

# **AB 579 (Ting): Clean & Healthy School Bus Act California Zero-Emission School Bus FAQ**

AB579 would require all new school bus purchases to be zero-emission school buses, beginning in 2035. The bill also extends the lease term to 15 years to maximize long-term savings.

## Is this target feasible?

- Prior to this bill, California has committed to a 100% zero-emission bus fleet by 2045. More than 200 school districts across the state are already operating zero-emission school buses in their fleets. There are upwards of 560 zero-emission school buses already on the road, with 327 of these serving students in the state's most pollution-burdened communities.<sup>1</sup>
- The California Energy Commission and the Air Resources Board estimate that existing state funding commitments will enable replacement of about 20 percent of the school bus fleet with zero-emission school buses.<sup>2</sup>
- This bill gives schools more than a decade to practically plan out and align their purchasing decisions with the timeline set forth by this bill.
- Other states are already outpacing California's leadership on zero-emission school bus adoption. In 2022, New York State adopted a law requiring all new school bus purchases be zero-emission by 2027, and all school buses in operation to be electric by 2035.

## What programs are already in place to fund electric school buses and the supporting charging infrastructure to help school districts meet this goal?

- This bill builds on established programs and funding streams already in place to lower purchasing costs and encourage the transition to electric school buses.
- According to the [2022 SB 1403 School Bus Incentive Program Report](#) published by the California Energy Commission and Air Resources Board, California has invested nearly \$3 billion in zero-emission school buses to date. This includes \$1.5 billion authorized by the legislature in the FY 2022-23 budget agreement for a grant program to help school districts purchase electric school buses and construct charging stations.<sup>3</sup> This grant funding gives priority to rural and small school districts, as well as local educational agencies operating the oldest internal combustion buses. Together with new federal funding, record state funding makes unprecedented resources available to school districts to electrify their school bus fleets.
- In October 2022, at least 20 school organizations across California were awarded more than \$68.2 million total in grants from the first round of

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<sup>1</sup> "Appendix E: 2022 SB 1403 School Bus Incentive Program Report," jointly published by the California Energy Commission and California Air Resources Board on October 12, 2022. [https://ww2.arb.ca.gov/sites/default/files/2022-10/fy2022\\_23\\_funding\\_plan\\_appendix\\_e.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-10/fy2022_23_funding_plan_appendix_e.pdf)

<sup>2</sup> Ibid.

<sup>3</sup> Education omnibus budget trailer bill Assembly Bill 181.



funding for the Environmental Protection Agency (EPA)'s new Clean School Bus Program. Up to \$5 billion will be allocated over the next 5 years toward the purchase of zero-emission school buses through a competitive grant process. California is currently eligible for up to \$500 million of the \$5 billion that the US EPA has set aside for this program.<sup>4</sup> In addition, as part of this program, the Joint Office of Energy and Transportation offers [technical assistance](#) to school districts to successfully plan for, and deploy, zero-emission school buses.

- California has historically leveraged millions of dollars in combined funding from the Volkswagen settlement, California Energy Commission (CEC)'s School Bus Replacement Program, and Air Resources Board's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) to support school bus electrification.
- More than \$94 million is available through the School Bus Replacement Program for public school districts, county offices of education, and joint power authorities, most of which will support replacing old diesel school buses with pollution-free electric vehicles.
- There are extensive technical assistance programs available and under development through the HVIP program to assist schools through the process of transitioning to clean school bus fleets. This includes tools to help schools optimize charging infrastructure planning and other aspects of operating zero-emission school buses smoothly.<sup>5</sup> Additionally, \$17.67 million in dedicated incentives from the CEC's Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles (EnergIIZE) is available to support EV charging infrastructure deployment at schools. The EnergIIZE program also offers resources to help schools evaluate their specific infrastructure needs and identify other sources of available infrastructure funding in California.

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<sup>4</sup> States are only eligible for up to 10% of the \$5 billion total US EPA Clean School Bus Program allocation.

<sup>5</sup> For example, the state-funded HVIP program offers three technical assistance tools: a Total Cost of Ownership Estimator (provides fleet operators with a more accurate accounting of the cost model for purchasing and operating zero-emission school buses), Route Energy Modeling (REM) Tool (enables fleet operators to calculate the total energy demand for charging a zero-emission school bus based on a particular school bus route), and Fleet Transition Plan Automation (enables fleet operators to simulate the conversion of their fleet to zero-emission vehicles over a specified timeline, providing more visibility into associated energy demands to better inform coordination with utilities).



