



## Electric Vehicle Charging: Labour Market Information Study

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## Executive summary

### Purpose of study

The overarching aim of this research is to answer the following two questions:

- How many fully qualified electricians will be needed to carry out Electric Vehicle (EV) chargepoint installations to meet 2030 government targets, whilst also servicing the needs of the domestic market? Further consideration is also given to top end projections based on the number of new builds, the number of EVs on the roads and the potential for increased demand for commercial installations by 2030.
- How long does an average EV chargepoint installation take?

### Methodology

The work involved a two-stage approach consisting of desk research, which formed the backbone of the report, supplemented with in-depth interviews which provided greater detail on the numbers of people working in a team of installers and how long each installation takes.

### Projections for 2030

Before being able to answer the two research questions, it is important to understand the context in which EV chargepoint installations currently sit.

### Number of EVs on the roads

With the sale of new petrol and diesel cars and vans banned in the UK from 2030, it is natural to expect the market share of plug-in vehicles to rise. Highly conservative estimates project that there will be two million EV cars on the road in 2030. However – given growth rates at present and the fact that there are already almost one million such vehicles on the roads – this number is likely to be much higher, with current estimates as high as 11 million.

### Public chargepoints

Prior research suggests that the UK will need potentially between 253,000 and 661,000 extra chargepoints by the target date. The Electric Vehicle Infrastructure Strategy echoes this figure, stating that the UK government's target of installing 300,000 public chargepoints by 2030 should be treated as a minimum and potentially up to double this number may be required.

### New builds

As part of Building Regulations (Part S) on electric vehicle charging, from April 2022, all new builds must have an EV charger included for all associated parking bays. Government has stated it wants to see 300,000 new builds per year by the mid-2020s, while the current rate of new builds is approximately 200,000 per year.

### EV chargepoint installer team make up and work-rate

It is also important to understand this aspect, before being able to address the research questions.

### Domestic retrofit and new builds

Our research finds that one fully qualified electrician is required for EV chargepoint installations for both domestic retrofit and new build installations.

### Commercial

One fully qualified electrician is required for both destination (e.g. workplace and car parks) and residential on street chargepoint installations.

### Number of installations per day

Our research indicates that one fully qualified electrician can carry out EV chargepoint installations, achieving the following rates per day.

Type of domestic installation	Installations per day
Standard retrofit	2
Premium retrofit	1
New build	3.5

Type of commercial installation	Installations per day
Destination	0.89
Residential on street (lamp post)	7

For top-end projections we make the assumption that electricians only work at half rate, i.e. with time lost in between jobs (for instance due to travel or other commitments) thus ensuring a conservative estimate of the required number of workers can be established.

### Number of fully qualified electricians required

The number of chargepoint installations that will be needed by 2030 will primarily be determined by the number of EVs on the roads. Projections vary from as little as two million up to 11 million, and we have therefore based our calculations on seven million (mid-level) and a conservative “worst case” top-end scenario of 11 million. We know that 76% of households have access to off street parking and will likely need access to EV chargepoints at home. Further consideration is given to the amount of work involved in retrofit installations – our research indicates that 85% of retrofit installations are classed as ‘standard’, leaving 15% that as ‘premium’ installations which require more time per installation.

Current legislation dictates that new builds must have EV chargepoints installed as part of the build process. The government’s ambition is for 300,000 new builds per year by the mid-2020s, though current rates are approx.. 200,000 per year. We have incorporated the current level of new build installation into our mid-level calculations, and used the 300,000 target for top-end estimates.

**Table 1 Number of fully qualified electricians required for two scenarios (commercial)**

Type of commercial installation	Mid-level	Top-end
Destination	84	20
Residential on street	10	570
Total	94	590

**Table 2 Number of fully qualified electricians required for two scenarios (domestic)**

Type of domestic installation	Mid-level	Top-end
Standard	866	3,110
Premium	306	1,098
New builds	229	686
Total	1,401	4,894

Our findings indicate that between 1,495 and 5,484 fully qualified electricians will be required to carry out EV chargepoint installations if the sector is to meet targets and projected demand by 2030, although the top-end figure is a very conservative estimate and the actual number is likely to be lower.

