Clean School Bus Program and complemented the 2022, 2023, and 2024 Rebate Programs. The grants allowed third-party student transportation providers to apply on behalf of multiple school districts, including those in different states. California was awarded about $88 million, supporting the deployment of over 230 zero-emission school buses[27]. To maximize the impact of these federal investments, CARB collaborates closely with U.S. EPA to coordinate funding opportunities and ensure that the same school buses are not funded twice.

[26] Clean School Bus Program Awards: https://www.epa.gov/cleanschoolbus/clean-school-bus-program-awards

[27] Clean School Bus Program Awards: https://www.epa.gov/cleanschoolbus/clean-school-bus-program-awards

Clean Heavy-Duty Vehicles Grant Program

On December 11, 2024, the U.S. EPA announced 70 tentatively selected applications to receive a total of approximately $623 million in Clean Heavy-Duty Vehicles Grant Program funds under the Inflation Reduction Act to replace existing Class 6 and Class 7 combustion vehicles with zero-emission vehicles. The funding opportunity includes two sub-programs: one for school buses and one for vocational vehicles. About 61% of the available funding will go to school bus replacement projects through the school bus sub-program. The program opened for applications in April 2024 and closed in July 2024. Projects in California were tentatively awarded about $92.5 million to support the deployment of over 199 zero-emission school buses[28].

Diesel Emission Reduction Act

The *Diesel Emission Reduction Act State Grants*, a long-standing incentive program administered by U.S. EPA to replace diesel engines with cleaner alternatives, also provided over $7.7 million in federal funding for school bus replacement projects in California. These funds are not listed in the tables above because they were used to co-fund zero-emission school buses. They covered part of the school bus cost, while another incentive program provided the remaining funding. To avoid double counting, school buses supported by these funds are reported under the primary incentive program.

Local Air District Programs

California's air districts provide funding for school bus replacements using local dollars, such as AB 923 funds, often in combination with State or federal programs. These investments are frequently directed toward priority communities, including CAP Program Communities, disadvantaged communities, and low-income communities. In addition to direct funding, air districts may collaborate with regional planning organizations or local governments to pool resources and maximize impact. Through these efforts, air districts play an important role in supplementing State and federal programs, helping school districts access additional funds to accelerate the transition to zero-emission school buses.

Funding Needs

Funding continues to be a major obstacle for school districts that are seeking to replace their aging school bus fleets, particularly for school districts seeking to purchase zero-emission school buses. As mentioned previously, school districts primarily receive transportation funding through the State legislative process.

[28] Clean Heavy-Duty Vehicles Grant Program Tentative Selections: https://www.epa.gov/clean-heavy-duty-vehicles-program/clean-heavy-duty-vehicles-grant-program-tentative-selections

Incentive opportunities offered by the State, local air districts, federal government and others continue to play a critical role in achieving the goal of deploying a fully zero-emission school bus fleet by 2045. While previous State and federal investments have helped reduce emissions and expand clean school transportation, sustained and reliable funding is still essential to meet long-term goals.

California has about 22,300 school buses statewide, with roughly 15,500 owned by public school districts. Of these, staff identified roughly 12,500 publicly owned combustion engine school buses that still need replacement with cleaner zero-emission models. Replacing this portion of the fleet with zero-emission school buses is expected to cost a total of about $4.9 billion.

To fully replace the existing public school bus fleet with zero-emission school buses by 2045 will cost roughly **$245 million per year** for 20 years

To align with the State mandate that all medium- and heavy-duty vehicle operations be zero-emission by 2045, the turnover would take about 20 years. This pace would require replacing approximately 625 school buses per year, or about 5% of the fleet annually, at an estimated cost of $245 million per year. Accelerating the transition to meet a 2035 goal would mean replacing about 1,250 buses each year, or approximately 10% of the fleet, at a cost of about $490 million annually. These estimates cover bus purchases only. They do not include charging infrastructure, grid upgrades, workforce training, or savings from the lower fuel and maintenance costs of zero-emission technology. They also do not factor in future growth of the school bus fleet, or the eventual replacement of zero-emission buses once deployed.

