RECHARGE UK

REPRESENTING THE UK EV INFRASTRUCTURE INDUSTRY

# CHARGING FORWARD TO 2030

## Critical success factors for the deployment and operation of UK wide, inclusive, electric vehicle charging infrastructure

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# Executive Summary

There are currently over 40,000 public chargepoints in the UK which support EVs, currently around 2% of vehicles on the road. In May 2023 EVs made up approximately 17% of new car sales, but following the introduction of the Zero Emission Vehicle mandate in 2024 we expect that[1], they will make up as much as 80% of new car sales and 70% of new van sales by 2030, rising to 100% of both by 2035. This means there will be approximately 11 million EVs on the road by 2030, up from 760,000 today[2].

This independent report from RECHARGE UK considers how we accelerate the rollout for EV charging infrastructure by breaking down the policy and regulatory barriers to chargepoint deployment, and meet the energy demand on the grid by 2030 from public charging. The report provides insight as to which parts of the UK are likely to experience high levels of public charging demand, and will therefore require significant improvements to local energy networks and the deployment of flexible energy solutions. This will inform EV infrastructure specific solutions to resolve geographic inequality in chargepoint deployment, and ensure no areas are left behind on the electrification journey leading up to the end of internal combustion engine (ICE) car and van sales in 2030.

As the UK's largest EV trade organisation RECHARGE UK and its partners recognise the significant opportunity for growth in this sector but also experience many barriers to chargepoint deployment in the UK. There are significant opportunities for future economic growth, but if progress is not made to overcome these barriers and improve experience for all EV drivers, there is a significant risk that private, commercial and public ICE vehicles remain on the road for longer.

Breaking down the barriers to chargepoint deployment will require a number of interventions, some of which will be at a local level, but the majority of which will need leadership from national and devolved Governments. For the chargepoint industry, including manufacturers, installers and operators, this will be crucial to enable them to deploy infrastructure at a rate that keeps up with the rising demand for charging.

This report highlights that major gaps remain between the UK Government's ambition for Zero Emissions Vehicle deployment and the policy and regulatory landscape it presides over. The report has developed a pathway, which identifies where necessary changes to policy and regulation are required to accelerate chargepoint deployment and ensure charging plans are smarter, in order to meet 2030 requirements. It also provides the distribution network operators (DNO's) and National Grid with additional data to highlight those areas most in need of additional network reinforcement for anticipatory investment before 2030. The report then examines what skills are needed to ensure chargepoint deployment and operation is successful, how we can ensure that those chargepoints are safe and accessible, and the skills needed to service and maintain EVs. Accessibility is a key requirement for UK chargepoint rollout success, with Motability* leasing wheelchair accessible vehicles to over 650,000 customers currently, highlighting the need for universal, assessable charging.

[1] https://www.zap-map.com/ev-stats/ev-market

[2] https://www.zap-map.com/ev-stats/ev-market

* https://www.motabilityoperations.co.uk/about-us/

# Recommendations

**We recommend the following initiatives should be pursued to ensure chargepoint deployment can keep up with the growth in EV sales in the UK. These are:**

## 1 Take action now to plan for public charging demand

Local strategies and action plans for EV charging need to be developed now. These can be informed from the data in this report highlighting where installing infrastructure can support the future charging demand, and where DNOs and National Grid will need to focus their efforts to ensure adequate electricity supply is available to support that infrastructure. Effective planning and central co-ordination will be critical to optimise deployment so that drivers looking to adopt an EV don't feel put off by lack of charging availability.

## 2 Implement the recommendations and guidance in this report to accelerate network deployment

This report has highlighted there are several barriers to chargepoint deployment that if resolved could lead to a streamlined installation process that would lower costs and shorten timescales. If our recommendations are adopted, chargepoints will be installed quicker and therefore accessed by a far greater number of people to accelerate the transition to EVs delivering the highest levels of $CO_2$ reduction, seeing the highest improvements in air quality.

## 3 Support industry to address skills gaps

Although industry can set up bespoke training for their most needed skills, a more efficient, long-term strategy that could be adopted is for the Department for Education to link up with industry to identify potential courses that could be offered as part of a Green Jobs Campaign by Government. This would tap into the enthusiasm from young adults for green jobs and also include upskilling to ensure the existing workforce is not left behind in the electrification journey.

## 4 Ensure there are multiple chargepoint types in locations which are safe and accessible

Apply intelligent design principles designed for optimum use (high utilisation) by ensuring the multitude of different charging needs are met at charging locations meaning multiple chargepoint types should be installed where possible. To gain and maintain public confidence in EV charging, chargepoints must be well-sited, in a safe location, usable by van drivers and other professional drivers which will all be equally important as EV ownership rises.

# Introduction

The UK Government's Zero Emission Vehicle (ZEV) mandate looks to set sales targets for electric vehicles (EVs) every year from 2024-2035. Starting at 22% in 2024, 80% in 2030 and 100% in 2035 for cars, and 10% in 2024, 70% in 2030 and 100% in 2035 for vans[3]. The charging industry supports this but requires an equivalent heavy goods vehicle (HGV) mandate as soon as possible, and now needs clear direction on detailed regional and local planning requirements coordinated from Central Government to ensure that chargepoint rollout can be successful.

With significant funding to date from Government the UK's seeing a big acceleration on the number of public chargepoints being installed through the Local Electric Vehicle Infrastructure (LEVI) Fund[4] and soon also the Rapid Charging (RCF) Fund[5]. However, what RECHARGE UK often hear from its member organisations, and local authorities, is that there are severe delays between agreeing on a chargepoint site and these going live. Furthermore, this report's identifed the need to address the appropriateness of chargers deployed in relation to the development plans and needs of the consumer.

One reason for this is that at a local level network capacity is too low to support the rollout of EV charging, and as chargepoint rollout increases, DNO's, some of whom are already struggling with high volumes of connection requests, may not have adequate resources to manage these connection requests. This adds to the project's timeline which can make projects less attractive for investment. Local Authorities have to date also had similar issues of reduced capacities and planning requirements have further delayed the installation process.

Despite grants available to them, landlords and tenants are not applying for the grants available to them at the volume required, with only 2,347 sockets installed since the launch of the grant in April 2022[6]. There could be a number of reasons for this, including being unwilling or unable to fully understand how the grant scheme works, or

[3]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1154610/zev-mandate-co2-emissions-regulation-consultation-document.pdf

[4]https://www.gov.uk/guidance/apply-for-local-ev-infrastructure-levi-funding

[5]https://www.gov.uk/guidance/rapid-charging-fund

[6]https://www.gov.uk/government/statistics/electric-vehicle-charging-device-grant-scheme-statistics-april-2023/electric-vehicle-charging-device-grant-scheme-statistics-april-2023?utm_source=substack&utm_medium=email

being put off by word of mouth regarding the potential cost of grid reinforcement.

Furthermore, we see that car park owners to date have been slow to install chargepoints at the scale required to meet the Zero Emission Vehicle (ZEV) sales targets set out in the ZEV mandate. We await the Government's response to the Future of Transport Regulatory review which will set some targets for car park owners to install chargepoints. RECHARGE UK see this as an opportunity to futureproof car parks by matching a proportion of chargepoint targets for car parks with the ZEV sales targets in the ZEV mandate e.g., by 2035 all car parks would need every parking space to enable charging for an EV.

All of the above is magnified in rural communities where the EV charging infrastructure to date has not been installed at the same pace as in urban areas. To ensure rural communities are not left behind, this report identifies learnings from abroad where rural communities have been supported in their electrification journey and make suggestions which the UK Government could adopt, to ensure the levelling up of transport truly means levelling up for all. In rural areas there is likely to be less competition, meaning mixed use cases where multiple different speeds of chargepoint are deployed to meet the different use cases for charging, will be more important.

These factors have all contributed to the uneven and inequitable foundations of the network, as chargers are too often positioned in a location convenient to point of connection and rarely developed beyond the current car park layout to keep costs as low as possible.

This report considers how multiple actors including national and local Government, DNO's, car park owners and landlords could adapt to ensure chargepoint operators (CPO's) install, develop and maintain safe and accessible chargepoints at the rate required to ensure charging infrastructure can adequately support ZEV rollout based on the sales targets for cars and vans published in the ZEV mandate, and provide coverage across the whole of the UK to meet growing demand in areas outside of London and the South East.

It considers the full picture of EV charging, analysing demand projections out to 2030 per postcode area level, what policy and regulatory changes are required to ensure we can meet that charging demand, the skills gaps we need to bridge to ensure CPO's can meet this demand, and finally looking at how we ensure charging infrastructure is safe and accessible to use, so that everyone can purchase an EV without charging being a barrier to adoption.

This report has been prepared by RECHARGE UK, the EV Charging Infrastructure Forum of the Association for Renewable Energy and Clean Technology (REA). It was written by Matt Adams (RECHARGE UK), with input and data from Ben Allan (Field Dynamics), Jade Edwards (Zapmap), Kate Tyrrell (ChargeSafe), Mark Constable (Trojan Energy), Neil Durno (Syzygy Consulting) and Oriana Hesketh (Field Dynamics).

About the Association for Renewable Energy and Clean Technology (REA): The Association for Renewable Energy and Clean Technology (known as the REA) is the UK's largest trade association for renewable energy and clean technologies with around 550 member organisations operating across transport, heat, power and the circular economy. The REA is a not-for-profit organisation representing fourteen sectors, ranging from biogas and renewable fuels to solar and electric vehicle charging. Membership ranges from major multinationals to sole traders. For more information, visit: www.r-e-a.net

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# 1. A route to successful chargepoint deployment by 2030

One of the most cited problems with electrification is the need to connect to the grid. Already in 2023, we see that DNOs are continuing to report significant levels of connection requests, of which EV connection requests will continue to grow significantly going forward.

Local Authorities are also sometimes under resourced and do not have the capacity to dedicate time and resources to chargepoint rollout. Until recently they have not had the funding or the expertise to provide consistent, widespread coverage of EV charging. With the LEVI Fund more funds are put towards local authorities enabling them to hire the appropriate staff to assist in chargepoint deployment. With over a million plug in vehicles on the road today we are seeing frequent reports about a disparity in EV charging between London and the South East, and the rest of the country. By 2030, it is predicted that we could have between 10 and 15 million electric vehicles on the road, spread out across the country. These 10-15 million drivers will want to have access to on street and off-street charging, either through plugging in at or near their home, or at work, or in a commercial premises.

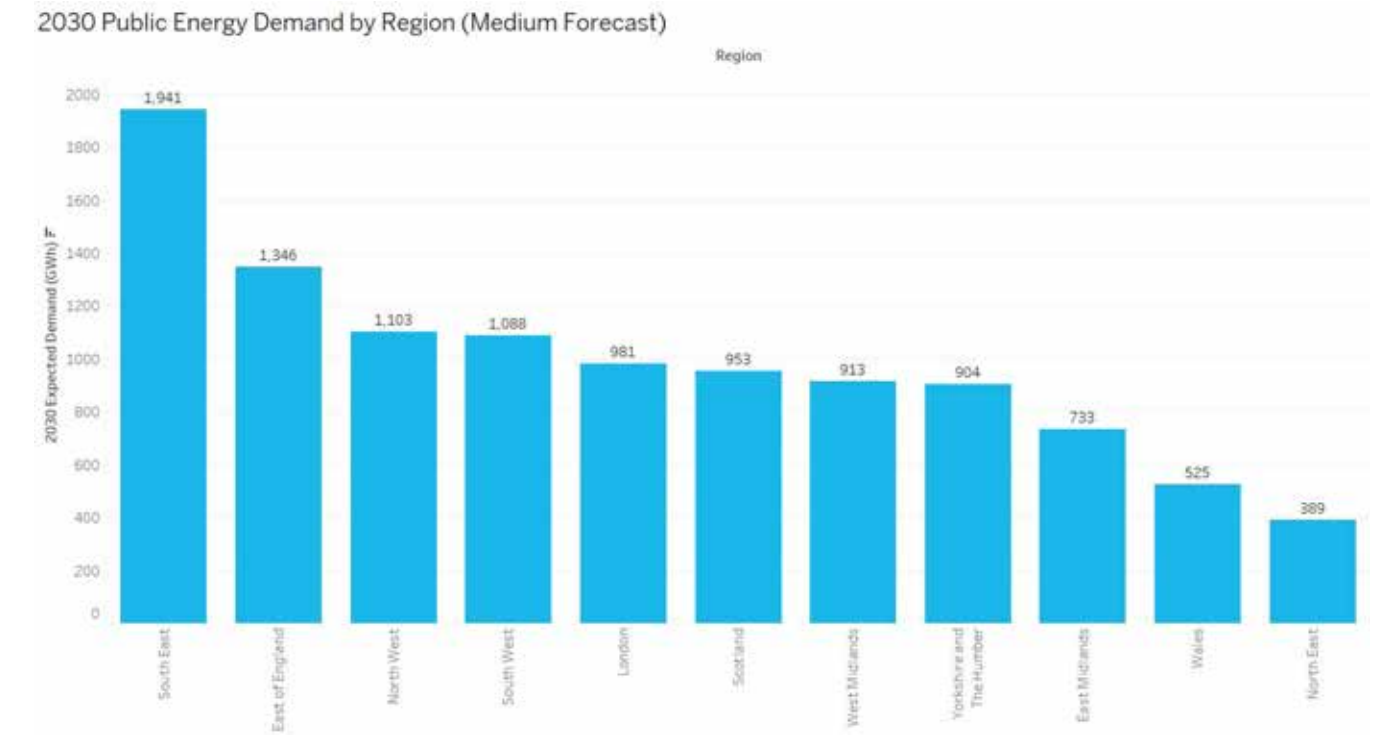
Linking the two issues above, Field Dynamics have projected the electricity demand for EV charging by 2030, using three scenarios from the Future Energy Scenarios (FES) 2022. A full list of assumptions and methodology for their calculations is available in Annex 1. From this data we can provide a useful tool for regions and Local Authorities to help build charging infrastructure that is fit for the future. This report makes recommendations on how to bridge the gap between the distinct efforts of the DNOs through their Distribution of Future Energy Scenarios programmes and the local council initiatives and provides data which can assist National Grid and DNOs by providing data on the level of energy required per region to support EV rollout.

**Public charging demand**

In 2030 demand for public charging will rise to 10,876GWh in our medium scenario, assuming EV production capacity can keep up with the sales targets in the ZEV

mandate (Figure 1). This highlights the need for significant funding and resources to be allocated to rapidly increase energy provision for public charging infrastructure going forward.

*Figure 1:*




The 2030 geographic distribution of energy demand calculated in figures 1-3 are based on the location of MOT tests in 2021. It assumes an adoption rate of 36.5% across the country, as per the Customer Transformation FES 2022 scenario. The energy demand includes 96% of on-street household demand (the remaining 4% being provided at work) and 19% of off-street household demand (the remaining being provided from either home chargers or at workplace). Annual mileage and vehicle mix are assumed to be as per 2021 MOT data. Vehicle count is as per 2022, Q3 Department for Transport (DfT) licensing data.