## 1. Introduction

### 1.1 Background

For the year to July 2022, over 20% of all new cars sold in the UK were battery operated vehicles<sup>1</sup>. The rapid acceleration of the move away from petrol and diesel vehicles is well illustrated by the comparative figure for 2016 - less than two percent.

To sustain this unprecedented transition, it is imperative that sufficient electric vehicle (EV) chargepoint infrastructure is in place. The vast majority of drivers will do most of their charging at home overnight, but there is also a need for public chargepoints for two main purposes: to facilitate long distance journeys, and to support those without off-street parking.

Introduced in 2020, government grants provided by the Office for Zero Emissions Vehicles (OZEV) supported the installation of EV chargepoints for domestic homeowners, but these ended in March 2022. The focus of support has now changed to support those who do not have access to off street parking and, therefore, off-street charging. The UK Government has pledged to increase the number of EV public chargers to 300,000 by 2030, backed by £1.6 billion in funding.

Based on these government targets, and the rapidly expanding EV market, there is a real need to increase the rate at which chargepoints are being installed, both in domestic and commercial settings.

To fulfil this, a suitably qualified workforce is required. However, there is uncertainty around the approximate number of installers that will be required. Some in the sector are saying tens of thousands of installers will be needed to meet these targets.

The Electrotechnical Skills Partnership (TESP) is concerned that forecasts on this scale may encourage moves towards diluting and deskilling the sector. TESP suspects that the real numbers required may be significantly lower and commissioned Pye Tait Consulting to investigate this further.

In the research we specifically examine the situation by the two core chargepoint settings, namely commercial (residential on street and destination) and domestic (both retrofit and new build). Further consideration is given to the approximate number of fully qualified electricians (ECS gold card standard) required for each type of installation, projections for the number of new builds by 2030, the number of EVs on the roads by 2030, and the number of domestic retrofit (both standard and premium) installations required. As the sector is still in its relative infancy, and as the real time demand for installations between now and 2030 is susceptible to change, also it will be important to consider a range of scenarios including the top end estimates for commercial installations, numbers of EVs on the roads and the number of new builds, to generate an estimate of the number of electricians required in this scenario.

We investigate the claims that tens of thousands of installers will be required, gathering information on how the market currently functions. Through a combination of desk research and in-depth interviews we achieve the overarching aim of this research which is to answer the following two questions:

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<sup>1</sup> <https://www.zap-map.com/ev-market-statistics/>

- How many fully qualified electricians will be needed to carry out EV chargepoint installations to meet 2030 government targets, whilst also servicing the needs of the domestic market? Further consideration is also given to top end projections based on the number of new builds, the number of EVs on the roads and the potential for increased demand for commercial installations by 2030.
- How long does an average EV chargepoint installation take?

Recently at COP26 a declaration was made by representatives of governments, businesses, and other stakeholder organisations to commit to the rapid acceleration of the transition to zero emission vehicles to assist in the achievement of the goals of the Paris Agreement. Together, they plan to work towards all sales of new cars and vans being zero emission globally by 2040, and by no later than 2035 in leading markets.

It is envisaged that the target will be reached via two main technologies: battery and hydrogen (either burned direct or used in fuel cells). There are very significant problems with hydrogen as a fuel, not least the fact that its energy density is far lower than that of fossil fuels. As things stand, however, it appears that hydrogen will be the best option for heavy vehicles like buses and trucks, while electric traction may best suit cars and small vans. The approach to electric vehicles (EVs) is currently being pursued via two differing approaches: plug-in hybrid EVs (PHEVs), and electric vehicles powered solely by batteries (BEVs).

The introduction of zero-emissions vehicles in the UK is founded on the UK electric vehicle infrastructure strategy,<sup>2</sup> published in March 2022, with the core aims:

- to end the sale of new petrol and diesel vehicles by 2030 (in eight years' time), and
- for all new cars and vans to be fully zero emission at the tailpipe by 2035.

