

# DEVELOPERS GUIDE TO ELECTRIC VEHICLES

## INSTALLING CHARGING STATIONS IN ANN ARBOR COMMERCIAL DEVELOPMENTS

Ann Arbor is already experiencing high demand for existing public charging stations, and this demand is expected to increase. Installing electric vehicle (EV) charging stations provides an opportunity to attract new customers or tenants, and preparing a new development for charging stations is cheaper than modifying an existing site or structure. This guide provides considerations for installing charging stations and an overview of the different levels of charging. For further information, contact [cleancities@cec-mi.org](mailto:cleancities@cec-mi.org).

At a Glance:

- **FUTURE PROOF:** Installing conduit during the planning phases saves money in the long run.
- **ADA ACCESSIBILITY:** Plan on placing first charging station near ADA parking spaces.
- **FREE TO CHARGE:** Given the low cost of electricity, plan on allowing customers to charge for free.
- **INFRASTRUCTURE:** The charger installed should be based on budget and customer needs.

### WHY EV CHARGING?

Electric vehicle charging stations (commonly referred to as electric vehicle supply equipment, or EVSE) are free-standing or wall-mounted units designed to deliver electricity to the on-board batteries that power electric or plug-in hybrid vehicles. Charging stations communicate with the vehicle to ensure that a safe and appropriate amount of electricity is being supplied to the vehicle.

There are numerous benefits to installing EV charging stations for employee, employer, and the community. These include, but are not limited to, employee recruitment and retention, corporate branding and public relations, and environmental and public health.

### COST CONSIDERATIONS

As of 2014, the cost of installing charging equipment, which is highly dependent on specific site conditions, is estimated to range anywhere from \$800 to \$7,000. Installing the necessary electrical conduit and upgrades for charging equipment in new or renovated properties in preparation for future charging station installations will save money in the long run should the developer or occupant decide to install charging stations.

The cost for charging equipment varies significantly based on features and charge rate. The table below gives approximate ranges for the cost of charging stations at the three common charging levels:

CHARGE RATE	APPROXIMATE COST
AC Level 1	\$300 - \$500
AC Level 2	\$1,000 - \$7,000
DC Quick Charge	\$20,000 - \$50,000

Given that most charging stations transfer electricity at a maximum rate of 3.3-6.6 kilowatts, the electricity used to charge an EV would cost a station owner between \$0.43-0.86 per hour (assuming a rate of \$0.13 per kilowatt-hour for commercial users and that the vehicle is charging the entire time it is plugged in). Most charging station manufacturers offer additional products that can collect payment for time spent at a charging station. However, the costs of these add-ons should be weighed against offering the electricity free-of-charge to the user. More often than not, it costs the station owner less to provide free charging to EV owners.

### INSTALLATION CONSIDERATIONS

The first decisions a developer will need to make when installing charging stations are the kind and quantity of station they want to install. Many employers will begin by installing one or two stations to assess demand and ultimately expand the program once it proves successful. The kind of charger installed often depends on the specific requirements of that development. Generally, businesses or employers that expect individual users to park for shorter periods of time (1 - 8 hours) will install Level 2 charging stations, whereas organizations who expect a longer turnover cycle (8+ hours) between vehicles will opt for a Level 1 charging system.

With regards to station placement, the first charging stations installed by a property owner should be ADA accessible. One way to provide accessibility accommodations for EV charging is to place a charging station adjacent to an existing accessible parking space, such that either space could use the access aisle. Refer to the Clean Energy Coalition website for more parking configurations.

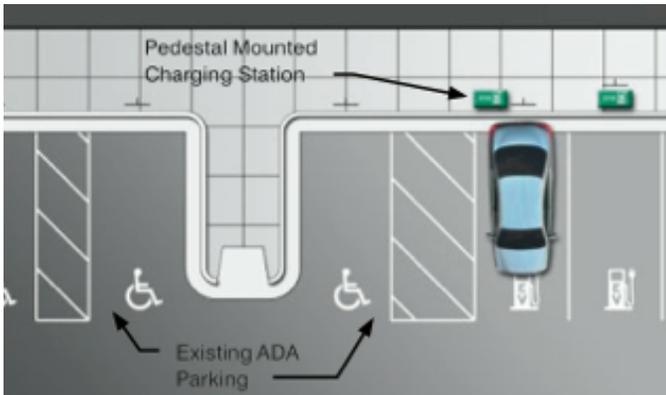


Image 1 accessibility EV parking with pavement markings

## EV CHARGING BASICS

There are three levels of charging for an electric vehicle. AC Level 1 and AC Level 2 use a standard EV charging coupler as shown in Image 1. DC Quick charging uses separate connectors that will vary based on the vehicle manufacturer.

### AC LEVEL 1

Of the three standard charging levels, Level 1 charging takes the longest for a full charge and only averages about 2 to 5 miles of range to an EV per hour of charging. Though Level 1 charging is the least expensive option, it may not be able to meet the power demands of EVs with larger batteries. Level 1 charging stations often provide an economical choice for workplaces where employees' vehicles would be parked for prolonged periods of time.

### AC LEVEL 2

AC Level 2 charging stations are the most commonly installed stations for both commercial and residential applications. Level 2 charging requires a single-phased branch circuit with a voltage rating of 240 volts. The higher voltage allows for a faster charge of the vehicle's battery, averaging about 10 to 20 miles of range per hour of charging. AC Level 2 stations can be either wall or pedestal mounted. The station owner should verify the station has the correct NEMA electrical enclosures rating if it is intended for outdoor use.

### DC QUICK CHARGE

As the name suggests, Quick (or Fast) Charging is one of the fastest ways to charge an EV's battery. Quick Charging has an input rating of 480 volts and is the fast-

est charge available, averaging 60 to 80 miles of range in 20 minutes of charging. Quick Charging is ideal for retail and some commercial applications, where vehicles are only parked for short periods of time.

## EV PARKING IDENTIFICATION

EV parking spaces should use the MDOT-approved sign illustrated in Image 2 to ensure EV use. The standardized sign helps create continuity among EV drivers and the general public. Sign details are available on the Clean Energy Coalition website (see the Resources section of this guide for a link). The parking space should be painted with the EV symbol, shown in Image 1. The paint color should match the color of the parking space lines, and dark colors should be avoided.



Image 2 parking signage

## ADDITIONAL RESOURCES

**Clean Energy Coalition** Plug-in Ready Michigan  
[cec-mi.org/plugin](http://cec-mi.org/plugin)

**EV Everywhere** Grand Challenge  
[electricvehicles.energy.gov](http://electricvehicles.energy.gov)

**Plug In America**  
[pluginamerica.org](http://pluginamerica.org)

**Ann Arbor** Climate Partnership  
<http://a2energy.org/EVs>

Property owners should contact their electrical service provider to see if they qualify for any incentives or special EV charging rates.

**DTE Energy**  
[www.dteenergy.com/pev](http://www.dteenergy.com/pev)  
[pev@dteenergy.com](mailto:pev@dteenergy.com)

**Consumers Energy**  
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