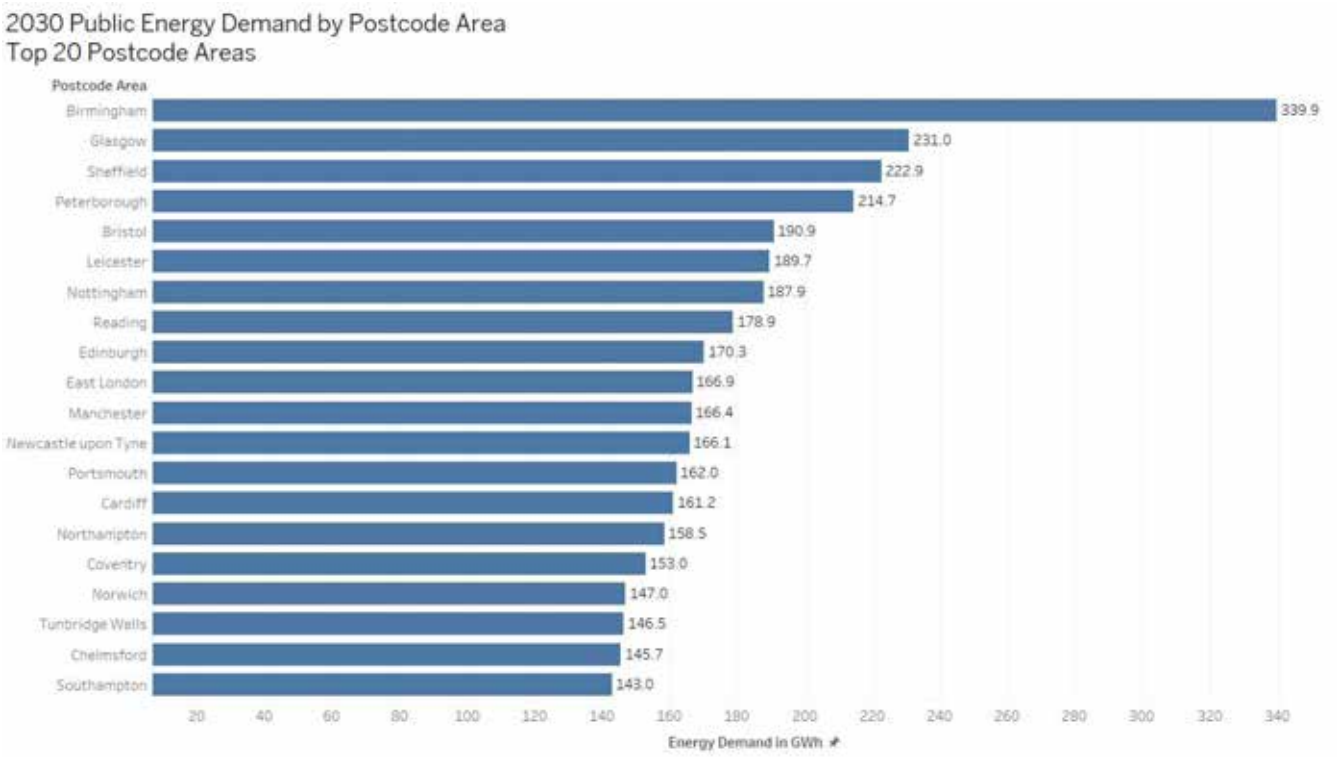
Figure 1 highlights the significant energy demand each region will have for EV charging. Every region except the North East and Wales will have more energy demand for public EV charging than we have across the entirety of Great Britain today. It is anticipated that Yorkshire and the Humber and the West Midlands will have a similar level of demand as the entire of Scotland and marginally lower levels of demand than London which is expected to have 981GWh of demand by 2030. It is clear however, the areas which will need the most grid capacity will be the South East, East and North West of England. Going forwards, regional and local authorities will need to consider how to increase the utilisation of their charging infrastructure, as this will indicate they are in the right location and are built for the right drivers.

Each region will also have unique challenges to address when deploying charging infrastructure. For example the East of England is the flattest, driest region in the UK and so easily prone to flooding, therefore the infrastructure placed around the chargepoints e.g., tarmac/concrete would need to use material which does not contribute to a risk of flooding.

This report will not focus on specific issues in each region, but we encourage political leaders in each region to work with regional development and transport planners to identify where and what type of charging is required, who will use it, and how the chargepoints can be utilised most effectively.

Field Dynamics have also broken down the demand to a postcode level and Figures 2 and 3 show where demand for public charging will be highest.

*Figure 2:*




Figures 2 and 3 show the demand for public charging in 2030 using the medium scenario. The darker areas represent the areas with the most demand in GWh per postcode. Figure 2 highlights the areas with the largest demand in 2030, where as Figure 3 breaks down the entirety of Great Britain's public charging energy demand, and maps the areas with the most demand highlighted in darker colours. The map on Figure 3 shows that the darkest area in England is to the west, which is Birmingham. Birmingham is projected to have the largest demand in the UK of 339.9GWh which is due to the fact that it has the largest vehicle count of any part of the UK with 1.1 million vehicles today. Significant energy demand will therefore be put on Birmingham by 2030 and to future proof it, local authorities must begin examining where grid reinforcement is most likely to be needed over the next seven years. Glasgow is the second largest with 231GWh of demand, closely followed by Sheffield and Peterborough.

Furthermore, despite the most energy demand in GWh coming from the South East and the East of England in Figure 1, it is clear when we break down the demand to a more granular level, significant demand for EV charging will exist in smaller hot spots across the regions, expressed on the map graphic and broken down by postcode in Figure 3. From Cardiff and Bristol, to Manchester, Glasgow and Birmingham there will be significant energy demand for public EV charging.

This data demonstrates that electric vehicle uptake will increase significantly across the UK, beyond the South East and London. Therefore it is critical that the DNOs, local and regional authorities work together to plan for the future and ensure their infrastructure is ready to meet this growing demand, in order to avoid a continuation of an uneven and unequitable EV charging network, which we see now in areas outside of London and the South East particularly,

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*Figure 3:*

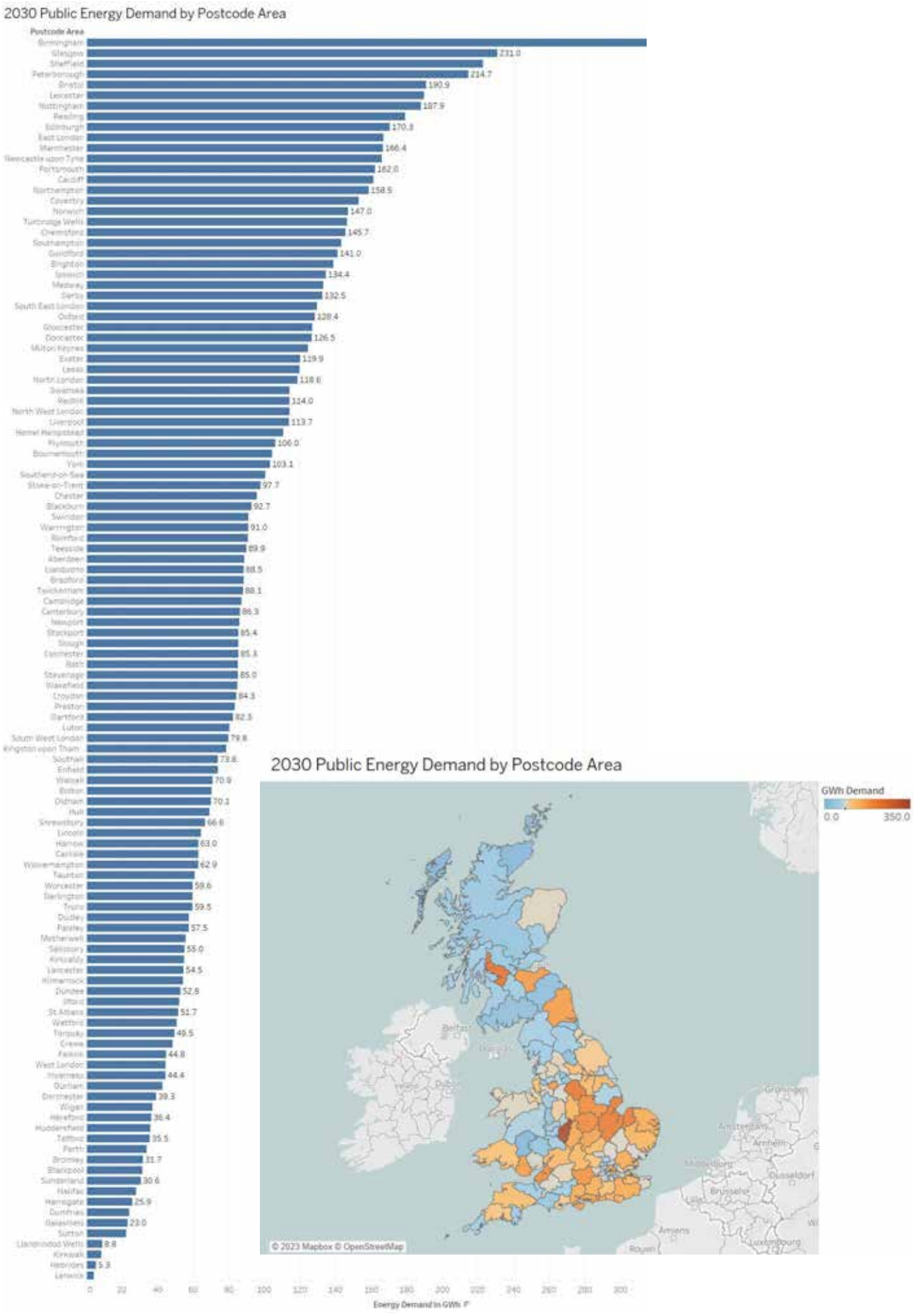
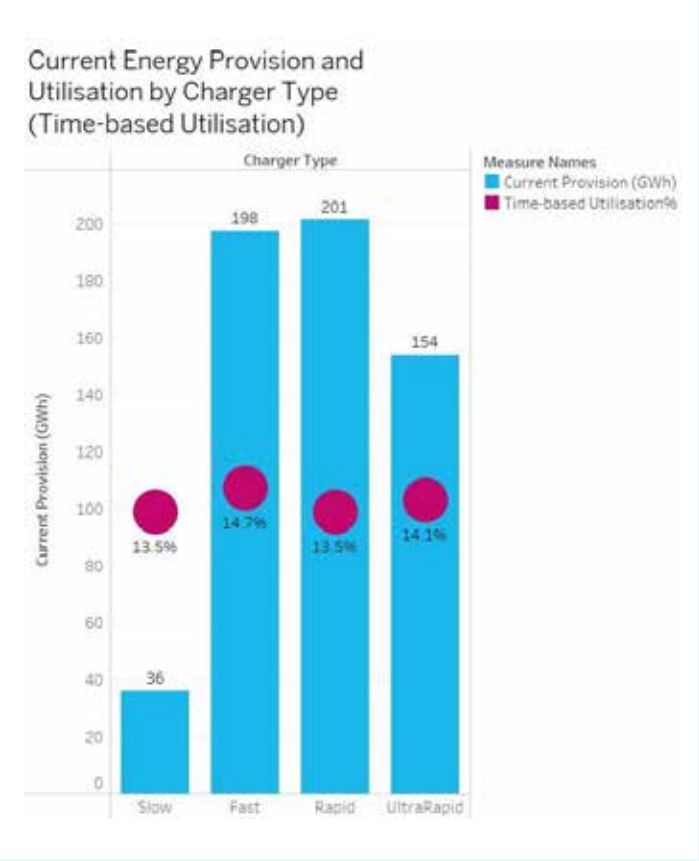

2030 Public Energy Demand by Postcode Area
Postcode Area
Birmingham
Glasgow
Sheffield
Peterborough
Bristol
Leicester
Nottingham
Reading
Edinburgh
East London
Manchester
Newcastle upon Tyne
Portsmouth
Cardiff
Northampton
Coventry
Norwich
Tunbridge Wells
Chelmsford
Southampton
Guildford
Brighton
Ipswich
Medway
Derby
South East London
Oxford
Gloucester
Doncaster
Milton Keynes
Exeter
Leeds
North London
Swansea
Redhill
North West London
Liverpool
Hemel Hempstead
Plymouth
Bournemouth
York
Southend-on-Sea
Stoke-on-Trent
Chester
Blackburn
Swindon
Warrington
Romford
Teesside
Aberdeen
Llandudno
Bradford
Twickenham
Cambridge
Canterbury
Newport
Stockport
Slough
Colchester
Bath
Stevenage
Wakefield
Croydon
Preston
Dartford
Luton
South West London
Kingston upon Thames
Sheffield
Enfield
Walsall
Bolton
Oldham
Hull
Shrewsbury
Lincoln
Harrow
Carlisle
Wolverhampton
Taunton
Worcester
Darlington
Truro
Dudley
Paisley
Motherwell
Salisbury
Kirkcaldy
Lancaster
Kilmarnock
Dundee
Ilford
St Albans
Watford
Torquay
Crewe
Preston
West London
Inverness
Durham
Dorchester
Wigan
Hereford
Huddersfield
Telford
Perth
Bromley
Blackpool
Sunderland
Halifax
Harrogate
Dumfries
Galashiels
Sutton
Llandrindod Wells
Kirkwall
Hebrides
Lerwick
0.0
231.0
214.7
190.9
187.9
170.8
166.4
162.0
158.5
147.0
145.7
141.0
134.4
132.5
128.4
126.5
119.9
118.6
114.0
113.7
106.0
103.1
97.7
92.7
91.0
89.9
88.5
88.1
86.3
85.4
85.1
85.0
84.3
82.3
79.8
73.8
70.9
70.1
66.6
63.0
62.9
59.6
59.5
57.5
55.0
54.5
52.8
51.7
49.5
44.8
44.4
39.3
36.4
35.5
31.7
30.6
25.9
23.0
8.8
5.3
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Energy Demand in GWh
2030 Public Energy Demand by Postcode Area
GWh Demand
0.0
350.0
Belfast
Dublin
Amsterdam
Arnhem
Düsseldorf
Brussels
Amiens
Rouen
Luxembourg
© 2023 Mapbox © OpenStreetMap

*Figure 4:*




## Solving the utilisation problem

The energy provision in Figure 4 is estimated from the average session duration and based on Zapmap estimates for expected power throughput: Slow average power = 3kW, Fast - average power = 7kW, Rapid - average power = 35kW, Ultra Rapid - average power = 50kW. The utilisation is calculated as the percentage of time the charger is being used.

Figure 4 highlights that presently utilisation of public chargepoints courtesy of Zapmap data is consistent across the charger types. This shows the amount of time in the day these charger types are used is similar at 14% on average. This means presently a chargepoint, on average, only has a vehicle plugged in to it 14% of the day or a little over 3 hours.

## Maximising utilisation: Incentivising Responsible Use

To improve the utilisation rate, one of the strongest ways to fulfil the demand for public charging we suggest that options like bookable slots (time limited) and financial tools to discourage remaining in a charging bay beyond the period required to adequately charge the vehicle, could be effective in certain cases.

For example, in general, ultra rapids are mostly are mostly intended for en-route charging, including at hubs, fuel forecourts and motorway service stations where customers are likely to be on the move. So, financial tools to discourage idling could be effective here, but they would not work for slow chargers which are more likely to be used at night by those who do not have a home chargepoint meaning additional charges would not be effective. However, bookable time slots could be more appropriate for slow chargers which face the issue of vehicle owners leaving their vehicle plugged in for significantly longer than required.

## Providing dynamic charging infrastructure

It is also important in building for the future, that public charging infrastructure has a variety of different charger types to facilitate different use cases and support the demand for charging from different vehicle types.

The energy provision in Figure 5 is estimated from average session duration and based on Zapmap estimates for expected power throughput: Slow average power = 3kW, Fast - average power = 7kW, Rapid - average power = 35kW, Ultra Rapid - average power = 50kW. The energy provision is based on the assumption that chargers are utilised 20%, 30% or 40% of the time.

