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A guide for electric vehicle charging

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EV charging scenarios and their connections requirements

Electrifying our roads

Northern Powergrid owns and operates the electricity distribution network that powers the lives of more than 8 million people across the North East, Yorkshire and northern Lincolnshire. We connect people to the electricity network and if our customers' power supply is ever interrupted, we will be there to fix it.

Our role in the industry



Supporting your electric vehicle journey

This guide provides a range of scenarios for any individual or organisation thinking of installing electric vehicle (EV) charging infrastructure, from off-street domestic charge points to fast and rapid chargers at major charging hubs and fleet depots. There are a wide range of EV charging scenarios and this guide will help you to understand the differences, assess your own need and make an informed choice.

The charging scenarios covered in this guide are:

- off-street residential charging;
- on-street charging;
- destination and commercial charging;
- charging hubs; and
- fleet electrification.

Each section will explain what the scenario is suitable for, how to get connected, and our requirements as the company responsible for the region's electricity network.

The transition to electric vehicles

As transport decarbonisation gathers pace, our roads will increasingly be filled with EVs and electric heavy goods vehicles (eHGV) as households and businesses continue their net zero journeys. With the UK government ban on the sale of new petrol and diesel cars by 2030 (2035 for hybrid vehicles) and many local authorities declaring climate emergencies and setting out local net zero plans, we are preparing to support the electrification of transport. Our forecasting data predicts a significant growth in numbers, with more than 5 million EVs, 72k eHGVs and 18k electric buses on our roads by 2050.

To support the transition, there will be a significant increase in electric vehicle charge points (EVCP) connecting to our network as more households and businesses purchase EVs, and businesses and local authorities transition their fleets to eHGVs. We have already seen a significant growth in EVCP applications for a range of different technologies from domestic charge points right through to rapid charging hubs on our regions roads and motorway networks.

We are responding to this growing demand by ensuring that customers can connect to our network, and investing in our network to support the subsequen increase in electricity demand.



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By 2050, we forecast our network could be supporting:











Types of EV chargers — What are your options

There are three types of EVCPs – slow, fast and rapid/ultra-rapid.

Each charging scenario has different capabilities and connection requirements and understanding the differences is important to ensure you choose the option that best suits your needs.

The graphic below details how the the three main types of EVCPs compare to one another:



Rated power

The rated power impacts the speed at which the EVCP delivers power and the network capacity required to connect. Typically, there will be sufficient capacity on the network with existing connections to install a single slow charger – however installing multiple or higher power chargers may require a detailed assessment to determine what is required to support the connection which, dependent on the type of project could include network reinforcement.

Alternating Current and Direct Current charging

An EVCP can use either Alternating Current (AC) or Direct Current (DC) to charge your vehicle's battery. DC can deliver a higher power rating, which is why most rapid and ultra-rapid chargers use this method, whereas slow and fast chargers mainly use AC.



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What type of charge point is right for my EV?



Your ability to use different types of charge points depends on your vehicle. All EVs are capable of connecting to a slow charger, but not all vehicles are capable of using the high powered rapid and ultra-rapid chargers. It is important to check with your vehicle manufacture and charge point installer and use a suitable EVCP for your vehicle.



Off-street residential charging

If you have access to off-street parking, installing an EVCP at your property is often the most convenient way to power your EV. Most homes connected to our network can accommodate slow chargers, which means installing an EVCP should be a relatively straightforward process.



For off-street residential properties, slow chargers are the usual type of EVCP. Households can charge vehicles overnight and therefore a 3-7kW EVCP is sufficient. Some installers do offer 22kW EVCP for households but it is important to assess whether you need such a high power rating as they can prove more expensive.

Getting connected

To get an EVCP installed at your home, we recommend you appoint a reputable installer who can take you through the application process from start to finish.

