Frequently Asked Questions

Guide to Transitioning to a Zero-Emission School Bus Fleet

Selecting a zero-emission school bus will require your school district to consider several factors that play a key role in operations, maintenance, and charging infrastructure needs. When making this decision, be sure to engage with all relevant stakeholders such as school district administrators, superintendents, City and or County staff, electric utility representatives, school bus fleet & facility managers, bus drivers, and maintenance staff. Connecting with other school districts that have deployed zero-emission school buses can also be beneficial. Please visit the California Zero-Emission Vehicle Population Dashboard to find deployed zero-emission vehicles near you.

The following guide represents a compilation of a few of the many best practices and considerations that school districts have found helpful when beginning their transition to zero-emission. The first section pertains to the zero-emission school bus vehicle selection and the second portion pertains to the infrastructure and charging equipment selection.

ZERO-EMISSION SCHOOL BUS SELECTION

What should I consider when selecting a vehicle dealer?

It is best practice to research the type of vehicle options a dealer has, any accompanied warranties, and the level of service and locations for maintenance and repairs. Confirm that the service locations are available within a reasonable distance to have routine maintenance and repairs completed in a timely manner.

What information should I provide to my vehicle dealer to ensure a proper bus selection is made?

1) The number of students the bus needs to transport.
2) The distance required for each route in your bus fleet.
3) The type of terrain and conditions your school district operates in.
4) When and how long are your dwell times (e.g., mid-day and/or overnight)?
5) What automatic HVAC control options do you need (e.g., pre-heat or pre-cool)?

What comes first, electric school bus selection or charging equipment selection?

Zero-emission school bus selection comes first. The charging equipment is selected **after** the vehicle has been selected to ensure the power level of the charging equipment selected is sufficient to support the vehicle battery and that the charging equipment is compatible with the vehicle inlet. Much of the charging selection depends on the capacity of the vehicle battery, and

the owner operator's planned route(s)/range. Ask your dealer if they have recommendations on which charging equipment will work best for your bus and operational needs. When discussing charging equipment options, be sure to ask about the warranty and charging equipment repair help.

Please visit the HVIP Vehicle Catalog to start exploring your options on eligible school buses. [Note that all vehicles with a "Set-Aside" banner are Public School Bus Set-Aside eligible vehicles/dealers] For more information, please visit Public School Bus Set-Aside.

What is the operational range for most electric school buses?

Electric school buses have a variety of operational ranges available. Depending on school bus type, operational range falls between 100 to 150 miles. The operational range varies based on the battery pack capacity and how it is impacted by weather, driving behavior of the operators, terrain, bus weight and utilization of internal heating and cooling.

What is regenerative braking and how does it function?

Regenerative braking captures kinetic energy created during a braking or a slowdown event and converts that energy into electricity, which is then routed through an electric motor into the vehicle's batteries, extending the range of the vehicle.

Tip: Increase regenerative braking by anticipating your stops and removing pressure from the accelerator to slow down the vehicle.

Can electric school buses withstand extreme temperatures?

When operating in extreme climates, talk to your dealer about the impact that the climate may have as you evaluate your future bus and battery size, including route distances, storage location, utilization of heater and air conditioning, etc.

Tip: Talk to your dealer regarding pre-heating/pre-cooling while plugged into the grid, and how this helps extend the range.

Where can I find out more about zero-emission school bus training?

- California Energy Commission's ESB Technician Training series
- CALSTART's Electric School Bus Network
- Sunline Transit Agency
- U.S Department of Energy's Alternative Fuels Data Center Driver and Technician Training

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INFRASTRUCTURE and CHARGING EQUIPMENT SELECTION

When should I involve my electric utility provider and what questions should I ask?

Working with your electric utility provider from the onset of the planning process is critical to understand potential build out requirements, cost, development timelines and energy load capacity availability. Having these conversations early will allow time to obtain the necessary equipment and plan accordingly. Refer to the California Energy Commission website for a list of California electric load serving entities.

Tip: Work with your electric utility provider to evaluate electric vehicle billing rate options and potential demand charges to mitigate high charging costs.