*Figure 5*

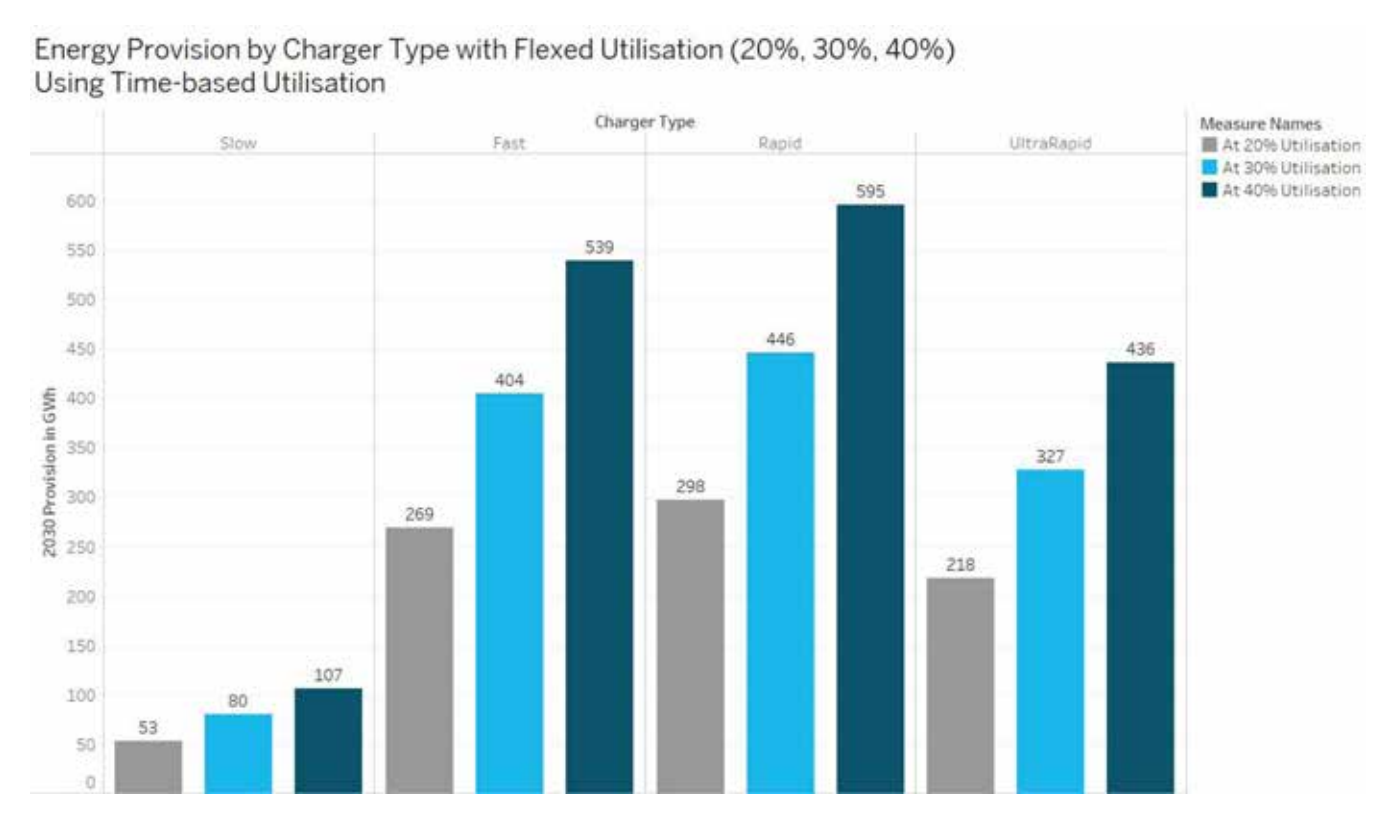



Figure 5 projects the additional capacity which can be unlocked by improving the utilisation rate of the chargers operational today, reflecting the importance of greater utilisation.

Assuming utilisation of current chargepoints can be increased to 30%, this will deliver 1,257GWh of energy which is 1/8$^{th}$ of the estimated energy demand for 2030 (10,868 GWh). With a utilisation rate of 30% and adequate provision of different chargepoint types whose utilisation rates will vary across the day, in different locations, this engrained flexibility will support the demand for charging expected in 2030, particularly with 300,000 chargepoints in the ground by 2030.

In addition to the charger type, it will also be important to identify where the highest levels of demand are likely to stem from in terms of vehicle type, with some regions or local authorities likely to have higher proportions of certain vehicle types which may put more strain on the grid and charging infrastructure.

*Figure 6:*

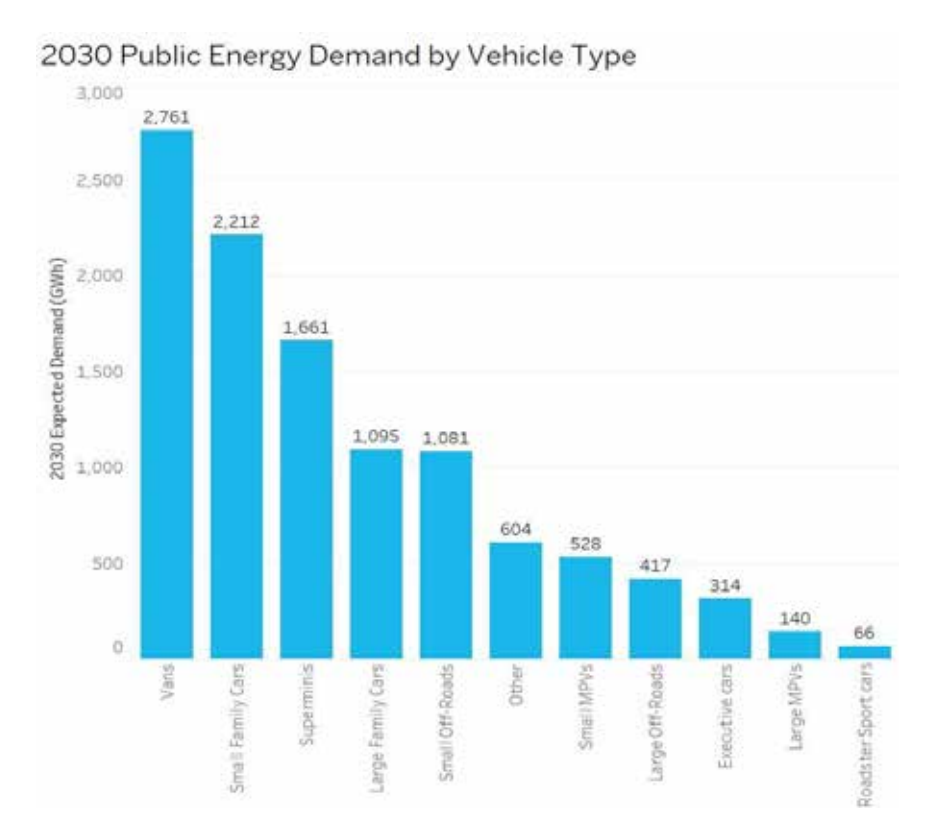



Figure 6 shows the expected energy demand for 2030. It includes 96% of On-street household demand (the remaining 4% being provided at work) and 19% of Off-street household demand (the remaining being provided from either home chargers or at workplace). It assumes 36.5% adoption rate, as per the Customer Transformation FES 2022 scenario and a 5% increase in vehicle energy efficiency (3.5 miles per kWh). Annual mileage and vehicle mix are assumed to be as per 2021 MOT data. Vehicle count is as per 2022, Q3 DfT licensing data.

Heavy Goods Vehicles (HGV) are not included in this graph due to the underdeveloped market for electric HGVs. With no support to the road freight sector to procure more expensive electric HGVs and no indication on whether the Government will support the rollout of HGV charging infrastructure or hydrogen, many operators in the road freight sector are waiting for a decision before investing in new HGVs. This is resulting in older ICE HGVs staying on the road for longer. This is why the Government must urgently develop a position on the future of HGVs to lower the carbon footprint of the road freight sector.

Figure 6 highlights that by 2030 vans will have significantly higher expected demand for public charging than any other vehicle type, 500GWh more than the next largest (small family cars). Indeed, their energy demand is likely to be greater than the lowest six vehicle types combined.

Therefore, in building infrastructure for the future, regional and local authorities should consult with fleet operators and van drivers to develop opportunities to collaborate in the interests of utilising existing connections / facilities, or shaping the development of new EV charging facilities and expanding current ones.

To meet the scheduled operational and route requirements of delivery and fulfilment fleets, bookable, reliable, suitably equipped charging facilities should be considered. Consultation with local fleet operators will be essential to identify common routes where such facilities would be most beneficial. These facilities not only enable commercial operators to transition with greater confidence (locality, availability and reliability of charge) and efficiency of their operations, they also ensure that the requirements of private car and small business vehicle operators are not frustrated by the potential contention at public charging facilities which would lower the utilisation rate of chargepoints.

## Manging the local network: Sourcing of available power

Overall, regions and local authorities within them have two choices: either, significantly increase the availability of energy on the local network with significant spending on grid reinforcement, which also have long waiting times; or they can increase the utilisation rate and invest in local renewable energy projects like solar and onshore wind and flexibility through battery storage and solar canopies to support charging demand. These decisions should be made using a plan which evaluates the options to provide power in the most appropriate combination of cost efficiency / speed of availability / carbon intensity.

This report recommends that Government and Local Authorities examine the following suggestions to develop greater local energy security and resilience to assist in powering public charging:

**A.** Optimise onsite renewable generation to store and provide power to occupier's and third-party fleets or private wire connections for local EV charging stations.

**B.** Improve the battery storage business case (income stream) to make static energy storage a more viable investment; creating more "behind the meter" flexible assets to support the grid with higher overall penetration of renewables.

**C.** Tangibly reduce the growth in surplus energy "spill" to the grid; provide a higher income for surplus generation by selling power to EV fleets; in turn providing a zero carbon, lower price (than public charging) and long-term price stability for powering these fleets - improving the total cost of ownership and reducing the investment barriers for commercial vehicle fleet adoption.

**D.** In combination, facilitate investment and improve the Energy Performance Certification ratings of commercial and industrial building stock, as well as increase the viability of static battery energy storage and solar canopy installations over car parking bays in many scenarios.

## Beyond 2030: Powering the drive to net zero transport

Further analysis from Field Dynamics also projects how charging demand will change from 2030 - 2050.

- **2030 Total Public Demand = 10.9TWh**
- **2050 Total Public Demand = 29.8TWh (same assumptions as per 2030 but assuming 100% EV adoption)**
- **2050 Total Energy Demand (includes all charging needs, home, workplace and public) = 66.6TWh**

By 2050, charging demand will nearly triple for public charging from 10.9TWh to 29.8TWh. Significantly, factoring in all types of charging e.g., home and workplace charging as well as public, the UK will need 66.6TWh of electricity available to power electric vehicles. This is a significant increase in charging demand. To power public charging in 2030 the UK will need the equivalent of half a Dogger Bank[7] the largest offshore windfarm in the world (estimated to be 18TWh) or 1.5 Dogger Bank's in 2050 to power public charging. To power all charging demand in 2050 the UK will need the equivalent of two Dogger Bank's and a Hinkley Point C[8] (estimated to be 26TWh).

This is why local flexibility will play a significant role in powering electric vehicles. Battery storage, and solar farms, rooftops or canopies are clear examples of technology which is available today that the Government must do more to support the deployment of, if we are to power electric vehicles easily and at a lower cost. Investing in these technologies and building policies to accelerate their deployment will be significantly less expensive and provide more flexibility and energy security to the system than building more interconnectors or a new offshore wind farm every few years to keep up with the demand for EV charging.

[7] https://www.equinor.com/news/archive/202111-dogger-bank-c

[8] https://www.blackridgeresearch.com/project-profiles/hinkley-point-c-nuclear-power-station-the-largest-nuclear-project-in-united-kingdom#:~:text=Hinkley%20Point%20C%2C%20which%20is,its%20anticipated%2060%2Dyear%20lifespan

[9] https://www.nationalgrideso.com/document/263951/download

**How renewable will power be in 2030?**

A key concern in decarbonising road transport through electrification is that to qualify as truly zero-emission, the underlying power system in the UK must depend on 100% renewable generation, so as not to simply shift the point of emission from the tailpipe of an ICE to the chimney stack of a thermal power plant.

To provide an indication of what percentage of the UK's electricity might be renewable in 2030, RECHARGE UK has used National Grid Electricity System Operator's (NGESO's) FES[9]. The FES models the UK electricity mix across four different scenarios: Consumer Transformation, System Transformation, Leading the Way, and Falling Short. Depending on the scenario used, the percentage of generation that is modelled to come from renewable sources in 2030 ranges between 74.5% in the Falling Short scenario and 88.24% in the Leading the Way scenario (Table 6). In addition, the total generation from any sources is 32.6% higher in the Leading the Way scenario compared to the Falling Short scenario, indicating a grid better prepared to bear the additional load from an electrified road transport system.

*Figure 7:*

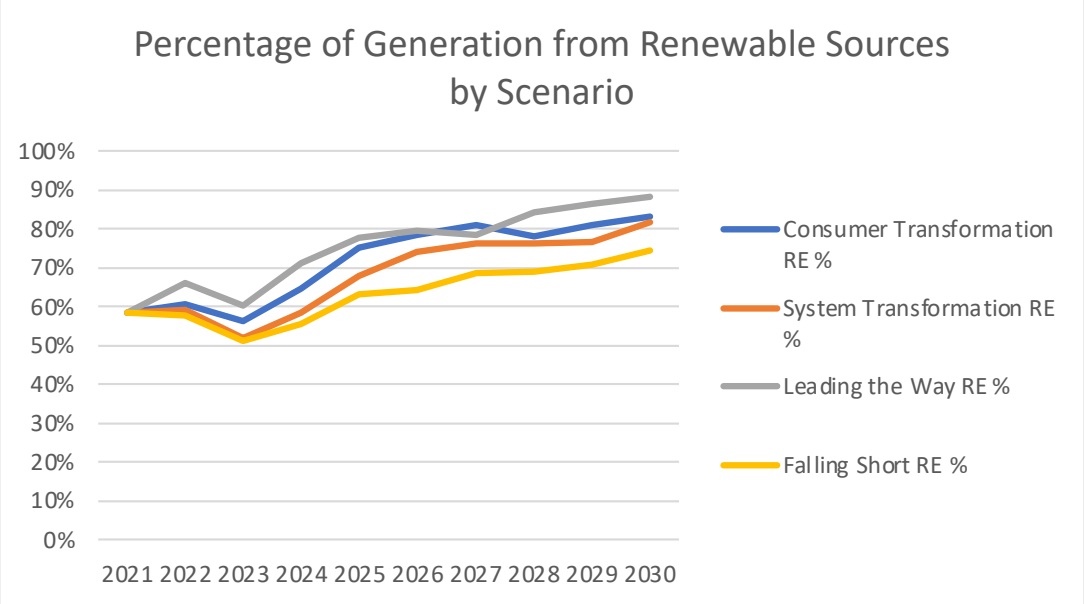
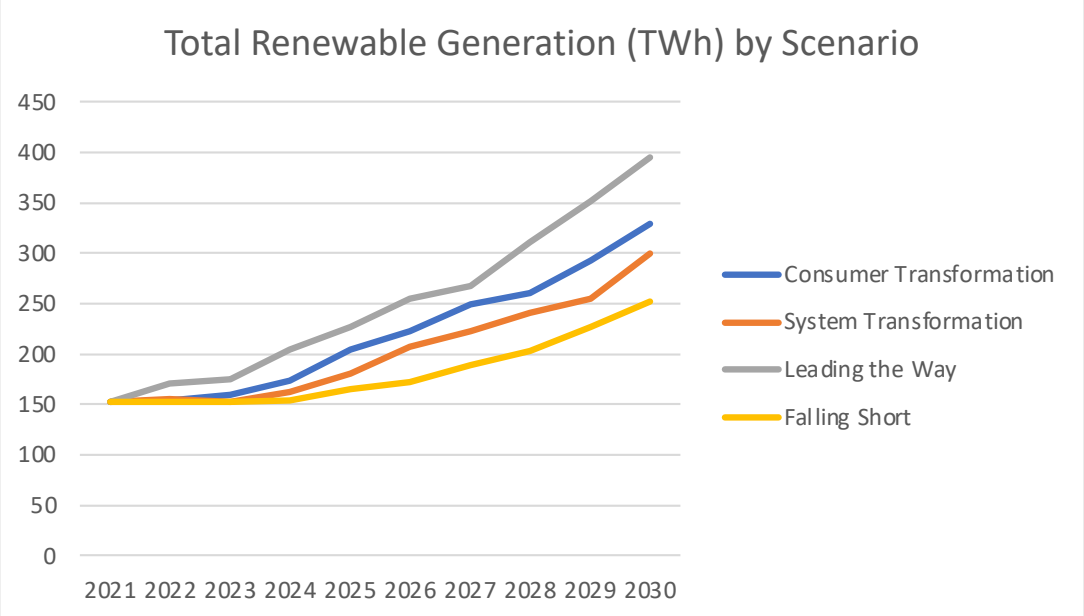



*Figure 8:*



Under the Consumer Transformation scenario, home heating, transport, and industry are largely electrified by 2050, with increases in energy efficiency. While the electricity generation capacity in 2050 is the highest from any scenario, it also has the highest electricity curtailment. In this scenario, the volume of renewable generation from 2021 to 2030 grows by 115%. In 2030, the largest share of generation is provided by offshore wind, generating 49% of total generation; followed by onshore wind (17.82%), solar (8.15%), nuclear (7.97%), and fossil fuels (5.59%). Generation reliant on carbon capture and storage (biomass and gas) jointly provide 4.35% of total generation.

