

# GETTING ELECTRIC VEHICLES MOVING

All you need to know about installing electric vehicle charging

The use of electric vehicles is on the rise, and are fast becoming more common place. Electric vehicles are expected to play an important role in achieving the UK's targets for improving air quality and reducing carbon emissions. In 2011 there were only 2,500 electric vehicles in the UK – now there are over 60,000, and that number is predicted to rise to more than 36 million in the next 30 years. That means demand for charge points are likely to rise, and as the electricity network for your local authority, WPD want to help you meet that demand.

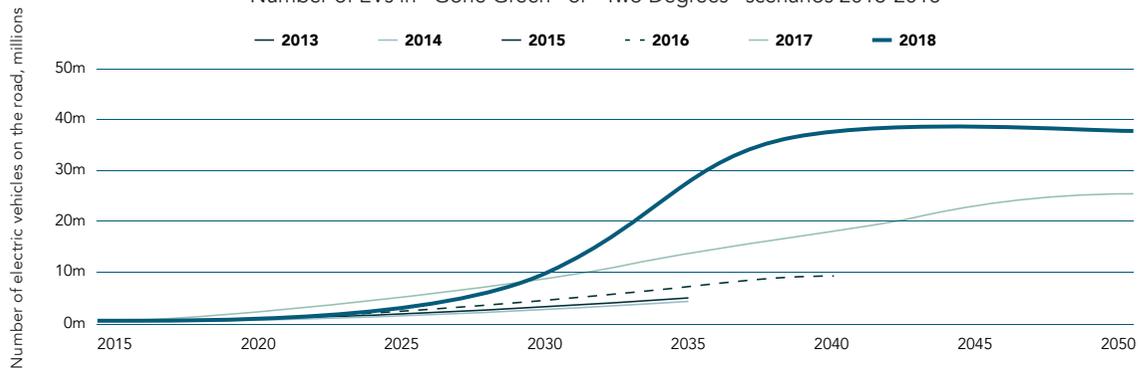
This guide lets you know:

- Why charge points matter so much to your electricity network.
- What the different kind of charge points are and what they do.
- The quickest, most efficient and economical way of connecting charging points to the electric network.

This guide explains the different kinds of charge points there are, what the quickest ways of installing the most economical, efficient and practical charge points in your local area and the role Western Power Distribution play providing power to on street charge points.

## National Grid now expects up to 36m EVs on UK roads by 2040, double last year's outlook

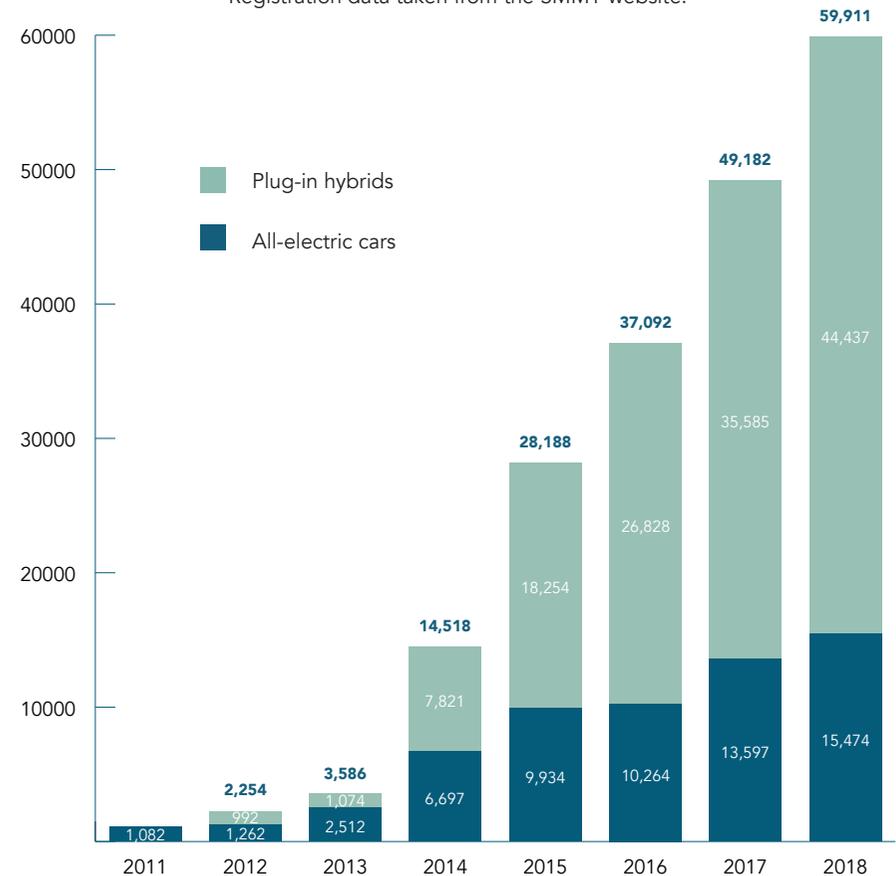
Number of EVs in "Gone Green" or "Two Degrees" scenarios 2013-2018



