

venson

Electric Vehicles:
A guide to spark
your interest.



The government is investing hundreds of millions of pounds through the motoring tax system, purchasing grant aid and vehicle charging points in encouraging demand for electric vehicles.

The UK is Europe's largest market for zero emission capable cars, accounting for almost a quarter (23.8%) of European Union electric and plug-in hybrid registrations in 2016.

Last year UK buyers registered 36,917 new electric vehicles (EV) and plug-in hybrid electric vehicles (PHEV) cars in 2016, compared with 29,189 in France and 25,214 in Germany. The total European Union market for those vehicles was 155,273 units.

Although data from the Society of Motor Manufacturers and Traders (SMMT) reveals that demand for electric and alternatively-fuelled vehicles qualifying for the government's plug-in car grant was 31.4% up on 2015 levels, volume remains a small percentage of total new car registrations – 1.3%. Since the plug-in car grant was launched in January 2011 there were to the end of 2016 83,052 eligible cars registered.

For commercial vehicles, in 2016 961 electric vans were registered (2015: 819), according to the SMMT. The plug-in van grant was launched in 2012 and as at October 2016, around 2,500 plug-in van grants had been claimed, said the Department for Transport.

Nevertheless, the target is for almost 25% of all new car registrations to be plug-in by 2021 and by 2040 the government's aim is that all new cars sold in the UK will have zero tailpipe emissions. If those ambitions are to be achieved then it is fleets – who are responsible for buying the majority of all new cars registered in the UK – and company car drivers who will be in the vanguard.

Venson Automotive Solutions is committed to promoting 'greener' fleets and helping businesses and drivers make the shift to plug-in vehicles and has a range of initiatives in place.

Venson fleet management solutions.

Company vehicles are an important asset for supporting core business operations and that's why our fleet management solutions are created in response to our client's needs and are based on our commitment to long term partnership and exceptional customer service. Testimony to this is our customer retention rate of over 95%.

Along with exceptional service we ensure our clients receive great value from their fleet, by delivering solutions that are based on impartial advice and that provide tangible financial return. We can do this because we've only ever specialised in fleet services, so our knowledge and in-depth understanding of the market is the best in this sector and relevant to public, private, not for profit and emergency service organisations.

We also believe in true partnership, working with fleet operators and their drivers to ensure they always receive the most appropriate solution to support their organisation's operational and financial needs.



Tell me about electric vehicle technology?

There are three types of technology powering electric cars all offering different benefits so drivers can match fitness for purpose to business need and lifestyle:

- **100% electric** – powered by a battery and charged from mains electricity with a single charge
- **PHEV** – matches a battery for short trips with a standard petrol or diesel engine for longer journeys
- **Range extender** – powered by a battery with an internal combustion engine generator on board, which powers the battery when it gets low giving additional range over and above a 100% electric vehicle

How broad a vehicle choice do I have?

There are plug-in cars available designed to suit all lifestyles and driving needs from super minis through lower and upper medium sector models to executive cars and including popular niche sectors such as sports utility vehicles and MPVs as well as estates. What's more the choice is increasing all the time as motor manufacturers broaden their vehicle choice and offer plug-in alternatives to traditional petrol or diesel models within well-established model ranges. Just to be clear, most mainstream car producers have plug-in vehicles in their ranges; if they don't then they soon will.

Are 100% EVs expensive to buy?

That's really a personal decision. The Renault Zoe is billed as the UK's "most affordable" EV with prices starting at £13,995 (Expression Nav) on the road taking account of the government's Plug-In Car Grant (see below). However, that excludes mandatory battery hire from £49 per month depending on battery size and annual mileage. Renault took the decision at launch of its EV range to lease batteries, while other manufacturers took the view that the battery was an integral part of the car. The Nissan Leaf, the UK's most popular EV costs from £21,680 (24KWH Visia) including Plug-In Car Grant (Nissan also offers a battery leasing option which reduces the on-the-road price of the entry model to £16,680). The BMW i3, another popular model, costs from £27,880 including Plug-In Car Grant.

But doesn't limited battery range restrict journey length?