Both targets are extremely ambitious.

The take up of BEVs has accelerated considerably over recent years, leading to there being around half a million such vehicles on the roads (about 2% of all cars on UK roads). As of the end of June 2022, there were more than 510,000 battery electric cars, and 2021 saw the biggest annual increase in number of registrations, with more than 395,000 battery-electric cars registered, showing a growth of 92% on 2020. This is in addition to 400,000 PHEVs. The total plug-in vehicle market share (BEVs and PHEVs) of new vehicles registrations is currently 20.8% (YTD).<sup>3</sup>

Battery technology is popular currently due to its relatively low running costs and, as range begins to increase, sales are likely to increase. There are issues to be solved with battery-powered vehicle which centre on the availability of sufficient heavy metals, the geo-political problems based on where those batteries are manufactured, and the building of the necessary recycling plants for such batteries. However, one of the major barriers to rapid take up is the availability of sufficient infrastructure in the form of charging stations. In January 2022, the UK government published data<sup>4</sup> which outlined that, as of January 2022:

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<sup>2</sup> Department for Transport, 2022, UK electric vehicle infrastructure strategy

<sup>3</sup> <https://www.zap-map.com/ev-market-statistics/> [Accessed 26 August 2022]

<sup>4</sup> Department for Transport, 2022, Electric vehicle charging device statistics: January 2022

- 28,375 public EV charging devices were available in the UK, with
- 5,156 being ‘rapid’ chargers and around 750 ultra-rapid charging points.

There are currently (mid-2022) around 33,000 public chargers and an estimated 400,000 private charging points across the UK with a wide variety of capabilities. The current rate of BEV registrations is far outstripping the rate of new EV ChargePoint installations, a situation that needs to be addressed if the move away from petrol/diesel is to be sustained.

The Office for Zero Emissions Vehicles (OZEV) is a part of the Department for Transport (DfT) and the Department for Business, Energy, and Industrial Strategy (BEIS). The Government has pledged to increase the number of EV public chargers to 300,000 by 2030, backed by £1.6 billion in funding.<sup>5</sup>

Based on these government targets, and rapidly expanding EV market, there is a real need to increase the rate at which chargepoints are being installed, both in domestic and commercial settings. To fulfil this, a suitably qualified workforce is required. However, there is uncertainty around the approximate number of installers that will be required.

Furthermore, there is concern that not all installers are sufficiently competent or qualified to undertake the job. In theory, the Level 3 Car Charging Point Installers qualification is designed only for fully qualified electricians as a bolt-on qualification. However, there are anecdotal accounts that many learners undertaking this course and going on to undertake chargepoint installations are not fully qualified electricians, instead switching from other lower skilled sub-sectors (such as smart meter installation). This raises immediate concern around the safety and quality of EV chargepoint installed by these individuals, as well as broader concern about the potential “de-skilling” of the sector.

With the EV market rapidly expanding, it is therefore critical for The Electrotechnical Skills Partnership (TESP) to understand how many installers are actually required, to be able to take informed action to ensure market demand can be met.

## 1.1 Aim and objectives

The overarching aim of this research is to answer the following two key questions.

- How many people will be needed to carry out EV chargepoint installations to meet 2030 government targets, whilst also servicing the needs of the domestic market? Further consideration is also given to top end projections for the number of new builds, the number of EVs on the road and the potential for increased demand for commercial installations by 2030.
- How long does an average EV chargepoint installation take?

A specific objective is to examine differences in answers to these two questions by chargepoint setting, namely commercial (in locations such as street, workplace, car parks, supermarkets, shopping centres, public car parks, hotels, off-street parking (such as lamppost and kerbside chargepoints) and workplaces) and domestic (both retrofit and new build).