Number of EVs on UK roads in National Grid scenarios published between 2013 and 2018. Source: "Gone Green" or "Two Degrees" Future Energy Scenarios 2013-2018.

## Registrations of plug-in electric cars in the UK by year (January 2011 – December 2018)

Registration data taken from the SMMT website.



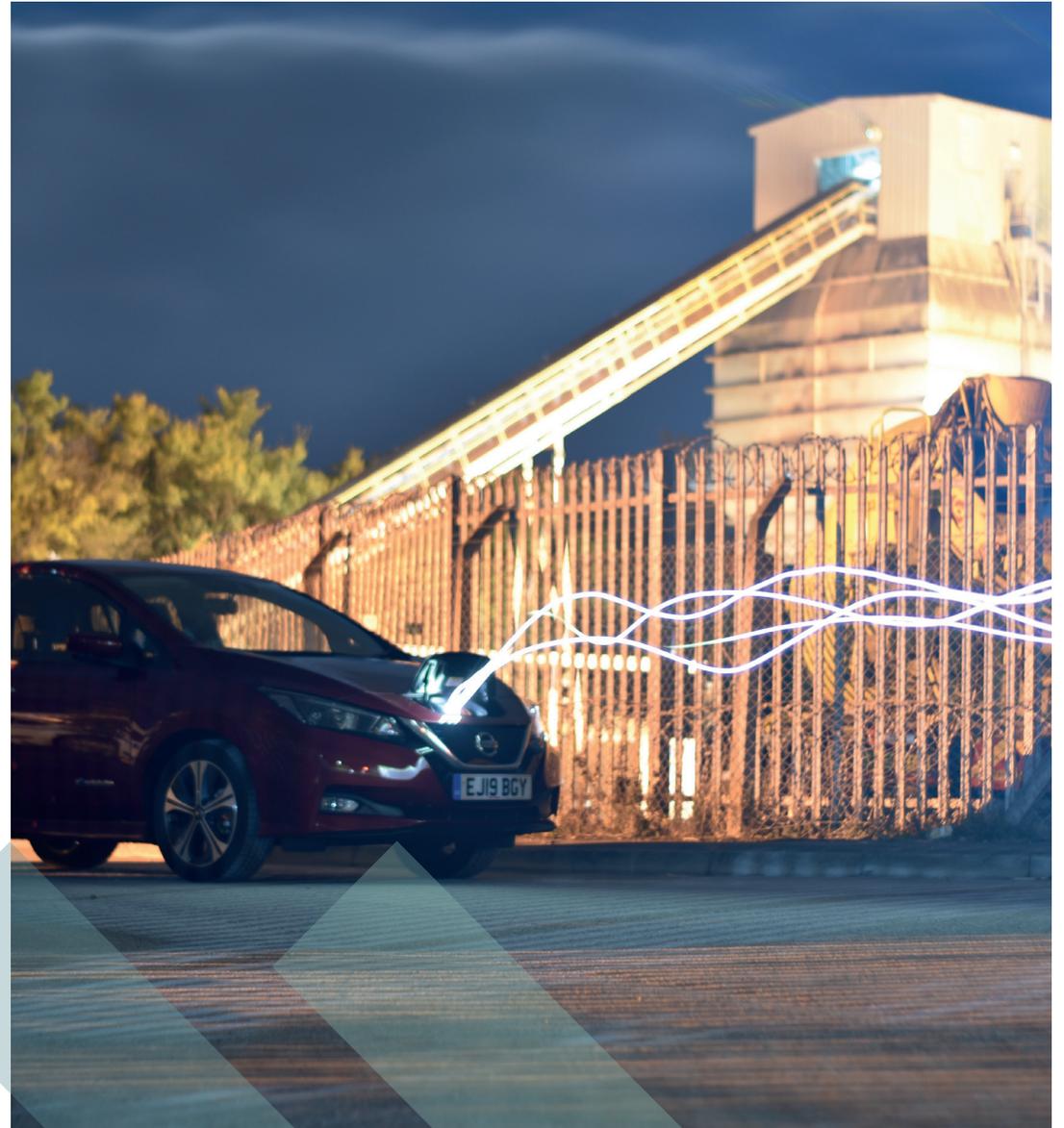
## WHO ARE WESTERN POWER DISTRIBUTION?

