ELECTRIC CAR DRIVER GUIDE

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For the many journeys in life

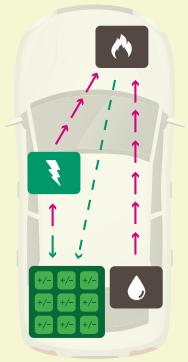
Introduction

Electric Vehicle technology has come on in leaps and bounds in the last few years with more model choice, greater battery range and an expanding public charging infrastructure.

As a result, more drivers are seeing full Electric Vehicles (EVs) as a viable alternative to a traditional petrol or diesel car. To help you decide whether a pure electric car is right for you, we've put together this guide to answer any questions you might have.

What is an 'Electric Vehicle'?

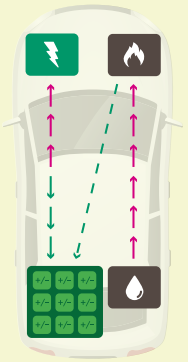
It's important to recognise that not all EVs are actually Plug-in Vehicles (PiVs). When vehicle manufacturers refer to 'electrification' of their model range, it can potentially involve one or more of the following EV technologies.



Mild Hybrid/48V system (MHEV)

In a 'Mild Hybrid', although the electric motor assists the engine, it won't travel solely on electric power.

Generally utilising a 48-volt system, the vehicle can't be plugged-in and offers greater fuel economy savings than a conventional start-stop function.



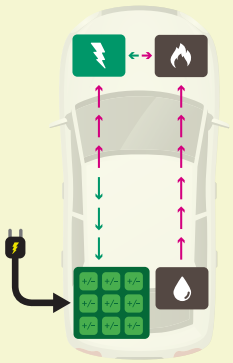
Full Hybrid (HEV)

A 'Full Hybrid' has an electric motor, combustion engine and a very small battery. It will travel a few miles on the electric power and then switch back to the engine.

This vehicle can't be plugged-in, so a combination of the engine and regenerative braking will recharge the battery.

MHEVs and HEVs are not plug-in vehicles and so, from a driver's point of view, they should pretty much be seen as simply more efficient versions of existing petrol and diesel models that can be driven in exactly the same way. And there'll be no change to how often you'll need to fill up the tank.

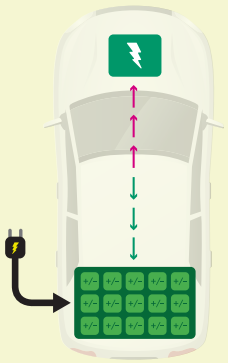
However, the two EV technologies shown below are both PiVs and, while we're focusing on Battery Electric Vehicles (BEVs) in this guide, both are covered where applicable:



Plug-in Hybrid (PHEV)

This has an electric motor, combustion engine and a larger battery. It will typically travel between 20 and 40 miles* on electric power and then switch back to the engine.

Although the engine and regenerative braking will help recharge the battery like a HEV, in order to fully recharge the vehicle, as the name suggests, PHEVs must be plugged-in to deliver the benefits of the electric range.



Battery Electric Vehicle (BEV)

These are fully EVs with much bigger batteries, powered only by electricity with no internal combustion engine.

Although BEVs make use of regenerative braking to top up the battery and maximise range, in order to fully recharge the vehicle, they must be plugged-in.

BEVs are usually referred to as just EVs, but can be referred to as 'Pure or Full' EVs.

What is a ULEV?

A ULEV or 'Ultra Low Emission Vehicle' is one with official tailpipe CO_2 emissions of 75g/km or less. Although at the moment all ULEVs are PiVs, don't automatically assume that a PiV is a ULEV.

*Depending on the individual model

Why choose an EV?

It might feel like a big step to switch from a petrol or diesel car to a BEV, however there are a number of reasons why choosing an EV could be a smart move:

Lower running costs

Although EVs are currently more expensive to buy or lease than equivalent petrol or diesel cars, they are much cheaper to run, costing approximately £0.04 per mile - but that could be as low as £0.02 per mile depending on your electricity tariff and the model of car.

Even when you have to charge up at a public charge station, the cost per mile will still generally be significantly less than for a petrol or diesel car.

