



Low Carbon Technology Guide

Electric vehicles

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1. What is it?

Electric vehicles (commonly referred to as EVs) are cars and vans that use a rechargeable electric battery and an electric motor instead of, or alongside, traditional petrol or diesel engine. Electric vehicles are becoming an increasingly attractive option in the UK due to generally lower running costs and intensifying public concerns around air quality and climate change.

There are two main types of electric vehicles available on the market:

- **Battery-electric vehicles (BEVs)** – Also known as ‘pure’ electric, these vehicles are powered only by a combination of a rechargeable battery and one or multiple electric motors. Because these vehicles do not have a petrol or diesel engine, they produce no tailpipe emissions and are generally more energy-efficient than traditional vehicles. Battery-electric vehicles are charged by an external power source, such as a public charge point or a charger in or outside your home. Depending on the model, BEVs can cover on average 100-300 miles on a single charge.
- **Plug-in hybrid electric vehicles (PHEVs)** – Unlike BEVs that only have an electric battery and motors, PHEVs also have a traditional petrol or diesel engine; they can be driven using the conventional engine, the electric motor or both. PHEVs have smaller batteries than BEVs, usually providing up to 50 miles of pure-electric range but once the battery is depleted, the traditional engine takes over, increasing the range, limited only by the amount of fuel in the tank.

- The batteries in PHEVs can be recharged from external power sources, and some can also be recharged directly from the petrol/diesel engine of the vehicle.

2. What should be considered before purchase?

2.1 CHARGING ELECTRIC VEHICLES

Recharging the batteries in electric vehicles takes time and depending on the type of charger, this time could range from minutes to several hours. There are three types of chargers currently available:

- **Slow** – These chargers are the slowest but often the cheapest way of charging an electric vehicle. These chargers can usually fully recharge a BEV in 6-12 hours, while recharging a PHEV would take around 2-4 hours, depending on battery capacity. Slow charging is a very common method of charging electric vehicles, particularly at home overnight or at the workplace during the day. Slow chargers can also be used with a standard 3-pin plug socket in your house, although it is not recommended in the long-term (see the ‘Home charging’ section).
- **Fast** – Fast chargers are commonly found at public charging stations and some workplaces and can sometimes be installed at home. These chargers can usually fully recharge a BEV in 1-6 hours, while a compatible PHEV could be recharged in under an hour, depending on battery capacity.

- **Rapid** – Currently the fastest charging solution available, capable of charging a compatible BEV to 80% in 10-60 minutes, depending on the battery capacity. They are usually found in places like service stations, car parks and dedicated EV charging stations. Only some of the EVs currently available on the market support rapid charging, and it is also the most expensive way of recharging EVs as you often pay a premium for the higher charging speed.

2.2 HOME CHARGING

Most electric vehicle owners charge at home, usually overnight, as it is the most convenient and the cheapest way of charging an EV. However, in most cases, it can only be done if an off-street parking space, such as a driveway or garage, is available.

If you have off-street parking available and plan to charge your vehicle at home, it is generally recommended to install a dedicated EV charger as using a standard 3-pin plug socket on a long-term basis could damage domestic wiring and a trailing cable running from your property to EV creates a trip hazard. You can also opt for a smart charger which would allow you to set charging preferences for your EV, such as desired charge level, what time the charging takes place etc.

Finally, you could consider switching to a special electricity tariff (such as a time of use tariff) offered by some electricity suppliers, which would allow you to charge the EV in the off-peak times when electricity is cheaper. Combining this tariff with a smart charger would allow you to almost fully automate the charging process and maximise your savings.

2.3 ON-STREET AND PUBLIC CHARGING

If you do not have off-street parking, charging an electric vehicle near your home is often more challenging. Even though the network of charging points is constantly growing, they could still be limited in some areas. Many local authorities are adding charging points to the lampposts so your electric vehicle could be charged while parked on the street, while some councils could approve private curbside chargers that would use your household's electricity supply. A number of workplaces also offer EV charging facilities in their staff parking areas.

If none of the above options is available, however, EV drivers can rely on public charging networks which are extensive and often offer a mix of slow, fast and rapid chargers. These networks are vital for the EV drivers without other charging options and the drivers undertaking longer journeys in their EVs. There are a number of websites and mobile applications such as [Zap-Map](#) and [Open Charge Map](#) that provide information on all the charge points available in the UK.

2.4 CHARGING PHEVS

Even though most PHEV models can recharge their batteries using the internal petrol or diesel engine, PHEVs are only efficient if they are regularly charged by external chargers. Otherwise, they could be even more expensive to run than conventional petrol or diesel vehicles.

2.5 BATTERY LIFE

The batteries in electric vehicles lose their capacity over time and eventually need to be replaced. This can cost of several thousands of pounds. Most manufacturers provide a battery warranty of up to 8 years or 100,000 miles, giving peace of mind to those purchasing or leasing new vehicles, but it is something that should be considered by those purchasing EVs on the second-hand market.

2.6 ENVIRONMENTAL IMPACT OF EVS

The production of an electric vehicle currently has a greater environmental impact than that of petrol and diesel vehicles, primarily due to the battery production and use of rare earth metals. However, studies show that over its lifetime, an electric vehicle is still better for the environment thanks to lower emissions associated with its use. Some EV manufacturers are also planning to or already are reusing and recycling old batteries, further reducing the environmental impact.

3. How much does it cost?

According to the Electric Vehicles Database, the average price of an electric vehicle in the UK is around £50,000, with the cheapest starting from about £20,000 and more premium models costing over £100,000. The price of the vehicle depends on the manufacturer, model, performance and optional extras purchased.

Even though the initial purchase price can be high, running costs are considerably lower; according to Energy Saving Trust, if charging at home, driving a battery-electric vehicle for 200 miles will cost approximately £8-12 in electricity, while driving 200 miles in a petrol or diesel car will cost around £26-32 in fuel. Battery-electric vehicles are exempt from vehicle tax, Congestion Charge, London's ultra-low emission zone (ULEZ) charges, and even qualify for free or discounted parking in some places.

4. What is the maintenance like?

Battery-electric vehicles have fewer mechanical components than traditional petrol or diesel vehicles, making servicing and repairs easier and often cheaper than conventional cars. On the other hand, plug-in hybrids are likely to have similar or higher maintenance and repair costs compared to traditional vehicles.

5. How can I get it?

There are many ways of purchasing an electric vehicle. You can do your own research to find the models that best suit your needs and then search online marketplaces or contact dealerships directly. The following website has an up-to-date list and specifications of electric vehicles currently available in the UK: [Electric Vehicle Database](#).

6. What funding help is available?

6.1 GRANTS FOR ELECTRIC VEHICLES

There are two UK-wide grants available to make electric vehicle adoption more accessible:

- Plug-in vehicle grant – provides a discount (up to a maximum of £5,000) when purchasing a qualifying brand-new electric vehicle.
- EV chargepoint grant – provides a discount (up to a maximum of £350) when purchasing and installing an EV chargepoint.

You can find more information on both grants in the [Grants for electric vehicles](#) guide.

6.2 ADDITIONAL FUNDING INFORMATION

If you live in Scotland, you can contact [Home Energy Scotland](#), who could advise you on the funding that may be available to you.

7. Useful websites

For more information on electric vehicles, please visit the following websites:

[Energy Saving Trust – Electric vehicles](#)

[Energy Saving Trust – Charging electric vehicles](#)

[National Grid ESO – How do electric vehicles work?](#)

[National Grid ESO – EVs and electricity](#)