Western Power Distribution owns and maintains the electricity cables and lines that bring the electricity to approx. 7.8 million homes and businesses across The South West, South Wales and the Midlands. We run and maintain the electricity cables in your area and keep the lights on, regardless of which electricity supplier you pay your bills to.

## SUPPORTING THE TRANSITION TO A LOW CARBON FUTURE

Electric vehicles can help the UK meet its carbon emission ambition. Western Power Distribution want to support local residents, businesses and the public sector to embrace a low carbon future.

We distribute electricity to charge points and we provide supplies to connect them to the network.



How much it costs to connect a charge point to the electricity network and how long it will take to install comes down to three things.

How much a charge point costs and how long it will take to install depends on:

- How many charge points do you want to connect?
- How many vehicles do you want to charge at any one time?
- How quickly do you want them to charge?

How long does it take to charge an electric vehicle? (Based on a 60KWh battery)

There are four types of charge plugs:

- Type 1 for AC charging.
- Type 2 for AC charging.
- CHAdeMO for DC charging.
- Combined Charging System (CCS) for DC charging.

The speed that cars can charge at is determined by how much electrical power (kW) the charge point delivers.

**Tip:** Three-phase power is relatively rare in the UK. There is almost no three-phase in homes, but there is some in some larger commercial buildings. Most public charge points are single-phase 7kW devices.

## Alternating Current (AC)

Typically used for top-up charging at home, work and destinations, there are two types of AC vehicle-side connectors.

AC CONNECTOR TYPE	TYPICAL POWER RATINGS	APPROX RANGE PER HOUR CHARGING**	FEATURES
Type 1 	3.7kW 7kW	12.5 miles 25 miles	<ul style="list-style-type: none"> <li>➤ 5-pins</li> <li>➤ Standard US socket</li> <li>➤ No locking mechanism</li> <li>➤ Single phase only</li> </ul>
Type 2 	3.7kW 7kW 22kW (three-phase)*	12.5 miles 25 miles 75 miles	<ul style="list-style-type: none"> <li>➤ 7-pins</li> <li>➤ Standard European socket</li> <li>➤ Inbuilt locking mechanism</li> <li>➤ Can carry three-phase power</li> </ul>

\* Some models of Renault Zoe can draw 43kW, giving 145 miles of range per hour (for the Zoe, 43kW is classed as an en route rapid charger)

\*\* Assumes 60kW full battery electric vehicle (BEV).

## Rapid Charging – Direct Current (DC)

Typically used for en route rapid charging, there are three types of DC car-side connectors.

DC CONNECTOR TYPE	TYPICAL POWER RATINGS	APPROX RANGE PER 30 MINS CHARGING*	FEATURES
CHAdeMO 	50kW*	75 miles	<ul style="list-style-type: none"> <li>➤ Original DC connector</li> <li>➤ Most common in the UK</li> </ul>
Combined Charging System (CCS) 	50kW 150kW** 350kW***	75 miles 225 miles 525 miles	<ul style="list-style-type: none"> <li>➤ High power</li> <li>➤ Neat arrangement with 2 x 'Type 2' pins</li> <li>➤ Likely to become most popular DC standard</li> </ul>
Type 2 	130kW	180 miles	<ul style="list-style-type: none"> <li>➤ Only Tesla Superchargers provide DC via a Type 2 connector</li> <li>➤ Charge rate 'throttles' to protect battery</li> <li>➤ Does not charge consistently at 130kW as a result</li> </ul>

\* Assumes 60kWh full battery electric vehicle (BEV). Data taken from the Pod-point web site.