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<sup>5</sup> <https://www.gov.uk/government/news/tenfold-expansion-in-chargepoints-by-2030-as-government-drives-ev-revolution>  
[Accessed 26 August 2022]

While in theory this sounds simple, involving a target number, time per installation, resulting in a number of qualified installers, the number of different settings and types of installation as well as the trends towards higher power systems will require a more nuanced approach and the addition of more research questions such as the potential differences between new build and retrofit installations, the implications of the balance in numbers between fast and rapid systems (based on market projections), the relative numbers of rural and urban installations, etc. Further consideration is given to the makeup of the installation teams, the number of fully qualified electricians (ECS gold card standard) per team, the roles of other team members and whether the EV chargepoint installers are working full or part-time on EV chargepoint installations. Whilst the government has set a fixed target of 300,000 commercial chargepoint installations by 2030, it should be noted that the sector is still in its relative infancy, and projections vary for the number of EVs on the roads, the demand for commercial installations and the number of new builds. Our calculations are based on the 300,000 fixed target and the mid-level of projections, but we also examine the highest (top end) projections to give an idea of the maximum number of electricians which will likely be required to carry out the installations.

## 1.2 Methodology

The work involved a two-stage approach consisting of desk research, which formed the backbone of the report, supplemented with in-depth interviews which provided greater detail on the numbers of people working in a team of installers and how long each installation takes.

### Desk research

We accessed a wide range of sources including

- Government publications including reports, working papers, government documents, white papers and evaluations.
- Websites of manufacturers and installers of chargepoints.
- Websites and YouTube channels of Distribution Network Operators (DNOs).
- Zap-map

**Key word searches included:** “home charging ev”, “ev charging map”, “three phase power newbuilds UK”, “three phase power”, “three phase power DNO”, “commercial EV charge point installations”, “different types of commercial EV chargepoints”, “Government targets for EV chargepoints”, “how many EVs on the roads by 2030”, “new build projections for 2030”.

A full list of sources is contained in the bibliography in Appendix A.

### Depth Interviews

- The topic guide was developed by Pye Tait and finalised in collaboration with TESP.
- Contact recruitment – TESP provided contacts in government, EV installation facilitators<sup>6</sup> and installation businesses, whilst Pye Tait sourced contact details with manufacturers and installers via its FAME database and web-searches.

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<sup>6</sup> Companies who have banks of electricians registered with them to carry out EV chargepoint installations

- Nine interviews were completed which included representatives of government, facilitators of chargepoint installations and installation companies.

Organisations participating in depth interviews are listed in Appendix B. The topic guide used for interviews is provided in Appendix C.

## 2. State of play

This chapter outlines the current landscape in the UK with respect to EV chargepoints, providing an overview of the “state of the nation” in terms of take-up, available initiatives, and government policy and support, whilst also looking to the future to identify what the EV chargepoint infrastructure requirements will look like in 2030.

### 2.1 Grant schemes for charging EVs

A variety of schemes are available through The Office for Zero Emissions Vehicles (OZEV) to incentivise take-up of EV by subsidising chargepoint installations. OZEV is a part of the Department for Transport (DfT) and the Department for Business, Energy, and Industrial Strategy (BEIS).

These incentives have been key to developing the infrastructure required to charge EV's, encouraging consumers to move away from petrol and diesel vehicles. Initially the focus of the grants was on the domestic market, but this has recently changed to commercial installations. Feedback from depth interviews indicates that since funding for homeowners has ended, demand for domestic installations has been noticeably lower.

*‘Grant funding needs to be highlighted. When the OZEV grant was open to almost everyone, they could see the demand for chargepoints installations go up and up. Demand has fell off [sic] with the change in April, 250 enquiries a month in March, then in April dropped to 30, when the grant ended.’ Facilitator*

#### 2.1.1 EV chargepoint grant

This provides funding for up to 75% towards the cost of installing EV smart chargepoints at domestic properties across the UK. It replaced the Electric Vehicle Homecharge Scheme (EVHS) on 1 April 2022, which was initially set up to accelerate the take up of EVs by ensuring that charging infrastructure was in place. Whilst this scheme has now been replaced by the EV chargepoint grant, there has been a shift in emphasis to now focus on other options that will be more beneficial to those who do not have access to their own private off-street parking.

The EV chargepoint grant is targeted towards four separate audiences.