Electricity prices are much more stable than fuel prices and so monthly motoring costs won't fluctuate anywhere near as much as they do for petrol or diesel cars.

Electricity suppliers are increasingly providing EV-related home tariffs that are designed to incentivise you to charge your car during non-peak times. Maximising these opportunities will significantly reduce your motoring costs.

Zero tailpipe emissions

As well as zero tailpipe CO_2 emissions, EVs don't emit any exhaust air pollutants, which makes them great for the environment.

Low company car taxation

Compared to petrol or diesel cars – even low emission models – EVs have extremely low levels of company car taxation for the next five years, which makes them the perfect choice for company car drivers and anybody looking to get a new car via a salary sacrifice scheme:

Tax year	2020/21	2021/22	2022/23	2023/24	2024/25
BIK Rate	0%	1%	2%	2%	2%

Comparing this to a 100g/km petrol car the benefits are clear:

Tax year	2020/21	2021/22	2022/23	2023/24	2024/25
BIK Rate	23%	24%	25%	25%	25%

Great to drive

It is often said that once you've driven an EV, you'll never want to go back to a petrol or diesel car. That's because they're great to drive and the reason for that boils down to a number of reasons:

- They have much better torque and acceleration, which makes them great around town and for overtaking
- They're very quiet and much smoother to drive, making them more comfortable and less stressful on longer journeys
- The batteries in an EV are usually mounted on the floor, which means that EVs have a very low centre of gravity, and are therefore much more stable.

EVs are more convenient

If you're able to charge your EV at home, then you'll always have a full 'tank' when you leave the house in the morning. And you won't have to make regular stops at the petrol station.

And unlike when you visit a petrol station, when you do have to use a public charge station for your EV, you can do something else with your time whilst your car is charging, such as checking on your emails, making some calls, doing a bit of shopping or grabbing something to eat.

City centre access

EVs are already exempt from the London Congestion Charge and the Ultra-Low Emission Zone. However, it seems inevitable that over the next few years, there will be more restrictions on petrol and diesel vehicles entering city centres, which makes an EV a great future proof option.

Charging guide

Understanding how and where PiVs can be charged is an important part of any decision to choose a PHEV or EV.

One of the best independent and up to date sources for information on PiV charging and infrastructure is Zap-Map (https://www.zap-map.com/). The following information on charging connectors and types has been adapted from the Zap-Map Guide to EV Charging. More information on public charging can be found in the FAQ section.

There are four main types of PiV charging – slow, fast, rapid and super/ultra-rapid charging. These represent the power outputs, and therefore charging speeds, available to charge a PiV.

Each charger type has a set of connectors designed for low or high power use, and for either AC or DC charging. The following sections offer a detailed description of the four main charge point types and the different connectors available.

Note: Power is measured in kilowatts (kW) and all charging times are dependent on the battery capacity of the individual vehicle.

Connectors and Cables

The choice of connectors depends on the charger type (socket) and the vehicle's inlet port, examples of which are shown overleaf.

On the charger-side, rapid chargers use CHAdeMO, CCS (Combined Charging Standard) or Type 2 connectors. Fast and slow units usually use Type 2 or 3-pin plug outlets, but it's also possible to charge via a Commando connector, which are more commonly used to provide a power supply to caravans and boats.

On the vehicle-side, the European standard for the inlet socket on new vehicles is now the Type 2 (7-Pin) socket. However, older Nissan Leaf and Mitsubishi Outlander PHEV models use the Type 1 (5-pin) socket.

Models that have always used a Type 2 socket then use the corresponding CCS rapid connection, whereas although the Leaf and Outlander have converted to the Type 2 socket for standard charging, they still maintain the CHAdeMO socket for rapid charging.

Most, but not all, PiVs come with two cables for slow and fast AC charging; one with a three-pin plug and the other with a Type 2 connector charger-side, and both are fitted with a compatible connector for the car's AC inlet port. These cables enable a PiV to connect to most untethered charge points, while use of tethered units requires using the cable with the correct connector type for the vehicle.

