

7 STEPS to Successfully Adopt an Electric School Bus

Battery-electric school buses eliminate tailpipe emissions and can curb operating costs, but incorporating them into a fleet requires careful planning, staff training, and evaluating options. Here's a guide to getting off on the right route.



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Thinking of adding electric buses to your fleet? If so, you're not alone. School districts and contractors in the U.S. and Canada bought nearly 500 electric school buses in the 2019 sales year¹.

School Bus Fleet's 2019 sales report and other recent research² show electric power eclipsing compressed natural gas as the second-most popular alternative fuel for school buses.

Some OEMs now see electric school buses as "the future of the pupil transportation industry"³. While forays into electric school buses in the '90s didn't take root, today the technology is advancing rapidly and has been shown to fit well into the typical school transportation duty cycle, with ample time to recharge between morning and afternoon routes.

With the elimination of tailpipe emissions and the potential to decrease maintenance and operating costs, it's not hard to see why many bus operators are going electric. Mandates are another factor — for example, California is ramping up requirements for zero-emission buses in the next decade.

While the benefits of electric buses are clear, incorporating them into an existing fleet of conventional buses isn't a simple proposition. The move requires careful planning, evaluation of the technology options, staff training, and communication with the public.

Here are seven steps to take for a successful shift to electric school buses.

1.

CHART THE COURSE

Transportation experts who have experience with electric buses advise deciding up front what the end game will be⁴. For example, is the goal a fully electric fleet or a mix of different propulsion types? Determining this from the get-go will help in mapping out related plans, such as charging infrastructure.

Some school districts and contractors have begun their electric ventures with a pilot project. This gives operators a chance to demonstrate the viability of electric buses in their fleet while testing them on a variety of routes and gaining real-world experience.

The World Resources Institute recommends launching a structured pilot project that includes the following elements⁵:

- ▶ Clear definitions on the scale and timing.
- ▶ Specification of the data needed.
- ▶ Data collection mechanisms.
- ▶ Plans for charging infrastructure.

The World Resources Institute also suggests testing more than one electric bus model to increase the project's flexibility and decrease its vulnerability.

After a successful demonstration, start phasing in more electric buses, perhaps buying a few each year as part of your fleet replacement plan.



2.

TAP INTO GRANTS AND FINANCING

Although the purchase price of electric buses is considerably higher than that of conventional diesel buses, grants and financing programs can help operators make the initial investment in the vehicles as well as the necessary infrastructure.

The Environmental Protection Agency (EPA) regularly provides funding to replace old school buses through the Diesel Emissions Reduction Act. For instance, in 2019 the EPA offered more than \$10 million to public and private fleet owners to scrap old diesel school buses and replace them with new buses certified to the agency's cleanest emission standards. That includes battery-powered electric school buses.

Vouchers and grants to support electric bus adoption are also offered at the state or regional level, and some states have earmarked funds from the Volkswagen (VW) diesel emissions settlement for zero-emission bus purchases.

As one example, Virginia announced in 2019 that it would allocate \$20 million of its VW settlement funds for a new electric school bus initiative⁶. School districts can be reimbursed up to \$265,000 for the purchase of one electric bus, including charging infrastructure. Virginia has also earmarked \$14 million in VW funding to develop the state's electric vehicle charging network.

In Michigan, the Department of Environment, Great Lakes, and Energy recently awarded seven school districts a total of \$4.2 million to purchase 17 electric school buses⁷. The move is part of a state program that is financed in part by VW settlement funding.

Meanwhile, Illinois' plans for its VW settlement share include allocating up to 10% (about \$10.9 million) for all-electric school buses.

In many cases, bus suppliers can help operators secure grants. As another option, some OEMs offer financing programs that enable fleets to lease electric buses, batteries, and charging infrastructure. On that front, two types of leasing options are available⁴:

- ▶ **Capital leases, which are often used by fleets that plan to run the bus for at least 12 years.**
- ▶ **Operating leases, which are a preferred option for fleets that plan to lease buses for five to seven years before trading them in for newer models.**

3.