Once you have appointed an installer, they will conduct an assessment of your electricity supply to determine whether you can accommodate an EVCP. During this assessment your installer will look at where your vehicle is usually parked and then decide where to install your charge point.

Your installer will then need to complete the relevant form to notify us of your intention to install an EVCP, which can be completed online or via a form that can be emailed or posted to us.

In a small number of cases, and dependent on your properties electricity supply, we may need to undertake network reinforcement works before the EVCP is connected. Your installer will identify this during his initial assessment, inform you of what this means and then make an application to increase the size of your connection. Only Northern Powergrid can undertake works to increase the size of your electricity supply.







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If you require an increase in supply or other works are required, your installer will ask Northern Powergrid to undertake the work



You can now charge your EV at home

On-street charging

If an off-street charging scenario is not available, an on-street charging scenario can benefit whole neighbourhoods to take part in the EV transition with provision from local authorities and third party providers.

EVCPs can be installed in public locations like on streets or in car parks. In this scenario, you may find the chargers lining the streets and close to designated EV parking bays, or they can also be a part of existing street furniture like street lighting poles or bollards. Network reinforcement may be required to enable the necessary connections requirements for on-street EVCPs. This will come with additional costs attached to the connections process.

Suitable charging solutions



Both slow and fast charge points can be installed at on-street locations. If you are connecting to an existing unmetered connection, your energy supply may limit you to a slow charger, but fast chargers can also be accommodated on-street by installation of an EVCP to a supply pillar.

Getting connected

If you are a household looking for on-street charging solutions in your neighborhood, we advise that you speak to your local authority in the first instance to understand if they are planning to install on-street EVCPs in your area. We work closely with local authorities and third-party public EVCP providers to support the roll-out of on-street charging.

If you are a local authority or third-party provider, to get started you may want to consider speaking to a member of our team in our connections surgeries about your on-street charging plans. Our team can assess your plans against the available capacity on our network in the proposed location and confirm whether existing connections can support slow charging, or whether new connections for slow and/ or fast chargers will be required.





the area

connections

experts





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inform you when



If a new or upgraded connection is required, Northern Powerarid will undertake this work and



EVs can now be charged at this location

Destination and commercial charging

As the EV transition gathers pace, organisations can increasingly benefit from installing EVCPs at their sites to help people charge at work or leisure destinations.

Whether it is for people who need to plug in during their working day, charging while food shopping or in a multistory car park while out for the day, destination and commercial charging is growing significantly as an EVCP solution that supports the transition to net zero.

Suitable charging solutions



Depending on the need of your customers or employees, slow or fast chargers could both be suitable solutions. A fast charger might be useful for businesses where customers want to charge for only a couple of hours, but slow chargers could be suitable for business where employees are working for eight hours.

Getting connected

To get EVCPs installed at your existing site, you should start by appointing a reputable installer. The installer will be able to advise you on the best charging solution based on the requirements of your customers and employees.

The installer will assess the existing electrical demand on your connection and estimate how much extra power you will require based on the charging scenario you need. If this is more than your existing electricity supply can accommodate, then your installer will need to apply to Northern Powergrid for an increase in the size of your connection.

If you are building new premises or a new development, you should include details of any EVCP you intend to install when you make an application with us for your new connection. If you need any help or advice designing your scheme, you may want to consider talking to our experts before making an application.





to assess if

you need an

upgraded

connection

will submit the necessary applications on your behalf and Northern Powergrid will determine whether any upgrade works are required

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If an upgrade to your connection is required, Northern Powergrid will undertake the work and inform your installer when complete





Once your site's supply is sufficient, your installer can complete the connection of your EVCP(s)



EVs can now be charged at your site

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Charging hubs

As EV uptake grows and vehicle ranges expand, we expect charging hubs that support rapid charging and long distance travel to be become commonplace across our region.

Charging hubs require significantly more capacity from our network and may be built at existing sites such as motorway services or at new sites that will require a new connection.