This is one of the most frequently repeated myths, so it is critically important to analyse your own journey patterns. A Venson survey suggested that limited mileage range was the second biggest deterrent for drivers, but research by joint government and motor industry campaign group Go Ultra Low (GUL) suggests journey patterns should be no deterrent to choosing a plug-in vehicle as your next company car. GUL says the average commute in the UK is less than 10 miles, so the majority of plug-in cars are able to charge entirely at home or work, only occasionally using public chargepoints as a back-up or additional top-up for longer journeys. What's more GUL says, more than a third of UK motorists never travel more than 80 miles in a single trip, comfortably within the range of most pure electric vehicles, which is comfortably above 100 miles and increasing all the time as battery technology improves (the Tesla Model S has the best range at a published 265 miles and the Nissan Leaf has a published 155 mile range). What's more for drivers who regularly need to travel further or don't have a driveway for home-charging or a workplace recharging facility, some plug-in hybrids can travel around 700 miles without needing to refuel. Therefore, whether driving for business or leisure and using largely urban or motorway driving, plug-in vehicles are a clear company car choice option.



That's all fine, but isn't the maximum benefit of a plug-in vehicle derived from running it as an electric vehicle?

That's absolutely right. Fuel savings are one of the many benefits of driving electric vehicles. Indeed the Department for Transport calculates that electric vehicle running costs are as low as just 2p a mile and the Energy Saving Trust suggests such vehicles cost £2-£3 to fully charge at home for a 100-mile range. The equivalent petrol or diesel car costs £9-£13 to drive 100 miles – more than 400% more on a mile for mile. Therefore, the cost of charging an EV is significantly less than filling up a petrol or diesel vehicle. So, if selecting a PHEV the more miles driven on electric power, the greater the financial savings – and you're helping the environment as well. Fuel economy of all vehicles, including PHEVs, is influenced by many factors including driving style and road conditions, and while there is much comment about the poor fuel economy of plug-in hybrids relative to published data that can largely be attributed to the laboratory-based testing of vehicles rather than real-world driving. It is worth recalling that a Toyota Prius Plug-In entered in last year's Fleet World-organised MPG Marathon returned 109.14mpg over the 387-mile route. At the UK's average fuel cost of £5.20 a gallon, that equated to just £14.63 worth of fuel to drive a route equivalent to the distance between London and Glasgow by road. To help fleets and employees decide if a plug-in car is right for them is one of the reasons why Venson Automotive Solutions has launched its consultative CleanFleet service.

OK. You are starting to convince me, but isn't access to recharging points a problem?

The lack of recharging points across the UK has in surveys been shown to be the biggest deterrent for drivers to go electric, including in Venson Automotive Solutions' own survey. But the facts prove otherwise so don't panic! The government calculates that there are more than 11,000 charging points already in place and the network is growing all the time – that's more recharging points than there are fuel station forecourts (2015: 8,490). The government has made millions of pounds available for more charging points to be located in key areas, which include retail shopping car parks, railway station car parks and other popular locations. Furthermore, fuel companies such as Shell and Total have pledged to put charging points on their forecourts. What's more, GUL research suggests that because of journey patterns more than 90% of electric vehicle charging takes place at home. Nevertheless, when planning a journey of some distance it is worth checking in advance the charging point locations so an EV can be recharged on route. A map showing all vehicle recharging points can be viewed at: <https://www.zap-map.com/live/>

How long does a recharge take?

Technology is improving all the time. Currently chargepoints are categorised by the power they produce. That's measured in kilowatts (kW), and the higher the number, the faster a vehicle's battery will charge. Most networks offer a mix of 'rapid' (43kW-50kW), 'fast' (7kW-22kW) and 'standard' (up to 3kW) charging options. So the options are:

- **Rapid** – will charge a battery from flat to 80% in under 30 minutes and are generally installed at motorway service stations, retail outlets and other public facilities.
- **Fast** – a battery recharge in two-four hours (depending on battery size) and installed in public locations
- **Standard** – generally used at home and work and takes about six hours to fully charge a battery.

Charging involves attaching an electric cable between the car and the socket and, unfortunately, just as with mobile phone charges there is no universal fitment. Standard charging uses the universal three-pin plug at the charging point outlet, and either a gun shaped Type 1 (J1772) or Type 2 (Mennekes) connector for coupling with the vehicle inlet. The latter is also usually used for 'fast' charging. 'Rapid' charge units provide a tethered cable with a non-removable vehicle connector. I know that all sounds complicated, but really it's not. To find out what connectors are used by a particular EV model go to <https://www.zap-map.com/electric-vehicles/ev-charge-point-selector> or <https://evconnectors.com/>.



