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How do electric cars work?

By Marta Moses | Posted January 08, 2020

If you want to understand how electric cars, or EVs, work and what the difference between hybrid and pure electric cars is, then read on.

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How does the electric car engine work?

Electric cars function by plugging into a charge point and taking electricity from the grid. They store the electricity in rechargeable batteries that power an electric motor, which turns the wheels. Electric cars accelerate faster than vehicles with traditional fuel engines – so they feel lighter to drive.

How does charging work?

You can charge an electric vehicle by plugging it into a public charging station or into a home charger. There are plenty of charging stations around the UK to stay fully charged while you're out and about. But to get the best deal for home charging, it's important to get the right EV electricity tariff so you can spend less money charging and save more on your bill.

EVs and their range

How far you can travel on a full charge depends on the vehicle. Each model has a different range, battery size and efficiency. The perfect electric car for you will be the one you can use for your normal journeys without having to stop and charge up halfway through. Explore our EV leasing options.

What types of electric cars are there?

There are a few different types of electric vehicles (EVs). Some run purely on electricity; these are called pure electric vehicles. And some cars also be run on petrol or diesel, which are called hybrid electric vehicles.

- **Plug-in electric** - This means the car runs purely on electricity and goes all its power when it's plugged in to charge. This type doesn't need petrol or diesel to run, so it doesn't produce any emissions like traditional cars.
- **Plug-in hybrid** - These cars mainly run on electricity but also have a traditional fuel engine, so you can use petrol or diesel too if they run out of charge. When running on fuel, these cars will produce emissions, but when they're running on electricity, they won't. Plug-in hybrids can be plugged into an electricity source to recharge their battery.
- **Hybrid-electric** - These run mainly on fuel like petrol or diesel but also have an electric battery too, which is recharged through regenerative braking. These let you switch between using your fuel engine and using 'EV' mode at the touch of a button. These cars cannot be plugged into an electricity source and rely on petrol or diesel for energy.

What are the inner parts of an EV?

EVs have 90% fewer moving parts than an ICE (Internal Combustion Engine) car. Here's a breakdown of the parts that keep an EV moving:

- **Electric Engine/Motor** - Provides power to rotate the wheels. It can be a DC/AC type. However, AC motors are more common.
- **Inverter** - Converts the electric current in the form of Direct Current (DC) into Alternating Current (AC).
- **Drivetrain** - Most EVs have a single-speed transmission, which sends power from the motor to the wheels.
- **Batteries** - Store the electricity required to run an EV. The higher the kW of the battery, the higher the range.
- **Charging** - Plug into an outlet or EV charging point to charge your battery.

EV batteries - capacity and kWh explained

Kilowatts (kW) is a unit of power (how much energy a device needs to work). A kilowatt-hour(kWh) is a unit of energy (it shows how much energy has been used), e.g. a 100 watt lightbulb uses 0.1 kilowatts each hour. An average home consumes 3,100 kWh of energy a year. An electric car consumes an average of 2,000 kWh of energy a year.

Electric car charging

How to charge an EV?

You can charge an electric vehicle either by plugging it into a socket or by plugging it into a charging station. There are plenty of charging stations around the UK to stay fully charged while you're out and about. There are three types of chargers.

Three-pin plug - a standard three-pin plug that you can connect to any 13 amp socket
Socketed - a charge point where you can connect either a Type 1 or Type 2 cable
Tethered - a charge point with a cable attached with either a Type 1 or Type 2 connector.

How long does it take to charge an electric car?

There are also three EV charging speeds:

- **Slow** - typically rated up to 3kW. Often used to charge overnight or at the workplace. Charging time: 8-10 hours.
- **Fast** - typically rated at either 7kW or 22kW. Tend to be installed in car parks, supermarkets, leisure centres and houses with off street parking. Charging time: 3-4 hours.
- **Rapid** - typically rated from 43 kW. Only compatible with EVs that have rapid charging capability. Charging time: 30-60 minutes.

SLOW   8-10 hours
FAST   3-4 hours
RAPID   30-60

Charging up in changing seasons

The weather affects how much energy your electric car consumes. You have a larger range in summer and a smaller range in winter.

Charging on the go

Don't forget to download the Zap-Map app to find the nearest charging station when you're out and about.

How far can you travel on one full charge?

An EV's range is dependent on the battery size (kWh). The higher the EV battery kWh, the more power and the further you travel. Here are examples of how far some electric cars charge will go:

- Volkswagen e-Golf - range: 125 miles - equivalent to a journey from Bristol to Snowdonia National Park.
- Hyundai Kona Electric - range: 250 miles - equivalent to a journey from London to the Lake District.
- Jaguar I-Pace - range: 220 miles - equivalent to a journey from Edinburgh to Birmingham.

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