

BEYOND SPEED: THE ADVANTAGES AND LIMITATIONS OF LEVEL 3 CHARGERS



Level 3 DC Fast Chargers, also known as “DC quick chargers” or “superchargers,” are a powerful alternative to traditional Level 1 and Level 2 chargers. Most people understand the main benefit of Level 3 DC chargers is significantly faster charging, but there are other perks both drivers and charging station operators should pay attention to as well.

On the flip side, it is also important to understand some limitations a Level 3 charger may have in certain applications before purchasing a charger or plugging in for a charging session.

Benefits of DC Fast Chargers

1. Rapid Charging Speed

How much faster is a Level 3 charger?

Here's how long it takes for a typical EV with a 60kWh battery to reach a full charge with each type of charger:

Level 1: 10-30 hours

Level 2: 2-8 hours

Level 3: 20-30 minutes

As you can see, Level 3 chargers offer a much faster and more convenient option for drivers on the go. That means less time will be spent waiting for a vehicle to reach a full charge.

With Level 3 chargers, charging station owners can serve more customers for a faster return on investment and shorter payback period. Operators of commercial fleets with EVs can also benefit by keeping their vehicles on the road with less interruptions and downtime.

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2. Wider Power Output Range

When it comes to the amount of power a charger can deliver to an EV battery, Level 3 chargers are truly in a class of their own.

Level 1: 1 kW

Level 2: 7-19 kW

Level 3: 50-350 kW

With the largest power output range available, Level 3 chargers are ideally suited for a wide range of charging applications. That gives Level 3 operators a distinct advantage because they can provide power to an extraordinarily large customer base with different power needs:

50 kW: ideal for small box trucks and cargo vans with short routes that can wait 45 mins to an hour for a charge during reloading.

150 kW: perfect for passenger vehicles on the go and is [the minimum output required by the federal government for publicly accessible electric vehicle chargers](#).

300+ kW: intended for transit busses and class 6-8 over-the-road trucks that need to charge quickly and continue on a route.

3. Reduced Range Anxiety



Because Level 3 chargers offer rapid charging, they go a long way to helping drivers get past the fear of getting stranded on the road.

As more Level 3 charging stations come online and the distance between chargers shrinks, range anxiety is further

alleviated. This can help raise consumer confidence, leading to increased sales of EVs.

It is also important to recognize that as electric vehicles evolve, you won't have to replace a Level 3 charger. That's because they already come equipped to handle larger battery capacities and higher power output level requirements.

4. Next Generation EV Compatibility

While not all electric vehicles are compatible with Level 3 charging, Level 3 fast chargers can be used to charge a wide range of passenger vehicles, class 8 trucks and everything in between.

With auto manufacturers from Honda to Ford planning to electrify a significant portion of their fleets in the coming years, there's even more incentive to consider the benefits of investing in Level 3 fast charging. [According to the International Energy Agency](#), 1 out of every 3 new vehicles sold by 2030 will likely be an EV.

Limitations of DC Fast Chargers

1. Location and Size

Unfortunately, you can't install a Level 3 charger just anywhere.

Due to the large volume of power required, they need to be connected to commercial-grade electrical power with higher voltages than most businesses (including convenience store gas stations) and homes can handle. They can also be quite tall – six feet or higher – making it difficult to install in low-clearance areas like parking garages without extensive planning and design work.

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2. Battery Life and Capacity

DC fast chargers can't be your (or your customers') primary charging source.

That's because it is widely recommended across the industry for EV drivers to use Level 1 and Level 2 chargers for the bulk of their charging needs. This is important for achieving a slower and more balanced charge that promotes battery life.

Level 3 chargers should only be used when traveling longer distances. Even then, it is recommended for drivers to charge no more than 80% of their battery's capacity. Consistently charging beyond 80% (also known as calendar aging or cycle aging) is where the greatest risk of battery degradation can occur.

3. Cost Barriers

The average Level 3 DC fast charger costs up to \$80,000 (not including installation and infrastructure costs, which could cost another \$80,000 on top of the charger itself). Compared to Level 2 chargers, DC fast chargers are 10 times more expensive.

However, \$5 billion in federal assistance is available through the [National Electric Vehicle Infrastructure formula program](#) to help pay for all or a significant portion of equipment and up-front installation costs. Another \$2.5 billion is also available through the [Charging and Fueling Infrastructure Discretionary Grant Program](#).

4. Internet Connection Quality



Without a strong and stable internet connection, an EV charger can't work.

For that reason, it's critical to test the network infrastructure in the location where you plan to install chargers. In some remote and rural areas, internet access may be scarce or not available at all, making it more of a challenge to operate EV chargers in those areas compared to an urban or suburban environment with a more established and reliable connection.

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