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**Omega**

# **Electric Vehicle Charging in the UK**

# Introduction

The UK has committed to reducing greenhouse gas emissions by 28% by 2035, moving to Net Zero by 2050. Transport, in particular cars, is the largest source of emissions (accounting for 27%). Moving from petrol and diesel cars to electric vehicles (EVs) is therefore key to reducing emissions and meeting the Net Zero target. The UK Government has committed to end the sale of new internal combustion engine cars and vans from 2030.

Alongside affordable new and second hand EVs, access to a reliable, fair priced and easy-to-use public charging network is key to unlocking EVs for the masses. A number of articles discuss charging at home being one of the main solutions, however with estimates ranging from 40% to 75% of British homes having access to off street parking, the need for public and workplace charging for EVs is clear. This demand provides commercial opportunities in a variety of forms from survey and design, through installation, maintenance and back-office provisions for monitoring, control and financial transactions.

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**Combatting 'range anxiety' and solving some of the negative charging perceptions for EVs will not only require investment, but will also call for careful consideration of a number of issues, says**

*Iain Coleman, Head of EV Charging Solutions at OmegaRed.*

# Charging speed

While charging at home using a standard 3-pin plug can replenish some vehicles overnight, as battery capacity increases this will become a less viable option. Tesla, for example, state that you will add 6-8 miles of range per hour of charge when using a standard 3 pin plug. 3.6 kw home charging will provide a range of 14 – 17 miles from 1 hour of charging (based on Tesla Model 3) whereas a 7kw charger will provide up to 32 miles from 1 hr of charge.

If a majority of drivers charge at home or at the workplace, then what happens if you can't? No driver will want to be stuck somewhere waiting for their car to charge. Fortunately, most modern EVs now support charge rates of 120kw. No new cars currently support 350kW rapid charging speeds, although the Porsche Taycan's 270kW maximum comes close. It does, however, have a starting price of £85,000. Using a Rapid charger with the Porsche will give somewhere in the region of 80% charge in about 20 mins, while the same charge on a Jaguar I-Pace (100kW maximum) will take roughly 45 minutes.

Most electric cars will automatically slow their charge rate once they reach 80 per cent, in order to protect battery health and longevity. Of course as technology progresses we will see cars that can take ultra-fast charges giving 80% in under 10 mins. It seems clear that faster charging speeds along with some behavioural shifts will help move perceptions towards EVs being a convenient and usable alternative to petrol and diesel cars.





## User behaviours

If you have ever considered the fuel consumption of your petrol or diesel car you will know that it is most cost-effective to run your vehicle with less fuel as it will be carrying less weight. You will also recognise that your vehicle gets better fuel consumption on long journeys at relatively high speeds compared to urban driving. This, coupled with the relatively quick times to refuel petrol or diesel vehicles, encourages the behavior of running towards empty before filling up.

With the extended times to charge EVs, the current limited range and higher energy consumption at higher speeds due to wind resistance, driver behaviors will need to change to an “always topped up” mentality. This will drive the need for charging facilities at many locations away from the home. Different types of chargers giving different charging speeds will provide different customer experiences, again giving rise to changes in customer behavior. It is likely we will see different ideas on how people charge their cars and therefore different forms of marketing and pricing.

If we accept that workplace charging is a necessity, one other example would be fast charging in existing petrol stations allowing for a 10 minute “petrol station” experience. Alternatively, charging points in locations such as shopping centres, areas with leisure and entertainment opportunities, or supermarkets will allow for, and actively encourage, a longer experience away from the car and correspondingly increased footfall and ancillary revenue. Another issue to consider is the reliability of the public charging network. Nothing adds to “range anxiety” more than knowing you are on your last few miles and wondering if the charger on route to your next destination is working.



## Driving the EV markets

With this mind, it is worth considering how the UK Government is supporting both the installation of the infrastructure and the purchase of EVs at a reasonable price. As with all things, new EVs are expensive. The recent changes in substantially lower 'Benefit in Kind' taxation for company car drivers who choose EVs and plug-in Hybrids over traditional petrol and diesel cars is one incentive designed to increase the uptake in low emission vehicles. This initiative over the next few years will in turn help to flood the secondhand car market with EVs and plug-in hybrids driving down price. Government grants for the installation of both workplace and home chargers further supports the market.

