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EV Charging Explained

Hitachi Capital (UK) PLC
Vehicle Solutions

If you've made the switch to a plug-in hybrid (PHEV) or a full electric (EV) vehicle, you probably have some questions about charging.

In theory, charging an EV is simple; it's just like a phone, plug it in and wait for it to fill. But, in reality, there are a few things you need to consider. How long will it take, will you do it at home or on the road, do you have the right adapters and apps?

There are lots of questions, and we've developed this guide to give you the answers to some of the most common ones, and some of the ones you were afraid to ask!

Slow, fast, rapid or supercharged?

There are lots of different speeds of charger and how fast your car charges is dependent on a few factors:

- How much electricity can be taken from the source - from home charging on a three-pin plug right through to a Tesla supercharger at 120kW, delivering 200 miles of charge half an hour.

- The size of the battery - just like the fuel tank on a traditional car, the batteries of EV's come in different sizes. The bigger the battery, the longer to charge.

Often charging speeds are broken down into four simple categories:

- **Slow – 3-5kW**
  Charging at home on a three-pin plug this is usually called slow charging. It can take 13 hours or more from empty to a full charge, but obviously, that depends on the model. The vast majority of electric cars will be supplied with a cable designed for a three-pin domestic plug socket, however, charging via a three-pin plug should be reserved for occasional and emergency use only. You can check manufacturers guidance for further details.

- **Fast – 7-22kW**
  This category covers charging from 7kw through to around 22kw and tends to cover both home charging units and out of home charging points. Installing a 7kw home charger could cut your charge time by half!

- **Rapid – 25-99kW**
  When you're out on the road and need a top-up, a rapid charge is a great option. These charging points can top you up from empty to 80% full in around 30 minutes.

- **Ultra Rapid and Supercharger – 100kW+**
  Ultra Rapid is the next-generation of rapid charge. Supercharger is the name Tesla has given to its charging network. Only available to Tesla drivers, these chargers can deliver a 200-mile range in just half an hour.

Type 1, type 2, commando?

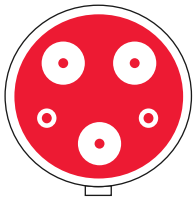
In addition to different speeds of charger, there are different types of connector. These fall into two groups, AC; for slow and fast charging up to 43kW, and DC; for rapid and supercharging. Most cars come with two or more cables to allow the use of chargers with different connector outlets.

It sounds confusing, but it's actually quite straightforward.

European EV models (Audi, BMW, Renault, Mercedes, VW and Volvo) tend to use Type 2 inlets and the CCS inlet for rapid charging. You'll usually find just one socket in the car that can take both connectors. Historically manufacturers such as Nissan and Mitsubishi preferred a type 1 and CHAdeMO inlet combination.

A rapid charger can provide an 80% charge in only 30 minutes

Slow and fast charging



Type 1: Mainly found in the US, and on some older European models. This is still the connector used by the Mitsubishi Outlander PHEV.

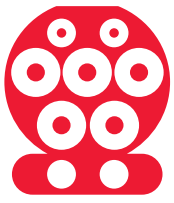
Type 2: this is the standard for European and Asian vehicles (Nissan Leaf for example) from 2018 onwards. It's by far the most common and can charge at a level of up to 43 kW.

Commando: these are often used on commercial or industrial sites where more power is required than a normal UK 3-pin plug.

3 pin: For charging at home or the office, without a dedicated charging point installed.

Rapid and supercharging

CHAdeMO: Mainly used in older vehicles and the Nissan Leaf (100% electric BEV) and the Mitsubishi Outlander (partially electric PHEV).



CCS (Combo 2): Widely used in Europe, this is a version of type 2 connector with two additional power contacts. It allows very fast charging. This socket is always combined with either a Type 2 or a Type 1 socket.

Should I get a home charger?

Charging at home is probably the most convenient option. Plug it in when you get home, or overnight and when you're ready to go out again, it's all ready. It is possible to charge your EV using your existing electricity supply and three pin-plug. However, this does take a lot of time and lots of EV drivers choose to get a home charger fitted.

There are government grants available to cover some of the cost, making it much more affordable. The Electric Vehicle Homecharge Scheme (EVHS) provides funding of up to 75% towards the cost of installing an electric car charger up to a maximum of £350.

It's worth noting that these grants are only available for vehicles parked off-street and on working 'Smart Chargers' so you'll need to do a little bit of extra planning before getting the charger installed:

- Smart chargers work on wifi so you'll need an active wifi contract.
- Think about the location of the router - will the signal reach the charger or do you need a booster?
- The charger will work remotely via an app so you'll need a smartphone.

When it comes to choosing your charge point, there are lots of different options and price ranges. It's possible to pay anywhere from around £500 fitted up to £1500 or more, minus the grant. There are lots of companies that offer a complete service from purchase through to installation, and they'll apply for the grant on your behalf. It's worth doing some research and shopping around. Make sure you consider:

- What connector you need.
- How fast you want to charge.
- How much charge your car and your supply can manage.
- Tethered or untethered - a tethered charger comes with the cable as part of the unit so you can't change it. An untethered charger has a removable cable, which adds flexibility, but could be a security risk as the cables can be detached and stolen.
- How it looks - there are lots of different styles available and whilst this probably isn't the most important point, if it's on the side of your house, are you happy with how it looks?
- Will you be using standard home electricity or do you have, or will you get, solar?

If you're charging at home you could also consider switching to an EV friendly electricity tariff. These tariffs offer cheaper, off peak, overnight electricity and with your smart charger, you can ensure the charging only starts when the cheaper tariff starts.

Charging on the move

These days, charging on the road isn't a problem. There are tens of thousands of public charging points up and down the country, in fact, according to Zap Map, charging locations now outnumber petrol stations.

There are some things you need to consider if you're planning to charge when out and about. Unfortunately, unlike petrol stations, it isn't as easy as plug and go. There are lots of different charging networks and they all have slightly different requirements. Many of them require you to use an app so it's worth planning ahead and downloading the required apps and registering in advance so that you aren't caught out. Here are three of the most common charging brands:

- Polar - this is currently the UK's largest public charging network. You'll need their app or a membership card. It's possible to use Polar pay-as-you-go or they offer a subscription service.
- Pod Point can often be found in the car parks of supermarkets including Tesco and Lidl. They have an app that you'll need to install but charging is often free.
- Charge your car (CYC) is another large network with over 2,000 devices available nationwide. Access is via an RFID card or the CYC smartphone app. These are either free to use or charged on a pay-as-you-go basis.

There are lots of websites and apps that provide maps of UK charging points and access requirements, many of them use Zap Map, which has very comprehensive coverage.

For more EV tips and advice take a look at our blog

www.hitachicapitalvehiclesolutions.co.uk/blog