It's worth remembering that charging speeds – and therefore charge times – are not only dependent on the charge unit, but also on the vehicle's onboard AC or DC charger. The charging speed will be limited to the lower of the two figures.

AC Charging – Slow and Fast

AC Charging (Alternating Current) is the most common form of charging infrastructure primarily found at home, in the workplace or at other public places such as supermarket car parks. The battery can't take AC directly, so an onboard charger converts it to Direct Current (DC).

The speed at which a battery charges is determined by the charge unit and the on-board charger. For instance, a PHEV with a 3.5kW onboard charger will only take power at 3.5kWh even if connected to a 7kWh charge unit.

Similarly, an EV with a 7kW onboard charger will only take power at 7kWh even if connected to a 22kWh charge unit.

Slow Charging

Slow Charging is typically from a domestic 3-pin plug socket and is commonly used by many owners to charge at home overnight. However, as battery sizes are increasing, the time taken to fully charge an EV by this method is increasing. An EV with a 50kWh battery would take approximately 24 hours to fully charge from a 3-pin socket.

However, slow charging is not necessarily restricted to home use, as 3-pin charging sockets can sometimes be found in workplace and public charge points. Because of the longer charging times compared to fast units, slow public charge points are less common and tend to be older devices.

Whilst 3-pin slow charging is fine if a little bit time consuming, because of the higher demands of PiVs and the longer amount of time spent charging, it's a good idea for anybody who needs to charge regularly at home or the workplace to think about getting a dedicated PiV charging unit installed.

Fast Charging

As well as home units, fast chargers tend to be found in places such as car parks, supermarkets or retail parks where you're likely be parked for an hour or more.

Fast chargers are typically rated at 7kW but slower 3.7kW and faster 11kW or 22kW (single or three-phase 32A) units can also be found. Charging times vary depending on unit speed and the vehicle, but a 7kW charger will recharge a compatible EV with a 50kWh battery in around 8-9 hours.

Tesla chargers provide 11kW or 22kW of power but, like the Tesla Supercharger network, are intended only for use by Tesla models. Tesla does provide some standard Type 2 chargers at many of its locations, and these are compatible with any PiV using the correct cable, although some of these are tethered units with a Type 2 cable connector.

Charger Connector and Socket Types

	Slow	Fast
Connector type	3-Pin	Type 2 (7-Pins)
Power rating	2 – 2.5kW	7kW is the most common (3.7kW, 11kW, 22kW also available)
Charging Output Socket		
Vehicle Inlet Socket (European Standard)	Type 2 (7-Pins) 	
Legacy Vehicle Inlet Sockets*	Type 1 (5- Pins)* 	

* The European standard for the Vehicle Inlet Socket on all new vehicles is now the Type 2 (7-Pin) shown above. However, older Nissan Leaf and Mitsubishi Outlander PHEVs are fitted with the Type 1 Socket.

DC Charging – Rapid and Super/Ultra Rapid

Rapid chargers supply high power Direct Current (DC) straight into the battery (bypassing the onboard charger) and are the fastest way to charge an EV. They're typically used for charging en route and so are found in motorway services or in locations close to main roads.

Non-Tesla rapid DC chargers have the charging cable tethered to the unit and provide power at 50kW (125A) via either the CHAdeMO or CCS charging connector. Both types will typically charge an EV 10–80% in about 50-60 minutes depending on battery capacity. In many cases, the charging units power down when the battery is around 80% full. This is to protect the battery and extend its life.

The vast majority of EVs use the CCS connector, however the Nissan Leaf utilises the CHAdeMO socket.

	CHAdeMO	CCS
Power rating	50kW	50–350kW
Charging connector		
Vehicle inlet socket		

Rapid charging can only be used on vehicles with a rapid-charging capability. Not all EV models have the additional CCS connector and this may be an optional extra as part of the model specification.

Given the easily recognisable connector profiles (see images above), the specification for your model is easy to check from the vehicle manual or by inspecting the onboard inlet.

The next generation of ultra-rapid DC units will increase the power first to 150kW and then to 350kW, which will significantly reduce overall charging times. However, in a similar way to the AC onboard charger, not all EVs can charge at these higher rates and are limited to 50kW.