ANALYZE ROUTING AND SCHEDULING FACTORS

Although the range of electric buses has been increasing in recent years, they still come up short on distance when compared to other propulsion systems. In general, battery-electric buses average about two-thirds the range of their diesel or natural gas counterparts. This adds to the complexity of routing and scheduling.

When incorporating electric buses into a school transportation system, start by tackling these essential questions⁸:

- ▶ **What is each vehicle's range?**
- ▶ **What are the minimum charging requirements for each route?**
- ▶ **What is the charging time for each battery?**



The answers to those questions will help in deciding whether to employ short charges during the day or long charges overnight. Another factor to consider in charging is the utility’s peak times, when electricity rates will be higher.

While routing and scheduling of electric buses is a complicated undertaking, fleet management software can help monitor battery usage and charging times while creating efficient schedules. Fleet management programs can also track key data on electric buses, such as maintenance costs and component failures.

To make the charging process easier and more efficient, electric bus operators can opt for new managed charging infrastructure. After plugging in a bus, these systems charge the bus only as needed, and they can be programmed to charge at the times of day when electricity rates are lowest¹¹.

To further boost sustainability, solar equipment can help power electric buses. A transit agency in Indianapolis has done just that: A solar installation on its roof provides 1 megawatt, essentially fueling all 21 of its electric buses¹².

4.

MAP OUT INFRASTRUCTURE

When adding electric buses to your fleet, you’ll need new infrastructure to keep the vehicles powered up. The key, experts say, is to plan for future growth. Charging stations should be designed with scalability in mind.

There are four key questions that should be addressed to determine a bus operator’s infrastructure needs⁹:

1. How many buses will be charged?
2. What is the bus battery capacity (kWh)?
3. What is the bus rate of charge (kW)?
4. What is the allotted time for recharging buses?

Local utility providers can help bus operators map out charging infrastructure. In California, Bellflower Unified School District worked with Southern California Edison and a contractor to create a designated electric vehicle line from an existing utility pole to a new charging space in the district’s bus yard¹⁰.

5.

PREP AND TRAIN STAFF

Drivers may be apprehensive about getting behind the wheel of an electric bus for the first time. Training sessions help drivers become more comfortable with the new buses while learning their features and nuances.

As the World Resources Institute notes⁵, driving an electric bus is not drastically different from driving a conventional bus. However, reinforcing good driving habits helps optimize the efficiency of electric buses by increasing battery life and decreasing operating and maintenance costs.

Maintenance staff will also need initial instruction before they start working on electric buses, and ongoing training to stay abreast of developments in the technology. School bus operators can tap their bus suppliers for support in getting their staff up to speed on how to operate and maintain electric buses and charging infrastructure.



6.

EDUCATE THE COMMUNITY

Don't overlook the public relations aspect of adopting electric buses. Take the opportunity to tout the benefits to the community: cleaner air, reduced use of fossil fuels, and less noise.

That latter point presents an additional need for communication with the community. Because electric buses run much quieter than diesels, they require greater attention on the part of school bus passengers and pedestrians. If bystanders are distracted, they might not realize that a bus is headed their way. This issue can be addressed in messaging to parents and the general public.

Electric school buses also offer a learning opportunity for students. School districts can incorporate the electric vehicles into lessons on the environment, clean air, and sustainability.

7.

DON'T GO IT ALONE

With all the variables and options to consider, the route to an electric bus fleet can get complicated. Fortunately, there's no shortage of capable guides.

Consultants can assist with factors like infrastructure design, charging equipment options, best practices for RFPs, and routing and scheduling. Suppliers can provide training and help find funding sources and financing options. Utility providers can make accommodations to power up your facility's charging infrastructure.

And, with many school districts and contractors across the nation already operating electric buses, your colleagues in the industry can share insights to help you navigate the road to an electrified fleet. Fortunately, there's no need to go it alone.



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