While progress has been made, the long-term replacement of California's school bus fleet remains uncertain due to inconsistent and limited funding. Without stable and sustained investment, school districts face significant challenges in planning and executing large-scale zero-emission bus deployments. Funding gaps jeopardize the State's ability to meet its 2045 zero-emission mandate and risk slowing the momentum already achieved through recent programs. Continued uncertainty in available resources underscores the need for reliable, long-term funding commitments to ensure every student in California can benefit from safe, clean, and zero-emission transportation.

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 shift 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 school buses, and to provide opportunities for innovative financing mechanisms.

Table E-5 provides a brief comparison of these key elements for many of the main ongoing school bus funding programs.

Zero-Emission Wherever Possible

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

While CARB incentives are designed to prioritize zero-emission school buses wherever possible, tradeoffs remain in replacement decisions. Conventional-fueled school buses have lower upfront costs and can provide short-term emission and safety benefits when replacing vehicles that are decades old. As a result, some programs that require scrappage allow replacement with internal combustion vehicles. For example, under Moyer, a replacement school bus may use any engine certified to 2010 standards or cleaner, including zero-emission, hybrid, alternative fuel, or diesel. However, diesel school buses have long operational lifespans, which can prolong the deployment of a fully zero-emission fleet.

Replacing the Aging Fleet

As discussed in previous sections, retiring the oldest school buses and replacing them with new models provides substantial air quality, climate, and safety benefits. To maximize these benefits, many State funding programs require scrappage of old school buses and set minimum age requirements for replacements

Another method to clean up the public school bus fleet in California is to repower or convert the engine and drivetrain of an old combustion school bus to zero-emission or another 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, companies that perform conversions target school buses when they are between 5 and 7 years old. On average, publicly owned school buses operating in California are approximately 13 years old and it is usually not cost effective or technologically feasible to repower school buses that old. Additionally, for the oldest school buses in the state, scrapping

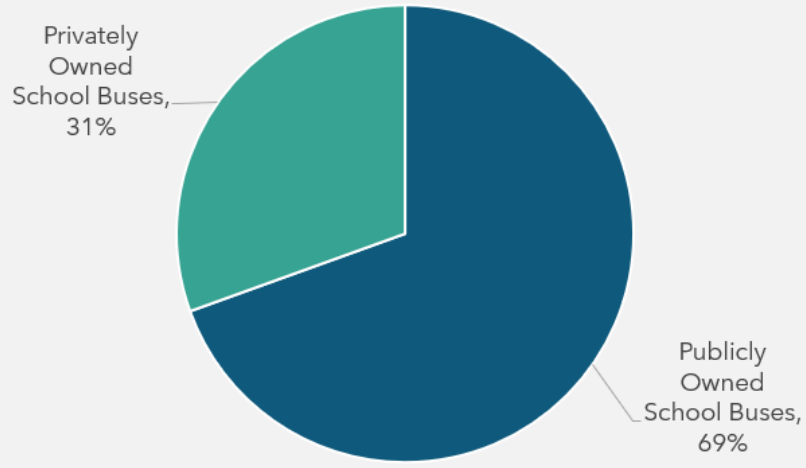
and replacing them with a new school bus improves safety by ensuring the school bus is equipped with modern safety features such as seat belts.

CARB understands that some school districts may need to expand their fleets and offers incentives to help ensure those districts can purchase zero-emission school buses. For example, HVIP offers funding to cover the incremental cost of purchasing a zero-emission school bus compared to a conventional diesel. The incentive offered for fleet expansion projects is generally lower than for incentives that require scrappage.

Focus on Publicly Owned School Buses

For some public school districts, using a third-party school transportation provider that owns and operates buses can be a cost-effective way to deliver transportation services. In recent years, new "zero-emission bus as a service" providers have entered the market, offering technical expertise and all-inclusive pricing or leases that cover the bus, infrastructure, and energy. These providers often secure better pricing through bulk purchases and, in some cases, install charging infrastructure that serves multiple districts from a single hub.