We have a sized approach to EV charge capacity with different solutions for domestic, streetside, car park or large depot scenarios.

## DOMESTIC SMART HOMES EVs AND STORAGE

We will utilise the findings of our Electric Nation project to refine our design models. We are also investigating how three phase cables can provide additional capacity and show how a domestic installation can make use of locally generated power and storage to provide the energy required to charge an electric vehicle.

## ON STREET CHARGING SOLUTIONS

This project will look at solutions for charging vehicles in residential locations on the street or at communal parking areas. WPD intend to work with Local Authorities and other Regional bodies to design and demonstrate dedicated infrastructure for electric vehicle charging.

## HUB CHARGING SOLUTIONS

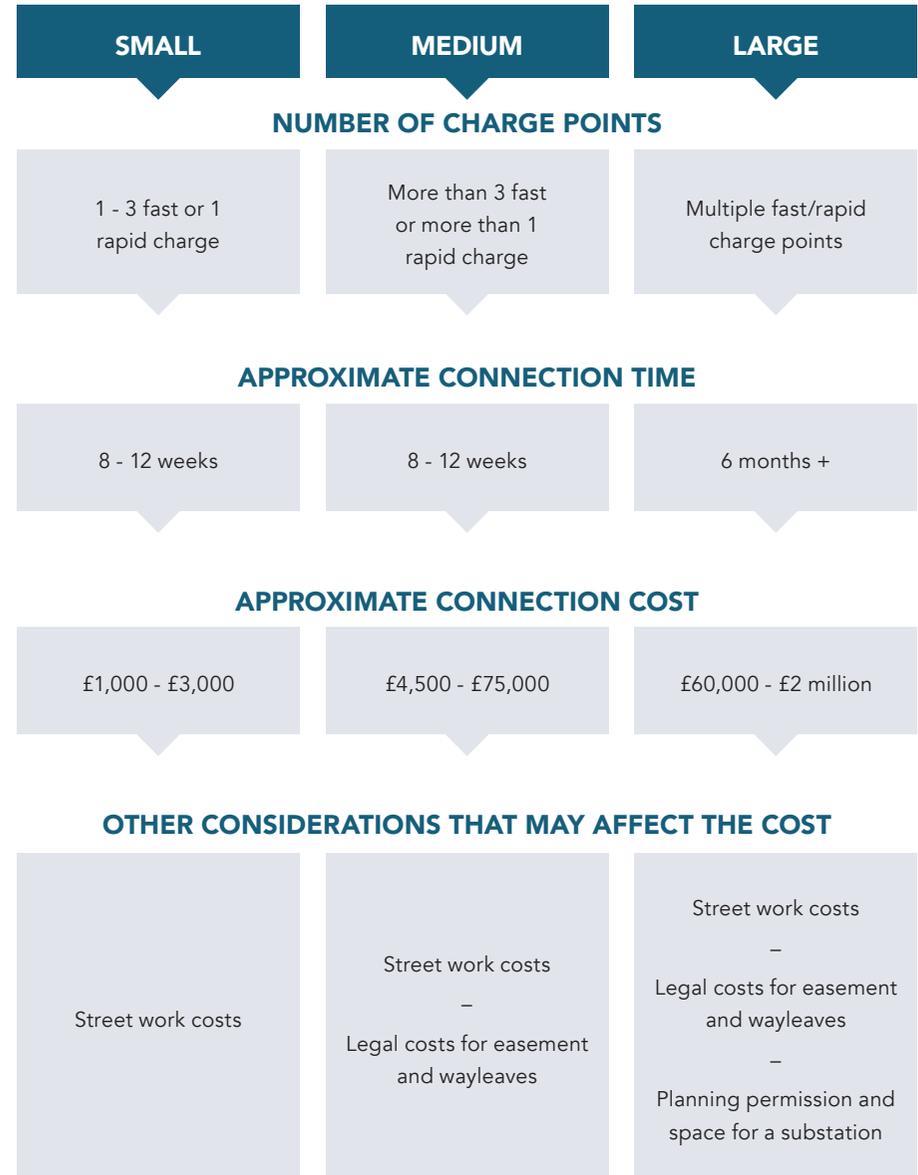
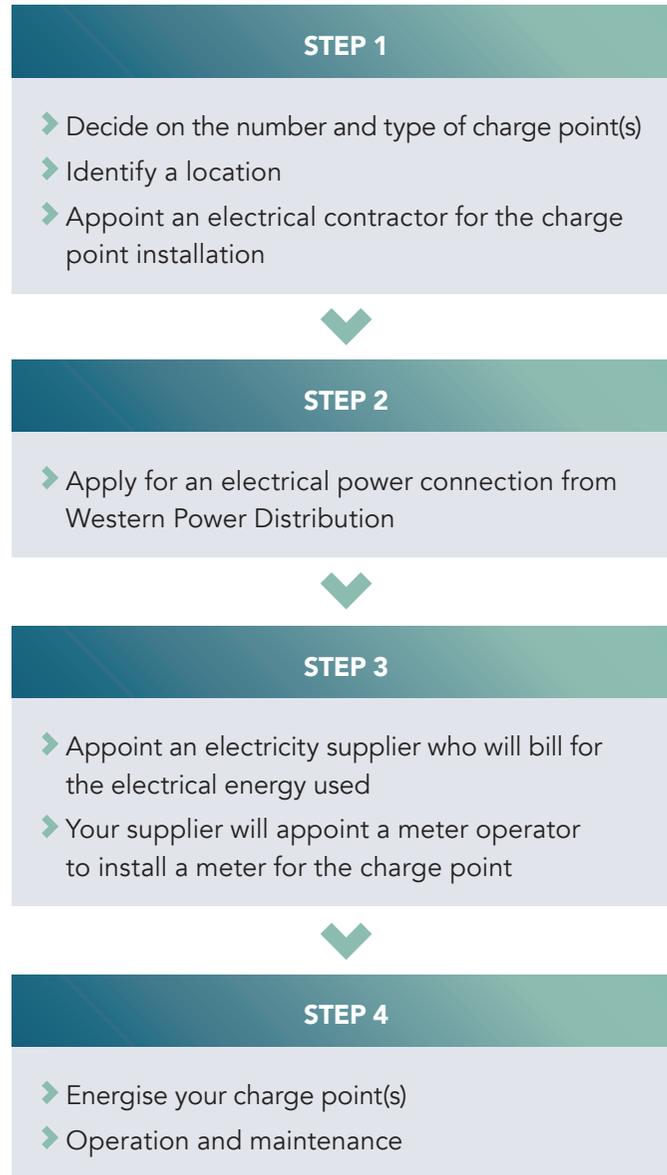
Local Authorities are likely to establish charging hubs in car parks and other on street locations. These offer the advantage of being able to provide a large single point load connection to the WPD network using a bespoke transformer.

