

# Driver's Checklist: A Quick Guide to Fast Charging



The auto industry is getting electrified. Electric vehicle (EV) production has grown 10X over the past four years and EV sales will grow 14X over the next ten years. As EV adoption grows, so does the number of charging stations. There are thousands of EV charging stations across the U.S. that offer different types of charging at different speeds, so EV drivers can stay charged up anywhere they go.

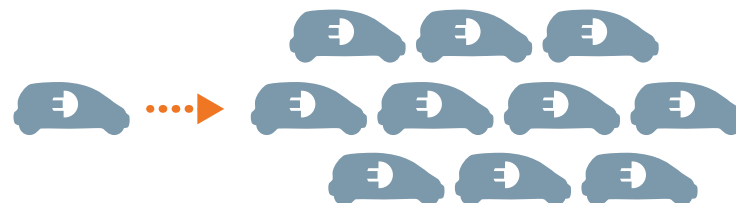
The details of EV charging might seem a bit complicated. But there's good news: you don't need to know much about electricity to charge an EV. It's like how you don't need to know all the differences between regular, plus and premium gas to fuel a combustion engine—you only need to know what type of gas the car takes. It's pretty much that simple for EVs, too.

Here's a quick overview of how the different types of EV charging work, so you can plug in with confidence the next time you need to.

## EV Sales Are Exploding

EV sales grew 10X over the past four years.

They are expected to grow 14X in the next 10 years.



## How Does EV Charging Work?

You most likely charge your cell phone or computer often, even if you don't know a lot about electricity. You just plug in the device and go about your day.

EV charging is similar. It connects the battery in your car with a power source that can charge it. There's a lot going on behind the scenes, but as an EV driver, you don't have to worry about it.

Most power outlets use AC, or alternating current. Batteries typically use DC, or direct current, to charge. This means that part of the charging process involves converting AC to DC.

There are three main types of EV charging: Level 1, Level 2, and DC fast. Levels 1 and 2 convert AC to DC using an on-board converter in the EV. Each vehicle's on-board converter has specific limits on how fast it can charge.

With DC fast charging, the conversion from AC to DC happens in the charging station, not in the EV. This allows stations to supply more power, charging vehicles faster.

## How Long Does it Take to Charge an EV?

Typical time to fill up an 80-mile battery by charging type



\* DC fast charging can get many EV batteries charged to 80 percent in 20-30 minutes

## Types of Charging

### Level 1

“Level 1” charging is just plugging in to a standard electrical outlet. Level 1 charging can be convenient for home use, but charges very slowly, offering about 5 miles of Range Per Hour (RPH). Level 1 is most useful when a vehicle will be parked for several hours.

### Level 2

Some home chargers and most public charging stations are “Level 2.” These stations can add 12 to 25 RPH, depending on the type of EV and its on-board charger. Level 2 charging stations are ideal for times when you'll be parked for at least an hour, such as at work, restaurants, movie theaters, sporting events or longer shopping trips. Level 2 charging will generally give you enough juice to get around town, and works up to six times faster than Level 1 charging.

### DC Fast

On long trips or when you're pressed for time, you'll probably want a faster charge to get where you're going. DC fast charging can deliver 100 RPH or more, charging some EVs to 80 percent in 20-30 minutes.

DC fast charging stations have various power levels. In general, higher power levels charge EVs faster. Check each DC fast charging station to find its power level. Charging speed may also depend on the type of charging port your EV has.

Note that not all plug-in cars on the road today have a DC fast charging port. Most plug-in hybrids can only charge at Level 1 or 2.



ChargePoint Express 200  
50 kW DC Fast Charging Station

## EV Charging Basics

| Type                               | Miles of Range Per Hour of Charging (RPH)  | Time to Fully Charge  | When to Use   | Connector   |
|------------------------------------|--|---|---|---|
| Level 1, Standard Wall Outlet (AC) | 5 RPH  | + 16 hours for an 80-mile battery<br>+ 40 hours for a 200-mile battery                              | + Get some charge while you sleep<br>Note: slower for cars with large batteries | Note: you'll need your own cable to plug in to the wall for Level 1 |
| Level 2 Charging Station (AC)      | + 12 RPH for cars with 3.7 kW on-board charger<br>+ 25 RPH for cars with 6.6 kW on-board charger                             | + 3.5 hours for an 80-mile battery<br>+ 8 hours for a 200-mile battery                              | + At work<br>+ While you sleep<br>+ Topping up around town                      | J1772 connector   |
| DC Fast Charging                   | 100 RPH or more, depending on the power level of the charger<br><br>+ 24 kW (up to 100 RPH)<br>+ 44 to 50 kW (up to 200 RPH) | Depends on the power level of the charger and car model, but could be 80% charged within 30 minutes | + Short stops<br>+ Express Corridor locations                                   | SAE Combo (CCS)     CHAdeMO     Tesla                               |

### Connectors

All EVs except Tesla use the same J1772™ connector for Level 2 charging. Tesla makes adapters that allow their vehicles to charge using J1772 or CHAdeMO connectors.

Not all EVs come with DC fast charging as a standard feature. It's often available as an upgrade package.

When choosing a DC fast charging station, check the connector to make sure it fits your car's charging port. There are three different DC fast charging connector standards in North America, each used by different EVs.