##### 1. Flat owners/occupiers and people living in rented properties

A one-off maximum grant of £350 is available for eligible individuals who live in a flat or are renting, have their own private off-street parking, and own the qualifying vehicle.

##### 2. Landlords

Landlords can receive up to 200 grants for residential properties, and up to 100 grants for commercial properties each financial year, receiving up to £350 per grant.

##### 3. Residential carparks

The EV infrastructure grant for residential car parks covers the costs of installing the infrastructure needed for chargepoints to operate and for future chargepoints to be installed. Each grant application can be for up to a maximum of £30,000, up to 30 applications are allowed per financial year. The following are eligible to apply for grants.

- The landlord of a property that lets the property
- A right to manage (RTM) company
- Companies that own the freehold of a leased or rented property
- Companies owning a building's common areas – this can include shareholders who are leaseholders, or companies that manage the building
- Property listed on the property factor register
- The residents' management company
- Housing associations
- Private registered providers of social housing (PRP)
- Public authorities
- Charities.

#### 4. Staff and fleets

The EV infrastructure grant for staff and fleets covers the costs of installing the infrastructure needed for chargepoints to operate and for future chargepoints to be installed. Each grant application can be for up to a maximum of £15,000. Businesses can apply for a maximum of five grants though they must be for different sites.

- This grant is for small and medium sized businesses (less than 250 employees) that want to install EV chargepoints on their properties.
- The business must be registered at Companies House. If it does not have this, it must be VAT registered with Her Majesty's Revenue and Customs (HMRC).

##### 2.1.2 Workplace Charging Scheme

The Workplace Charging Scheme (WCS) is a voucher-based scheme that provides support towards the up-front costs of the purchase and installation of electric vehicle charge-points, for eligible businesses, charities and public sector organisations. The grant covers up to 75% of the costs of purchase and installation (inclusive of VAT), at a price of no more than £350 per socket, allowing for a maximum of 40 sockets to be installed across all sites. Eligibility criteria are that applicants:

- Are a Registered business, charity or public sector organisation.
- Received less than €200,000 of public support in the last 3 financial years, including the current financial year (Northern Ireland only).
- Have received less than 325,000 Special Drawing Rights (SDR) limit of public support in the last 3 financial years, including the current financial year (Northern Ireland only).
- Have a current or future need for EV chargepoints.
- Have their own off-street parking either onsite or nearby.
- Own the property or have the landlord's consent.

##### 2.1.3 On-Street Residential Chargepoint Scheme

The scheme has been put in place to ensure that those residents without off street parking have access to EV chargepoints, thus ensuring on street parking is not a barrier to purchasing an EV. Funding is now available to local authorities for up to 60% of capital costs for the project. Funding

per chargepoint is capped at £7,500, though in extraordinary cases where electrical connection costs are extremely high this may rise to £13,000 per chargepoint. Whilst the primary focus of the scheme is on street chargepoints, applicants will be considered for car parks owned by local authorities or businesses who have long term leases on existing car parks. The following criteria apply to applicants:

- Applications must be made for one or more chargepoints of up to 22kW.
- Chargepoints must be located in residential areas and be for the use of local residents.
- Proposed locations must have a shortage of off-street parking.
- Local authorities must demonstrate the current or future demand for chargepoints, this can be in the form of resident applications for infrastructure or a strategic decision to promote the use of EVs in an area.
- Chargepoints must have a dedicated parking bay and be available 24 hours per day.

## 2.2 Domestic

### 2.2.1 Types of installation

BEV and PHEV drivers often need to think about home charging solutions as the majority of EV drivers charge overnight to take advantage of lower night-time tariff charges. The range of options available for the domestic market is high; with at least 38 domestic chargepoint manufacturers available in June 2022.<sup>7</sup>

Three power options are available and two connectors, type 1 and type 2. Most chargepoints can come with a tethered cable of either type, or as untethered allowing the cable to change between charges. Power options are:

- 3.6kW
- 7kW
- 22kW.<sup>8</sup>

The power rating of a domestic charger determines how quickly an EV can be charged, and it should be noted that 22kW chargepoints require three-phase power connections to be installed. Currently, only one distribution network operator (DNO) in the UK is installing three-phase power as standard on new builds: Western Power Distribution, across the Midlands, South Wales, and Devon and Cornwall.

