What's the difference between Level 2 AC charging and DC fast charging?

Discover why various charging scenarios require different EV charging solutions.

E-mobility is becoming mainstream

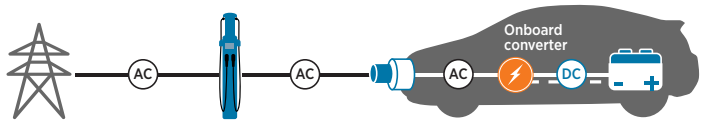
Part of what's giving consumers the confidence to make the switch to electric transportation is the widespread buildout of Level 2 AC and Level 3 DC fast charging infrastructure at shopping centers, multifamily properties, parking facilities and along highways.

Charging power basics

The difference between Level 2 AC and DC fast charging has to do with how electricity from the grid makes its way to an EV's battery. The power from our energy grid is alternating current (AC), and most power outlets use AC power. Batteries, on the other hand, use direct current (DC) power. When charging an EV, the AC power from the grid must be converted to DC power so it can be stored in the vehicle's battery.

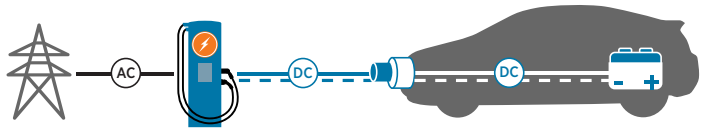
AC charging

AC charging, sometimes called "Level 2," delivers electric power to the car, which the vehicle then converts to DC — or battery — power using an onboard converter.



DC charging

With DC charging, or "DC fast," the charger itself converts AC power to DC before delivering it straight into the vehicle's battery.



When to choose Level 2 AC charging

- **At work or home.** Level 2 charging stations are great for when drivers park their car in one spot for more than two hours. EVs can reach a full charge from a Level 2 charging station in just a few hours or overnight, depending on the vehicle type and battery size.
- **While running errands.** These charging stations can provide up to 25 miles of range per hour (RPH), which makes them convenient for use while shopping or dining. Since most people run errands within 20 miles of their home, even a brief top off can provide enough juice to get to the next stop.

When to choose DC fast charging

- **On a road trip.** DC fast stations can charge an EV to 80% in as little as 20 minutes, making DC fast chargers a great choice during extended journeys when drivers want to refuel and get back on the road quickly.
- **When someone's in a real hurry.** If an EV's battery is very low and the driver needs to get somewhere quickly, DC fast charging can be a lifesaver.
- **When driving a fleet vehicle for work.** To keep vehicles charged up around the clock, DC fast stations allow fleet drivers to charge up quickly in depots or at public stations along driving routes.

Why faster is not always better

- **It's more expensive.** Because DC fast stations require more power supply, they are more expensive for station owners to operate. These costs are passed on to drivers in the form of higher charging fees.
- **It can impact the battery's lifespan.** A lot of power flows from a DC fast charger, and managing it puts extra strain on some EV batteries — potentially reducing the battery's efficiency and overall lifespan.
- **Not all EVs can take a fast charge.** Not all EVs come with a DC fast charging port, so some drivers will not be able to use them at all. This limitation will likely disappear as automakers evolve their standards.

Learn more about how DC charging really works.

What's the deal with Level 1 charging?

Some drivers may still use Level 1 charging cables at their homes. These require only a 120-volt, 20-amp circuit, which means you can simply plug them into a normal household outlet and connect to an EV at the other end. Level 1 charging speed depends on the type of EV (all-electric or plug-in hybrid), the size of the battery and how much energy the battery has in it. For example, an EV with a 100-mile battery plugged into a Level 1 charging cable can take about 24 hours to fully charge when it's nearly empty.

Need charging for your business?

The type of charging you choose depends on what type of business you run as well as your customers' behavior.

What types of businesses benefit from Level 2 charging?

Level 2 chargers usually don't require expensive electrical upgrades because they operate in a more conventional power range than DC fast chargers. When installing multiple stations, however, it may be necessary to upgrade your electrical supply or use software to manage available power between stations.

Workplace. Level 2 charging is a great benefit for employees who park their cars at work all day anyway. Adding EV charging to your parking facilities also helps you meet corporate sustainability goals.

Multifamily housing. EV charging attracts residents and increases property values. Regional building codes often require a certain percentage of EV-ready parking spaces in new developments, and Level 2 is a cost-effective way to meet those requirements.

Public parking facilities. Offering charging can attract EV-driving customers and help diversify revenue.

Retail. At shopping malls, restaurants, event venues and other places where drivers usually spend more than an hour, Level 2 charging draws in customers and allows them to charge up before heading to the next stop. Connecting your loyalty program to your charging solution can increase customer traffic even further.

Light-duty fleets. Level 2 charging is perfect for daytime fleet operators. Drivers simply plug in at night while vehicles are parked and they'll be fully charged the next day.

What types of business benefit from DC fast charging?

Hardware, site buildout, installation and operation all cost more for a DC fast charging solution. Greater electrical supply is also needed. Depending on your business, however, the ability to charge more vehicles per day can help recoup the initial costs quickly.

Fuel and convenience and quick-stop retail. Businesses along thoroughfares and highways benefit from DC fast charging solutions that allow customers to refuel and get back on the road quickly.

Municipalities. Electric buses and heavy-duty electric work vehicles serving cities and towns have high-capacity batteries that require high-power DC fast charging. To keep vehicles charged up around the clock, fast chargers can be installed at locations along the fleet route.

Heavy-duty fleets. Rather than rotate vehicles out for charging, use DC fast to keep an entire fleet — such as forklifts and yard tractors — running around the clock.

Many businesses have a use case for both DC fast and AC charging. For example, a retail location might offer DC fast charging for customers but offer AC charging for overnight fleets and staff.

Level 2 vs. DC fast charging at a glance

	Level 2	DC fast
Where to implement	+ Home + Work + Anywhere drivers may park for more than an hour	+ Along major highways + Quick-stop retail locations + Fleet depots
AC/DC converter	In the EV	Within the charging station
Charging speeds	Limited by onboard converter	Determined by station power, cable amperage and battery voltage
Electrical capacity	240-volt; 40- to 100-amp circuit; 6.2 kW to 19.2 kW	400-volt AC, 3-phase, 96A, 50 Hz (EU) 480-volt AC, 3-phase, 80A, 60 Hz (NA)
Range per hour	About 25 miles	About 100 miles
Charging fees	Lower	Higher
Availability	Widely available	Not as widely available, but increasing
Home use	Can install at home	Cannot install at home
Time to charge	4-10 hours for 100% charge	15-45 minutes for 80% charge

Level 2 or DC fast, ChargePoint has got you covered

As the largest EV charging network for businesses, fleets and drivers, ChargePoint offers a comprehensive solution of software, hardware and professional services to help you run a best-in-class EV charging program.

+ **Software.** Gain complete control and rich insights with advanced EV charging management software.
+ **Hardware.** Select from a portfolio of networked AC and DC charging stations, designed using cutting-edge hardware technology to be safe and reliable while offering drivers a user-friendly, premium charging experience.
+ **Services.** Access a suite of best-in-class services, including flexible financing, site selection consulting, dedicated help with implementation and industry-leading support.

ChargePoint® solutions are purpose-built for commercial, fleet and residential settings, so you can use one charging and e-mobility platform across your entire operation. Our team of charging experts can help you build your charging strategy as your business grows.

Learn more

Explore ChargePoint EV charging solutions and get in touch when you are ready to deploy charging for your organization.

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