Tesla's Supercharger network also provides rapid DC charging to drivers of its cars, but use a Tesla Type 2 connector and charge up to 250kW.

Rapid AC chargers can also be found which provide power at 43kW (three-phase, 63A) and use the Type 2 charging standard which some vehicles make use of.

Frequently asked EV questions

Where can I find reliable and impartial information about EVs?

There are a number of websites providing a huge amount of essential information and guidance on choosing and running an EV:

www.goultralow.com is a joint campaign between the government and car industry that provides all the facts and information you need to make an informed decision about switching to an EV.

www.ev-datase.org is an independent website providing comprehensive information and data on every EV on the market, including both real-world and official data.

www.zap-map.com is the UK's leading charging point website providing both an interactive charge point map and general supporting information on EVs and charging.

What's the range of an EV?

The electric range of an EV varies by make and model with Worldwide Harmonised Light Vehicles Test Procedure (WLTP) figures starting at around 120 miles but going up to more than 350 miles.

However, it's important to remember that the actual range achieved during real-life driving is likely to be different to the WLTP range, so think carefully about which model could be right for you.

If you're able to complete your regular journeys on a single charge, then the model chosen should be suitable for you. However, this doesn't mean that other models (with a lower range capability) are unsuitable, but just that you'll need to plan ahead a bit more.

What factors affect the real-life range?

Like any car, personal driving style, speed, load weight, the weather, driving conditions and terrain will affect the efficiency of the car. However, temperature has a big impact on battery efficiency affecting the range, battery regeneration whilst driving and charging speeds.

The level of regenerative braking will also affect the range. For example, long steady motorway journeys which have less opportunity for braking or slowing down benefit less.

Manufacturer websites often provide 'range calculators' to help drivers understand the variance in battery/range performance.

The website www.ev-database.org is also a good independent source of model information including typical real-life ranges in different conditions.

What is regenerative braking?

Regenerative braking is a system in which the electric motor that normally drives an EV essentially operates in reverse (electrically) during braking or slowing down.

Instead of consuming energy from the battery to propel the vehicle, the motor acts as a generator that charges the battery with electrical energy that would normally be lost as heat through traditional mechanical friction brakes.

Most EVs also have the ability to adjust the level of regenerative braking which will have an impact on the range achieved.

How long does it take to charge an EV?

The time it takes to charge an EV depends on the speed of the charging unit, the size of the battery - or how much electricity is required - and the capability of the onboard charger in the car, which varies by model:

- The car will only draw power as fast as the onboard charger allows, even if the charge unit is capable of delivering more power.

A slow charge (from a domestic 3-pin socket) will only provide about 2.5kW.

A fast charge unit (both home, workplace and public) is typically about 7kW:

- A domestic fast charge unit will fully charge a 50kWh battery in around 8–9 hours which would usually be done overnight.

A rapid charge unit is typically 50kW whereas a Super or Ultra charger can range from 100kW to 350kW:

- These are found at most motorway service stations but are also appearing in retail car parks. Only one car can charge at a time even if there is more than one connector available on the unit
- A rapid charge unit would charge a 50kWh battery to 80% in about 50 minutes.

Estimated charge times for a selection of models based on different charge units are shown in the table.

Model	Battery (kWh)	Range - miles (WLTP)	Slow (0-100%)	Fast (0-100%)	Rapid (10-80%)
Audi e-tron	95	277	44h	14h	76min
BMW i3	42	193	19h	6h	36min
DS3 cross back e-tense	50	199	24h	8h	53min
Hyundai Kona	67	298	33h	10h	63min
Kia e-Niro	67	283	33h	10h	63min
Jaguar i-Pace	90	292	43h	13h	75min
Mercedes EQC	85	259	41h	13h	75min
MINI electric	33	145	15h	5h	28min
Nissan Leaf e+	62	239	29h	10h	62min
Peugeot e-208	50	211	24h	8h	53min
Renault Zoe ZE50	50	245	27h	9h	56min
Tesla Model 3	75	348	37h	12h	75min
Vauxhall Corsa-e	50	205	24h	8h	53min

Why do rapid charge times only go to 80% of the battery?

