

**ELECTRIC
VEHICLES**

WHY ARE ELECTRIC VEHICLES BECOMING MORE POPULAR?

Transport currently makes up 35% of Scotland's greenhouse gas emissions and is one of the main sources of nitrogen oxide and particulate matter - air pollutants that are harmful to public health. This is because the vast majority of vehicles use fossil fuels (petrol or diesel) to drive the engine.

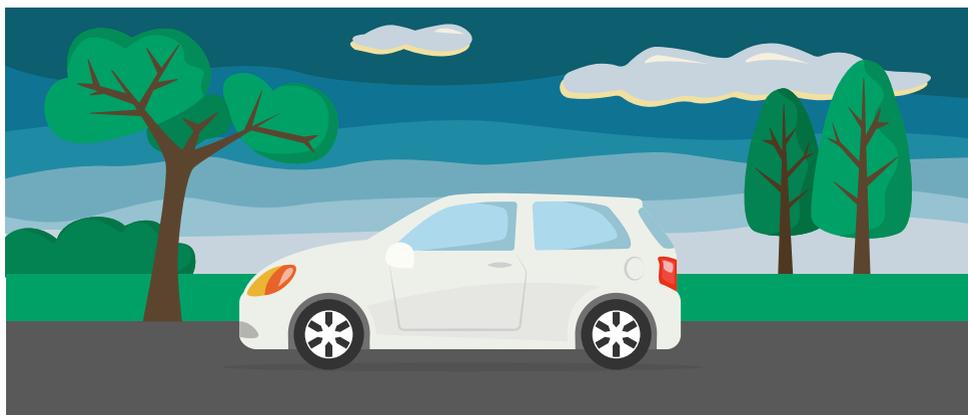
The Scottish Government has set a target date of 2032 for ending the sale of petrol and diesel cars or vans. They are also currently introducing low emission zones in Scotland's four biggest cities (Edinburgh, Glasgow, Dundee and Aberdeen), between 2018 - 2020.

Electric vehicles (EVs) produce less carbon emissions and air pollutants, such as nitrogen oxides (NOx) and small particles in the air, than fossil fuelled ones. Of course they are only fully non-fossil-fuelled if they run on renewable electricity - and even better if this renewable electricity is from a locally generated renewable source.

WHAT ARE THE DIFFERENT TYPES OF ELECTRIC VEHICLE?

BATTERY ELECTRIC VEHICLE

This runs entirely on electricity, with no petrol or diesel engine. Contains a battery that stores energy, which is used to power an electric motor. Can be charged from a standard electric socket or a special electric vehicle charge point. Many new electric cars have a range of over 150 miles.



FUEL CELL ELECTRIC VEHICLE

Usually called a hydrogen vehicle, there is no petrol or diesel engine. They are powered by hydrogen fuel cells which generate electricity. The electricity powers an electric motor. There are only three main models currently on sale in the UK, which are currently more expensive than most electric cars, and only 14 hydrogen refuelling stations (2 in Scotland), although they have a range of 300-400 miles.¹

¹ www.rac.co.uk/drive/advice/buying-and-selling-guides/hydrogen-cars

HYBRID ELECTRIC VEHICLES

These have a petrol or diesel engine as well as an electric motor and battery. When the electric battery is emptied, the petrol or diesel engine starts up and powers the car. There are different types, some of which can be plugged into the mains to recharge (plug-in hybrids) and some which can't plug in (called mild-hybrids) which recharge their batteries by getting back some of the energy during breaking. Plug-ins generally have an electric-only range of under 30 miles or mild-hybrids of less than 10 miles and so still mainly run on petrol or diesel for longer journeys.



ELECTRIC BIKE

This is a bike with an integrated electric motor which helps the cyclist to propel the bike along. This can help with moving the bike faster, travelling further without getting tired and with uphill slopes. Some e-bikes will recharge the battery on the downhill. If you want to cycle on the road without full vehicle registration and insurance, in the UK e-bikes should only provide assistance up to 15.5mph and with a maximum motor power of 250 watts.

WILL I SAVE MONEY RUNNING AN ELECTRIC VEHICLE?

New EVs are currently more expensive to buy than fossil fuel vehicles, however they are expected to achieve “price parity” within the next few years. Also as time moves on the second-hand market for EVs will grow.