Under the System Transformation scenario, the volume of renewable generation from 2021 to 2030 grows by 96.46%. In 2030, the largest share of generation is provided by offshore wind, generating 47.9% of total generation; followed by onshore wind (18.96%), nuclear (8.77%) solar (7.08%), and fossil fuels (5.89%). Generation reliant on carbon capture and storage (biomass and gas) jointly provide 4.2% of total generation.

Under the Leading the Way scenario, there is almost no unabated natural gas used for electricity generation, and in 2035, almost half of the demand for energy from the road and rail transport sector is met with electricity. In this scenario, the volume of renewable generation from 2021 to 2030 grows by 158.55%. In 2030, the largest share of generation is provided by offshore wind, generating 50.2% of total generation; followed by onshore wind (19.09%), solar (9.61%), nuclear (7.24%), other renewables (2.64%), and fossil fuel and gas with CCS tied at (2.26%). Generation reliant on carbon capture and storage (biomass and gas) jointly provide 3.89% of total generation.

Under the Falling Short scenario, there are relatively minimal differences to today, with the exception of increased electrification of surface transport; and while there is a significant increase in renewable electricity generation, unabated gas generation continues at a higher level than other scenarios. In this scenario, the volume of renewable generation from 2021 to 2030 grows by 64.57%. In 2030, the largest share of generation is provided by offshore wind, generating 39.96% of total generation; followed by onshore wind (20.6%), fossil fuel (15.56%), nuclear (9.93%), solar (5.31%), and waste (4.83%). No generation is reliant on carbon capture and storage (biomass and gas).

# 2. Accelerating chargepoint rollout - addressing the barriers to deployment

## The context

Currently at a national and local level there are significant barriers to chargepoint deployment that add cost and time to chargepoint installation. These barriers therefore affect individuals wanting to install a chargepoint at their home, a landowner wanting to install a chargepoint(s), a CPO offering rapid charging on the strategic network or a business wanting to install chargepoints for their fleets or employees.

This chapter focuses on:

- Barriers to chargepoint installation at a local authority level, highlighting the financial and time costs these inflict on those involved in the installation process.
- The chapter then focuses on national level policy barriers that are a result of existing UK wide legislation that need modernising.
- Realistic suggestions on how these barriers can be overcome and chargepoint rollout accelerated.

## Accelerating rollout at a local level

### Section 50 Licences

A Section 50 permit is applied for when a company who is not a Statutory Undertaker needs to install or do work on the public highway. If successful the applicant is granted permission to install, inspect, maintain, adjust, repair, alter, renew, remove, or change the position of the Apparatus. As well as enabling the applicant to break up or open the highway or any sewer, drain or tunnel under it, or to tunnel or bore under the highway.

Although a Section 50 Licence request was mandated as part of the New Roads and Street Works Act 1991 (NRSWA)[10] it is included in this section as chargepoint operators have expressed concern that Section 50s act as a tax on chargepoint deployment through the LEVI Fund and/or private investment for example. Presently a Local Authority using LEVI grant funding could still levy £1,000 per installation, which comes from within the entire project budget.

[10] https://www.gov.uk/government/publications/installing-apparatus-in-a-highway-section-50-licence-nrswa-1991

[11] https://www.gov.uk/government/publications/open-standards-for-government/identifying-property-and-street-information

So, if organisations wish to install three lamp post chargers on one street, they could lose over £1,500 of the grant funding (up to 50% of the cost) simply to grant the installer permission to install the chargepoints.

RECHARGE UK and its members see this as detrimental to chargepoint installation. Not only does this cost a significant sum of money when installing multiple chargepoints but it will also be passed on to the consumer, with higher capital costs meaning higher tariffs are charged to the user for the CPO to achieve the same level of commercial return, and sites can also become less commercially attractive and may not attract the investment required to install the infrastructure.

It is therefore proposed, that the Section 50 Licence application process is scrapped for chargepoint installations, and replaced with a system of co-ordination with local authorities that is far less costly. With potentially millions of chargepoints to be installed over the next 30 years it is vital that processes like these do not delay and/or add unnecessary cost to chargepoint installation. This will allow private sector investment to go further and reduce the need for public funding to develop local EV charging networks.

As things stand, Section 50s are rarely, if ever, denied. As such they are a bureaucratic exercise, especially once a few trial installations of a solution have been undertaken.

However, if Government determines that a Section 50 Licence is required in an area where a Section 50 application process could be particularly improved, is for larger hubs of on-street chargepoints where more than one Section 50 permit is required (e.g., If multiple chargepoint installations cross from one side of the street to the other, or lead around a junction from one street to another). In such instances, a significant number of streets in the national dataset of 'Unique Street Reference Numbers (USRN)[11] contain more than one USRN each. Some local authorities have a strict 'one permit for every impacted USRN' approach, while others have more flexibility to require one permit per system, regardless of the number of impacted USRNs.

In practice this means that the Section 50 licence costs between £400-£1,300 for a system of chargepoints and can be double or even triple this cost for the most effective layout in each location. This report proposes that specific guidance is issued, so that only one Section 50 is required per system installation or per contract. Our preference which we believe will lead to the most cost and time savings is for Section 50s to be scrapped entirely across the UK. However, if this option proves not to be viable for Government, then we believe this could be a common-sense starting point that can accelerate chargepoint installation.

**Accelerating local authority charging involvement**

At present the national Government has dedicated £480 million to local authorities to spend on chargepoint deployment and employ dedicated EV charging officers through the LEVI Fund. This is one of the most significant investments in Local Authorities anywhere in the world. However, currently many Local Authorities are unprepared for this and do not have any legal obligation to prepare for or install chargepoints. Indeed, in Q4 of 2022 only 37% of Local Authorities had developed charging plans[12]. We have seen to date that, prior to the LEVI Fund, some Local Authorities have however adopted very positive EV policies. An example of such an authority is Coventry City Council, who are often presented as one the leading local authorities on EV charging and have put significant time into this[13].

We believe that, to ensure all local authorities can reach these levels of ambition and effectiveness, the Government should introduce a **statutory duty** to plan for EV infrastructure on Local Authorities as first proposed in the Future of Transport Regulatory Review 2021[14]. We believe that the best way to do this would be producing new legislation like the Air Quality Regulations (AQR) 2000. In addition to education for local authorities on what good charging infrastructure should look like, which could be provided like the education programme in the LEVI Fund run in partnership with OZEV and industry to help those managing electric vehicle roll out in their Local Authority. CENEX's NEVIS platform[15] has already made some headway here.

Firstly, the legislation should include a provision which states that local authorities must "Monitor and report on chargepoint provision in their local area". This will ensure that Local Authorities have a clear understanding of what already exists in their area and be able to ensure that there is not unnecessary competition for grid capacity or infrastructure already provided by CPOs and where local authorities may install new chargepoints. This will enable the most efficient installation practices in each area. Moreover, this provides the ability for Local Authorities to be transparent and highlight the positive work they do in ensuring their residents can adopt EV's as quickly as possible. It would also raise residents' awareness through the report of where they can charge their vehicle which may inspire residents who would have otherwise not purchased an EV to make this positive change more quickly.

Secondly, this new law should also have a provision stating that to accompany the monitoring and reporting, Local Authorities must "produce EV Charging Action and Renewable Energy Supply Plans no later than 6 months after the May 2024 Local Elections". Local EV charging action plans will be used by local authorities to identify suitable locations for new chargepoints across the local authority as well as at on-street level, being informed by resident's requests for new chargepoints in their street. This will then ensure that the newly created Project Manager role from the LEVI funding will have an adequate resource available from which to inform spending decisions from the LEVI grant and in the long run ensure local authorities keep up with charging demand as EV ownership rises.

In this context, a model of a charging action plan should be provided by the Office for Zero Emission Vehicles (OZEV) and based on existing best practice, for example, Oxford County Council's Electric Vehicle Infrastructure Strategy[16], which identified

[12] https://www.bvrla.co.uk/industry-campaigns/decarbonisation/fleet-friendly-charging-index.html

[13] https://www.coventry.gov.uk/transport-strategy-2/coventry-transport-strategy-implementation-plan/5

[14] https://www.gov.uk/government/consultations/future-of-transport-regulatory-review-zero-emission-vehicles/future-of-transport-regulatory-review-zero-emission-vehicles#statutory-obligation-to-plan-for-and-deliver-a-charging-infrastructure

[15] https://nevis.cenex.co.uk/

[16] https://mycouncil.oxfordshire.gov.uk/(S(111temanaulowwi3xfkizm45))/documents/s55283/CA_MAR1621R11%20Annex%203%20-%20DRAFT%20Oxfordshire%20Electric%20Vehicle%20Infrastructure%20Strategy%2020210225.pdf

where early adopters need public charging infrastructure and where there would be a need for on street charging for those without driveways. Figures 4, 5 and 6 in this strategy are a key level of analysis that all Local Authorities could look to emulate and improve on, identifying growth in EV adoption beyond 2025 which is where Oxford County Council's analysis ends.

This would be a positive step in the right direction to aligning National Government ambition for at least 300,000 public chargepoints, with the potential Local Authorities have to make a significant positive impact in this space.

**Reforming Road Traffic Regulations Act 1984**

Road Traffic Regulations Act 1984[17] mandates that a consultation must be taken at a local level with residents and relevant authorities, such as a local NHS Trust or Fire Chief, if they impact on moving or stationary traffic on the highway or could impede an ambulance or fire engine.

Community consultation to change a parking space for any vehicle to one specifically for electric vehicles would therefore require a Traffic Regulation Order (TRO). Implementing a TRO involves a lengthy process that, according to Gloucestershire County Council[18], can last anywhere from 12-18 months and cost thousands of pounds to the Local Authority. The process involves:

- Feasibility and priority assessment consideration.
- Proposed scheme design.
- Informal consultation (21 days minimum for comments to be received).
- Consideration of all comments received.
- Amendments and preparation for statutory processes.
- Statutory consultation (21 days minimum for comments to be received).
- Consideration of all comments received.
- Amendments and preparation for public consultation.
- Draft all relevant legal documentation ready for formal advertising of the scheme in the media and on the GCC website.
- Formal consultation (21 days minimum for comments to be received).
- Consideration of objections (and attempts to resolve them).
- Detailed report or TRO Committed (if unresolved objections).
- Making of the TRO including sealing.
- Implementation of the TRO (making physical changes on site).

This process is clearly designed to provide rigorous consultation across a number of groups including the local community. In the instance of changes to restrictions of a parking bay, it is currently necessary to apply for a TRO[19]. However, where there is an existing on-street parking bay, implementing an EV only bay will cause no additional obstruction to the roadway.

Where petrol or diesel vehicles block an electric vehicle driver from parking in front of a chargepoint (often referred to as "ICE-ing") this leads to some newer adopters of electric vehicles, particularly those on a lease deal returning to an ICE vehicle at the next opportunity due to their inability to charge their vehicle in public. Therefore, EV only bays will be crucial in future, therefore local authorities need to make it easier to implement EV only bays, by having a modernised and streamlined TRO process.

This can be prevented by excluding changing parking spaces to electric vehicle only from needing to apply for a TRO, if a CPO has detailed how their chargepoints will not impede on pedestrians on the pavements such as wheelchair users and prams. This will be important over the next few years, as people who have less enthusiasm for an EV as an experience and want it only to get from A to B with a lower carbon footprint will want to be able to charge their vehicle easily and without being obstructed by an ICE vehicle.

[17] https://www.legislation.gov.uk/ukpga/1984/27/contents

[18] https://www.gloucestershire.gov.uk/highways/traffic-regulation-orders-tro-and-traffic-schemes/what-is-a-traffic-regulation-order-tro/

[19] https://lruc.content.tfl.gov.uk/london-electric-vehicle-charge-point-installation-guidance-december-2019.pdf

ICE-ing will also be problematic when open data comes into force as part of the Consumer Experience Regulations 2022. The regulations mandate that chargepoint operators must provide information such as whether a chargepoint is being used. However, without a booking or without being plugged in, an ICE vehicle can block a chargepoint from being utilised, and lead to both losses for a CPO and an EV driver not being able to charge. Therefore, enabling the quick change in use for a chargepoint to EV only should not need a TRO.

However, we understand the need for a TRO in circumstances where a chargepoint is being installed or a new parking place set up. We therefore recommend, as chargepoint installation will rise significantly over the next several years, that the TRO process is streamlined as the number of TROs will rise exponentially over the next few years and would require significant spending, time and resources which we presently do not have and will result in the TRO process potentially taking more than even 18 months to complete.

For example, experimental TROs have been set up across the UK over the last few years. Experimental TROs like regular TROs impose traffic and parking restrictions. However, unlike a regular TRO, an experimental one allows a council to, for example, change a parking space to EV only on a temporary basis, 18 months, with a rule that objections must be lodged a maximum of 6 months after the TRO[20]. If there are no objections, and the 18-month timeline passes by without incident then a TRO can be approved for the trial meaning it continues on a permanent basis. RECHARGE UK see this as a significantly powerful tool that Local Authorities must use going forwards when rolling out charging infrastructure so that it can be delivered, without obstacles such as ICE vehicles, rapidly.

Furthermore, to accelerate the process, appropriate funding should be provided to ensure that enough staff are available to process TROs. With the significant number of public chargepoints expected to be built by 2030 it is clear that, like the funding provided to Local Authorities through the LEVI scheme

[20] https://www.gloucestershire.gov.uk/media/6687/explaination_of_experimental_traffic_orders-36785.pdf

for additional expertise, similar funds should be set up to enable Local Authorities the ability to manage and process TROs efficiently.

### Futureproofing car parks: the role for the Future of Transport Regulatory Review

The future of transport regulatory review consultation was published in 2021 where the Government consulted on mandating landowners of non-residential car parks with more than 10 car parking spaces to install:

- 1 chargepoint.
- Cable routes for electric vehicle chargepoint cabling for 1 in 5 spaces.

Since this was published the Government have published their final ZEV mandate consultation which at the time of writing looks set to mandate a minimum of over 20% ZEV cars and 10% ZEV vans as a proportion of new vehicle sales per vehicle manufacturer in 2024. With an overarching aim of an end to the sale of ICE vehicles in 2030 and 100% of new car and van sales being zero emissions at the tailpipe by 2035, mandating only 1 chargepoint in total and cabling for one in five or 20% of spaces, that this will very quickly be outdated and lead to inadequate public charging infrastructure.

New and existing car parks must be able to support the number of electric vehicles that are likely to be on the roads by 2030. This includes space for chargepoints to be safe and accessible. This could be achieved by using permitted development rights to an agreed limit decided by OZEV through consultation with industry to enable spaces to be effective at charging EVs. This is the only way to ensure that public charging infrastructure will not become quickly outdated. RECHARGE UK encourage Government to introduce this legislation at the same time as the ZEV mandate (2024) to ensure that car parks can keep up with EV charging demand.

