

EV Charging Decision Making Guide



Planning Questions

Your Vision

What is your reason for having an EV charging station?

What are your short term goals for EV charging?

What are your long term goals for EV charging?

What will be your next phase of charging site development?

Who do you expect will use your charging station(s)?

Will your charging station(s) serve employees?

Will your charging station(s) serve visitors to your property?

Will your charging station(s) serve your fleet?

Will your charging station(s) serve the general public?

Do you anticipate drivers at your charging station will be filling up on a longer distance road trip?

Do you anticipate drivers at your charging station will be topping off as they drive around town?

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Planning Questions

Your Project

What is your ideal project timeline?

What do you see as your biggest obstacle?

Does the station need to make a profit?

Have you developed a cost estimate for your project idea?

How much money do you have to budget for this project?

How much do you have set aside for upfront costs?

Do you have an ongoing O&M budget?

Do you have a replacement plan for when a station needs to be replaced, typically 5 to 10 years?

Who on your staff will be working on your EV charging project?

What is the time frame you'd like to make a profit in or cover costs?

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Planning Questions

Your Chargers

Are you familiar with the difference between level 1, level 2, and DC fast chargers?

Are you interested in level 1, level 2, and/or DC fast chargers?

Do you have an idea what type of chargers are best for your business?

Are you interested in networked charging? This allows remote management and payment processing for an additional monthly cost. Costs may or may not be recouped by driver fees.

Do you want to own or lease charging equipment?

Do you want a service contract?

How will you repair an EV charger that is down?

How will you respond to driver concerns if the station is down?

Who on your staff will be the point of contact for your EV charging project and the management of the equipment once installed?

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Planning Questions

Your Location

Do you have a site location for the EV chargers in mind?

Do you own the location or have the rights to install charging?

Where else is EV charging in your community?

Have you considered site upgrades in addition to the charging infrastructure such as signage or canopy roofing?

Is there close proximity to services such as stores and restaurants?

What safety considerations should be taken into account to preserve traffic safety?

How will traffic be impacted on your site as the result of EV charging being offered?

Is the business staffed 24/7?

Are there bathrooms? Is your location well lit?

Will the charging stations be handicap accessible?

What do you see as your biggest location challenge?

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Electric Utility Questions

Your Service

Have you started communicating with your electric utility to understand how ready your site is?

Do you know what type of power is on site currently?

What is the current power infrastructure capable of accommodating?

What can your site accommodate for future growth in EV charging?

What are the cost estimates for infrastructure upgrades?

Are there reliability reports for your facilities?

What are typical response and repair times for maintenance of grid infrastructure?

Is redundant service available for resiliency planning?

Where is the transformer located and where would additional transformers need to be placed?

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Electric Utility Questions

Your Next Steps

Can you request an electric utility site visit or site design?

How do you begin a new service request?

What paperwork do you need to sign?

What are the timelines for major site work?

Do you need a permit?

If a permit is required is that something you do or the electric utility?

What is your billing analysis based on low utilization and a higher utilization rate?

How will demand charges affect your business?

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Electric Utility Terms

Transformer - a piece of electrical equipment that can increase or decrease the voltage of electricity. Electricity traveling through overhead lines is generally high voltage and requires a transformer to convert the electricity to a lower voltage for residential or commercial use.

Switchgear - equipment composed of a series of disconnect switches, fuses, or circuit breakers used to control, protect, and isolate electrical equipment.

Single Phase Power - carried by one line at low power levels. Single phase power is insufficient for large sources of electric demand and would not support the needs of a fleet electrification project.

Three Phase Power - carried by three lines at high power levels. Three phase power is necessary for the level of power required for DC fast chargers.

Alternating Current (AC) - The type of power used in homes and businesses. AC can be converted into DC via a converter.

Direct Current (DC) - The type of power used in batteries and electric motors. To charge the large batteries used in buses, the AC power from the electric company must be converted into DC. For DC fast chargers, this conversion happens inside the charging station.

