Ev charging dc

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When we talk about charging an EV, the main difference between AC and DC charging (and the time it takes to do so) is where the conversion from AC to DC happens, i.e. in the vehicle or the charging station.

Electric mobility is more popular than ever, and growing alongside it is the EV charging ecosystem. On paper, the concept is simple: instead of filling up a tank with fuel at the gas stations, EVs plug into a charging station to top up their batteries.

In practice, however, not all chargers are created equal. EV charging stations come in many different shapes, sizes, and use cases. One of the main factors that differentiate them, however, is the type of current they use.

AC and DC are two entirely different types of electrical current. Both travel in different directions, flow at different speeds, and have different applications. The hard rock band AC/DC, despite having an album titled "High Voltage," have nothing to do with electrical currents or EV charging.

AC is an electrical current, or flow of charge, that periodically changes direction, i.e., it alternates. AC power can be generated from renewable sources that use rotating generators, such as wind or hydropower turbines. AC can also be efficiently transported over long distances--which is why virtually all of the world"s electricity grids use AC power, and why you can find AC power flowing from the sockets in your home and office.

DC always moves in a straight line and can be generated by renewable power technologies such as solar panels. Among other things, DC can be used for energy storage, powering electronics, and LED lighting. Batteries store DC power, and though you may have never realized it, every time you charge your laptop, the charger converts the AC power from the grid into DC power for your laptop"s battery.

When we talk about charging an EV, the main difference between AC and DC charging is where the conversion from AC to DC happens. No matter whether an EV uses an AC or DC charging station, the car"s battery will still always store DC energy.

With AC charging, the power flowing to an EV represents a flat line (so, not much of a curve at all). This is due to the relatively small onboard converter that can only handle a limited power spread over longer periods.

By bypassing the car"s slower onboard converter, DC charging, on the other hand, can deliver much higher power, but its output forms a decreasing charging curve. This is due to the EV"s battery initially accepting a high flow of power but gradually taking in less as it reaches full capacity.

As an example, imagine a glass as the EV"s battery, a water bottle as a DC charging station, and the water inside that bottle as the power. At first, you can quickly fill the glass with water, but you"ll need to slow down as you get to the top, so the glass doesn"t overflow.

By now, you probably have a sense that AC and DC charging work quite differently and serve different roles. You might be thinking that since DC charging is faster, it should be your preferred option every time.

While DC charging is fast, it also relies on more bulky and expensive equipment, and requires a high-voltage connection to the power grid, which makes it impossible to install at home.