### Deploying charging for rural communities

To date, charging infrastructure in the UK has predominantly been installed in urban areas, with over 40% of the UK's current EV charging infrastructure installed in Greater London and the South East[21]. This has been because the majority of chargepoint demand has come from urban areas, however as EVs have become more popular and are increasingly being adopted by people across the UK in greater numbers, local authorities have begun engaging with CPOs to agree tenders that necessitate chargepoint installation in less densely populated rural areas, with organisations like Midlands Connect facilitating this in the Midlands. Charge Place Scotland* have been operating rural DC charging for five years and have successfully used public funding to fill gaps in rural EV chargepoint provision. We recommend that local authorities across the rest of the UK utilise learnings from Charge Place Scotland to achieve rural parity.

We would urge local authorities who are participating in EV infrastructure for the first time to follow this as an example of best practice in Scotland, to ensure that all their residents have access to EV charging. Many rural residents will not have driveways and so it will be important going forwards that local authorities and National Government develop a strategy for charging in rural communities to facilitate this, as well as the potential for on street charging solutions like Trojan Energy.

[21] https://www.zap-map.com/ev-stats/how-many-charging-points

* https://chargeplacescotland.org/about-us/

**Deploying charging for communities with seasonal demand**

In Norway, to address seasonal demand for charging in mountainous rural areas, portable EV chargepoints are deployed to cater for additional demand created by seasonal tourists and other visitors, which would otherwise be beyond the capacity of the existing local EV charging infrastructure. We see a similar problem in the UK where charging at popular tourist destinations proves sometimes difficult when thousands of people flock to one concentrated area at once. We propose that, when examining new innovation funding for EV charging, the UK Government begin to offer support and funding for portable chargepoints. This will contribute to resolving seasonal demand issues in less densely populated areas. Local Authorities could place portable chargepoints in locations with limited or no demand in summer, such as school car parks and sporting facilities. This could be an obligation put on local authorities to ensure that unnecessary congestion is avoided in the peak summer months.

Therefore, RECHARGE UK strongly suggest that there must be an analogous seasonal demand management approach which local authorities manage in tourist hotspots.

**National level barriers to deployment**

At a national level, there are several areas which impact on chargepoint deployment which can only be addressed through national level policy changes rather than at a local authority level. Grid reinforcement, and approval processes for chargepoint installation are two areas where there is a significant need for reform, to improve the ability of Distribution Network Operators (DNOs) to fulfil connection requests and to reduce the time scale and cost of the Wayleaves process which together add significant time and cost factors to chargepoint deployment.

## DNO rights and reform

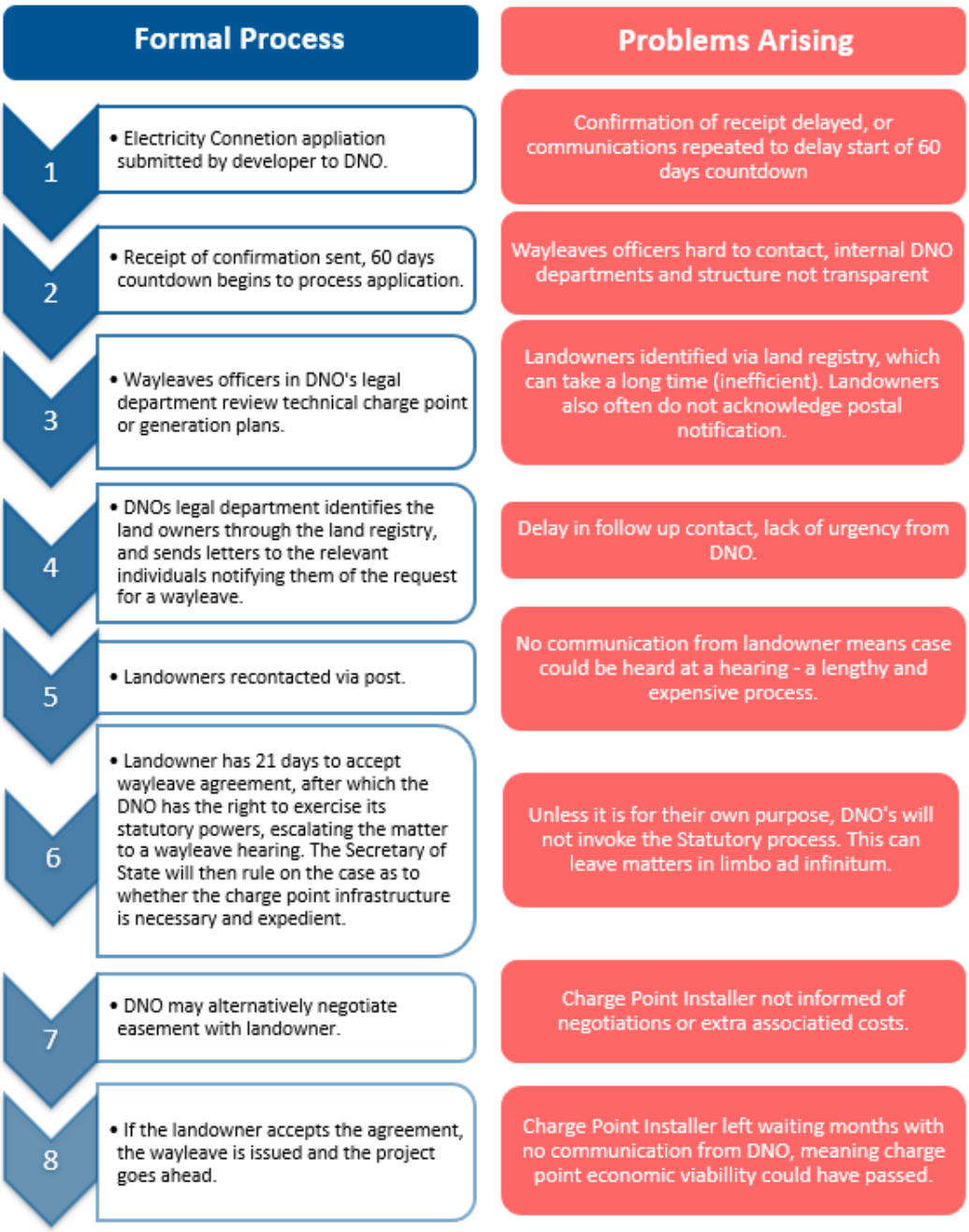
RECHARGE UK proposes to enable DNOs to process connection requests that the Government introduce new rights for DNOs based on the Electronic Communications Code to:

- Reduce time and resource required to agree wayleaves.
- Reduce uncertainty around wayleaves and planning permission.

Although we recognise the significance of the proposed move to prevent "unready" projects from holding up connection of projects which are ready to go live, there is still a need for greater reform. Wayleaves are crucial to any electricity infrastructure developer, and to Great Britain. Wayleave agreements are in essence the right for a developer to install, place, and/or run their equipment over a third-party's property.

Securing wayleaves, is a complicated issue involving multiple parties and requires developers to navigate different processes depending on the local electricity distribution network (DNO) they are engaging with. In some cases, our research indicates they can extend project completion by up to two years.

Currently the wayleaves process looks like this:



The first right which should therefore be put on a DNO is regarding point 6 overleaf. If third party landowners refuse to allow works to cross their land, DNOs should invoke their existing statutory process. In most cases this would offer a platform for easier discussions and early agreement in the background of a set framework. A mechanism that enables developers to require DNOs to exercise this right, if a timeline and clear criteria are met, would be a sensible way forward which would accelerate the process.

More broadly, a mechanism is required for more efficient communication between DNOs and chargepoint installers at every stage of the connection process. The simplest solution would be an online tracking system, updated by the DNO at each stage of the process, accessible by the chargepoint installer. This would reduce time spent by both chargepoint installer and DNO teams on communicating next steps in the wayleaves process.

Furthermore, although the graphic is a good indicator of the wayleaves process, each DNO has a different approach to applying this process. This adds further confusion and delays to developers, who must account for subtle differences in the approach taken by each DNO they engage with. To remove this inconsistency, we strongly encourage DNOs to work together to agree a standardised process for obtaining wayleaves, as is the case in most European states. This could be progressed, for example, via the Open Networks programme led by the Electricity Networks Association (ENA).

We understand to achieve these asks, and also manage an ever-growing number of connection requests, DNOs will need the right funding and extra staff to do this. To enable a rapid rollout of EV charging infrastructure EV charging should be classified as critical infrastructure and prioritised in the network connection cost to avoid long waiting times which make some projects redundant currently.

Presently, the Department for Energy Security and Net Zero (DESNZ) are consulting on putting the Cyber Assessment Framework (CAF)[22] on CPOs which require nationally significant infrastructure such as PowerStation's, to have very high levels of cyber security. If these are to be extended onto chargepoints, chargepoints should also, for the same reason, be prioritised in the connection queue as nationally significant infrastructure. This should come in to force soon as a lack of charging infrastructure will impact on the ability of emergency services and road haulage to continue performing at normal levels. Both the Cyber Assessment Framework (CAF) regulations being consulted on and our recommendation to class chargepoints as nationally significant infrastructure in the connection queue, should come in to force at the same time to ensure consistency in how chargepoints are classed.

We recognise that in 2021 OFGEM published an Open Letter on the Green Recovery Scheme[23]. This Scheme is aimed at accelerating low regrets, shovel ready network investment under the remainder of the RIIO-ED1 period to stimulate economic recovery and support faster delivery of decarbonisation benefits for consumers, while supporting Government's climate change ambitions. This had a value of £301.3m, with £126.78m coming from existing network company allowances, and £174.52m being made available through new allowances. 40% of the investment proposals received by DNOs were for ultra rapid charging across motorway service areas. RECHARGE UK welcome actions like this from DNOs and OFGEM and encourage the Government to work with OFGEM to enable more funding to be made available for EV charging connection requests.

**DNO Pricing**

Before the last price review period, DNOs reportedly requested that they pay for grid reinforcement by adding pennies to energy bill for households across the UK through Distribution Use of System (DUoS) charges. However, OFGEM decided that some aspects of grid reinforcement should be paid for by the developer/CPO e.g. transformers and cables added to the grid. This meant that on the 1st of April this year, as part of the new price review period, fees were increased. If homeowners are required to pay for grid reinforcement costs to support domestic chargepoint installations, this will

[22] https://www.gov.uk/government/consultations/delivering-a-smart-and-secure-electricity-system-the-interoperability-and-cyber-security-of-energy-smart-appliances-and-remote-load-control

[23] https://www.ofgem.gov.uk/sites/default/files/docs/2021/05/dno_green_recovery_scheme_decision.pdf

continue to act as a barrier to domestic EV chargepointinstallations and therefore EV uptake. The same also applied for business fleet operators, who are more likely to require grid reinforcement due to the number of vehicles they operate and are therefore more likely to incur prohibitively expensive connection costs. This will lead to a delay in EV adoption and lower carbon savings across the UK. We recommend that the next price review period does not continue to further raise costs and looks at ways to reduce costs.

Reducing upfront capital connection costs by socialising them within energy bills would, in the next few years, be a sensible approach to managing the cost of grid reinforcement. Energy prices as a larger proportion of energy will be generated from renewables will in time reduce, and therefore the cost to the consumer of adding grid reinforcement to the bill at the time of the next price review will be diminished. We believe that this is a strong way to ensure grid reinforcement doesn't become a financial barrier to chargepoint delivery.

Lastly, although DNOs operate within a regulated marketplace, their costs and pricing structures have little transparency and are therefore poorly understood. RECHARGE UK members have informed us that they have been quoted two different prices for the same job on the same day - sometimes one price is as much as double the first. This is clearly an unacceptable practice, and we therefore recommend that OFGEM introduce a requirement for a transparent pricing mechanism to ensure pricing is more widely understood.

**A right to charge**

Presently one of the major barriers to chargepoint deployment is that tenants in domestic properties are not empowered to request a chargepoint. Many tenants who have parking may be blocked from having a chargepoint either because a landlord will reject the request or because the landlord is not aware of the grant schemes available to landlords to install chargepoints. Furthermore, housing associations may find the cost to be prohibitive, particularly if grid reinforcements are required, even if the cost is divided up between tenants.

In Norway the Norwegian Electric Vehicle Association (Elbil) drafted legislation[24] intended to empower tenants to request and receive a chargepoint in multi occupancy buildings. This legislation was subsequently adopted by the Norwegian Government.

RECHARGE UK has received a translation of the legislation[25] which details the rights for tenants provided by the legislation. We strongly support a similar piece of legislation for the UK and detail below the outline of the Norwegian legislation which we support being adopted in the UK.

A right to charge in condominiums and housing cooperatives was established which translated reads as:

Item 1: "A section owner who has his own parking space on the condominium's property has the right, with the board's consent, to set up a charging point for an electric car and plug-in hybrid vehicle adjacent to the parking space. Consent can only be refused if there is good cause to do so."

Item 2: "A section owner who has the right to park on the condominium's property, but without having their own space, can request that a charging point be set up for an electric car and plug-in hybrid vehicle. The board shall comply with the request unless there are reasonable grounds for refusal. The board decides where to set up the charging point."

**How these work:**

- This is an individual right. This means that the general assembly cannot overrule the board's consent.
- The right involves accessing a functioning charging point.
- This means that the tenant can, in principle, also demand that work necessary to achieve this be performed. This may include upgrading the power grid and establishing infrastructure.
- The unit tenant must obtain the consent from the board before they can set up a charging point.

[24] https://elbil.no/om-lading-i-borettslag-og-sameier/

[25] https://www.regjeringen.no/contentassets/3d6bca49284d4549ae1e0d8c7aaac4ba/nn-no/pdfs/prp201920200144000dddpdfs.pdf

**How these work cont.:**

- Pursuant to the second sentence of item 1, the board may reject a request to set up a charging point if there is "reasonable cause". Costs exceeding approximately 1/2 Grunnbeløp (NOK 56000 presently) are guidelines for when the Ministry considers there to be "justifiable grounds". ½ G is a standardised unit of measurement in Norway which is decided on each year and is the National Insurance scheme basic amount and half a G in this instance has been selected as the threshold for which the cost is considered too high for grid reinforcement and would lead to a rejection of a request for a chargepoint.

**Who pays?**

- If the tenant has their own parking space, then they pay for the charger but the whole building has to pay for the background infrastructure, as it's seen as a common cost. This means wiring is installed for all or most parking spaces at the same time.
- If the unit owner doesn't have their own space, then everyone in the building will pay for the chargepoint. The chargepoint is paid per minute once charged up, to avoid people blocking the chargepoint unnecessarily.
- All common infrastructure is paid for by the whole block.
- Electricity cost is paid for by the driver.
- If leasing a chargepoint then the cost will be divided for infrastructure costs.

RECHARGE UK would support the adoption of a similar piece of legislation being introduced for domestic tenants in the UK. This will empower tenants who want to electrify their vehicle to do so without fear they will be rejected. For the UK context it will be important that as well as freeholders, leaseholders who rent to a tenant also have the same duty put on them to approve a chargepoint installation and a request for a chargepoint cannot be unreasonably refused, the absence of a refusal would in this context constitute approval as well.

This will play a significant role in levelling up, particularly as the second-hand market develops and more people are able to access and purchase EVs. We think this, particularly with grid connection costs potentially being prohibitive to some people, is a positive way to lower costs to entry in a fair way that advantages the entire multi occupancy building for the future as well as the present.

## Modernising regulations for rapid chargepoint deployment

Presently the regulatory landscape around EV chargepoint installation is based off regulations which originated decades before chargepoints were being installed and lead to significant delays in deployment which could easily be addressed if the regulations were modernised.

In the most recent version of The National Planning Policy Framework (NPPF) (2021)[26] it says 'If setting local parking standards for residential and non-residential development, policies should take into account the need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emission vehicles'. However, with internal combustion engines presently blocking chargepoints there is a need to strengthen this regulation, to state that "policies must take in to account the need to ensure an adequate provision of spaces exclusively for charging plug in and other ultra-low emission vehicles". This would then also prevent the need to apply for a Traffic Order Regulation to change the use of a parking space at a later date.

There is also a need for the NPPF to be as streamlined as possible and it should make provisions for the rapid deployment of charging infrastructure to keep up with the pace of EV adoption in each Local Authority.