Retrofitting three-phase power into existing housing can take anywhere from 15 working days to 14 weeks (due to the time taken to apply for local council permits and the availability of electricity supplier contractors). The cost to upgrade from single to three phase power is estimated between £1,700 to £6,000+ (lower costs for quicker times, as cost increases with the complexity of the work).

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<sup>7</sup> ABB, Alfen, Andersen, bp pulse, ChargePoint Services, cityEV, DBT, Easee, eHome, Elektromotive, Eusto, EO Charging, EV-Box, EVCP, eVolt, Garo, Growatt, Hypervolt, ICU Charing Equipment, Indra Smart Pro, Keba, Ke Contact, myEnergi, NewMotion, Nexans, Ohme, Pod Point, Project EV, Rolec, Scame, Schneider Electric, Secadis, SmartEV, Swarco, Sync EV, Viridian EV, Wallbox, and Webasto.

<sup>8</sup> Three-phase power required

Barriers to domestic installation include the change to the government grant for EV chargepoints. As it currently stands, only tenants and landlords of apartment buildings/flats are eligible for grants. A conversation with one installer suggested that ‘private’ grants might be available, but there is no accessible information regarding this.

New residential buildings with associated parking spaces, for use by the occupant or visitors to the occupant, must have EV chargepoints installed as per the Building Regulations Part S<sup>9</sup>. This standard sets out that new build installations must at minimum prepare for 7kW chargepoints to be installed, must be universal (i.e., untethered), and must meet the standards described in BS EN 61851, BS EN IEC 61851-1, and BS 7671.

### 2.2.2 Current levels of take-up

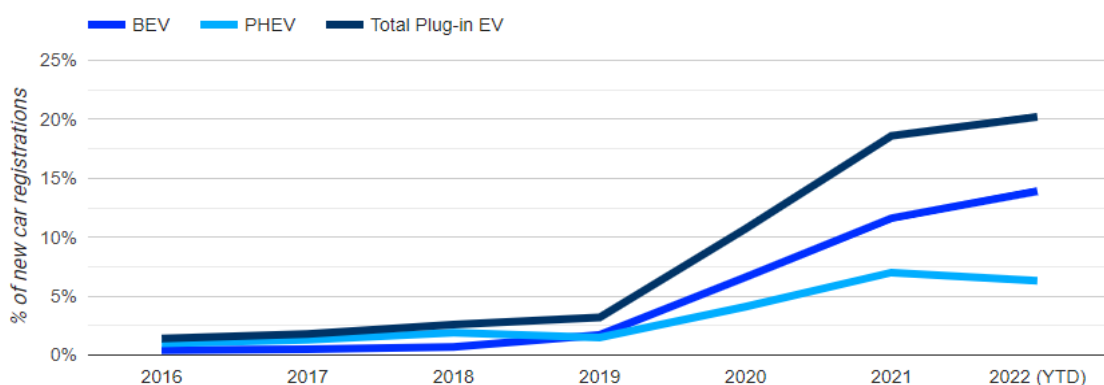
According to Department for Transport data, 277,030 domestic charging devices have been installed with the help of OZEV funded grant schemes as of 1 January 2022<sup>10</sup>. A limitation of this data is that it only counts installations that used grant funding to assist with the cost of the installation.

There are currently (July 2022) 523,989 battery-electric vehicles (BEVs) registered in the UK<sup>11</sup>. 2021 saw the biggest annual increase in number of registrations, with more than 395,000 BEVs registered: a growth of 92% on 2020.

Total ‘car park’ for plug-in electric vehicles reached 910,000 by the end of June 2022, with 400,000 PHEVs registered alongside the 510,000 BEVs. The total plug-in vehicle market share is currently 20.2% (YTD).

These numbers suggest that installation of domestic chargers is likely higher than that suggested by OZEV grant-funded data.