So tell me about home and workplace charging points?

Government financial help is available. The Electric Vehicle Homecharge Scheme provides grant funding of up to 75% towards the cost of installing electric vehicle chargepoints at domestic properties across the UK capped at £500 (including VAT). The Workplace Charging Scheme (WCS) is a voucher-based scheme that provides support towards the up-front costs of the purchase and installation of electric vehicle charge-points, for eligible businesses, charities and public sector organisations. A grant of £300 for each socket up to a maximum of 20 across all sites is available. In both cases an approved list of authorised installers is available. In short, charging a plug-in car at home or work is no different to charging your mobile phone – drivers arrive home or at work, plug-in and make their next journey with a 'full tank'. The cost to charge an electric car in the UK varies between home, work and public charging, but the following prices are indicative:

- **Charging at home:** Costs about £3 for a full charge or 2p per mile
- **Charging at work:** Some employers will install workplace charging points and typically offer free access throughout the day. Others opt for a time-based tariff to encourage sharing of charging stations and another model is to offer free employee charging for a set period of time and then charge a fee when that time expires to encourage employees to vacate charging spaces.
- **Charging at public stations:** Public charging points at supermarkets or car parks are often free to use for the duration of a stay.
- **'Rapid' charging stations:** Typically cost £6.50 for a 30 minute charge, although costs can vary from free to being more expensive (Tesla Motors' Supercharger Network has points across the UK which are free to use for owners of Tesla electric vehicles).

While we are on the subject of money, as a driver do I benefit from the government's plug-in car scheme?

As a company car driver, I'm afraid not. The plug-in car grant – £4,500 for category 1 models (cars with CO₂ emissions of less than 50g/km and a zero emission range of at least 70 miles) and £2,500 for category 2 and 3 models (typically PHEVs) – is available to the purchaser of the vehicle. As is the plug-in van grant – 20% off the cost of a vehicle up to a maximum of £8,000 subject to performance criteria.

But there must be some financial benefits for company car drivers choosing an electric car?

Yes there are. The motoring tax regime is designed to favour EVs and PHEVs because it is based around CO₂ emissions and plug-in cars are either zero emission or have very low emissions. Furthermore, with London due to introduce an ultra-low emission zone potentially in September 2019 and towns and cities across England considering implementing clean air zones to improve air quality plug-in vehicles will be able to drive in those areas without playing any charges (EVs and PHEVs are already exempt from the London Congestion Charge). In short, if choosing an EV as a company car major benefit-in-kind tax savings are available versus petrol and diesel vehicles with employers making Class 1A National Insurance savings; first year and standard rate VED is £0 for EVs (if the car costs more than £40,000 VED is £310 a year in years two to six) with PHEVs also benefiting from savings versus petrol and diesel cars; there are also capital allowance savings for employers. That's all in addition to fuel savings, as previously highlighted.



That's helpful, but in terms of performance aren't electric vehicles more like milk floats or golf carts due to the weight of the batteries?

Not for a long while, the technology's moved on leaps and bounds. EVs are among the most technically advanced cars on the market and have performance to match. For example, the Renault Zoe, which the manufacturer bills as the UK's "most affordable" EV has a published 0-60 time of 8.2 seconds, while the Tesla Model S completes the 0-62mph sprint in 2.7 seconds. As regards top speed, well you can't drive at those speeds legally in the UK!

Does driving style impact on EV range and what happens if I run out of charge?

Driving style, road conditions, the weather and a range of other factors can all impact on EV range. The more aggressive the acceleration and braking, the greater the impact on range. Therefore, the best approach is to anticipate traffic flow and cruise without aggressive acceleration and braking – known as smart driving. Most EVs also recapture energy lost when slowing down, so gentle, sustained deceleration helps improve range more than hard braking. EVs operate best in urban areas and range is impacted most on motorways, driving up hills will also impact on range as will carrying a lot of weight in a vehicle. Electric vehicles on average consume about 15% more energy per mile when they're driven in an extreme weather region – very cold or very hot – but the UK does not suffer from such extremes so there should be little or no impact on battery performance. Additionally, some EVs regulate battery temperature. Using vehicle features that rely on energy from the battery – heating, lights, air conditioning, heated seats, infotainment systems etc – will all impact on an EV's usable range. Just like a fuel gauge on a petrol or diesel vehicle, an EV will highlight available range. As range diminishes, the EV will deliver warnings and, in most cases, a 'countdown' to 0 miles so best to 'charge up' as soon as possible, which is why journey planning is important. If the worst does happen and the car runs completely out of charge – drivers will notice performance reducing as the final mile or two of battery range is reached – then a call to the appropriate breakdown assistance service is required for help and transportation to the nearest charging facility. Most breakdown providers include towing of EVs within their policies. By the way, EVs safety systems are typically powered by a separate small battery so will continue working after the 'main' battery has run out of charge.

