Electric vehicle fast charging
A practical overview of the most frequently asked questions

What is the difference between AC and DC charging?
An AC charger supplies AC (Alternating Current) to an onboard charging device that then charges the EV battery. Faster charging is accomplished with DC (Direct Current). A DC fast charging station supplies power directly to the battery management system inside the vehicle with no onboard charging infrastructure needed inside the vehicle.

AC charging versus DC charging
On-board versus Off-board equipment

What kind of cars stand these abbreviations for: PEV, BEV, PHEV?
All vehicles with a battery that can be recharged from an external source of electricity are considered PEVs, or plug-in vehicles.

BEV stands for Battery Electric Vehicle, or a fully electric vehicle powered by an electric motor with no gas engine.

A PHEV, or plug-in hybrid electric vehicle, has both a plug-in electric system and a gasoline engine as backup to power the car.
## How fast do EV’s charge?

<table>
<thead>
<tr>
<th>AC wallbox</th>
<th>DC wallbox</th>
<th>DC Fast</th>
<th>DC High Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>3–22 kW</td>
<td>20–25 kW</td>
<td>50 kW</td>
<td>150–350 kW</td>
</tr>
<tr>
<td>4–16 hours</td>
<td>1–3 hours</td>
<td>20–90 min</td>
<td>8–20 min</td>
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</tbody>
</table>

### Further influencers on the charge speed

- **Battery pack capacity**
  - Larger battery packs can be charged faster

- **State of charge**
  - Charge speed can drop to prevent the battery cells from overheating

- **Battery temperature**
  - Heating or cooling systems keep the temperature constant

- **Battery chemistry**
  - Higher performance causes cost and additional weight

### What are the fast-charging standards currently being used by electric car manufacturers?

ABB follows the fast charging standards:

- 50 kW CHAdeMO – Global
- 22–43 kW AC – Global
- 50–350 kW CCS2 – EU, US, South Korea, Australia
- Tesla - proprietary - CHAdeMO adapter
- GB/T - China

Fast charging is paramount in making electric vehicles a success. Fast charging makes electric cars more useful because of the reassurance drivers get knowing they can quickly recharge, it eliminates range anxiety. It seems that car owners with fast-charge capable cars, with enough fast charging stations around them, feel capable of taking longer trips.

### For more information please contact:

**ABB EV Infrastructure**
Delftweg 65
2289 BA Rijswijk
The Netherlands
Phone: +31 70 307 6200
E-mail: info.evci@nl.abb.com

abb.com/evcharging