Therefore, a new, fast track process should be established for EV charging deployment which allows for careful consideration of traffic and accessibility concerns but mandates that this must be done within a fixed time period, to provide more certainty to chargepoint operators that they have a strict timeline by which they will know the decision and can provisionally begin preparatory work, such as timetabling installation or site assessment.

Furthermore, the Government should continue the work they have started on amending permitted development rights and extend this to chargepoints. Recently the Department for Levelling up, Housing and Communities consulted on amending wayleaves for solar canopies[27]. RECHARGE UK strongly supported this move and further encourages Government to include chargepoints within scope of permitted development rights. For example, as part of the consultation it asked whether permitted development rights for Local Authorities should be amended so that the permitted development can also be undertaken by a body acting on behalf of the Local Authority. We strongly encourage the Government to do this both for solar canopies for which it was consulting on as well as chargepoints. This will significantly accelerate chargepoint deployment through the LEVI scheme, if adopted quickly, and will allow for faster rollout of chargepoints at a local level for years to come, which will provide more confidence in EV infrastructure and see faster levels of EV adoption.

## Addressing the information failure at the vehicle point of sale

Presently there is an obvious point of failure at the point of sale which is resulting in delays in EV adoption and subsequently chargepoint installation. Presently if a customer walks into a car dealership, first or second hand, and mentions they do not have a driveway, many customers are taken to a hybrid or petrol car instead and told that an EV may not be for them. However, there are several options which could be discussed at the point of sale, on street chargers connected to a home like Trojan, and options to charge at a neighbour's driveway through systems like Co Charger are clear and obvious solutions that should be, but presently are not, mentioned. An electric vehicle can be for everyone, regardless of where an individual lives and this must be communicated better at the point of sale.

This is why RECHARGE UK will soon be launching an industry working group to discuss how we can address this information failure and looking at providing solutions to the problem. This solution could involve a cross industry endorsed sales document which lists the different charging options available to customers, which should also include information about the number of public chargepoints in their locality, as well as possibly online, where online retailers could provide a link to a web page that details the charging options available to them.

[26] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

[27] https://www.gov.uk/government/consultations/permitted-development-rights-supporting-temporary-recreational-campsites-renewable-energy-and-film-making-consultation

**Upcoming policy changes; addressing consumer experience and deploying the ZEV mandate**

Recently the Government have finalised their response to the Consumer Experience regulations consultation and, 12 months after the legislation is laid, we will see new chargepoints above 8kW, and new and existing rapid chargepoints 50kW and above being fitted with contactless payment. 24 months after open data requirements will also be introduced which will make it significantly easier to see when a chargepoint is free or down. Both will significantly improve the consumer experience and help counter claims that charging infrastructure is unreliable or hard to use.

However, despite this significant progress Plug and Charge is still not being called for by Government. Plug and Charge would mean an EV driver could simply plug in their vehicle and leave it to charge without interacting with any payment system with the car acting as the driver's card through an almost instantaneous secure connection and card details like expiration dates and signatures verified. We think this is a strong solution that will help reduce queues at chargepoints as there will be less time taken to interact with the chargepoint and make it easier than filling up an ICE vehicle, automating the payment process. Presently few manufacturers produce vehicles which are Plug and Charge compatible, chargepoint operators cannot provide this service alone and will need the support of car manufacturers to achieve this.

Going forwards we recommend that the Government revise their ZEV mandate as the technology becomes more widely available to include Plug and Charge compatibility within the regulatory definition of a zero-emission vehicle. For chargepoint operators, support would also be required to adopt ISO 15118 which enables chargepoints to be plug and charge compatible. We recommend cross industry consultation on this step within the next 12 months to ensure that as we get close to 100% new ZEV sales by 2035 that the interaction with public charging is as streamlined and efficient as possible, to achieve higher utilisation rates and lower queues by adopting plug and charge.

Lastly, with the ZEV mandate Government response due to be published in the near future, we need regulations on the sale of new ZEVs to be as strong as possible to ensure market stability in a still relatively nascent charging industry. The ZEV mandate must be implemented from January 2024 at full strength and address the serious concerns raised by the whole charging industry regarding the generous flexibility mechanisms afforded to manufacturers, which is a significant departure from its previous position expressed in the consultation prior.

**Developing energy flexibility - deploying Vehicle to Grid (V2G) / Vehicle to Everything (V2X)**

DfT should also look to examine the potential for Vehicle to Grid to be incorporated in the ZEV mandate as well, looking at ways to ensure V2G compatible vehicles are produced to ensure that consumers can benefit from considerable running cost savings if they maximise their vehicles potential flexibility. As we move to a country with higher variable renewable generation, the earlier we maximise EV charging flexibility the stronger the UK's energy security will be. We recommend DESNZ and DfT work collaboratively to ensure this potential is realised and work with industry to maximise this rollout.

The Faraday Institute* released a report in April 2023 called "the Role of Hydrogen and batteries in delivering net zero in the UK by 2050"[28] which highlighted that V2X could offer 445GWh of energy storage capacity by 2050. We have highlighted in Chapter 1 the importance of energy flexibility in powering EV charging going forward and this significant level of flexibility should not be neglected, and we now need Government to begin providing incentives for V2X.

This could be through the ZEV mandate, and the potential for credits to be awarded for V2X compatible vehicles should be utilised as soon as possible. DfT did not mention this in their most recent consultation, and we see this as problematic as it has a huge role to play in EV adoption. It both delivers large flexibility to the system, as explained above, and provides significant consumer savings. In Octopus Energy's V2X trial they saw customers saving as much as £840 annually through utilising V2X[29]. These savings can also be passed on to consumers without V2X, saving non-participating customers money through grid balancing cost reductions.

Going forwards the Government must look to develop an appropriate reward mechanism built on the level of participation in flexibility and apply learnings from trials like the Octopus trial. One learning which we see as important for consumer engagement is presently there is no transparency in the value of the flexibility to the provider and therefore what the customers asset is earning. This must change going forward to enable a quick understanding of the financial benefits of participating in V2X. This point is not exclusive to V2X either and is something the Government must consider for all flexibility assets.

[28] https://www.faraday.ac.uk/wp-content/uploads/2023/04/L2C231476-UKLON-R-01-F_Market-and-Technology-Assessment_FaradayInst_24Apr2023.pdf

[29] https://octopus.energy/press/octopus-energy-and-national-grid-eso-demonstrate-future-role-for-electric-vehicles-in-first-for-great-britain/

* https://www.faraday.ac.uk/about-faraday-institution/

# 3. Addressing the skills gaps - Enabling a futureproof deployment pathway

**The context**

The electric vehicle charging sector is a market which is significantly growing year on year and will continue to do so for decades to come, as the number of EV's on the road grow each year. However, those who install and manufacture chargepoints have technical skills which comparatively few people in the UK have compared to similar roles. As the charging industry is expected to increase chargepoint numbers from over 40,000 chargepoints today to the Government's target of 300,000 by 2030, the limited skills pool will be severely under resourced to manage the rising number of chargepoint installations and chargepoint manufacturing. In addition, there will be an increasing workload involved in maintaining chargepoints once installed.

This chapter aims to provide an overview of the key skills gaps already identified today, before using more recent data later this year to provide a more thorough, detailed analysis of the skills gaps that are likely to emerge across the transport sector, and make recommendations about ways to balance this. We aim to publish this in November 2023.

**Bridging the gap in chargepoint installation**

A recent workshop by City & Guilds (one of the UK's oldest and most well recognised skills and training providers in the country), made several suggestions on how we may address a growing skills gap in EV infrastructure installation.

Firstly, in addressing whether the pipeline of new electrical engineers will be enough to support EV growth over the next few years the workshop found that there will be enough electrical apprentices coming through. In April 2022 there were 35,000 electrical apprentices in training and the demand for further training is not subsiding[30]. However, for EV chargepoint

[30] https://www.cityandguilds.com/news/april-2022/bridging-the-skills-gap-for-ev-infrastructure-installation

installation the key is for Government, educators and organisations to do more to create awareness, particularly towards parents that this is a credible industry for young people of all demographics. As the installation of charging infrastructure is about innovation technology and programming and being part of a solution to climate change, this is something that energises and captures the imagination young people today.

The SMMT[31] recently published their analysis on how to address the skills gap and conclude that the Government must continue to elevate STEM in further education and promote automotive and manufacturing as life-long career opportunities, contributing positively to green growth, mirroring the conclusions from City & Guilds.

**Managing the existing workforce**

Presently there are two issues we must address to ensure we can maintain a high rate of chargepoint installation:

- Untrained workers install EV charging devices incorrectly, resulting in damages, losses or injuries to the public.
- Limited numbers of trained electricians install EV charging devices at a far slower rate and fail to meet 2030 targets.

In a survey by City and Guilds[32] one problem which was raised by electricians is that one third of chargepoint installers have learned on the job and have no formal training, which is problematic for the 45% of employers who only hire those with formal training.

RECHARGE UK and its members have for several years called for a qualification to be created that covers the full process of chargepoint installation and wider green skills such as energy storage. The Government must work urgently with key stakeholders in the education sector and EV charging sector to create a bespoke course which achieves this, so that both the existing workforce can retrain, and young adults can come into the workforce without the need to upskill later down the road.

The SMMT in their recent report also suggests that to support workforce upskilling the Government should reform the Apprenticeship Levy[33], allowing a proportion of unspent Levy funds to be focused on priority training areas such as electrification, decarbonisation and digitalisation. We support this suggestion and recommend the Government should seriously consider a full upskilling programme. We further recommend such policies should be adopted in political parties' manifestos for the upcoming General election expected next year.

**Maintaining electric vehicles**

Furthermore, multiple reports across the industry in recent years have highlighted that there will be a significant skills gap in EV technicians by 2030.

A report published by the Social Market Foundation in December 2022[34] highlighted that although we presently have a surplus of technicians which is likely to last a few years, 2027 will be the tipping point and by 2030 the industry is set to face a shortfall of 25,100 EV-trained TechSafe technicians by 2030.

[31] https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Manifesto-2030-Automotive-Growth-for-a-Zero-Emission-Future.pdf

[32] https://www.cityandguilds.com/-/media/cityandguilds-site/documents/qualifications-and-apprenticeships/building-services-industry/ev-infographic-report-pdf.ashx?la=en&hash=936D53B669022ABE2888276E303C9F41831DBF57

[33] https://www.smmt.co.uk/wp-content/uploads/sites/2/SMMT-Manifesto-2030-Automotive-Growth-for-a-Zero-Emission-Future.pdf

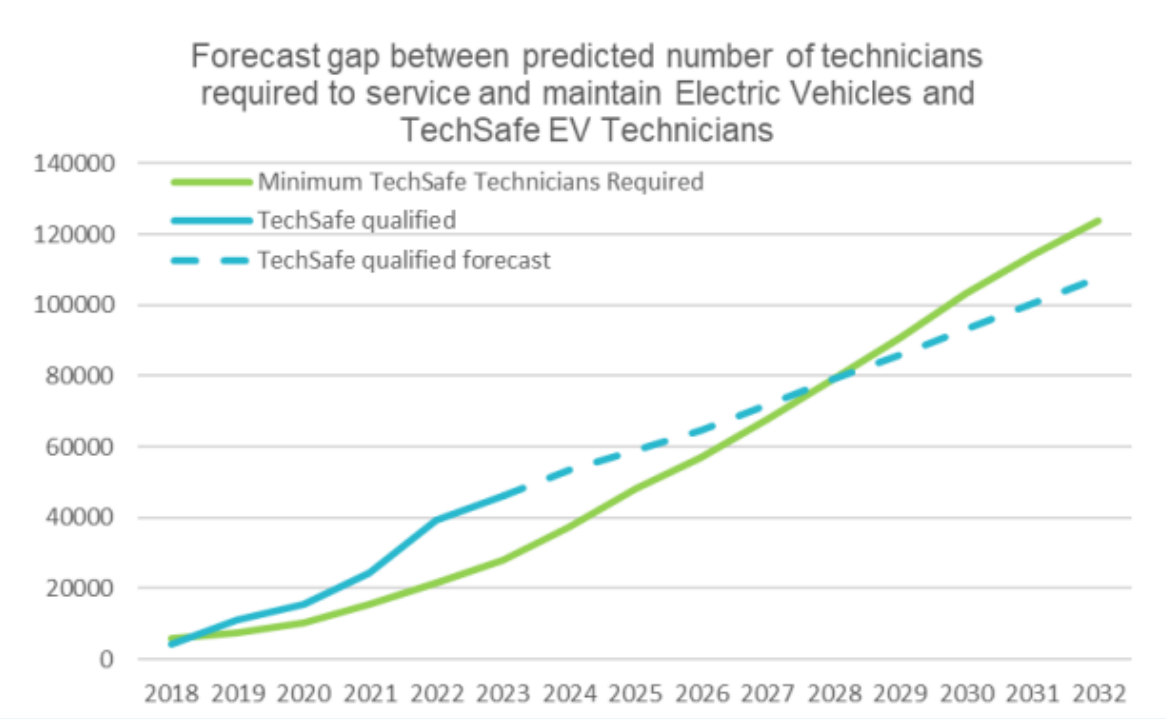
[34] https://www.smf.co.uk/publications/a-vehicle-for-change/

Among the top suggestions by the SMF, RECHARGE UK recognise the need to launch an attractive green careers campaign to get young people and those from underrepresented backgrounds into EV repairs. This builds on the need for bespoke electrical engineer courses which could also be a part of this campaign. With a general election also expected next year any credible manifesto must also make a commitment to develop a medium-term plan to upskill technicians for EVs, which will be essential both in ensuring a just transition in which people are not left behind and enable a faster rollout of electric vehicles and charging infrastructure.

A report in 2023 by the Institute of the Motoring Industry also highlighted that currently only 16% of technicians are qualified to work safely on EVs.

Their report also forecasts the minimum number of technicians required by 2032 and contrasts this to the existing trend of qualified technicians in Figure 10[35] below.

*Figure 10:*




The IMI predicts that by 2030, we will need 103,000 TechSafe qualified technicians to work with electric vehicles, increasing to 124,000 by 2032. This is a significant increase from 14,800 in 2022. They also warn of a potential shortfall of 4,500 qualified technicians by 2029, increasing to 16,000 by 2032. The Government and any future Government must prioritise addressing this skills gap which both the SMF and IMI predict will happen in the next few years to ensure electric vehicles can be maintained and stay on the road going forwards.

[35] https://tide.theimi.org.uk/sites/default/files/2023-04/EV%20Technicians%20forecast%20report%20March%202023v2.pdf

**Conclusions:**

RECHARGE UK from a preliminary analysis of existing data suggests that a key issue across the EV industry going forward will be a lack of skilled professionals who are able to install and maintain charging infrastructure or maintain and repair electric vehicles.

There is a clear conclusion from this: the Government, the education sector and the electric vehicle sector must come together and urgently establish courses that can be used to capture the energy of young people who are passionate about mitigating climate change and ensure that we can upskill the existing workforce, so that the transition to electric vehicle is a just one that provides opportunities for all, regardless of background.

These courses must be driven by the Government and any political party in the run up to the next General Election should consider how to address the Green Skills gaps in the EV sector and convince the public of why these roles are exciting, worthwhile and valuable.

# 4. Accessible charging - empowering the public and businesses to charge

**The context**

Over the last few years EV adoption has accelerated and elements of the public charging network have been highlighted to sometimes fall short of a desirable level of safety and accessibility. Over the last two years PAS 1899[36] was consulted on and introduced as a new standard designed to improve accessibility of public charging, particularly for those with accessibility needs. Many local authorities have now adopted PAS 1899 as a necessary standard to meet for CPOs to be eligible to bid into their tender.

PAS 1899 covers different aspects of charging that need to be considered to enable those with accessibility needs to charge. This includes physical aspects of the environment surrounding fixed charge points (e.g., kerb height, ground type); the location, placement and spacing of chargepoints within the streetscape/public realm; the information, signals and indicators to be provided to users; and the factors to be taken into account in the design and specification of accessible charge points (e.g., height of charge point, cables and cable management systems, bollard spacing, colours used on screens, weight and force and ease of use of the equipment).