Is it true that there is less to go wrong with 100% EVs so service maintenance and repair (SMR) costs should be lower than those for internal combustion engine models?

That's right. The relatively low volume of plug-in vehicles on the roads means that definitive figures based on a reliably large sample of models across a broad spectrum of brands are not yet available. An EV has just three main components – the on-board charger, inverter and motor – which Nissan says for its Leaf make the EV 40% cheaper to maintain compared to petrol or diesel-powered alternatives. However, industry data providers suggest that a 100% EV will achieve an average 25-40% versus a petrol or diesel car. SMR cost savings are accrued because there are fewer parts that require maintenance in an EV. There are a total of 20 items used in petrol and diesel cars but not in EVs that require inspection, maintenance or replacement over a vehicle's 10-year/150,000-mile life. These include the alternator, power steering fluid (it uses electrical assistance), radiator and assorted pipework, spark plugs, starter motor, thermostat, timing belt and a water pump. Additionally, EVs require no oil changes, air filter, transmission fluid, exhaust pipe or radiator hoses. Not only does that make an EV cheaper from an SMR viewpoint, because there are fewer moving parts to go wrong it means potentially improved reliability and reduced off-road times. It is also important to note that pure-EVs – as opposed to range extended EVs and PHEVs – will typically have lower annual mileage and therefore will almost certainly hit date-derived service intervals before mileage intervals.



A recent study by Go Ultra Low found that UK motorists could save an average £306 a year in garage bills by switching to a new electric car. Every year, the average motorist forks out £400 for servicing and maintenance for their petrol or diesel car – more than four times the sub-£100 annual spend for an electric model, said the survey. The saving on PHEVs is not as great as on pure EVs at perhaps 20%. However, that depends on how many miles are driven on electric power as the more miles driven using the internal combustion engine will result in wear and tear on friction items and greater oil use among other factors.

I've heard many stories about battery reliability, potential fire risks, and battery recycling. Please tell me the facts.

There are many myths that get reported, but the fact is that EV manufacturers typically warranty a battery for at least eight years and 100,000 miles, while some manufacturers go to 125,000 miles or even unlimited mileage, although some warranties are less generous. That should give peace of mind that manufacturers have confidence in the battery technology. It also means that there is no problem in charging EVs as regularly as required. However, one tip is to charge the battery to slightly less than full capacity, which, while it reduces available range, it places less strain on the battery and leaves room to store energy from regenerative braking. Often when batteries are full or near full, regenerative braking will be disabled to avoid overcharging the batteries. With regards to any fire risk, it is true that EVs can burst into flames. However, that is not a problem confined to vehicles – think mobile phones or Boeing's Dreamliner plane. Rather it is a problem related to batteries: essentially pack a lot of chemical energy into a small space and if something goes wrong, a fire or explosion is the result. However, according to the United States' Department of Transportation, Americans drive about three trillion miles a year with a vehicle fire occurring on average every 20 million miles, compared with one fire in more than 100 million miles for a Tesla. With regards to battery recycling, EV manufacturers have formed partnerships with power management specialists, which will convert batteries at the end of their vehicle life to carry out a different role. That, for example, could include for use in traffic signage, emergency lighting systems and in remote areas as back-up power supplies.

Is an EV's load space compromised by its batteries?

It is doubtful that anyone would choose an EV for its load-lugging capabilities. As previously mentioned – and the same is true for petrol and diesel cars – adding weight to a vehicle impacts on its fuel efficiency or in the case of an EV its range. However, for example, the best-selling Nissan Leaf, has a 370-litre boot space which is more than a Ford Focus. However, what is perhaps more pertinent is that the car's rear seats do not fold totally flat due to the large battery compartment beneath. Meanwhile, the Tesla Model S has a total of 894 litres of luggage space – 150 litres of which is in the front where the engine would usually be. Drop the rear seats and space grows to 1,795 litres. That means with the seats up, there's more space in a Model S than in a Mercedes E-Class estate.