#### SAE Combo (CCS) is compatible with

- + BMW
- + VW
- + Chevy
- + All upcoming U.S. and European cars
- + Some of the new cars from Asian manufacturers



#### CHAdeMO is compatible with

- + Nissan
- + Mitsubishi
- + Kia



#### Tesla is compatible with

- + Tesla
- Note: adapters available for J1772 and CHAdeMO



## How Fast Can I Charge?

Many factors affect charging speed. At a basic level, more power means a faster charge. The type of charger (Level 1, 2 or DC fast) matters, too.

In general, larger EV batteries take more time to charge, and EVs with higher-powered on-board chargers charge faster. Batteries also start to charge more slowly as they become more full. As an EV owner, you will learn over time how fast your car charges at different types of stations.

The charging speed you can get at a DC fast station depends on the station's power level, the EV's battery capacity and real-time updates from the vehicle to the charger. DC fast chargers can send a lot of power to an EV, but the vehicle will control how much power it takes in and slow down the rate of charge as the battery fills and heats up. Some vehicles with smaller battery packs can only take in maximum power for a short time before the charging speed slows.

DC fast chargers can charge at varying RPH. Check the power level on a DC fast charging station to understand how fast you should be able to charge. After a few DC fast charges, you'll have a better idea of how quickly your EV charges at different power levels.

## Take Charging to the Next Level

Now that you know about all the charging options out there, are you ready for an EV (or a new EV with DC fast capability)? Check out some reasons to go electric here: [chargepoint.com/happier](https://chargepoint.com/happier)

Find DC fast charging locations in the ChargePoint mobile app: [chargepoint.com/mobile](https://chargepoint.com/mobile)



Download the free ChargePoint mobile app

## More on ChargePoint Express Charging

ChargePoint knows that EV drivers want to go farther. Our ChargePoint Express charging stations make it easy to get charged fast, and get to more places.

### Why Express?

Most of the time, EV drivers can just add a little bit of energy every time they park, using Level 1 or Level 2 charging. But for longer trips or when time is in short supply, EV drivers need another option. That's where DC fast charging comes in.

DC fast charging stations make it easy for EV drivers to get a lot of charge in not much time. Locating DC fast charging stations along major highways or at popular destinations makes it easy for EV drivers to pull off the road, charge up quickly and continue to their destination.

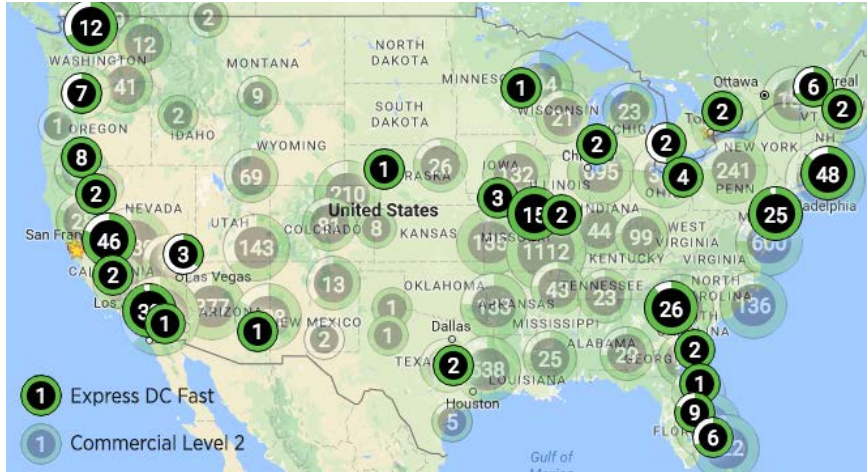


ChargePoint Express stations around the country make it possible for EV drivers to take road trips, without using any gas. Taking an all-electric road trip is now easier than ever.



## Where Can I Fast Charge?

There are more than 350 DC fast charging spots on the ChargePoint network, and that number continues to grow. Many DC fast charging stations are located within a mile of major roads and close enough to one another to eliminate range anxiety.



More than 350 DC fast charging spots on the ChargePoint network, with more than 30,000 spots total (September 2016)

You can always find nearby charging stations on the ChargePoint mobile app and driver portal. In the app, you can filter for a particular DC fast connector type to make it really easy to find the type of charging station you need. Or, enter the kind of EV you drive and the app will recommend the right stations.

## When Should I Use DC Fast?

DC fast doesn't replace Level 2 charging, it just provides a quicker charging option for longer trips. Level 2 charging is still the best choice for everyday charging and anytime you'll be parked for several hours, like overnight. You can always find both station types in the ChargePoint app.

## How Do I Charge?

1. Download the ChargePoint mobile app and create an account
2. Activate your ChargePoint card
3. Find nearby stations
4. Unlock a ChargePoint charging station with your ChargePoint card or the mobile app
5. Plug in
6. Track charging status on the mobile app



## Learn More

Learn more about ChargePoint Express charging:

- + [chargepoint.com/products/commercial/cpe100](http://chargepoint.com/products/commercial/cpe100)
- + [chargepoint.com/products/commercial/cpe200](http://chargepoint.com/products/commercial/cpe200)
- + [chargepoint.com/drivers/express](http://chargepoint.com/drivers/express)

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