Figure E-4: School Bus Ownership in California



While third-party providers are a popular option for some, most public school districts own their school buses. Of the 22,300 school buses in the state, about 15,500 are publicly owned, and approximately 59% of school districts operate at least one school bus. Districts without school buses may partner with local transit agencies or contract with third-party providers, which generally operate newer fleets. Since most school buses are publicly owned and tend to be older and higher-polluting funding

programs have prioritized and provided dedicated funding to support public school districts. Third-party providers, like other for-profit businesses, have funding opportunities in programs such as the HVIP Standard. This approach ensures that limited funds are replacing the oldest public school buses first, maximizing emission reductions and improving health benefit where they are needed most.

Table E-5: Comparison of Ongoing Public School Bus Incentive Funding Programs*

Program Requirements	HVIP Standard	Moyer & Community Air Protection incentives**	U.S. EPA Clean School Bus Program
Zero-emission school bus incentive amount range	$81k-$276k	Up to $400k	$145k-$345k
Eligible fuel types	ZE	ZE, Hybrids, Alt. Fuels, Diesel	ZE, CNG, Propane
Requires scrappage of an existing school bus	N/A	√	√
Gross vehicle weight rating requirement for bus to be scrapped	N/A	≥14,001 lbs	≥10,001 lbs
Model year/age requirement for old school bus to be scrapped	N/A	Any	2010 or older for CNG and Propane, Any for ZE
Repowers of old school buses are eligible	√	√	√
Program includes or can include infrastructure funding	N/A	√	√
3rd party transportation providers that contract with public schools are eligible	√	√	√
Funding can support driver and mechanic training	N/A	N/A	√
Funding available for other medium- and heavy-duty vehicles (white fleet)	√	√	N/A

Acronym Key: Zero-Emission (ZE), Compressed Natural Gas (CNG), Alternative (Alt.)
**Comparison of program requirements as of August 2025. 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 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. Incentive funding has supported the purchase of more than 3,400 zero-emission school buses across over 350 public school districts and charter schools statewide. Of these, about 250 agencies have already deployed at least one zero-emission school bus, with more than 1,560 currently operating throughout California.[29].

Over 1,560 zero-emission school buses have been delivered or deployed in California

Most battery electric school buses can drive from 100-155 miles per trip when fully charged, which is enough for most school bus routes. Some models are reported to have even longer ranges of up to 300 miles per trip when fully charged. Increased battery storage capacity continues to expand and develop. At least one battery electric school bus is available in all the same types and classes as conventional school buses. These can be viewed using 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 in the U.S. with 23 available school bus models as of July 2025.[30]

Zero-Emission School Bus Infrastructure

Successful and cost-efficient charging or fueling infrastructure results from extensive planning that considers both immediate and future infrastructure needs. There is no standard approach to infrastructure planning as each California local educational agency's fleet and site are unique. Therefore, assessing long-term zero-emission transportation goals and involving the service utility early in the process is critical.

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[29] "California Zero-Emission Vehicle Population Dashboard" (2025). *https://californiahvip.org/cazevdashboard*

[30] CALSTART (2025). Drive to Zero's Zero-Emission Technology Inventory Data Explorer. Version 1.0. Available online at: *https://globaldrivetozero.org/zeti-data-explorer/*

Local educational agencies often lack the staff and financial resources needed for zero-emission infrastructure planning. To help fill this gap, several organizations provide free technical assistance tools. CARB offers the *School Bus Fleet Infrastructure Planning Tool*, which provides checklists and installation timelines, and *CalFleetAdvisor* for vendor referrals and fleet transition planning—both administered by CALSTART. The World Resources Institute's *Electric School Bus Initiative* provides an *Electric School Bus Toolkit* with *Request for Proposal* templates, educational resources, and a *Technical Assistance Menu* covering utility coordination and infrastructure upgrades. The Joint Office of Energy and Transportation's *Clean Bus Planning Awards* also support school districts with Electric School Bus route analysis, charging station planning, and full fleet electrification plans. CARB's *Planning and Capacity Building* grants provide up to $500,000 per project to help communities (including local educational agencies) plan for clean, equitable transportation solutions. These grants support early-stage planning, outreach, workforce development, and local readiness. A new solicitation is scheduled to open for eight weeks in the Fall of 2025.