How easy is it for an EV to be stolen?

Government data reveals that the number of vehicle thefts in the 12 months ending September 2016 in England and Wales, the most recent period for which figures are available, was 88,496. Car theft rates are significantly lower than many years ago due to the millions of pounds spent on vehicle security by motor manufacturers. Today luxury cars and performance cars feature prominently on the list of stolen cars and are frequently stolen to order for distribution overseas with organised gangs using specialist tools to reverse engineer a vehicle's security systems, as opposed to opportunist thieves stealing cars. There are no figures available relating to the theft of electric vehicles, but there is a suspicion that they may not be high on a thief's 'wanted list'. That's because a thief has no idea how much charge is in the battery and will not want their getaway hampered by having to find and spend time at a charging point. What's more, as experts frequently point out, despite the 'cat and mouse' game played by motor manufacturers and thieves in terms of vehicle protection the weak link in the chain remains a driver being careless with their keys/key fob for remote access.



Is it possible to take an EV abroad via car ferry or through the Eurotunnel? Also will the car battery go dead if parked at airport for two weeks when I'm on my summer holiday?

Taking an EV on a car ferry is not a problem. What's more some ferry operators, including StenaLine and Irish Ferries, have recharging facilities on board some of their vessels. If using a ferry and you want to recharge then best to contact the operator in advance to book a slot. Taking an EV through the Channel Tunnel is also not a problem. In fact Eurotunnel Le Shuttle says it is the only place in Europe where drivers can find all of the main rapid chargers for EVs in one place, and use them free of charge. The operator has chargers for universal electric and PHEV cars, and dedicated Tesla chargers at both terminals, so if drivers find their electric or PHEV car is low on battery power, a recharge is possible before heading through the Tunnel. Many airports provide a charging facility in their short stay car parks – again best to try and book a slot – and many operators offer an off-site parking and recharging facility. However, if you simply want to park your EV in a long stay car park and jet off for that well deserved fortnight in the sun then don't panic! There will almost certainly be a small loss of charge as the EV's features such as the alarm, telematics system and battery monitoring will consume some power, but that is unlikely to be any more than 2-3%.

Is towing a caravan, boat, horse box or trailer with an EV or PHEV a realistic option?

Towing with a PHEV should not be a problem although, as with any vehicle it is always best to checking the towing limit. For example, the UK's best-selling PHEV, the Mitsubishi Outlander is homologated for towing, and has a maximum towing limit of 1500kg, which the manufacturer says is ample for many mid-sized family touring caravans and the like. However, that is 500kgs less than the diesel version. With regards to 100% EVs the ability to tow is not as clear cut. The recently launched Tesla Model X, the world's first 100% EV SUV, is billed by the manufacturer as the "first electric car capable of towing" and has a 2,270kgs towing limit. Meanwhile, Nissan does not quote a safe towing capacity for the Leaf, the UK's best-selling 100% EV, while the BMW i3 Range Extender has a towing weight of 415kgs (the manufacturer does not give towing capacity data for the i3).

You really are convincing me that I should choose an EV as my next company car. So can I drive one?

Absolutely. Manufacturer car show rooms will have demonstrator models available to try. Also, just to underline the confidence that there is in demand for plug-in vehicles, the UK's first multi-brand centre to promote electric cars is due to open shortly. Milton Keynes is among UK towns and cities in the vanguard of promoting zero emission vehicles and the Milton Keynes EV Experience Centre is to open this spring (a date has yet to be announced). To be managed by Chargemaster, there will be a fleet of 52 electric cars available this year to 'try before you buy' on a short- or long-term basis rising to 99 in the next five years.

So what should I do now?

We hope this Q&A has helped you decide that a plug-in vehicle is right for you as a company car. Further information is also available at www.clean-fleet.co.uk; www.goultralow.com and <https://www.gov.uk/government/organisations/office-for-low-emission-vehicles>

venson

Venson Automotive Solutions Ltd, Venson House,
1 A C Court, High Street, Thames Ditton, Surrey KT7 0SR
Telephone 08444 99 1400
www.venson.com