## How much do electric school buses cost? What kind of long-term savings can school districts expect to see from transitioning to these vehicles?

- The upfront cost of an electric school bus is approximately \$350,000. Taking into account the Low Carbon Fuel Standard (LCFS) credits these buses are eligible for, lifetime fueling savings, and continued reductions in sale price, research shows that zero-emission school buses and diesel buses are on track to reach cost parity on a total cost of ownership basis over the next few years, well before the 2035 deadline even without state and federal incentives.
- Electric buses provide significant savings for school districts over the lifetime of the bus. Districts can expect roughly \$5,000-\$10,000 per year in savings on fuel and maintenance costs over the lifetime of their bus, compared to diesel buses, depending on fuel and energy costs by region. School districts have reported a 60% reduction in maintenance costs and 80% reduction in electricity and fueling costs<sup>6</sup>. Over time these savings can help to offset the upfront capital expense.
- In addition to federal and state grants, rebates, and other incentives, electric utility programs<sup>7</sup> can help school districts defray the upfront costs of these vehicles.
- Bidirectional charging capabilities available on most electric school buses enable vehicle-grid-integration (“VGI”) and vehicle-to-grid (“V2G”) programs. While only in pilot form now, this technology has the potential to create additional revenue streams (or at a minimum, facilities and fueling cost savings), thereby improving the value proposition and/or shortening the break even point for these buses. More than 500 of the publicly-funded zero-emission school buses operating in California today are “V2G-capable” (i.e., able to export stored electricity back to the building or the grid as needed to provide reliable, low-cost back-up power).<sup>8</sup>

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<sup>6</sup> The Lion Electric - <https://thelionelectric.com/documents/en/BrochureLionCang.pdf>

<sup>7</sup> For example, PG&E’s EV Fleet Program: [https://www.pge.com/en\\_US/large-business/solar-and-vehicles/clean-vehicles/ev-fleet-program/public-school-fleets.page](https://www.pge.com/en_US/large-business/solar-and-vehicles/clean-vehicles/ev-fleet-program/public-school-fleets.page)

<sup>8</sup> “Appendix E: 2022 SB 1403 School Bus Incentive Program Report,” jointly published by the California Energy Commission and California Air Resources Board on October 12, 2022. [https://ww2.arb.ca.gov/sites/default/files/2022-10/fy2022\\_23\\_funding\\_plan\\_appendix\\_e.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-10/fy2022_23_funding_plan_appendix_e.pdf)