What information will I need when having discussions with my electric utility provider?

- The site address.
- A satellite map of the location.
- Location of the proposed charging equipment.
- Anticipated number of electric buses in the next 12-months and in the next 5 years.
- Anticipated number and type of charging equipment.

Note: A signed copy of Easement rights from the property owner may be needed if the property is being leased.

The infrastructure INSITE tool offers an electric vehicle work plan. The plan recommends reaching out to your local utility early on to avoid potential delays. Make sure your plan accommodates for the total number of electric vehicles you will have long term. It is highly recommended to start discussions with your local municipality as early as possible. The Authority Having Jurisdiction, more commonly known as the agency that reviews and approves plans and permits, (City and/or County) staff will review to approve or reject the site plan design.

What information and services will utilities provide?

After preliminary information has been obtained, a local utility company will assess the site for feasibility, such as the service line, power availability, and the transformer feeding energy to your street and/or facility. The electric utility engineer will construct a Final Site Design as a blueprint for your contractor to begin construction and will coordinate with and obtain final approval from your Authority Having Jurisdiction (AHJ). An Authority Having Jurisdiction is the city and/or

county enforcing the requirements of a code or standard, and for approving the equipment being installed.

To break ground, a permit must be acquired from the Authority Having Jurisdiction. There are also required inspections to ensure building is up to code and safety measures have been taken.

Note: All electric utility providers may provide different services or require different information, please check with your local electric utility provider to discuss your project needs.

Where can I obtain more information about my Authority Having Jurisdiction, and a checklist of what is needed to obtain a permit?

Please visit the CA Electric Vehicle Charging Station Permit Streamlining Map for more information on locating your Authority Having Jurisdiction (city and/or county). The map is intentionally streamlined to make the permitting process simple. A checklist along with contact information may be found by selecting your city or county.

Do I need to find an EVITP certified electrician right away?

EVITP (Electrical Vehicle Infrastructure Training Program) certified electricians are required during the installation of the charging infrastructure, but it is recommended to involve them during the site planning to ensure electrical rules and regulations are being followed when deciding the placement of the electrical equipment.

What is a Preliminary Site Plan?

A Preliminary Site Plan is a satellite image (map) of the location which should include the building, street as a point of reference, and a highlighted map area with the locations for the charging stations. The electrician uses this information as part of the feasibility study and cost analysis.

What is a Final Site Plan?

A Final Site Design/architectural drawing is executed by the electric utility Engineer and Contractor and must be approved by the Authority Having Jurisdiction (AHJ). The Final Site Design is more detailed than a Preliminary Site Plan, it includes path of travel, power capacity, official location of the charging equipment and charging stations, below ground details, etc.

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RESOURCES

Zero-Emission School Bus Selection

The EPA Clean School Bus Program Bus Inventory Sheet is a tool that school districts can use to help collect the relevant information required when selecting an electric school bus.

World Resource Institute's Electric School Bus Buyer's Guide is a comprehensive guide that offers school districts and others an overview of the electric school bus market and a catalog ("Buyer's Guide") that presents electric school bus models available today with detailed vehicle specifications.

The Zero Emission Technology Inventory (ZETI) Tool is an interactive online resource to provide comprehensive information including regions where zero-emission brands are available for purchase, and the timeline over which additional models are expected to become available.

The U.S. Department of Energy's Alternative Fuels Data Center's database of state and federal funding programs is a resource that can help school districts identify various funding options available.

Infrastructure and Charging Equipment

To learn the basics of how to anticipate scaling needs, build out your school bus depot, and engage with your utility so that your charging infrastructure matches your fleet's needs, please visit the Resources tab in the EnergIIZE website. Scroll down to "Electric," drop down near the bottom of the page and find the "Infrastructure Planning Guide – School Bus" for details.

The World Resources Institute (WRI) provides a Power Planner as a resource for school districts to prepare for and engage in discussions with electric utilities about the electrification of school bus fleets.

If you have further questions, please reach out to the School Bus Team at SchoolBusTeam@CALSTART.org for further assistance.