



# Workplace Charging Do's and Don'ts

## Things to think about before adding charging infrastructure for light-duty plug-in electric vehicles

Employees are buying more and more plug-in electric vehicles, (PEVs) which include battery electric and plug-in hybrid electric vehicles. As a result, many employers have added workplace charging to support the use of clean technology vehicles. Here are some things to consider when adding charging at the workplace.



### Charging infrastructure levels, performance and costs

Charging Level	Charge Time to go 25 miles	Hardware Costs	Installation Costs*
Level 1 – 110 V	6 hours	\$0 to \$5	\$0 to 2,000
Level 2 – 220 V	< 2 hours	\$500 to \$4,000	\$2,000 to \$3,000
Fast Chargers	13 to 21 minutes	\$6,500 to \$45,000	\$8,000 to \$85,000

*\*Installation costs vary widely by site.*

Levels 1 and 2 electric vehicle supply equipment (EVSE) are the interface between the electric grid and PEVs. EVSE safely provides AC electricity to the car. The battery charger is located onboard the PEV. Level 1 EVSE can be hard-wired to an electrical circuit or it can be portable and plugged into a 110/120-volt outlet. Level 2 EVSE is hard-wired to an electrical circuit and mounted on a wall or pedestal.

Level 1 and 2 EVSE both use a standard plug, called a SAE J1772 connector, to connect to the PEV charge port. All PEVs have a J1772 charge port. Level 1 can be more suitable for charging smaller batteries, but it can charge too slowly for larger battery packs.

Direct Current Fast Chargers (DCFC) contain an off-board charger and provide DC electricity directly to the PEV battery. The battery charger is located inside the fast charger.

Three fast charger technologies (SAE Combo Connector, CHAdeMO, Tesla) are in use today and are not compatible. So it's important to match the type of fast charger technology to the fast charger technology of employees' vehicles. Not all PEVs can be fast-charged.

## Installation costs for all charging levels

- Cutting concrete or asphalt for trenching
- Boring
- Long distances from the electrical service
- Updating or adding electrical service
- Pedestal mounting
- Excessive permitting requirements
- Requirements for engineering drawings
- ADA compliance



## Pick the best sites to save money on installation

- Sufficient electric power already exists
- Hanging Level 1 and 2 EVSE on walls
- Running wall-mounted conduit
- Soft soil or grassy area trenching
- Siting infrastructure near electric service
- Work with the local electric utility
- Plan for future infrastructure additions by running additional conduit
- Size infrastructure for potentially larger batteries in future PEVs

## Consider high cost of demand charges

- Demand charges occur if power demand exceeds a certain level on a single electric meter, which is often 20 kW. Fast charging is often at 50 kW
- Demand charges can exceed \$1,000 per month
- Four or more Level 2 EVSE can exceed 20 kW



## Recommendations

- EVSE siting should consider employee, visitor and work-fleet use
- Workplace EVSE need defined processes and procedures for shared use
- Visitor EVSE should operate in a manner similar to public charging
- Focus on siting distances from the electrical service (closer is cheaper)
- Use proper signage
- A charging policy should be developed that covers employees' shared use of single EVSE, the use of cord sets that can reach multiple parking spaces, what if any, fees for employees' workplace charging, and the management of peak demand versus electricity supply issues
- Consider tax implications for providing employees free charging