Many of our members in the public charging space have now, in a short space of time, ensured their new products and locations of their chargepoints are PAS 1899 compliant, however, across the charging space a significant legacy issue remains. There will always be more work to do to ensure everyone, regardless of their accessibility needs, can access a chargepoint. The Future of Transport Regulatory Review in 2021 consulted on the possibility of mandating accessibility requirements for all public chargepoints. RECHARGE UK would support this move going forward to ensure those with accessibility needs are not left behind in the charging rollout.

Despite the progress in this space, ensuring the public feel safe to charge their vehicle must be a top priority going forwards for all CPOs, car park owners, Local Authorities and anyone with a responsibility in the public charging space. Ensuring an adequate level of safety measures are in place at public chargepoints will be vital in maximising EV uptake, by being able to reassure those who are mindful of their physical safety.

[36] https://www.bsigroup.com/en-GB/standards/pas-1899/

**Case Study: Charge Safe - Ensuring charging sites are accessible and safe**

RECHARGE UK member, ChargeSafe[37], was established in 2021 by Kate Tyrrell and James Coyle. Kate had worked previously in the charging industry and found herself driving in her EV to events all over the country on a weekly basis. Kate found herself feeling frightened to leave her vehicle to charge at some charging locations which were often at the back of a car park, with poor lighting and no CCTV. Since then, Kate and James created ChargeSafe with the aim to support the public charging networks to identify areas for improvement with greater accuracy, championing what's being done well and ultimately leading to a more inclusive charging experience for the UK.

Today ChargeSafe provide a 140+ Point independent inspection, designed to be completely unbiased and provides each site with its own ChargeSafe Score to reflect safety and accessibility considerations and challenges of the charge site. This is not just for safety but also accessibility.

The accessibility scoring is directly influenced by the BSI PAS 1899: 2022 guidance, published last year and gives an accurate reflection of how useful the site will be to those with accessibility requirements. The work of ChargeSafe and other organisations championing safety and accessibility will only become more important as EV infrastructure rollout continues to rollout at a rapid rate.

Another RECHARGE UK member, Osprey, recently benefitted from ChargeSafe's expertise and have improved accessibility and safety at their new site, Paisley Park. Osprey's new site at the Paisley Park, an eight-charger, high-power hub, was the first of Osprey's new accessibly designed hubs and was scored 4.46/5 by ChargeSafe, the highest accessibility score seen so far by ChargeSafe on the UK network.

Feedback provided to the design and logistical installation team mean that Osprey now have effective guidance on measures they can implement to improve the inclusivity of sites ahead of install, as well as areas they can improve by retrofit.

**Why is sending the right message important?**

Today there are over 760,00 EVs on the road with over a quarter of a million plug in hybrids. However, a disproportionate amount of these early adopters are men who may not have in the past thought about their own personal safety or the accessibility of a site in the same way as, for example, a woman or someone with accessibility needs. Moreover, while charging a driver cannot depart without having to unlock their vehicle and disconnect the charger if they are concerned about their safety.

Last year a survey of EV drivers by Britain Thinks and the DfT[38] found that of 848 respondents who drove EVs or plug in hybrids (PHEVs) 76% were men and only 24% women. The report found when asking respondents for a safety rating of public charging infrastructure 70% of men had given it a rating of between 8-10 out of 10. Whereas women were significantly less likely to give the same infrastructure a high score, only 55% of whom provided the same 8-10 out of 10 score. Respondents giving lower ratings cited a range of reasons: location of chargepoints in isolated or dark areas, charging at night, insufficient lighting, concerns about leaving the cable exposed whilst charging, and concerns about potential theft of the vehicle.

The report also found that only 6% of respondents found that accessibility for disabled drivers was an issue. The report does not show what proportion of respondents had a disability, however what this report highlights is that a changing demographic of EV drivers is causing the charging industry to improve its offer, to attract more people to its chargepoints and ultimately lead to higher uptake of EVs.

To address this issue, RECHARGE UK host sessions throughout the second half of the year, open to everyone in the industry, to highlight what work needs to be done to ensure public charging infrastructure is as safe and accessible as possible. We see this as crucial to ensure that everyone who purchases an EV, regardless of where they are, can feel confident that they can access and safely use public charging infrastructure. This will play a part in our campaign to end charging inequality, ensuring industry is aware of the challenges newer EV adopters are facing when they purchase an EV.

[37] https://www.chargesafe.uk/

[38] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1078871/dft-ev-driver-survey-summary-report.pdf

## Building a transition for commercial vehicles

In addition to ensuring PAS 1899 compliance, we see a lack of infrastructure which is ready for electric vans and professional drivers.

Most electric van models are built with the charging socket at the front of the van. Many fleet operators require their drivers to only drive out of a space forward, requiring them to reverse into spaces as this is a safer manoeuvre than reversing out, potentially into oncoming traffic. This means that where van drivers can park their electric van, they often find the chargepoint cable to be too short to reach the front of their van, requiring less common, specialist chargepoints which are rarely found in the UK. This means that van drivers are often reliant on charging at work or at home.

Furthermore, many van drivers find they cannot access car parks due to height restrictions at the car parks, and if they can access them find the parking bays are too short and narrow to be used. This is a serious concern for van drivers and fleet operators who will need to interact with public chargepoints more going forwards as uptake increases.

Local Authorities and car park operators currently benefit from being able to refer to PAS 1899 when ensuring their car parks can be accessed by wheelchair users. To ensure that going forwards their car parks are accessible to van drivers, Local Authorities have told us that they would benefit from being able to refer to a similar standard which guarantees van accessibility. According to the BVRLA's fleet friendly charging index[39] as of Q4 2022, only 3% of Local Authorities had engaged with fleets which suggest that there needs to be a way for Local Authorities to quickly ensure that their car parks are fleet friendly.

We suggest that industry partners work together, using the learnings from the PAS 1899 process to develop a van charging standard in partnership with BSI to ensure that van drivers and fleet operators are not second-class citizens in the journey to net zero transport. The REA is launching a van and HGV working group this summer and would welcome wider industry participation and will look to establish an early draft of a van charging standard in the future which industry is invited to feed in to.

It is clear, particularly for car parks on route for fleet vehicles, that a certain proportion of spaces should be designated as accessible, to facilitate larger vehicles like vans, which may need longer and wider spaces. Vans also act as portable workshops and therefore it is important to van drivers, particularly those who cannot charge at work or at home, that where they park their van has adequate lighting and CCTV. For on-street charging, Local Authorities should consult with van drivers to ensure that when they charge their van it is safe.

To support the transition to electric vehicles across different commercial options, data-backed modelling is required to inform and support transport planning. Essential to the effective development of plans for transport authorities and officers to determine, guide planning and procure (over time) the appropriate volumes and types of chargers, bay layouts and sizes depending on the location and nature of charging required. Private commercial businesses with fleets and commercial drivers should look to share data, such as driver locations with Local Authorities, with the appropriate data security levels, to enable Local Authorities to deploy charging infrastructure where it is needed most, and ensure an efficient chargepoint rollout which will result in higher utilisation rates.

This necessitates intelligent design where Local Authorities, CPOs, and businesses will need to consider the volume, type, power and timing of charger deployment which will be as important as the geographic distribution. This is an area requiring detailed consideration in relation to the strategy for regional / area development: e.g., urban development; commercial and industrial; socio-economic / demographics; energy and transport infrastructure.

At a wider level, the Government must work with fleet operators, Local Authorities and CPOs to meet the scheduled operational and

[39] https://www.bvrla.co.uk/industry-campaigns/decarbonisation/fleet-friendly-charging-index.html

route requirements of delivery and fulfilment fleets with bookable, reliable, suitably equipped charging facilities. These facilities not only enable commercial operators to transition with greater confidence (locality, availability and reliability of charge) and efficiency of their operations, they also ensure that the requirements of private car and small business vehicle operators are not frustrated by the potential contention at public charging facilities.

In addition, as referred to in Chapter One, the chargepoint rollout must reflect the multitude of different use cases. The development of EV charging infrastructure needs to move into more intelligently designed phase plan of equitable and investible development, in order to ensure that the considerable benefits of decongestion, decarbonisation and air quality are delivered to have the greatest effect in the most cost efficient and expedient delivery.

Set out overleaf are the range of location types where vehicle charging infrastructure will need to be deployed. Rather than see these as having a single type of charging customer, industry must consider that the same facility could well provide for different types of charging needs for different users, or at different times of day / week / year, and may be well placed to provide for a combination of these circumstances due to the nature of traffic passing or attending these locations, or through detailed understanding and well-planned co-ordination of different user charging needs.

*Table 1: Types of Parking Location by Category*

| Category | Parking Locations |
|---|---|
| **Residential** | • Home driveway<br>• Assigned off-road parking<br>• Common parking area (such as basement or surface municipal area)<br>• Roadside parking (permit or allocated space) |
| **Retail / Leisure / Tourism - customer parking** | • Leisure / Tourism venues (e.g. inns / campsite / ferry terminal / sports club / theme park)<br>• Retail parks<br>• Pop-up events / seasonal tourist hotspots - temporary deployment |
| **Town / Public Transport** | • Roadside parking - taxi ranks / minibuses<br>• Roadside parking - shared / car club<br>• City / town centre - car parking<br>• City / town edge - Park and ride / mobility hubs<br>• Bus and coach stations<br>• Bus / public service vehicle depots<br>• Rail / Airport - car parking (Pick up / Short-stay / Full day / Multi-day) |
| **Commercial** | • Workplace car parking - staff and visitors<br>• Hire / Rental - depot<br>• Municipal facilities - Industrial parks / trading estates<br>• Ports and logistic centres<br>• Depot parking - commercial fleets<br>• Truckstop services<br>• Retail Park - logistics / delivery yards |
| **Public (municipal)** | • Major road network service areas<br>• Refuelling / service stations<br>• Dedicated rapid charging hubs<br>• Major roadways (dynamic / in-transit charging) |
| Specialist (dedicated) | • Blue-light services depots / stations<br>• Autonomous vehicle charging bays / depots<br>• Private facility - Non/off-road vehicle (airside / portside / mining / construction / agricultural)<br>• Vehicle dealership / engineering workshop<br>• OEM / reseller distribution and delivery facility |

To end the uneven and inequitable foundations EV charging, all stakeholders must consider how their sites are likely to be used and where possible offer multiple types of chargepoint to ensure that the right people are using the right chargepoint. This will increase utilisation and enable more vehicles to charge per day using the same sites. In our example of the Inn, if they choose to install one chargepoint, for example the fast charger, the tenant or guest staying in the room upstairs may plug in their car and leave it for hours or even days before moving it, meaning no one else can charge. However, with more options, this customer would park in a slower charger, freeing up the fast charger for a family staying there for an evening and a rapid or ultra rapid charger could be used for a customer coming in to watch the end of a sports game.

There are many different locations expressed in Table 1 for greater charger deployment in new, as well as expansion of existing, locations required to keep up with the current (even faster) rate of EV vehicle adoption. The Charge Point Developer and Operator (CPO) market continues to expand and is becoming more competitive, as well as landlords and occupiers investing for themselves and with support from incentive schemes. Political and societal pressure is delivering dramatic demand for charge network expansion, across a wide range of location types. In the current growth stage of the market the range of options and the income shares available from CPOs are many and varied, with attractive returns for landlords. The range of equipment, quality and long-term support will also increase in variety, as we experienced in solar PV and are experiencing in domestic and small commercial battery energy storage systems.

To create a strong and adaptable network across the UK it requires regional and local authorities to provide clear aims, requirements and programmes to direct business investment. Collaboration between landlords, fleet operators and facilities managers will be instrumental in determining how infrastructure is deployed for the greatest benefit. It has now become necessary to start planning more intelligently and efficiently to achieve profitable levels of utilisation (beyond the current land / connection grab), make the best use of network connection capacity and deploy integrated technologies to cope with peak power demands, to enable a fair and successful transition to and beyond 2030.

EV charging infrastructure needs detailed planning far beyond just securing sufficient “power from renewables” sources. The opportunity exists for energy asset owners to increase return on investment for embedded generation investments across a range of their real estate facilities, where many fleet operators can utilise the green power. As well as minimising the carbon intensity of energy used for powering transport, we can reduce the need for distribution of power around the DNO networks and sell power at a price above the export tariff and below the public charging hubs – this provides for improved value for the energy asset owner and lifetime cost certainty for fleet operators.

Key to making the best investment decisions is the landlords’ understanding that the type, speed, number and timing of charger deployment is appropriate to each site. There is a risk that landlords are not made aware that the range of use cases vary significantly between sites, during times of the day, influenced by other charging facilities, and that these will evolve over time. Achieving the greatest benefit from any given site, or portfolio, relies upon determining suitable installations based on typical occupier requirements, the range of scenarios for opportunity charging, avoiding prime sites being cherry-picked and ensuring passive infrastructure is installed to allow ease of charge bay expansion. Done well this is a time-consuming activity requiring knowledge and experience outside of the resources of most landlords.

Tendering, and procurement based on like-for-like comparisons and validating proposals is not straight forward, but the risk of taking the simplest option is to limit the growth potential and investment returns. One of the REA's members, Syzygy, has a team of experts working across renewable energy and electric vehicle charging infrastructure. Syzygy have invested and develop the evlab® platform which is a data-backed feasibility tool, factoring many of the key attributes which influence the potential and design options for individual sites or real estate portfolios. The EV consultants can then advise on strategy and business case development, feasibility studies, tendering and funding options, project and asset management (end to end support to manage clients' fleet and EV chargers).

The next significant development in the EV charging infrastructure market through to 2030 is the growth in van and truck fleet adoption and the energy and special demand for third party fleet charging. The successful adoption of ZEV fleets is crucial to the green economy and requires detailed stakeholder planning and engagement. This movement to large scale commercial fleet adoption will also provide more predictable (if not contractual) levels of utilisation for facilities which have the appropriate access and facilities to enable ease of use as part of a network of depots available for professional fleet members. Planning commercial charging beyond just the immediate needs of a tenant's fleet will provide for more certain investment returns.

The over arching regulation, local transport decarbonisation plans, clean air zones and urban development plans are as critical as the availability of public or private sector funding. If there is a significant mismatch between the speed of deployment of EV charging and the development and refinement of regional and local planning, it will make it difficult to produce the best-informed plans for regional aspects of network charging. The formation of the EV Infrastructure Forum is a welcome development to provide emphasis and pace to enabling a successful period of significant and efficient investment in the UK EV charging infrastructure landscape and its many dependencies.

# Conclusions and recommendations

**Conclusions**

The uneven and inequitable charging infrastructure which currently exists can be resolved despite the significant growth of demand by 2030 for EV charging in areas that currently have little EV infrastructure per vehicle.

This report has highlighted that to end the uneven and inequitable foundations we have today; build charging infrastructure fit for the future; and to achieve a just transition we must:

- Ensure that regions and local authorities have the grid capacity to support EV charging demand.
- Ensure the local grid is supported by flexibility through battery storage, solar and V2X.
- Break down the policy and regulatory barriers which currently add significant cost and time to chargepoint deployment.
- A skills campaign must be created by Government to promote green skills and encourage more electrical engineers and installers to fill the skills gaps that will emerge by 2030.
- Industry should develop a van standard to ensure commercial fleets and van drivers are able to use public charging infrastructure easily and so local authorities can easily enable this.
- The Government should mandate accessibility and safety requirements at all public charging locations where feasible, for example we would not expect on-street charging to be able to have the same degree of safety measures like CCTV as a car park.
- Consider the different use cases for a chargepoint and ensure they are flexible in design and accessible to support greater utilisation by different use cases. To ensure efficient investment and use of the connection capacity to avoid competing demand for peak connection power at a range of locations in the same network circuits / areas.

If the relevant stakeholders mentioned in this report follow our recommendations, the uneven distribution and unequal charging infrastructure we have today can be improved and we will see a just transition to electric vehicles, where there will not be charging poverty, regions and local areas will be able to power the significant increase in demand and set themselves up to continue doing so by adopting flexible technologies to help power their charging infrastructure.