The UK Government Plug-In Grant offers a maximum of £3,500 toward the cost of approved new low emissions vehicles. Transport Scotland also offer an **interest free loan** through the Energy Saving Trust to finance the cost of a new EV. Alongside the lower cost of fuel and tax as shown in the table, this means that the difference in purchase price could be offset within 3 years, depending on the car model and personal usage patterns.

You might also consider buying a second-hand EV. Although not eligible for the Plug-In grant they can be cheaper than buying new.

EV VS PETROL VEHICLE COST COMPARISON ¹

	VW e-Golf purchase	VW e-Golf lease	VW Golf 1.5I Petrol
Purchase cost (£)	29,340 ²	0	22,155
Annual lease costs (£)	0	2,784 ³	0
Cost per mile ⁴ (p)	3.4	3.4	9.9
Annual vehicle tax (£)	0	0	145
Annual servicing (£)	13.20	13.20	106.80
CO ₂ emissions (g/km)	0	0	113

Car insurance costs can be significantly higher for electric vehicles though this depends on the driver too.

¹ Using online calculator: www.nextgreencar.com/tools/comparison

² This is the price after applying the UK Government Plug-In Grant of £3,500

³ Using www.drive-electric.co.uk - their leases are on 5,000 miles/yr

⁴ Cost per mile assumes petrol price of £1.31/litre and 16.5p/kWh of electricity and is subject to change as prices vary

WHAT ARE THE PROS AND CONS OF BUYING AN ELECTRIC VEHICLE?

EV pros

- Lower cost per mile to run
- Exempt from vehicle tax
- No tailpipe emissions
- Can charge from home
- Exempt from low emission zone charges, and less likely to be banned from future low-emission zones
- Lower servicing and maintenance costs
- Quieter, smoother drive, including one pedal driving and quicker acceleration
- Some good comfort elements: Instant cabin heat without waiting for engine to warm up, remote controlled pre-heat to defrost

EV cons

- Higher purchase costs
- Longer refuelling time (though no need to stay with vehicle during refuelling)
- Reliant on public charge points if no home charger
- Need more journey planning to access charge points on longer journeys
- More limited choice of models at present

WHERE CAN I CHARGE AN EV?

If you have parking space at your home, you can install a home charger (though if you live in a flat above the ground floor at present you will need to use public chargers). If you buy an EV the garage may arrange to install a home charging point. The cost of an outside, wall-mounted charging point may be less than £300 and grants are available for home chargers via the Electric Vehicle Homecharge Scheme.¹ This provides grant funding of up to 75% towards the cost of installing domestic electric vehicle charge points. Further Scottish funding is available of £300.

If you live in a shared building or do not have space for a home charger, there are numerous public charging points across the UK. Scotland has the most charging points per person in the UK. Local authorities are being encouraged to install on-street charge points for areas without off-street parking. There are now more public chargers in the UK than there are petrol stations!

Here is a website showing where all the public charging points are in your local area! **EV Charging Stations Map** www.zap-map.com/live

¹www.energysavingtrust.org.uk/scotland/grants-loans/domestic-charge-point-funding

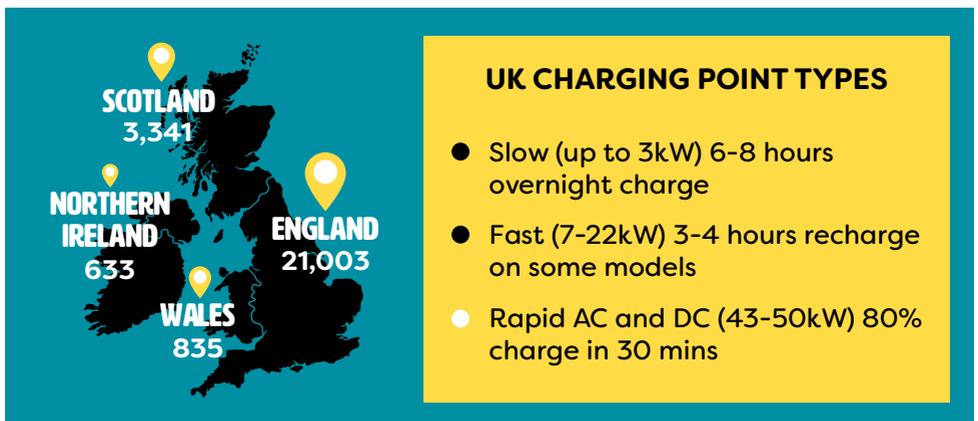
HOW LONG DOES IT TAKE TO CHARGE AN EV AND HOW FAR CAN I TRAVEL ON A FULL CHARGE?