Suitable charging solutions

Charging hubs offer a range of different charging options and therefore all types of EVCP may be suitable. Rapid and ultrarapid charge points are installed at charging hubs to support rapid recharging for EV drivers who need to increase their range guickly, such as long motorway journeys requiring multiple charging sessions.

Getting connected

If you are seeking to install a charging hub at an existing or brand-new site, you may wish to speak with our team to assess your options. The electricity connections at existing fuel stations were not designed to accommodate the high demand EV charging hubs and you will need to understand the existing capacity and whether any reinforcement works will be needed to accomodate your plans.

Because of the level of electrical demand required for charging hubs with multiple fast and rapid/ultra-rapid chargers, there may be significant costs associated with upgrade works that need to be undertaken on our distribution network. Our team can help you explore your options and advise on the likely cost and timescales:

- You can consider load sharing schemes on your site to make the best use of your connection. These share the available capacity across your site's EV chargers but still ensure all vehicles can charge when required. Some advanced load sharing schemes communicate with the vehicle's battery to better optimise charge sharing.
- Where reinforcement works are required, Northern Powergrid may be able to offer you a flexible connection. This could require you to restrict operations for short periods but could enable you to get a quicker and more cost-effective connection.





your existing

where a new

connection is

connection

or network

capacity

required

team to

arrange an

appointment

If an upgrade to your connection is required, Northern contractor Powergrid should submit will undertake the necessary the work applications and inform to Northern you or your Powergrid contractor when



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If you require a new connection. Northern Powergrid or an Independent Connection Provider (ICP) will complete this work



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EVs can now charge at your charging hub

Fleet electrification

If your organisation operates fleet vehicles, you might be planning to replace older petrol and diesel vehicles with EVs or heavy EVs like buses, bin wagons and electric heavy goods vehicles (eHGVs).

Installing the necessary charging infrastructure to support your fleet is a vital part of this transition – but different fleets will have very different needs.



Fleet vehicles vary in charging requirements and usage patterns, meaning that your EVCP requirements depends heavily on the needs of your fleet. All types of EVCP could be used for fleet electrification.

Getting connected

You should appoint a reputable contractor to support you with your fleet electrification needs and they can help to advise on your requirements and next steps with Northern Powergrid.

When thinking about electrifying your fleet, you should first consider the size of your fleet, the vehicles you operate and the pattern of use.

- Size of your fleet: the size of your fleet will dictate the amount of EVCPs you need to install at your premises. A small fleet may only require 1-2 slow chargers, but a large fleet may require dozens of EVCPS, and it will significantly affect the size of your connection.
- Type of vehicle: operating small EVs means slow or fast chargers should be sufficient for your charging needs. Larger vehicles such as eHGVs may require large capacity chargers to support fleet operations.
- Pattern of use: the pattern of use of vehicles will significantly impact the number and type of EVCP you install. For fleets only operating vehicles 8 hours a day, overnight charging means slow chargers can be used. However, for fleets where vehicles are used more frequently, a more powerful EVCP may be required to reduce charging times.







Typical costs and timescales

The costs and timescales associated with connecting EV charging infrastructure depends on a number of different factors.

We want to support your planning as much as possible and can provide indicative costs, depending on the project.

The cost of installing an EVCP and the length of time that it will take will always depend on your existing connection, whether you're installing a slow charger at home or building a major charging hub at a motorway service area. Depending on your charging needs and the size of your existing supply, work may need to be carried out to

Connection Offer Expenses

If your installation requires detailed design and assessment works to be carried out by Northern Powergrid, you will be charged Connection Offer Expenses. All DNOs charge CoE as they reflect the cost of our engineers completing the design works. The amount charged is dependent on the size and complexity of the connection required. You will not be charged CoE when you connect and notify as these installations do not require any upfront design or assessment work by our engineers.