Finally, many of the critical motorway service charging stations require costly increases in grid capacity before more chargepoints can be installed, which is a major barrier. The Government's £950 million Rapid Charging Fund (RCF) has been set up to fund these grid upgrades in England - providing a pivotal opportunity to open up and increase charging competition within motorway services, as well as increasing grid capacity; ultimately driving down the cost of charging at these locations.





# Public charging network

## What do we need and why do we need it?

The UK Government states that it is essential that there is a comprehensive and competitive EV charging network in place, one that people can trust and be confident in using – much like filling up with petrol or diesel. If this is not the case, and the charging network is perceived as inadequate, or not offering a fair deal, that will be a major barrier to EV take-up.

The Government has indicated that nearly 29,000 public charging points are needed across Great Britain by 2030, of which around 85% of these are Fast (22kW) or Rapid (43 – 350kw) chargers. The CCC (Committee for Climate Change) has recently stated:

- “The number of rapid chargers located near the major roads network needs to expand from 460 in 2016 to 1,170 per 100km by 2030.”
- and, “The number of public chargers needed for ‘top-up charging’ needs to rise from 2,700 in 2016 to over 27,000 by 2030”.

This clearly shows the need for public charging and will result in commercial opportunities for ownership of charging equipment, installation services, financial transaction management and ongoing maintenance provision.

# Smart charging networks

The time of day at which EV charging occurs could have significant implications for the UK's electricity system. It is expected that where they can, many consumers will charge their EVs at home. Without smart charging, EV charging is likely to happen during existing electricity system peak times (such as between 5pm and 7pm) when people arrive home from work. This would require significant levels of additional investment both in the electricity networks and in electricity generation capacity to meet the increased demand.



Source: Virta Ltd.

EV smart charging involves shifting charging to a different time of day, such as overnight when there is lower demand on the electricity system, or to times of high renewable energy generation, for example the middle of the day when solar is most effective. This can help reduce the need for costly electricity network reinforcement to meet increased demand from EVs, and offers benefits to consumers too, including savings on their energy bills.

We will undoubtedly see new legislation that limits or changes how and when EVs are charged at home. Government will define smart functionality within the legislation and require private chargepoints sold to include this functionality. Smart functionality will be described as the ability to:

- send and receive information
- respond to information by
  - increasing or decreasing the rate of electricity flowing through the chargepoint
  - changing the time at which electricity flows through the chargepoint.

Government will be including bi-directional vehicle-to-everything (V2X) chargers within the scope of the smart charging legislation. V2X is the umbrella term for technologies that export EV electricity to the grid (V2G) and those that export only to behind-the meter systems (e.g. vehicle-to-home). Government has expanded the definition from V2G to capture all forms of bidirectional charging.

# Reliability

From discussions with EV drivers, equipment manufacturers and charging providers, reliability and maintenance of charging units is fast becoming an issue. Any device that is designed for use by the general public will suffer from accidental damage as well as that caused by a lack of care. Effective maintenance and servicing of charging units will be an essential part of the jigsaw.

Thus driver “range anxiety” is not only centered on access to chargers in the public network, but also the reliability and availability of these chargers when they need to stop on route or charge at their destination. This will only be exacerbated as demand increases along with, possibly, abuse of charging facilities. We will need to see good levels of monitoring and control with remote reset capability along with good SLAs and response times for companies that are providing the maintenance.

Standardisation of charging equipment parts is a must; fortunately, we are seeing some of this with most vehicle manufacturers moving towards the CCS (Combined Charging System) for DC charging connection on European vehicles. Maintenance is not the primary driver for this shift away from the CHAdeMO connection for DC charging; this is also influenced by vehicle and charging standardisation but it will help support the maintenance needs on tethered charging units.

Further work is required around the few maintenance contracts that are out there.

Undoubtedly, we will see further legislation around inspection, test and standardisation of charging units that are in the public domain.

## In conclusion

There are many commercial opportunities in this market space from ownership of charging assets through installation and maintenance to management of the financial highway. The future of personal transportation is electric.



Source: Virta Ltd.





## References:

<https://www.gov.uk/government/publications/electric-vehicle-charging-market-study-final-report/final-report>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1015285/electric-vehicle-smart-charging-government-response.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015285/electric-vehicle-smart-charging-government-response.pdf)

Transport and Office for Zero Emission Vehicles paper **Electric Vehicle Charging Statistics** - <https://www.theccc.org.uk/publication/plugging-gap-assessment-future-demand-britains-electric-vehicle-public-charging-network/>



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