In its role as the State's primary energy policy and planning agency, the CEC is leading funding initiatives and knowledge-building efforts to ensure local educational agencies have the infrastructure needed to support zero-emission school bus fleets. In November 2020, the CEC released GFO-20-601, *Blueprints for Medium- and Heavy-Duty Zero-Emission Vehicle Infrastructure*, to accelerate the deployment of zero-emission vehicles and infrastructure with a holistic and forward-looking approach. The CEC is expected to open applications for blueprint development support in late 2025.

Additional State entities are supporting California educational agencies' fleet electrification. 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 electricity rates. Others can provide infrastructure and support services on an ad hoc basis.

Vehicle-to-Grid

Battery electric school buses that have V2G capability can improve community electrical grid resilience by providing a back-up energy resource. V2G capability is

the bidirectional flow of energy between an EV's on-board battery and the grid. 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. Benefits of V2G include onsite resiliency in the case of an emergency power shut-off by the utility or catastrophic event, as well as financial benefits through either onsite power offset using vehicle-to-building (V2B) or enrollment in export compensation programs. Schools using this technology have the potential to accelerate zero-emission uptake 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 program has invested in technology demonstrations focused on advancing and validating the performance of bidirectional charging technologies, including with battery electric school buses. For example, one project with eIQ Mobility, a NextEra Energy Resources company, will be demonstrating managed and bidirectional charging software with 20 Micro Bird battery electric school buses operated by First Student at a site in Richmond, CA. The bidirectional chargers were energized in April 2024, and they are being used to charge the First Student electric school bus fleet. V2G operations have faced setbacks due to interoperability issues stemming from the BorgWarner bidirectional EV supply equipment. The project team is working diligently to resolve these problems, but the process has been slowed by BorgWarner's decision to exit that charging market which has resulted in limited troubleshooting resources. Once the bidirectional functionality is proven in a lab setting, a Rule 21 interconnection will be executed with Pacific Gas & Electric to enable bidirectional power flow at First Student's Richmond site.

As a result of CEC's GFO-22-612 Electric School Bus Bi-Directional Infrastructure solicitation, a total of approximately $10 million in funding was awarded to four projects. The recipients, including Nuvve Holding Corp., The Mobility House LLC, Storer Transportation, and BorgWarner, will collectively install a total of 78 bi-directional charging ports to support 10 local educational agencies or school agencies across the state and enable battery electric school buses to connect to the grid. Each project will utilize V2G technology for grid interconnection, with two projects also incorporating a V2B application into their microgrid design. This solicitation is a two-phase approach, with the initial phase intending to assist local educational agencies by developing V2G charging infrastructure demonstrations. The

second phase of this solicitation is anticipated to be released in 2026, which will allow for larger scale deployments utilizing blueprints from phase one demonstrations.

Another CEC solicitation, GFO-22-609 Responsive Easy Charging Products with Dynamic Signals, was released in March 2023, which funded four projects from the recipients Bidirectional Energy, Kaluza, dcbel, and Gridtractor. Approximately $8.7 million in funding was awarded to these four projects, which will install a total of 749 smart charging deployments, with 378 of these deployments being bidirectional chargers.

Additionally, San Diego Gas & Electric has continued partnership with Cajon Valley Union School District for the V2G pilot program with battery electric school buses. The school buses' on-board batteries have been utilized as a renewable energy resource for discharging energy back to the grid during high demand or peak hours, and this specific pilot has installed six bi-directional chargers enabling the district to earn revenue through the Emergency Load Reduction Program[31]. 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 local educational agencies build a stronger business case for zero-emission battery electric school bus uptake while supporting grid resiliency and security. CARB and CEC have included V2G requirements for school buses in the Public School Bus Set-Aside and ZESBI and HVIP Standard.