AutoDesign

AutoDesign is an online, self-service tool that provides budget estimates to support stakeholders planning new projects where an electrical connection is required. It is perfect for installing EVCP where a new low voltage (LV) connection is required.

If you're seeking a new connection(s) up to a maximum of 210kVA, then AutoDesign can help. If you're seeking to install a slow or fast charger, you can use AutoDesign to generate a free of charge budget estimate and identify the most viable and costeffective locations to install EVCPs. increase the size of your connections and the underlying capacity, and that may increase the costs of the installation.

For residential connections, this could be a fuse upgrade which will be a small percentage of the overall cost of your EVCP. For larger projects, the cost of additional works and associated legal costs can be substantial, particularly where we need to reinforce the network with new infrastructure like substations.







	Unmetered	Small	Medium	Large	Very large
Typical for	Street lighting	Domestic property	Small commercial property e.g. petrol station	Medium commercial property e.g. motorway service area	Industrial e.g. factories and future motorway service areas
Capacity	Up to 5kW	<18W	<55kW	<276kW (fuse) or <1.1mW (air circuit breaker)	<8MW
Typical EVCP rating	Up to 5kW	Up to <7kW	Up to <43kW	120-350kW	350kW
Average quotation time	20 days	9 to 16 days	21 days	30 to 56 days	58 to 65 days
Average time to connect (following payment)	5 weeks	10 weeks	19 weeks	19-29 weeks	19-29 weeks

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How we are planning to meet growing electric vehicle demands

The growth of low carbon technologies is set to have a major impact on our network and supporting the uptake of these decarbonising solutions is how we're enabling the net zero transition across our region.

EVs play a huge role in this transition, and we are continuously planning and reviewing how we will accommodate these on our distribution network.

Our network investment

We have set out how we are planning and investing in our network from 2023-28, detailing how we will spend billions of pounds to deliver a network and associated services that supports customers and our region's net zero journey. To plan our spending, we harnessed data and our regional expertise to create a Planning Scenario that informs our investment plans.

Our Planning Scenario assumes that by 2030 there will be 32,000 requests for new EV connections across small works (domestic and small commercial) and major works (large commercial and industrial). That is a huge increase in demand for new connections associated with EVs so we are investing now to ensure that:

- Our network has sufficient capacity to support growing demand
- Our connections service can handle increased volumes of requests
- We develop future self-service tools, to reduce time to connect

You can learn more about how our approach to connections will support the EV transition on our website which sets out our plans.

Useful resources

Northern Powergrid resources

- Electric vehicle webpage northernpowergrid.com/electric-vehicles
- Our business plan for 2023-28 ed2plan.northernpowergrid.com/sites/default/files/ document-library
- Distribution Future Energy Scenarios northernpowergrid.com/sites/default/files/assets/ NPG%20DFES%202023%20FINAL%2020%20 Dec%2022.pdf
- Northern Powergrid connections webpage northernpowergrid.com/get-connected
- AutoDesign www.northernpowergrid.com/auto-design

Electric vehicle and charging experts

- RAC: rac.co.uk/electric-cars
- AA: theaa.com/driving-advice/electric-vehicles
- Zap Map: <u>zap-map.com</u>

UK Government

 Office for zero emissions vehicles website gov.uk/government/organisations/office-for-zeroemission-vehicles



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Contact us

There are a number of ways to engage with us about connections. Our connections webpage offers a wide range of information and self-service options. For when you can't find the answer on our website, you can email or may be able to speak to a member of the team.

For large scale projects that need discussing in more detail, we hold regular connections surgeries and encourage individuals and organisations to engage with us early if they are planning a major EVCP project.

General enquiries

- Call us: 0800 011 3433
- Email us: getconnected@northernpowergrid.com

Ask an expert

 Submit a specific question to a member of our team on our website: northernpowergrid.com/ask-an-expert

Connnections surgeries

 Find our our latest surgery dates on our website: northernpowergrid.com/customer-events-and-surgeries