Vehicle range (i.e. how far you can drive on a fully charged battery) can seem like a barrier to using an EV. However, statistics from Transport Scotland show that the average car journey in Scotland is 11 miles.² For those in rural areas, a higher average of 35 miles is more likely. All electric vehicles eligible for funding under the UK Government plug-in grant scheme have a range of at least 70 miles and the average range of most EVs currently on the market is around 200 miles.

Charge points come in three main types:

- **Slow chargers:** Use standard 13A sockets found in homes and workplaces and provide approximately 10 miles of range/hour of charging.
- **Fast chargers:** Can be found in the same places as slow chargers, but also in public locations such as hotels, car parks and visitor destinations. These provide between 25 and 80 miles of range/hour of charging. Most EV owners have a fast charger (about 7kW) installed at home without requiring any upgrades to their supply cable.
- **Rapid chargers:** Can be found in some of the same places as fast chargers, but also on route stops e.g. at service areas and will provide approximately 150 miles of range/hour of charging. Chargers are being developed that would charge even faster in the future.

²www.transport.gov.scot/publication/scottish-transport-statistics-no-35-2016-edition



CASE STUDY

JAMIE, EV OWNER IN PERTHSHIRE

In the last year, Jamie and his family have driven 12,000 miles in their electric car, saving over 3 tonnes of carbon dioxide emissions compared to the petrol car it replaced. Daily commutes to work in Dundee and around Angus are done without charging the car away from home, and they regularly take it on longer journeys of several hundred miles.

1Batteries are sensitive to temperature. Find out how to get the best from your battery: www.whatcar.com/advice/owning/how-long-do-electric-vehicle-batteries-last-for/n18117

“ We’ve got no regrets about going electric. Our total charging cost was £283 last year, and having just changed to an off-peak tariff we’re expecting it to be less than £150 this year – not much more than the cost of two tanks of petrol! We’ve only used rapid chargers once or twice a month. 97% of the energy the car has used has been from our home charger, almost all overnight. We’re getting an average range of 145 miles, up to 160 in summer and about 125 in winter at motorway speeds.¹ The range on new EVs is improving all the time, but I’m glad we got one now; it’s saving us so much money, reducing our carbon footprint and is much nicer to drive than other cars we’ve used. ”

For more information on buying, running or sharing electric vehicles or electric bikes, check out the following websites:

www.zap-map.com

www.energyinmotion.scot

www.chargeplacescotland.org

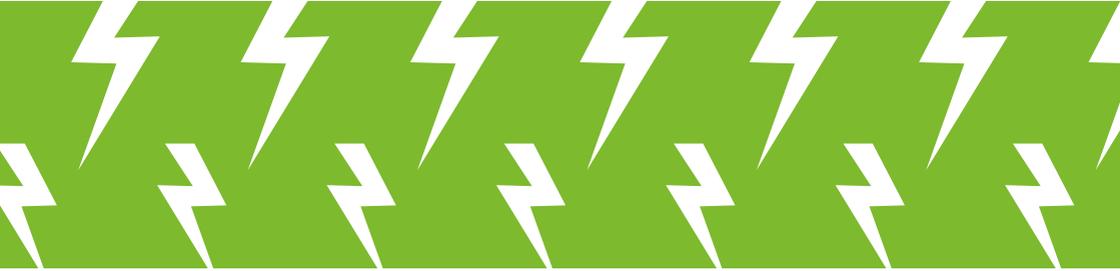
www.como.org.uk

www.lowemissionzones.scot

www.gov.uk/plug-in-car-van-grants

www.energysavingtrust.org.uk/scotland/grants-loans/electric-vehicle-loan

You could also contact your local community group to see if they are doing anything to help local people reduce their transport emissions, such as planning a shared electric car, electric community transport or e-bike scheme which you could use instead.



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