



100 mi

100-120+ mi

Average range on a full charge



~3 hrs

to fully charge with a DC fast charger



98%

Battery capacity maintained after 5 years



97%

Fewer moving parts compared to a diesel engine



550

lbs reduction in NO_x per bus (vs. diesel)



240

tons reduction in CO₂ per bus (vs. diesel)

Buses

① What is an electric school bus?

An electric school bus is simply a school bus with an electric motor powered by a large bank of batteries.

② Is an electric bus structurally any different than a traditional bus?

No. Electric school buses are structurally identical to their traditional counterparts. They are built on the same chassis as diesel buses by many of the same manufacturers, including Blue Bird, Thomas Built Buses, and IC. Electric school buses meet all Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS).

③ What are the health benefits of electric school buses?

Electric school buses eliminate student, driver, and community exposure to diesel fumes, which have been linked to childhood asthma, respiratory illnesses, and absenteeism. These effects are often more severe in historically marginalized and underrepresented communities.

④ Who supports electrifying school bus fleets?

The federal government, an increasing number of states, and grassroots organizations all support school bus electrification. Key advocates include: Mothers Out Front, Moms Clean Air Force, 350.org community action groups, Climate Mayors, DOE Clean Cities Coalitions, the American Lung Association, parents, students, superintendents, and engaged members of your local school board, among many others.

Cost

① How much do electric school buses cost?

Electric school buses cost ~3x as much as diesel buses. State and federal incentives help lower that cost. And public-private partnerships can further lower the cost and distribute it over a contract term — usually 10-15 years. That allows school districts and fleet operators to pay a fixed annual fee that is less than what they currently pay to purchase, operate, and maintain diesel buses.

② How much does it cost to install charging equipment?

Depending on equipment specified and project scope, upfront charging equipment costs can range from a few thousand dollars to hundreds of thousands of dollars — or more. In addition, many districts find that construction and installation can have significant hidden costs that negatively impact budgets and deadlines.

③ How complex is it to build an electric fleet?

Building an electric fleet involves a lot more than just the buses. It is a complex civil and electrical engineering project that includes project planning, equipment procurement, engineering, construction, utility interconnection & permitting, training, managed charging, EV fleet optimization, demand response, vehicle to grid (V2G) — and more.

④ If electric buses are getting cheaper and better, why should my community electrify now?

The best reason to upgrade your fleet now is to protect your children's and your community's health. States and municipalities are increasingly adopting 100% electrification mandates: Districts that start now can thoughtfully plan their transition and avoid equipment backlogs.



Want to learn more?

highlandfleets.com



Batteries

① How far can a fully-charged bus travel?

Depending on the model, a typical electric school bus can travel 100-120+ miles on a full charge. This range makes electric school buses suitable for more than 90% of all school bus routes in the United States. Electric school buses also have a regenerative braking mode that enables them to partially recharge while they're being driven, which can help extend range.

② How long does it take to charge an electric bus?

With high-voltage conduit and DC fast chargers, an electric bus can go from 0% to 100% charge in about three hours. Slower Level 2 chargers typically take about 8 hours to go from 0% to 100%. Buses rarely return from routes empty, and most can be topped up and ready for their next batch of routes in a matter of hours.

③ What's the lifespan of electric school bus batteries?

Electric school bus batteries last 10-15 years on average, with only 2% degradation after five years. At the end of their useful lifespan in electric vehicles, they can be reused in industrial applications; after that 90% of a battery's components can be recycled.

④ How do AC and heat affect bus range?

Electric AC and heat do reduce range, typically by 15% and 25%, respectively. Since the average U.S. school bus route is 35-40 miles, electric AC and heat range reductions are usually inconsequential; however, if desired, optional fossil-fuel-powered heaters that don't degrade range are available from some manufacturers. A clear benefit of electric AC and heat is that it cools and heats the buses very quickly, creating a significantly more comfortable work environment for drivers.

⑤ What is vehicle-to-grid technology?

Vehicle-to-grid (V2G) technology allows an electric school bus to both draw energy from the grid to charge its batteries, and discharge energy from its batteries back to the grid when the community needs it. This bi-directional charging infrastructure transforms an electric school bus into a valuable Distributed Energy Resource (DER) — effectively a large battery that utilities can draw on during periods of peak demand to reduce strain on the electric grid and make communities more resilient. Utilities with V2G programs pay for this extra power, which can help reduce the cost of electrification.

Maintenance

① How do electric bus maintenance costs compare to diesel?

Electric school bus drivetrains have 97% fewer moving parts than a traditional internal combustion engine, so there is less wear and tear than with a diesel bus. Regenerative braking also drastically reduces the need for brake jobs, and drivers often prefer it to friction brakes. For these and other reasons, electric buses have a lower total cost of ownership through maintenance cost savings, which are typically in the range of 30-50%.

② What is the warranty for the battery and electric drive motor? Is an extended warranty available?

Typical industry warranties cover eight years for the battery and drive motor with options to purchase extended warranties. Fleet electrification providers, including Highland, offer extended warranties as part of their contracts.

Performance

① Will my bus perform in the snow and extreme heat?

Electric motors & batteries are designed to be efficient in cold & heat - meaning more consistent performance across weather conditions..

② What happens if there's a grid outage?

Electric buses can maintain a full charge for weeks when parked - longer than most outages. In the event of an extended outage, Highland can bring temporary power generation to a site to support bus operations.

