

CONNECTING ELECTRIC VEHICLES

Driving the way to a more sustainable future



Electric Vehicles in a UK Context

Electric Vehicles (EV) will be one of the biggest catalysts in helping the UK Government reach its carbon emission ambition by 2040, and the Scottish Government's target of 2032 respectively.

Although you may not have noticed, EVs are fast on the rise; in 2014 only 500 EVs were registered per month. Now, in 2018, we are seeing around 4,700 EV registrations each month. If this trend continues we will also start to see a rise in EV charging points. In 2011, there were a few hundred charging points across the UK. This has risen to at the end of 2017 having around 4,300. As the network operator for your local area, we've detailed important information our customers need to know about connecting charging points to our electricity networks.

The aim of this guide is to:

- Put into perspective the current outlook on EVs in the UK today
- Outline the details for connecting chargers to the grid
- Jargon-bust terminology and answer common questions about EV charging.

Our Role

SP Energy Networks keeps electricity flowing to homes and businesses throughout our licence areas. We need to know when our customers are installing a charger to the grid, so we can continue to monitor the electricity supply and demand. We do not physically install your charger, this is the responsibility of your chosen installer.



Realise a low carbon future at lowest overall cost for our customers



Inform our customers on the steps we are taking to prepare for a low carbon future



Ensure a safe and resilient network



Engage with our stakeholders to ensure we meet these objectives



X electricity consumption

Charging an average domestic EV at home every night would almost double the electricity consumption of the home



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To cope with demand we need to invest around £200m to £300m in each of our electricity network areas in the next decade.

If we don't adopt smart charging, this could rise to over £1b investment in our areas. 20 moving parts

An electric vehicle has fewer than 20 moving parts – compared to a diesel engine which has over 2000...



£1billion

Common Words & Phrases

When we talk about new technology, it can sometimes be hard to understand exactly what is meant. We have put together a few common words and phrases around EVs that should make understanding the EV rollout easier.

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OFF PEAK:	When the usage of electricity in a region is low
SMART GRID:	A way for the grid to communicate with individual homes to optimise generation & distribution
КШН:	Stands for kilowatt-hour. 1 unit of energy equivalent to the energy expanded in one hour by one kilowatt of power. EV battery size is measured in kWh, so it is comparable to litres of fuel in a petrol tank
RANGE:	The distance you may travel before running out of power
RANGE ANXIETY:	The fear of running out of charge when driving an EV
SOC:	State of charge. Referring to a display which tells you the remaining battery level in percentage
PEAK:	When the usage of electricity in a region is very high

Types of Chargers Available

- Slow:

Slow chargers (up to 3 kW) take between 8-10 hours to charge most EVs today. A slow charger is the type that consumers would use to charge their EV overnight.

? Did You Know?

A typical slow charger will provide about 15 miles of range per hour. The same time it would it would take an elite runner to travel the same distance.

Fast:

Fast chargers are between 7kW-22kW and can charge the average EV in 2-5 hours.

? Did You Know?

A fast charger can provide up to 100 miles of range per hour. Similar to the length of Hadrian's Wall.

Rapid:

Rapid chargers are 43kW or above and can charge an EV to 80% in roughly 30 minutes.

? Did You Know?

30 minutes using a Rapid charger delivers more power than a typical smart phone uses over 20 years...

Smart Charging & Its Importance

Smart charging will play a vital role in how we manage the demand on the network caused by the influx in EV use by allowing the network to be more flexible, as well as saving consumers' money.

Principle: Intelligent charging of EVs where charge can be moved based on grid loads and the user's needs, mainly used to reduce peaks in demand.

A Guide to Connecting Chargers

The time, cost & impact on the network will depend on what you want to connect. The following should only be used as a guide as costs and time scales may differ depending on network constraints, such as distance to cables or available capacity.

Typically for residential houses or small offices, this would be a singular-small connection:

Most modern domestic services should be able to cope with a single slow charger without additional costs from us; however you would still need to pay your installer for their service.

If an upgrade is required for a fast EV charger or possibly multiple slow EV chargers:

- Upgrades required: Service cable upgrade
- Approximate cost: £300 £3,000
- Approximate impact: 10-20m cable, half day 1 day of work
- Approximate connection time: 8 weeks

If you think you need something to suit a small business or carpark, we would regard this as a medium sized connection:

A number of fast or rapid chargers (up to 20 or so depending on size) may require a connection up to 1MVA, similar to the requirement of connecting the power of a new supermarket

- Upgrades required: dedicated connection either at HV or LV
- Approximate cost: £5k 100k
- Approximate impact: Detailed network
 review and design required
- Approximate connection time: 3 6 months

Multi-story carparks, offices, commercial premises or similar would be classed as a large connection:

Rapid charge stations with multiple connections-greater than 1MVA

- Upgrades required: HV connection requiring new substation at HV or EHV
- Approximate cost: £100k +
- Approximate impact: Detailed network review and design required
- Approximate connection time: > 6 months depending on location

If an Extra High Voltage (EHV) connection is required it will have the typical cost of \pounds 1m or greater with an 18 to 24month installation time.

Key:LV = Low VoltageHV = High Voltage

MVA = Mega Voltage Ampere EHV = 33,000 volts

FAQs

We have gathered some common questions our customers have had on EVs and charging below.



As with a single vehicle charger it is the responsibility of the installer to ensure that the existing supply is capable of supplying the full properties electrical demand. Where multiple vehicles are being charged simultaneously this can often result in overloading of supplies or the requirement for a reduced charging output. Before installing a charger it is important to understand if the charger will deliver the desired output and that it does not present a risk of overloading supply equipment.



Provided a property's supply capacity is capable of supplying the full demand of the property and the installer of the EV charging unit is using approved equipment suitable for use within the property, there will be no charges associated with an EV charger installation. You pay your installer to install your charger. You will pay for any power used by the charger using your normal electricity metering arrangements where your demand exceeds your supply capacity or you are using equipment which is not suitable for your current supply characteristics there will be a requirement for reinforcement work. In some cases this work is carried out by us free of charge, alternatively a formal quotation for the required work will be sent to the applicant.



In the majority of cases where a charger is required to be onstreet the user will request a new supply which is separate to their existing property's supply. It is not permitted to run charging cables across public footpaths so the charging unit will normally be located at the kerbside. Supplies which are street side will generally be provided with a supply utilising a Terra-Terra (TT) earthing arrangement, including Residual Current Device (RCD) protection. Installers should ensure that they have the relevant permission from the local council or land owner prior to installing charging facilities on land not controlled by the Charge-Point owner.

Need to install an EV charging point? Here's what you should do:

Domestic and singular small connections:

Contact an accredited electric vehicle charge point installer to confirm whether your domestic electricity supply is adequate to support the charging point.



Provided there is no problem with your internal wiring, the electricity supply or the equipment which joins your internal wiring to our electricity network, named the 'cut-out', you can install the charge point.

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Once you have installed your charge point, notify SP Energy Networks by completing the form at spenergynetworks.co.uk/ElectricVehicles and email it to LCT North SPD - Ictapplicationnorth@spenergynetworks.co.uk LCT South SPM - Ictapplicationsouth@spenergynetworks.co.uk

For all other connections please contact us using the information below.



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