The speed at which a battery can charge slows down the more it 'fills up'.

This effect is less noticeable, in terms of charging times, when using a slower charge unit, but it's much more significant with a rapid charger.

The benefits of using a rapid charger are essentially lost once the battery reaches about 80% capacity and the additional time to charge the remaining 20% is disproportionally long compared to the 80%.

Rapid charge time figures are therefore always quoted 'up to 80%', partly from a manufacturer's marketing message perspective, but also from a practical one.

How much does it cost to charge an EV at home?

The cost to charge an EV depends on your electricity tariff and the amount of electricity (kWh) that's used.

A domestic tariff is around £0.14/kWh, meaning a car with a 50kWh battery would cost about £7 to fully charge, whereas for a car with a 80kWh battery, it would cost something in the region of £11.

Energy suppliers are increasingly offering off-peak tariffs to encourage EV drivers to charge up at different times of the day, particularly late at night. These rates can be as low as £0.05/kWh.

How much does it cost to charge an EV using public infrastructure?

Using public infrastructure will generally be more expensive than charging at home and the cost will depend on the provider, the location and the type of charge point:

- The faster the charger, the more the electricity is likely to cost
- Premium locations, such as motorway services, are likely to cost more.

Most charging networks can be accessed on a pay-as-you-go basis, usually through the individual network App or increasingly via a contactless payment facility:

- All new Rapid and Super/Ultra-chargers in the UK are now required to accept contactless payments. Many existing Rapid chargers are also being retrofitted with contactless technology.

Some networks have a subscription based model giving free or subsidised electricity at their locations:

- The BPChargemaster Polar network is the largest of these.

The cost to charge can vary significantly by charger/network, and whilst most charge based on a pence per kWh, some may charge a flat fee based on time:

- Unlike traditional petrol stations, charging costs are available online/via Apps and so with careful planning, you should not have any 'nasty' surprises!

How many public charge points are there?

There are more than 11,000 public charging locations across the UK with nearly 18,000 charge units. And the network is growing by approximately 500 units a month.

Approximately 20% of these locations have Rapid chargers.

How can I find public charge points or plan my journey?

Longer journeys beyond the range of your EV will require some planning to ensure that you have no charging problems on the way. Understanding what the realistic range is, particularly taking account of the weather and type of driving, is very important.

There are a number of Web and App based resources to help you plan your journey both in the UK and for driving across Europe:

- 'Zap-Map' not only provides a significant amount of general information about EVs, but also maintains a comprehensive and interactive map of all public infrastructure. There's also a journey planning facility with a number of filters, such as by charger network, to tailor your charging needs.
- 'WattsUp!' is a dedicated UK EV route-planning App that calculates a route in real time for your specific EV model and shows the live operational status of chargers along your route. It also has a 'low charge' feature to show the location of the nearest rapid chargers.
- 'A Better Route Planner' is an international EV route-planning Web and App based tool. Again tailored to your specific EV, it will allow you to set charging stops as way points on the route and will also calculate the approximate cost of the charge and show you the expected level of battery charge at the end of the journey.
- 'Plugshare' is an international community based Web and App route-planning tool tailored to your specific EV model. Drivers can also pay for charging sessions directly from the Plugshare App at participating networks, although this is not common in the UK at the moment, as well as sharing their experiences and photos.
- Google maps also now shows charge point locations, although there is minimal useful information beyond the type of charger and the network provider.

Can someone unplug my car or steal my cable?

No. Whilst your car is charging – as well as when it's charged up and still locked - the cable is interlocked with the car and the charge unit so it cannot be disconnected from the car or the charge unit by anyone other than the driver/key holder.

How much does it cost to run an EV?

Like any car, the cost per mile for an EV depends on how much the fuel – in this case electricity – costs and the efficiency of the car.

Assuming that your home electricity tariff is £0.14 per kW and you achieve about 4 miles per kWh, then your mileage will be approximately £0.04 per mile.

A higher electricity cost (from public chargers, particularly Rapid units) and a lower efficiency (larger, heavier cars will consume more energy per mile) mean that the cost per mile will be higher.

However, the tariff rate needs to be significantly higher (> £0.40 per kWh) for an EV to be costing more per mile than an equivalent petrol or diesel car.