Other Resources for School Districts

Low Carbon Fuel Standard Credits

LCFS credits can reduce operational costs for both publicly 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 dispensed to 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 vehicles or school buses that operate on low carbon fuels, the greater the credit generation and cost savings potential. The average credit price from July 2024 to

[31] San Diego Gas and Electric (2024). "Wheels on the electric bus go round and round": https://www.sdgetoday.com/EVSDevit

June 2025 was about $62 per credit.[32] 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 2024, LCFS credit revenue may be worth approximately $0.08/Kilowatt-Hour (kW-hr) when charging school buses with California average grid electricity[33] and $0.10/kW-hr with zero CI electricity, assuming a credit price of $62. LCFS staff has developed a credit value calculator[34] that is available on the LCFS dashboard,[35] 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 designee. While the credits cannot be used to generate revenue, the fleet can use the money toward EV purchases, infrastructure, operating costs, or associated LCFS program administration costs [36]

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, the 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 or CNG 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. However, buses purchased prior to January 1, 2020, are exempt from reporting requirements under the regulation, for both propane and CNG. An LCFS Frequently Asked Questions document titled *Reporting Requirements for School Buses*[37] describes these requirements in detail, as

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[32] California Air Resources Board. LCFS Credit Transfer Activity Reports. https://ww2.arb.ca.gov/resources/documents/lcfs-credit-transfer-activity-reports

[33] California Air Resources Board (March 24, 2025). "2025 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/2025_elec_update2.pdf

[34] California Air Resources Board. LCFS Dashboard, (Figure 7). https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard

[35] California Air Resources Board (2025). LCFS dashboard: https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard

[36] Title 17, California Code of Regulations (CCR), Sections 95480-95503.

[37] 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/schoolbusexemptions.pdf

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.

Federal Tax Credits

Federal tax credits may also benefit local educational agencies and third-party student transportation providers that purchase zero-emission school buses. The Inflation Reduction Act introduced the *Qualified Commercial Clean Vehicle Credit* that can provide up to $40,000 for each eligible delivered zero-emission school bus. *The Alternative Fuel Vehicle Refueling Property Credit* provides up to 30% of EV infrastructure project costs, with a maximum of $100,000 for EV infrastructure installed in low-income or non-urban communities.

Traditionally, it has been challenging for most local educational agencies to take advantage of tax credits due to their tax-exempt status. However, the Inflation Reduction Act also introduced a new mechanism known as elective pay, or direct pay, that enables school districts and other qualified tax exempt and governmental entities to benefit from the tax credits by treating the amount of the credit as a payment of tax and issuing a refund to the school district.

The United States Internal Revenue Service has developed a *fact sheet* about the direct payment mechanism for state and local governments. As this is a new mechanism, it is not yet known how many school districts will benefit from this tax credit.

These valuable federal tax credits, however, were set to expire in September 2025. Once they ended, local educational agencies and transportation providers lost a critical source of financial support, creating a clear need for increased funding to continue advancing zero-emission school bus programs and related infrastructure.

California Department of General Services Statewide Procurement Contract

In accordance with SB 114, and to provide a resource for the purchase of zero-emission school buses, CARB coordinated with the Department of General Services (DGS) to establish statewide procurement contracts for the purchase of zero-emission school buses. CARB provided guidance on technical specifications for the zero-emission school bus contracts which were informed by previous CARB zero-emission school bus funding programs, including the HVIP Public School Bus Set-

Aside. DGS opened the low-cost, competitive request for proposals in June 2023 and established contracts for school bus Types A, C, and D with various original equipment manufacturers based on the lowest-cost vehicle meeting minimum required specifications as outlined in the request for proposals. The original equipment manufacturers selected for the statewide procurement contracts executed their two-year agreement with DGS in October 2023, with up to three optional one-year extensions. One-year extensions have since been signed, extending most of the contracts through 2026. Statewide procurement contracts are currently available for use by any public local educational agency or the California State government, regardless of funding source.

