

Electric School Bus Fleet - Connectors

Overview

When planning your electric school bus fleet and its accompanying infrastructure, it is important to consider the different charging technologies available and the appropriate technology for your specific vehicles. Selecting the right chargers can help you minimize unnecessary costs and maximize the energy efficiency of your fleet's duty cycle.

Before buying electric chargers, it is important to evaluate your vehicle's charging rate to determine whether to select a Level 2 charger, Direct Current Fast Charger (DCFC), or a mix of both.

Finally, it is always important to consult with one's local utility to understand how charger selection may impact site upgrades.

Level 2 vs. Direct Current Fast Chargers

To compare, Level 2 chargers deliver charge at lower power than Direct Current Fast-Chargers (DCFC), meaning slower charging rates and therefore may be more suitable for depot charging. School buses often have reliable distances, routes, and 'return to base' expectations, often making Level 2 chargers an appropriate and cost-effective solution.

DCFCs on the other hand provide higher power and therefore can recharge vehicles more quickly. For electric school bus fleets with multiple shifts or shorter windows for charging, DCFCs may be a suitable solution for your fleet.

You can see a breakdown on power requirement and time to charge between Level 2 chargers and DCFCs in Figure 2 below.

Selecting the Right Connector

Note that, regardless of charger type, it is important to select the right connector. Typical connectors are shown in figure 1 below. Most Level 2 chargers require a connector with J1772 technical standard, and most DCFCs require a CCS1 connector. However, some bus models require unique connectors specified by the vehicle manufacturer. To avoid any deployment delays or unnecessary costs, check with your bus and charger manufacturers to guarantee the correct equipment before buying connectors for your bus fleet.

One must ensure that the vehicles you own or have ordered are compatible with the charging equipment you have ordered. This means utilizing the power output supplied by the charging equipment you have selected as well.

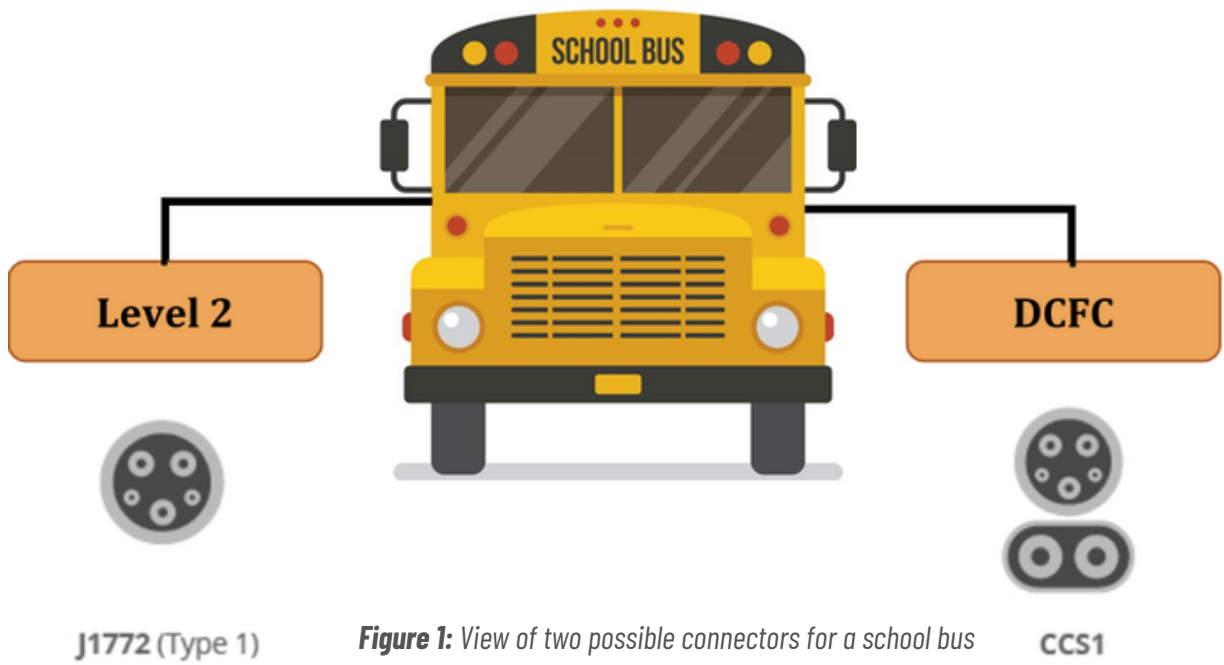


Figure 1: View of two possible connectors for a school bus

Charging Times for School Buses

A number of factors determine the amount of time to charge your electric school bus, including the style of EVSE used (Level 2 vs DCFC), the amperage of your EVSE, and the charge-management schedule you may have in place.

Many school bus charging depots have opted for a 19.2 kW EVSE to balance the cost of the equipment and mitigate potential demand charges. The table to the right outlines the estimated time necessary to charge a variety of school bus types.

*These figures are an estimate, and your experience may vary.

Estimated Charging Time for Electric School Bus (Using a 19.2 kW, Level 2 EVSE)

Type A School Bus (106 - 160 kWh battery)	2 hrs - 4.5 hrs (50%)	5.5 hrs - 8.3 hrs (0 - 100%)
Type C School Bus (127 - 220 kWh battery)	2 hrs - 5.5 hrs (50%)	6.6 hrs - 11.5 hrs (0 - 100%)
Type C School Bus (155 - 220 kWh battery)	2 hrs - 5.5 hrs (50%)	8.1 hrs - 11.5 hrs (0 - 100%)

Table 1: Estimated charging time of electric School Buses Source: VEIC



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