Can accessories such as roof bars be fitted to an EV?

Yes, some EVs – but definitely not all – can be fitted with roof bars, but this will need to be checked with the manufacturer prior to order.

However, like any car, roof bars and particularly roof boxes will significantly increase energy consumption and reduce range.

A roof rack on its own can reduce the fuel efficiency of a petrol or diesel car by up to 10% and so you can expect the same impact in an EV. A roof box or carrying bikes could reduce the range by up to 30%.

As with any car, roof bars and other attachments should be removed when not required.

Can I tow a caravan or trailer in an EV?

In theory, EVs can tow things like trailers and caravans. However, this will noticeably affect the range of the vehicle in the same way that the fuel consumption will increase on a petrol or diesel car.

Battery packs are very heavy and so EVs weigh much more than the equivalent petrol or diesel car, which significantly limits any potential towing weight capacity.

The additional weight can also overload the electrical system during braking regeneration when slowing down or particularly when driving down a steep hill.

However, not all EVs will have manufacturer approval for towing and so you should check this together with the weight capacity with the manufacturer prior to order.

What happens if I run out of electricity or breakdown?

Just like a petrol or diesel car, an EV has a 'fuel' gauge or range indicator so the chances of you running out of charge are minimal or no more likely than if you were in a petrol or diesel car.

As you near low battery levels, the car will alert you to this with warning signs and graphics on the dashboard and so this is unlikely to go unnoticed.

Many EVs will also have the ability to direct you to the nearest charge point.

In reality, EV drivers are much more aware of the battery capacity of their car compared to drivers of petrol or diesel cars.

If you do run out of juice, then you should treat this like any other breakdown and call the roadside assistance number. All the major breakdown recovery companies now provide services for EVs and their mechanics are High Voltage Awareness trained.

Some recovery vehicles are equipped with a power pack which will give an electric boost, however you're more likely to be taken to the nearest charging station or to your destination. It's recommended that EVs are not towed as this can cause damage to the electric motor.

How long do electric car batteries last?

New EVs typically come with a battery warranty of at least eight years or up to 100,000 miles, whichever comes first.

Although there will be some slight battery capacity degradation over time, which will vary by make and model, it's expected that batteries will last for significantly longer than the warranty period and mileage.

What charging cables will I get with my new EV?

All EVs should come with two cables; a 3-pin charging cable that plugs into a regular domestic socket and a fast charge 'Type 2' charging cable that you would need for a home charge unit and for accessing public charge points.

It's recommended that whenever possible, your EV is charged from a dedicated charge unit rather than a domestic socket, partly for convenience as it is up to three times faster, but also from a potential safety perspective as domestic sockets are not designed to deliver such a large amount of power over extended periods.

Using the 3-pin cable should be seen as a short term solution when visiting family or friends, or whilst you are waiting for your charge unit to be installed.

You must never use an extension cable to connect your EV to a domestic socket.

What happens if I drive an EV through deep standing water?

The high voltage battery and electrical systems are fully sealed and so there's no additional safety risk of an EV in deep or flood water.

Unlike petrol or diesel cars, EVs don't have an air intake and so the propulsion system isn't impacted in the same way when immersed in water. However, normal precautions should always be taken when driving through standing water in any car.

Do I have to fit a home charge unit?

It's recommended that if you have off-street parking and you are able to, you should install a home charging unit.

A home charge unit will typically be three times faster than a domestic socket, which will make a significant difference when charging a 50kWh+ battery. It will also be much more convenient than using a socket that may well be in a garage or inside the house.

When investing in a charge unit, we recommend that you install the fastest one possible. For most homes, this will typically be approximately 7kW. The cost difference between this and a much slower unit (typically 3.5kW) is generally relatively low, but the difference in charging times is significant and can be as much as twice as fast.

I'm unable to charge at home – can I still have an EV?

Yes, however running an EV will be that bit harder for you but not impossible.

You will need to seriously consider your daily driving patterns, where you might be able to regularly charge and the types of charger available.

If you're office based or are close to the office, then you'll have regular access to a charging point for extended charging periods.