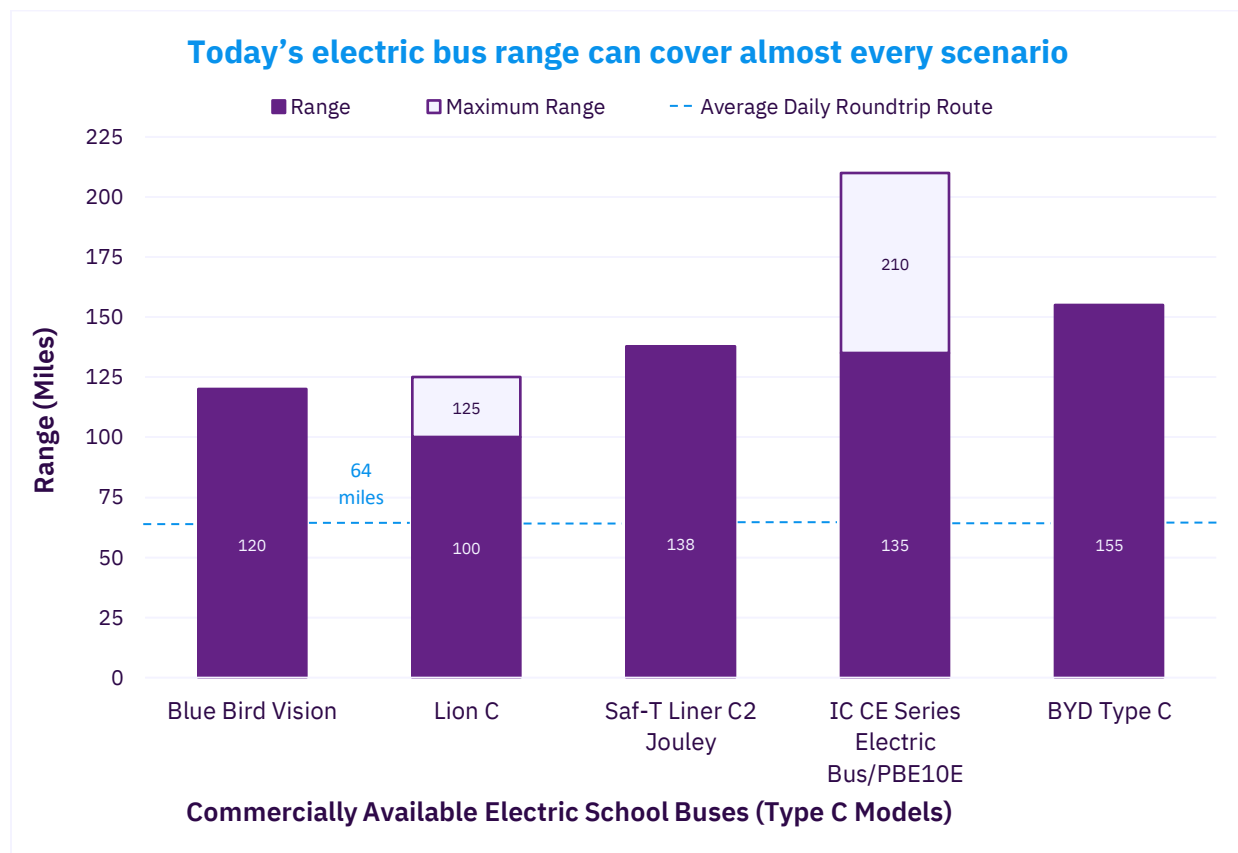


## Which manufacturers are producing these school buses?

- Original equipment manufacturers (OEMs) across North America are manufacturing zero-emission school buses today, with numerous available models on the market to choose from. Leading manufacturers of Type C zero-emission school buses (representing 70% of the current zero-emission school bus market) include Thomas Built Buses, IC Bus, Blue Bird, and Lion Electric.

## Will electric school buses be able to cover the range and routes needed in hilly, rural areas?

- Manufacturers already offer an increasing variety of electric school bus models with ranges between 100 to 200 miles. These available ranges are capable of meeting the vast majority of school transportation needs today — about 90% of school bus routes in the U.S. run less than 90 miles total a day.



Source: [https://files.wri.org/d8/s3fs-public/2022-06/esb-us-market-buyers\\_guide.pdf?VersionId=5Fe\\_3JMEHofev97KdayaZnJ7PxZy.WIw](https://files.wri.org/d8/s3fs-public/2022-06/esb-us-market-buyers_guide.pdf?VersionId=5Fe_3JMEHofev97KdayaZnJ7PxZy.WIw)



- Electric school buses run more efficiently than their diesel counterparts, in part because of regenerative braking. Regenerative braking simultaneously lowers the wear on braking systems and captures the kinetic energy to feed back into the battery, extending the range of the bus. Electric buses also have, on average, higher horsepower and torque levels which allow them to excel in hilly and mountainous environments. The average diesel bus has 200 – 350 HP and 500 – 1000 LB-FT of available torque while the average electric buses have 300-550 HP and 700 – 1,800 lb-ft of torque<sup>9,10,11</sup>
- In the event of extenuating range and terrain constraints impacting a school or local education agency’s ability to purchase or lease a zero-emission school bus in 2035 and after, this bill makes a one-time hardship exemption available for up to 5 years.

## Can electric school buses operate in hot and cold weather?

- Many electric school buses are already succeeding in winter climates. School districts in Michigan, New York, Colorado, Illinois, North Dakota, and Ontario, Canada, have all reported no issues with the electric school buses’ cold weather performance, operation, or charging. So, while electric school buses may experience a small reduction in battery range during extreme cold weather events (around 15% and up to 30% loss), there is even an electric bus operating in Tok, Alaska, that reports great operation even in 40 degrees below zero temperatures<sup>12</sup>.
- Electric drivetrains offer more reliability in such environments as diesel and biofuels tend to jam engines in extreme cold.
- Electric buses can draw from grid power while still plugged in for cabin heat and A/C before leaving the depot, reducing any potential impact from range loss.
- School districts in hot climates also are adding electric school buses—such as Salt Lake City School District, where Transportation Fleet Manager Ken Martinez has said the goal is to run the new buses in all conditions. “These buses are equipped with air conditioning so we can run them all during the summer,” said Martinez to local news outlet KSL.<sup>13</sup>