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Electric Utility Terms continued

Kilowatt (kW) - the amount of electrical power being delivered. Watts are determined by multiplying voltage and amperage together. Charging infrastructure power is measured by the maximum kW it can deliver into a battery.

Kilowatt-hour (kWh) - the amount of electrical energy delivered by applying one kilowatt for one hour. Kilowatt-hour is the unit of measure for battery size and determines how much energy can be stored in an EV battery.

Voltage - voltage determines the strength of electrical current. The higher the voltage, the more load in terms of kW's can be supported. Typical residential and commercial buildings use 110-220 volt (V) circuits. DC fast chargers require at least a 400V circuit while Level 2 chargers can use a 220V circuit.

Amps - Amps measure the current in an electric wire, or the "flow rate" of electricity. Amperage determines the amount of electricity a wire can deliver. Higher currents require thicker, more expensive cables. DC fast chargers require a circuit of at least 100 amps. Level 2 chargers can use circuits of between 20 and 80 amps.

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Electric Utility Terms continued

Demand Charge - Demand, represented by kilowatts (kW), measures the rate at which energy is used at a point in time. Utility demand charges recover a portion of the capacity-related costs associated with the generation and transmission of electricity.

• **Level 1 Chargers** - use 110/120 volt alternating current at 15 or 20 amps. A level 1 charger typically takes all day or overnight to charge a vehicle.

Level 2 Chargers - range from 3.3 kW at the low end to 19.2 kW at the highest end. They use 208/240 volts of alternating current. The amps can range from 20 to 100. The charging rate depends on the kW. An average level 2 charger takes 6 to 8 hours to provide a full charge.

DC Fast Charger - a DC Fast charger is currently capable of delivering up to 450 kW of power to vehicles and potentially more than one megawatt of power. These chargers typically require significant electrical infrastructure installation including transformers and switchgear. DC Fast Chargers can charge a vehicle from empty to 80% in approximately 15 minutes. DC fast chargers are most commonly used for fill-ups on long distance road trips.

Terms modified from the American Public Transportation Association's Checklist for Engaging on Fleet Electrification
https://www.eel.org/-/media/Project/EEI/Documents/Resources-and-Media/Newsroom/APTA_Checklist_For_Engaging_On_Fleet_Electrification_March2023.pdf?la=en&hash=8E3704E426D4666DA1FA882023EBAB4B42100F06

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Manufacturer Questions

Your Chargers

What type of charging equipment is ideal for your business and location?

Can the company help analyze the best product for your business?

How many chargers have you installed in total and specifically in this area?

Does the company provide detailed information on site preparation and infrastructure needs?

What is the payment model for the equipment?

What are the time frames for equipment delivery and installation?

Vehicle dwell time - how long vehicles typically will be plugged in and charging?

Does your charger have options to limit people parking for long periods after they have charged?

What is the turnaround time for service if the system is down or needs replacement?

Can you redeem tax credits and incentives in a lease agreement?

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Manufacturer Questions

Lease vs. Purchase

What are your ownership and leasing models?

Who pays for site upgrades?

Who pays for installing the charging equipment?

Who pays for the charging equipment?

Who owns the charging equipment?

Who pays for the electricity?

Who gets the revenue?

Who pays for service?

Who pays for repairs?

What does your service contract include?

What payment system does your company use?

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Charger Power Needs

<u>Charging Station Type</u>	<u>Power Levels and Proposed Circuit Ratings</u>
Level 1	110/120 Volt Alternating Current (VAC) at 15 or 20 amps
Level 2 3.3 kW (low)	208/240 VAC at 20 or 30 amps
Level 2 6.6 kW (medium)	208/240 VAC at 40 amps
Level 2 9.6 kW (high)	208/240 VAC at 50 amps
Level 2 19.2 kW (highest)	208/240 VAC at 100 amps
Level 3 DC Fast Charger	480 Volt service