**Recommendations**

It is critical to ensure an end to the uneven distribution of charging infrastructure and see a supply of chargepoints that can support the demand, that local and national Government work together to optimise the delivery of the infrastructure. They must connect effectively with the local businesses and communities that are seeking to go electrify to ensure the infrastructure is there to meet the demand.

The rollout of such a significant amount of infrastructure and the energy to support it will be challenging. Clear leadership and governance are needed for planning and delivery, using the most appropriate public or private delivery models. We propose the following recommendations:

1. A route to successful charging deployment by 2030

Charging demand will rise significantly across the entire of the UK by 2030 and this will require significantly more chargepoints installed in areas that to date have very little. Areas like Birmingham, Peterborough, Glasgow, Sheffield and Bristol will all have significant charging demand, moving away from the status quo where charging demand is centred in London and the South East, this will require a mixture of additional grid reinforcement, a more strategic deployment of chargepoints to increase utilisation and support the charging of more vehicles and the deployment of flexible solutions such as battery storage and solar to provide more local level support and reduce the

need for grid reinforcement in some cases, accelerating deployment.

The UK's grid in 2030 is likely to have a significant majority of its generation coming from renewable sources and in the 2022 Future Energy Scenarios medium scenario it estimates that between 74% and 88% of the grid's energy will come from renewable sources in 2030. This demonstrates that in 2030 electric vehicles will for the majority of the time be powered by renewable power, and with each year on the road carbon savings vs driving an ICE vehicle will rise year on year.

2. Addressing the barriers to deployment

*Table 2:*

| **Policy and Regulatory Barriers to Chargepoint Delivery (Local Level)** |
|---|
| Section 50 Licences |
| Local Authority involvement |
| Road Traffic Regulations Act 1984 |
| The Future of Transport Regulatory Review |
| Rural demand |

*Table 3:*

| **Policy and Regulatory Barriers to Chargepoint Delivery (National Level)** |
|---|
| DNO Rights and Reform |
| DNO Pricing |
| A right to charge |
| Modernise Regulations |
| Addressing the information failure at the point of sale |
| Maximising the ambition of upcoming Government policy |
| Develop V2X policy |

This report highlighted a number of policy and regulatory barriers to chargepoint delivery, they were:

We made the following recommendations to resolve barriers at a local level:

- Section 50 Licences: The Government should look to scrap Section 50's as they are an unnecessary cost to the chargepoint installation process. Failing this, mandate a one permit per system approach which will reduce the cost of installing multiple chargepoints in one location.
- Improving local authority involvement: The Government should introduce a statutory duty to plan for EV infrastructure on local authorities. This should support more detailed evaluation of requirement for anticipatory investment in grid capacity.
- Road Traffic Regulations Act 1984: Experimental TROs should be the standard practice for Local Authorities making changes to the highway involving electric vehicles. In addition, exclude changes in parking spaces to EV only from requiring a TRO.
- The Future of Transport Regulatory Review: Ensure that car parks can support a growth in EV demand to 2030, by mandating more ambitious minimum levels of chargepoints and cabling installed in car parks.
- Rural Demand: Local Authorities need to use public money to fill gaps in EV infrastructure that the private sector cannot. Government needs to support portable chargepoint innovation to support areas with seasonal demand whose infrastructure will not be able to support seasonal peaks in demand.

We have made the following recommendations to resolve barriers that are applicable at a national level:

- DNO rights and reform: Empower developers to require DNOs to exercise their right to escalate the wayleaves process to a wayleaves hearing if the landowner does not respond in the designated time period. Introduce an online tracking system to track the

wayleaves process, which should also be standardised to simplify the process for developers engaging with multiple DNOs.

- Connection queues: when emergency services and road freight are reliant on charging infrastructure to fulfil their roles, chargepoints should be considered nationally significant infrastructure and be eligible for prioritisation in the connections queue.
- DNO pricing: Reduce upfront capital connection costs by socialising them within energy bills. Ensure DNO pricing is transparent and easily understood externally.
- A right to charge: Introduce a right to charge in the domestic rental sector empowering tenants to charge their vehicle at home (where possible).
- Modernise regulations: Update the National Planning Policy Framework 2021 to make changes in parking space use and chargepoint deployment easier. Include chargepoints in the scope of permitted development rights.
- Address the information failure at the point of sale: Ensure on-street charging solutions are talked about at the point of sale.
- Maximise the ambition of upcoming policy: Ensure that the ZEV mandate is as ambitious as possible and flexibility mechanisms are restricted to provide investor confidence for a newly developed charging industry. Ensure Plug and Charge is included in future Government thinking to streamline the payment process and improve the consumer experience at chargepoints.
- Develop V2X policy: Include V2X in the ZEV mandate and develop an appropriate reward mechanism built on the level of participation in flexibility.

3. Enabling a futureproof deployment pathway

Recent industry reports have highlighted that electric vehicle and electric vehicle infrastructure deployment are likely to face significant barriers from a lack of skilled workers to maintain EVs and install and maintain charging infrastructure. It is recommended that:

- Electrical Engineers: Government need to create awareness, particularly towards parents that this is a credible industry for young people of all demographics to enter.
- Electrical Engineers: The Government must work urgently with key stakeholders in the education sector and Electric Vehicle Charging sector to create an electrical engineering course for chargepoint installation, so that both the existing workforce can retrain, and young adults can come into the workforce without the need to upskill later down the road.
- EV TechSafe Technicians: Urgently develop a new course for EV technicians which can be for new and existing members of the workforce.
- All political parties must consider how they can address the skills gaps in these areas and convince the public of the value of these roles.

4. Empowering the public and businesses to charge

Although the recent consumer experience regulations and PAS 1899 are helpful in addressing concerns regarding the safety and accessibility of public charging infrastructure more can be done to ensure women, disabled drivers and van drivers can feel secure in the knowledge they can access a chargepoint and park there safely.

The report recommends:

- Mandating accessibility requirements for public chargepoints.
- Introducing a van charging standard to enable van drivers to charge easily, as they will make up the largest single source of charging demand in GWh by 2030.
- That charging locations have multiple types of chargepoint, where feasible, to account for the different use cases of the customers. This will increase utilisation and the number of cars that can charge per day.

# Annex 1 - Energy Demand and Utilisation, methodology and assumptions

Over 60 million MOT records for 2020 and 2021 were analysed for this project, including vehicles assessed by MOT class 4, 5 and 7 tests. For each individual vehicle, the 2021 mileage was compared to the 2020 data to calculate annual mileage[40]. The data was extrapolated to match the 2022, Q3 latest counts from the DfT licensing data to account for new vehicles that were yet to be tested.

Body types in the DfT licensing data (VEH0120) was used to separate out vans from passenger vehicles and passenger cars were further classified using the NCAP[41] classification. An EV equivalent for each class was identified, which in turn gave an indication of estimated efficiency per vehicle class (Miles per KWh). Equivalent energy consumption per vehicle was then calculated.

The 2030 expected demand was then estimated using three scenarios (Low, Medium and High), based on the assumptions below:

- Vehicle count and mileage are assumed to be as per 2021.
- The adoption rate is assumed to be as per SP, CT and LTW FES 2022 scenarios.
- On-street % was extracted from Field Dynamics EV Map.
- Off-street residential charges %: A recent Zapmap survey suggests that for households without a home charger, 19% of their charging is still done at home (indicating use of domestic 3-pin plug, or community charging).
- On-street residential charges %: Assumption used that 96% of on-street households' demand will be provided by the public network.
- Energy efficiency: this was increased by up to 12% to allow for the fact that EV efficiency may improve before 2030.

**2030 Expected Charging Provision from current estate**

The number of public charging points, power output and annual energy provided by charger type was provided by Zapmap. From this data, Field Dynamics were able to calculate the utilisation of charging points by postcode area. The national average currently sits at 14%.

Field Dynamics assumed that the utilisation of the current estate will increase to somewhere between 20% and 40% as more vehicles make the transition to electric in 2030. The expected charging provision from the current estate for 2030 can be calculated as the existing provision, adjusted for the 2030 expected utilisation.

[40] https://ev-database.org/uk/cheatsheet/range-electric-car

[41] https://www.euroncap.com/en

# Annex 2 - Energy Demand and Utilisation, figures 1-6 explained

**Figure 1: 2030 public energy demand by region (Medium Forecast)**

Methodology: The 2030 geographic distribution of energy demand is based on the location of MOT tests in 2021. It assumes an adoption rate of 36.5% across the country, as per the Customer Transformation FES 2022 scenario. The energy demand includes 96% of on-street household demand (the remaining 4% being provided at work) and 19% of off-street household demand (the remaining being provided from either home chargers or at workplace). Annual mileage and vehicle mix are assumed to be as per 2021 MOT data. Vehicle count is as per 2022, Q3 DfT licensing data.

**Figure 2: 2030 Public Energy Demand by Postcode Area**

Methodology: The 2030 geographic distribution of energy demand is based on the location of MOT tests in 2021. It assumes an adoption rate of 36.5% across the country, as per the Customer Transformation FES 2022 scenario. The energy demand includes 96% of on-street household demand (the remaining 4% being provided at work) and 19% of off-street household demand (the remaining being provided from either home chargers or at workplace). Annual mileage and vehicle mix are assumed to be as per 2021 MOT data. Vehicle count is as per 2022, Q3 DfT licensing data.

**Figure 3: 2030 Public Energy Demand by Postcode Area**

Methodology: The 2030 geographic distribution of energy demand is based on the location of MOT tests in 2021. It assumes an adoption rate of 36.5% across the country, as per the Customer Transformation FES 2022 scenario. The energy demand includes 96% of on-street household demand (the remaining 4% being provided at work) and 19% of off-street household demand (the remaining being provided from either home chargers or at workplace). Annual mileage and vehicle mix are assumed to be as per 2021 MOT data. Vehicle count is as per 2022, Q3 DfT licensing data.

**Figure 4: Current Energy Provision and Utilisation by Charger Type (time-based utilisation)**

Methodology: The energy provision is estimated from average session duration and based on Zapmap estimates for expected power throughput: Slow average power = 3kW, Fast - average power = 7kW, Rapid - average power = 35kW, Ultra Rapid - average power = 50kW. The utilisation is calculated as the percentage of time the charger is being used.

**Figure 5: Energy Provision by Charger Type with Flexed Utilisation (20/30/40%) using time based utilisation**

Methodology: The energy provision is estimated from average session duration and based on Zapmap estimates for expected power throughput: Slow average power = 3kW, Fast - average power = 7kW, Rapid - average power = 35kW, Ultra Rapid - average power = 50kW. The energy provision is based on the assumption that chargers are utilised 20%, 30% or 40% of the time. Our model is based on today's figures, although we understand the average power of ultra rapid chargepoints is likely to grow in the next few years, the level to which they will reach is unknown and would add further uncertainty to our model. We are also aware that a number of older vehicles which may not support charging above 50Kw will still be on the road in six and a half years' time.

**Figure 6: 2030 Public Energy by Vehicle Type**

Methodology: This is the expected energy demand for 2030. It includes 96% of On-street household demand (the remaining 4% being provided at work) and 19% of Off-street household demand (the remaining being provided from either home chargers or at workplace). It assumes 36.5% adoption rate, as per the Customer Transformation FES 2022 scenario and a 5% increase in vehicle energy efficiency (3.5 miles per kWh). Annual mileage and vehicle mix are assumed to be as per 2021 MOT data. Vehicle count is as per 2022, Q3 DfT licensing data.

# Official Supporters

There exists a significant and pressing challenge facing the 16 million disabled individuals in the United Kingdom when it comes to embracing electric vehicles. The insufficiency of consideration demonstrated by key stakeholders in providing adequate space, implementing inclusive design principles, and ensuring site safety is a cause for concern. Presently, the BSI PAS 1899: 2022 stands as a commendable recommendation. However, the absence of stringent enforcement mechanisms perpetuates a situation where certain site developers prioritize their own financial interests at the expense of inclusivity, intentionally excluding individuals with accessibility requirements and those who may find themselves reliant on chargepoints during late hours and secluded locations. At ChargeSafe, our concerted efforts focus on applying pressure to the relevant entities to disclose safety and accessibility scores for each site. Nevertheless, it is crucial to acknowledge that this measure alone cannot effectively drive the implementation of necessary infrastructure. It is imperative to establish a mandate that compels regional and local authorities to adhere to these standards, thereby facilitating the widespread adoption of accessible and safe electric vehicle charging infrastructure.

Since 2011, GreenFlux has empowered charge point operators across Europe to build and scale their networks with our eMobility software and services.

Matching flexible electric vehicle charging demand with solar and wind supply provides opportunity to achieve climate targets, bolster energy security, and increase chargepoint utilisation - but there must be timely and sufficient investment in and deployment of renewable energy generation projects to realise this potential.

Further, streamlining the chargepoint deployment process and setting access and experience targets will be essential to realising the right number, type, and location of chargepoints.

There is a unique opportunity now for national and local governments to provide leadership and support the momentum building in the industry. Together let's ensure sufficient, timely deployment of EV charging infrastructure that will not only remove barriers to, but rather accelerate, EV adoption.

We are delighted to have worked with RECHARGE UK and their partners on this report.

It is clear that we are at the beginning of the build-out of a new piece of critical national infrastructure that will require the co-operation of many different stakeholders to be successful. It is also clear that neither funding nor willing participants are the key constraints, instead structural and procedural hurdles are the major factors holding us back. This report identifies and addresses many of these hurdles.

We are very pleased to have been able to support the report with our unique GWh based analysis of charging demand. It is so important to base projections and strategies around robust data rather than opinion. Our GWh based model provides a clear view of what energy demand we are likely to face and where, and from this we can then plan objectively how best to source that power and then distribute it through the myriad of options available.

Syzygy are delighted to have contributed to this report and the crucial recommendations to ensure that the benefits of transport electrification can be achieved through a fully national EV charging network.

The current high pace of deployment has to increase to catch up with even higher EV adoption in order to provide the confidence to the next wave of vehicle users (private and business fleets) to transition successfully, but speed of deployment alone is not enough to achieve success. The need for greater local and regional planning, systems thinking, intelligence in design, training and skills, and safe, accessible charging locations are all vital to achieving a fast but fair transition. These recommendations will ensure that public and business infrastructure investment can be made with confidence; that health problems due to air quality improvements can be reduced; that commercial fleet decarbonisation can be delivered in harmony with the needs of private EV drivers; that appropriate EV charging infrastructure is available throughout the UK&I.

Trojan Energy welcomes the publication of this report by the REA, at a time when focus on EV infrastructure is at its highest level ever. The great work already carried out by the industry over the last decade or so has laid a solid foundation, but to accelerate the deployment to support the millions of new EV drivers there will be between now and the end of this decade will require the measures laid out in the report.

Trojan is focused on home charging for those without driveways. The processes and associated costs of delivering charging on the public highway are a barrier to solving this challenge for the 10 million UK drivers who park on the street.

As a rapidly growing UK-based manufacturer, the skills gap is also of key interest to us. The industry will require an influx of local talent in all disciplines so that the pace of delivery can be maintained.

Zapmap Insights are delighted to have worked with RECHARGE UK and their partners on this report.

Zapmap has mapped over 95% of the UK's public points on its network, around 70% of which display 24/7 live status data.

This allowed the Zapmap Insights team to provide a comprehensive geographical view of the energy demand currently generated by public charging across the UK. The GWh-based model built on top of this data not only shows the industry the likely demand, but also where the highest requirement will manifest by 2030.

In turn, this allows the RECHARGE UK's campaign to highlight the distribution required, focus on the current hurdles to deploying the infrastructure, and also suggest ways they can be overcome.

With the right infrastructure in the right places, Zapmap can continue to support the next generation of EV drivers to search, plan and pay across the network, wherever they go.

# Acknowledgements

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Images courtesy of REA member companies, Motability and EV Clicks - www.evclicks.co.uk

[1]https://elbil.no/

**Find Out More and Support the Sector**

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