<sup>9</sup> Lion Electric - <https://thelionelectric.com/documents/en/BrochureLionCang.pdf>

<sup>10</sup> The Lion Electric - <https://thelionelectric.com/documents/en/BrochureLionCang.pdf>

<sup>11</sup> School Transport News - <https://stnonline.com/partner-updates/torque-and-why-it-matters-for-school-buses/>

<sup>12</sup> Motor Biscuit - <https://www.motorbiscuit.com/alaska-using-electric-school-bus-cool-40-degrees/>



## How long does it take an electric school bus to charge?

- With a typical Level 2 (AC) charger, electric school buses can reach a full charge from empty in approximately 8 hours. With DC fast charging option, the charging time drops to approximately 3 hours<sup>13,14,15</sup>. Because buses will rarely be charging from zero, this charge time would be less for normal daily use.

## What happens if the power goes out or there is a power outage?

- Backup power is usually a requirement, or best practice, at most depots already including traditional internal combustion engines, as gas or diesel pumps also do not work without electricity. Under a typical managed fleet scenario school buses could potentially offer a reliable source of backup power to a facility using the bidirectional charging capabilities (I.e., shifting power from the bus back to the facility/grid) currently installed on most models.

## How long will these buses operate? Does the battery wear down over time?

- Electric school bus batteries are expected to have a 12-15 year lifespan<sup>16,17</sup>, with some experts extending that estimate to 20 years with excellent charging practices and use<sup>18</sup>. This timeframe matches a diesel school bus, which has an average lifespan of 12 – 15 years as well. Unlike a diesel school bus, electric school bus batteries can be repurposed as stationary storage, therefore creating an end-of-life resale value.

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<sup>13</sup> Thomas Built Buses - <https://thomasbuiltbuses.com/resources/articles/heres-what-you-should-know-about-electric-school-bus-range/>

<sup>14</sup> Cummins - <https://www.cummins.com/news/2021/07/01/5-questions-about-electric-buses-answered>

<sup>15</sup> Blue Bird - <https://www.blue-bird.com/buses/electric-school-buses#:~:text=Blue%20Bird's%20electric%20buses%20can,charge%20in%20approximately%208%20hours>

<sup>16</sup> Gregory Poole - <https://www.gregorypoole.com/electric-bus-guide/>

<sup>17</sup> Environmental Defense Fund - <http://blogs.edf.org/energyexchange/files/2021/02/ElectricSchoolBusFactSheet.pdf>

<sup>18</sup> Business and Technology Report - <https://www.cooperative.com/programs-services/bts/documents/reports/battery-energy-storage-overview-report-update-april-2019.pdf>



## Are there mechanics who know how to service electric school buses?

- Many electric bus manufacturers provide initial training for bus drivers and mechanics as part of the purchase agreement and warranty of a new electric school bus. Many manufacturers also have online training instruction available to maintenance teams. Electric buses also have the benefit of having fewer parts and moving pieces than diesel buses (e.g., no oil changes, catalytic converters, etc.), so there are fewer parts that could need repair. Mark Alford, a heavy-duty mechanic with the Cajon Valley Union School District near San Diego described electric school maintenance as “Nothing really changes. Tires and breaks and general wear and tear, and all that other stuff is pretty much the same.” New business models like Fleets-as-a-service offer end-to-end operational services that include vehicle maintenance.

## Why are you advocating for extending lease terms for contracted electric school buses?

- Longer lease terms of 15 years could substantially improve the financial feasibility of electric school buses for school districts. In addition, shorter five-year leases do not align with the 12-15-year lifespan that research predicts is optimal for electric school buses to reach cost parity with diesel alternatives due to annual fuel and maintenance savings. Statutes in multiple states, including New York and California, currently limit leases to five years, which increases the cost of any lease for municipalities.

## About Advanced Energy United

Advanced Energy United educates, engages, and advocates for policies that allow our member companies to compete to repower our economy with 100% clean energy. We work with leaders of the Federal and state governments as well as regulators of energy markets to achieve this goal. The businesses we represent are lowering consumer costs, creating millions of new jobs, and providing the full range of clean, efficient, and reliable energy and transportation solutions. Today, these businesses have a combined market capitalization in excess of \$3 trillion. **For more information, please contact:**

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