Workforce Training

Training school fleet technicians and school bus operators is critical to successful deployment of zero-emission school buses and a positive user experience. Local educational agencies must make operational adjustments and develop essential skills to account for the differences between the operation and maintenance of zero-emission school buses and 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 because regenerative braking results in less wear on the brake pads.

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. Training is offered both on-site at school district locations and via online training platforms.

On October 26, 2023, the DGS Procurement Division released the latest statewide procurement contract for zero-emission school buses, requiring manufacturers and dealers to provide adequate training to local educational agencies that purchase zero-emission buses through the contract. The California Department of Education has developed a supplemental module to their Behind-The-Wheel curriculum that state-certified instructional personnel may use for the training of school 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 local educational agencies in all stages of procuring and deploying zero-emission school buses.

In 2019, CEC approved a contract for $1 million with Cerritos College to develop and deliver the "Electric School Bus Training Project." The project developed curriculum and training modules with school bus manufacturers, industry, and college automotive faculty to provide no-cost training to fleet technicians on the operation

and maintenance of the electric battery school buses. Initially, the training was offered to grantees who received electric school buses funded through CEC's School Bus Replacement Program. In 2023, the CEC added an additional $1 million to the contract with Cerritos College to expand the training to all California local educational agencies that have or will receive an electric school bus. A total of six online courses are available including Introduction to Electric Vehicles, Electric Bus and High Voltage Safety, Electric School Bus Level 1: Electrical Principles, Electric School Bus 2: Advanced Diagnostics & Automotive Communication Systems, and Electric Vehicle Supply Equipment and Charging Systems. In addition to the online courses, regional in-person trainings are held at schools or community college campuses for fleet operators and technicians looking to test their skills and gain more hands-on experience in the classroom. Not only has the program invested in workforce development through training, but the program serves as a community forum for technicians to share information and experiences and build peer support networks that will aid fleet electrification. To date, more than 300 technicians across 70 California educational agencies have been trained. Courses can be found on the dedicated Advanced Transportation and Logistics webpage[38].

To ensure safety and compliance with newly installed public charging infrastructure, AB 841 (Ting, Chapter 372, Statutes 2020)[39] was passed by the legislature in 2020. This bill added Section 740.20 to the Public Utilities Code, which requires electrical infrastructure contractors installing EV charging infrastructure and equipment on the customer side of the electrical meter to hold an Electric Vehicle Infrastructure Training Program (EVITP) 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.

In 2024, CEC approved a $3 million dollar contract with the Employment Training Panel (ETP) to establish the EVITP Fund, a competitive solicitation to increase the number of EVITP-certified electricians within California. ETP is a department under the California Labor and Workforce Development Agency, which oversees the State's comprehensive workforce investment system. The goal of this project is to train and certify a minimum of 3,000 EVITP electricians, with 50% of the funds being invested in employers or individuals located in low-income, disadvantaged, or rural communities.

[38] ATL webpage https://evfleettechtraining.com/

[39] AB 841(Ting, Chapter 372, Statutes 2020) https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201920200AB841

The first round of awards, announced July 18, 2025, includes 15 projects totaling over $1.7 million to train approximately 2,000 electricians [40].

In June 2024, the CEC published the Zero-Emission Vehicle Workforce Training and Development Strategy, A Roadmap for Clean Transportation Program Funding defining the CEC's vision for zero-emission vehicle workforce development goals and objectives through 2030. It is intended to clarify the CEC's role in zero-emission vehicle workforce development, recognize existing opportunities, identify workforce program objectives, and serve as a roadmap to building the career pathways necessary to support the deployment of zero-emission vehicles and infrastructure. On June 25, 2024, the CEC held a workshop to introduce the draft zero-emission vehicle workforce training and development strategy objectives and solicit feedback from the public. A revised Zero-Emission Vehicle Workforce Training and Development Strategy providing updates on the strategy objectives and incorporating stakeholder feedback is expected to be published in December 2025.