You should also review your local charging options in car parks or supermarkets and think about whether you can make use of them without any significant disruption to your normal daily activities.

You also need to bear in mind that public charging, in particular rapid and super charging, is noticeably more expensive than home charging, which will obviously impact your mileage costs - although it will probably still be cheaper than your current petrol or diesel mileage costs.

If you undertake regular business mileage, then you need to consider whether the Advisory Electric Rate (AER) will cover your electric costs.

Appendix 1 – Glossary of terms

Vehicle glossary

Abbreviation	Full description	Explanation
BEV	**Battery Electric Vehicle** Alternative descriptions: • EV • All electric • Fully electric	A vehicle powered solely by a battery charged from mains electricity. Currently, typical pure-electric cars have a range of approximately 200 miles depending on the model.
PHEV	**Plug-in Hybrid Electric Vehicle** Alternative descriptions: • Plug-in Hybrid Vehicle (PHEV)	A vehicle with a plug-in battery and an internal combustion engine (ICE). Typical PHEVs will have a pure-electric range of approximately 20-40 miles. After the pure-electric range is utilised, the vehicle reverts to the benefits of full hybrid capability (utilising both battery power and ICE) without range compromise.
E-REV	**Extended-range Electric Vehicle** Alternative descriptions: • Range Extended Electric Vehicle (RE-EV) • Series hybrid	A vehicle powered by a battery with an ICE powered generator on board. E-REVs are like pure-EVs but with a shorter battery range of around 40 miles. Range is extended by an onboard generator providing many additional miles of mobility. With an E-REV, the vehicle is still always electrically driven.
HEV	**Hybrid Electric Vehicle (HEV)** Alternative descriptions: • Full hybrid • Normal hybrid • Parallel hybrid • Standard hybrid • Self-charging hybrid	A hybrid vehicle is powered by, either or both, a battery and an ICE. The power source is selected automatically by the vehicle, depending on speed, engine load and battery charge level. This battery can't be plugged in; charge is maintained by regenerative braking supplemented by ICE generated power. A number of fuels can power hybrid ICEs, including petrol, diesel, compressed natural gas, liquid petroleum gas and other alternative fuels.
MHEV	**Mild Hybrid (MHEV)** Alternative description: • 48V system	A mild hybrid vehicle can't be plugged in, nor driven solely on battery power. Instead, a separate 48V battery/e-motor system supports the traditional 12V electrical system to improve efficiency. Mild hybrids bring 70 per cent of the benefits of a full hybrid at 30 per cent of the cost to both petrol and diesel vehicles.
ICE	**Internal combustion engine**	Petrol or diesel engine, including those adapted to operate on alternate liquid or gaseous fuels.

Battery and charging glossary

Charge times	
Charge time Alternative terms: • EV charge time • Recharge time	The time it takes to charge an EV. EVs require different lengths of time to charge according to the size of the battery, how much charge is left in the battery before charging and the type of charger used. The information below is based on the example of a pure-electric car to illustrate the most extreme charge time. PHEVs and E-REVs will take less time to charge.
Slow (2–2.5kW) Alternative terms: • Standard charge • Normal charge • Trickle charge	Standard charge is available in all UK homes from the domestic 3-pin wall socket. An electric car with a 50kWh battery will take approximately 24 hours to fully charge.
Fast charge (7kW–22kW) Alternative terms: • Faster charge	Fast charge requires a dedicated charging point either at home, the workplace or at a dedicated public charging bay. An electric car with a 50kWh battery will take approximately 8-9 hours to fully charge from a standard 7kW fast charger.
Rapid charge (20–50kW) Alternative terms: • Quick charge	Rapid charge will only occur at dedicated charge bays. A 50kW rapid charge unit will charge the majority of EVs to 80% in around 50-60 minutes depending on the size of the battery.
Ultra-rapid charge (120–350kW) Alternative terms: • Super charge	Extremely fast charging which will only occur at dedicated charge bays.
Opportunity charge Alternative terms: • Top up charge	Opportunity charging means the vehicle is charged whenever there is a chance to do so, allowing the battery to be topped up, for example at a supermarket whilst you shop.

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