## DEPOT SOLUTIONS

Where depots of commercial vehicles require charge we will either use the bespoke transformer option used for charge hubs or offer a high voltage connection to allow customers a higher connection capacity.



We describe new electricity connections as Small, Medium or Large. This section explains the costs and time for the power supply to be connected to different types of charge points.



### WHAT DOES WESTERN POWER DISTRIBUTION KNOW ABOUT SMART CHARGING?

Smart charging can help reduce costs for customers as well as manage demand on the network. Through our innovation team, we ran the world's largest EV project called Electric Nation. More details on this can be found at: [www.electricnation.org.uk](http://www.electricnation.org.uk).

### HOW MUCH DOES THE ELECTRICAL CONNECTION FOR AN ON-STREET CHARGE POINT COST?

Depending on how many vehicles you want to charge and how quickly you want to charge them, it can range from £1,500 for a new supply for a single slow to fast charge point, to £2 million or more for a cluster of rapid charge units. That's why we're really keen to work closely with local authorities and charge point operators to help you find the right solutions for your residents and businesses.

### HOW CAN I FIND OUT MORE?

To find out more visit our website at [www.westernpower.co.uk/electric-vehicles](http://www.westernpower.co.uk/electric-vehicles) or call 0800 0963080



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Registered in England and Wales  
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2019

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