Conclusion

While California has made significant progress in deploying zero-emission school buses, the continued reliance on aging diesel models highlights the work that remains. Ensuring every child rides a clean, safe school bus is vital for public health and essential to meeting the State's climate and air quality goals. CARB's strategy prioritizes replacing the oldest, highest-emitting buses first and funding zero-emission models wherever possible to maximize health and climate benefits. However, sustaining this progress and achieving full zero-emission school bus operations by 2045 will require continued and consistent funding. Ongoing support from state legislation, as well as local, federal, and air district programs, remains critical to helping school districts access the cleanest buses available.

Since the last SB 1403 update, California has committed an additional $99 million to school bus incentive programs, bringing the total investment to $2.08 billion. Of this amount, $1.39 billion has been allocated or spent specifically on zero-emission school buses. These funds have supported the purchase of more than 3,400 zero-emission school buses across over 350 public school districts and charter schools statewide. Of these, about 250 agencies have already deployed at least one zero-emission school bus, with more than 1,560 currently operating throughout California.

Funding remains a significant challenge for school districts working to replace aging school bus fleets, especially when pursuing zero-emission school buses. Incentive

[40] NOTICE OF INTENT TO AWARD: Electric Vehicle Infrastructure Training Program (EVITP) Fund: https://etp.ca.gov/wp-content/uploads/sites/70/2025/06/EVITP-Fund-Notice-of-Intent-to-Award.pdf

programs offered by the State, local air districts, the federal government, and other partners continue to be essential in advancing California's goal of a fully zero-emission school bus fleet by 2045; however, no new State funds have been allocated for zero-emission school bus replacement, leaving future progress dependent on existing programs and uncertain funding streams. Fluctuations in tariffs on imported materials and components create uncertainty in the cost and availability of school bus parts. This is especially true for electric school buses, which rely on globally sourced, high-tech components like batteries and power electronics. Unpredictable trade policy changes can lead to price increases or supply delays, making it difficult for school districts to plan and budget for fleet upgrades.

CARB and other partnering agencies continue to engage with stakeholders to support a more flexible shift to zero-emission school buses while maintaining its long-term climate and air quality goals. Despite market challenges, zero-emission school buses remain a critical investment in public health, particularly for children, and in the State's clean transportation future.

While historic federal and State investments over the past three years have significantly accelerated the uptake of zero-emission school buses, continued and coordinated support at the State, federal, and local levels are essential. Sustained funding, strategic planning, and policy alignment will be required to overcome economic uncertainties and ensure the reliable replacement of California's aging school bus fleets with cleaner, healthier, and more sustainable alternatives.

Acronym List

AB – Assembly Bill

AQMD – Air Quality Management District

CAP – Community Air Protection

CARB – California Air Resources Board

CEC – California Energy Commission

CERP – Community Emission Reduction Programs

CHP – California Highway Patrol

CI – Carbon Intensity

CNG – Compressed Natural Gas

DGS – Department of General Services

EnergIIZE – Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles

EPA – Environmental Protection Agency

ETP – Employment Training Panel

EV – Electric Vehicle

EVITP – Electric Vehicle Infrastructure Training Program

g/bhp-hr – Grams Per Brake Horsepower-Hour

HVIP – Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project

kW-hr – Kilowatt- Hour

LCFS – Low Carbon Fuel Standard

Moyer – Carl Moyer Memorial Air Quality Standards Attainment Program

NOx – Oxides of Nitrogen

PM – Particulate Matter

SB – Senate Bill

V2B – Vehicle-to-Building

V2G – Vehicle-to-Grid

ZE – Zero-emission

ZESBI – Zero-Emission School Bus and Infrastructure

ZETI – Zero-Emission Technology Inventory