



INFRASTRUCTURE PLANNING TOOL

A Transit Fleet's Guide to Successful Electric Bus Charging

Going Electric

Are you a transit fleet? Have you thought about moving your fleet towards electrification? Or, have you already decided to go electric? If so, hold the brakes! Before you choose your electric bus technology and begin the procurement process, you must first assess your infrastructure needs to successfully deploy an electric bus fleet. This tool will help you get started by providing quick and simple guidance on the planning that is required to implement electric charging at your bus depot.

Infrastructure First

In California and throughout the United States, transit fleets are moving towards electrification to reduce emissions, improve efficiency and seek the operational benefits of an electric bus fleet. Though technology has advanced, and fleets are realizing the business case of an electric bus fleet, infrastructure remains to be the biggest barrier to technology adoption. Infrastructure challenges such as deployment lead time, costly upgrades, space constraints, and demand charges are impacting a fleet's ability to effectively own and operate an electric bus fleet. When going electric, infrastructure planning must come first!

Infrastructure Planning Check List

Before you get started with planning your electric charging infrastructure, make sure you are prepared to know the following and soon, you'll be ready to go!

- Fleet Deployment Goals
- Project Team (Internal & External)
- Utility Point of Contact
- Staff Electrical Engineer (or External)
- Estimated Project Timeline
- Capital Budget for Project
- Available Battery Electric Bus Technologies
- Electric Vehicle Supply Equipment Options
- Smart Charging Software & Networking
- Available Incentive Programs
- Permitting Requirements
- Understanding of Contracting Process



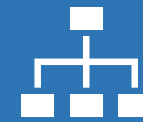
Important Considerations to Infrastructure Deployment

Until you have completed the infrastructure planning process, there are number of unknowns that will need to be evaluated to best determine your electric bus fleet deployment plan. For instance, though a transit fleet may initially demonstrate a few electric buses to determine fleet and operational suitability, it is critical to **anticipate potential scaling needs** in case a fleet transitions from 10 to 100 electric buses. Secondly, depending on fleet size, bus technology, charging equipment, access to the grid and power demand, **infrastructure costs can vary** with factors such as required utility upgrades, trenching and laying down conduit, and additional energy storage. Third, **working with your utility** from the onset of the planning process is critical to understand potential build out requirements, cost and development timelines. Lastly, working with your utility to **evaluate electric vehicle rates and potential demand charges** are important to avoid high charging costs while operating an electric bus fleet.



An Infrastructure Decision Tree for Transit Fleets

Five Smart Steps to Plan for Electric Bus Charging



Engage Utility

- Evaluate existing infrastructure programs.
- Determine EV rate structure.
- Plan charging times.
- Evaluate load sharing options.
- Understand utility application requirements.

Step 1: Consideration of Electric Bus Deployment

- Engage your utility, identify needed technical support, and obtain a new service request form.
- Confirm charging requirements, needs and costs from vehicle manufacturer and EVSE supplier.
- Determine fleet scaling potential.

Technical Support

- ID Electric Engineer (Internal or External)
- Evaluate options for contractor support.
- Build partnership between OEM, EVSE supplier, utility, engineer and fleet and operational staff.

Step 2: Bus Fleet Electrification

- Plan for phasing and timeline for deployment.
- Perform system modeling and understand bus duty cycles and projected energy needs (daily kWh, charging times and speed).

Deployment Timeline

It is important that you factor in the time it will take to plan, develop and deploy your electric charging infrastructure. Full deployment can take up to 1 – 4 years based on fleet size and needed upgrades. The timeline below is based on deployment best practices.

PLANNING: Steps 1- 5

3 – 12 Months

DEVELOPMENT: Electric Upgrades and Construction

6 – 48 Months

DEPLOYMENT: Integrating Electric Buses

1 – 3 Months

Step 3: Depot Yard Analysis

- Evaluate site infrastructure and utility grid infrastructure needs.
- Identify space availability.
- Evaluate charging/renewable energy options.

- Evaluate additional energy requirements, microgrids, energy storage & smart charging software.

Step 4: Development of Charging Schedule

- Identify charging hardware.
- Develop charging schedule (best window for charging).

Contact CALSTART for infrastructure planning assistance!
www.calstart.org

Step 5: Development of Electric Service Plan

- Detail requested service voltage and load schedule.
- Identify service drop and transformer locations.
- Develop conceptual electric single line diagram.
- Determine costs for design, site works and installation

- Obtain permits.