**Figure 1 Annual market share – plug-in market share of new car registrations in the UK (2016 to date)**



Source: SMMT, July 2022



<sup>9</sup> HM Government 2021 Part S of Schedule 1 to the Building Regulations 2010. [Accessed 26 August 2022]

<sup>10</sup> Department for Transport 2022 Electric vehicle charging device grant scheme statistics [Accessed 26 August 2022]

<sup>11</sup> <https://www.zap-map.com/ev-market-statistics/> [Accessed 26 August 2022]

### 2.2.3 Projections for 2030

In terms of single-phase power chargepoints, conservative estimates of 200,000 new builds per year as per the Department of Levelling Up, Housing & Communities data,<sup>12</sup> for seven to eight years (2022–2030) leads to 1.4 million to 1.6 million new build residential buildings with chargepoints already installed by 2030.

This is based on the new Building Standards legislation that requires all new build properties with associated parking to install an EV chargepoint. The legislation requires a 7kW chargepoint capable of sufficiently charging all vehicles in the associated parking bay for that chargepoint (up to two vehicles).

These data do not take into account the number of residential properties that are undertaking major renovations, which in this instance includes changing a property from a single to multiple dwellings, or vice-versa; or renovating part of a building to become a dwelling when it was not before or adding a flat to a building where there was not one before. These property types are also required by the new legislation to add EV chargepoints.

With the sale of new petrol and diesel cars and vans banned (at present) from 2030, it is natural to expect the market share of plug-in vehicles to rise. Highly conservative estimates project that there will be two million EV cars on the road in 2030. However – given growth rates at present and the fact that there are already almost one million such vehicles on the roads, this number is likely to be much higher, with current estimates as high as 8-11 million.<sup>13</sup>

## 2.3 Commercial

### 2.3.1 Types of installation

Charging an EV can vary in time from less than an hour to over twelve hours, depending on the car's battery size, how many miles are travelled between charges, and primarily the power rating of the charger being used. It should be noted that newer EVs have larger battery packs which give greater range but require more time to recharge than earlier EVs.

There are four primary types of charger.<sup>14</sup>

- **Slow** - usually rated up to 3kW and mainly used to charge overnight at home or workplace. Takes over 15 hours to fully charge on average and sometimes longer.
- **Fast** – the most common charger type rated at either 7kW or 22kW and can usually be found in homes and in car parks, supermarkets, leisure centres. Can take 4 to 6 hours to fully charge.
- **Rapid** - typically rated from 43kW and found at motorway service stations, petrol stations, supermarkets. Takes 30-60 minutes to fully charge but is only compatible with rapid-charging function EVs.

<sup>12</sup><https://app.powerbi.com/view?r=eyJrjoiZjg4NWl1MjMtZTRkNC00MGM4LWFkZTItMjdlODc4YWUwOTdhliwidCI6ImJmMzQ2ODEwLTIjN2QtdNDkzS1hODcyLTI0YTJlZjM5OTVhOCJ9> [Accessed 26 August 2022]

<sup>13</sup> <https://www.local.gov.uk/electric-vehicles-whats-going-out-there#:~:text=By%202030%2C%20it%20is%20anticipated,cars%20could%20reach%2025.5%20million>. [Accessed 26 August 2022]

<sup>14</sup> <https://www.edfenergy.com/electric-cars/charging-points> [Accessed 26 August 2022]

- **Ultra-rapid** - only an option for some EVs and is upwards of 100kW and charges in less than 30 minutes. This is much less common at present.<sup>15</sup>

Charging will either be via AC or DC charging, where AC gives around 22kW of power and is well suited for return-to-depot and return-to-home fleets, workplaces and small commercial installs, and DC offers a range of 25kW to 480kW which is designed for quick or rapid charging.<sup>16</sup> The UK charging network is made up of a few different types of charge points for different use cases, from high speed en-route chargers and charging hubs to destination chargers and on-street provision.<sup>17</sup>

The cables used for charging have connectors that are plugged into the EV and chargepoint; these vary by type of charging connector and the power rating of the charge point. There are five primary charging plugs used within the UK:<sup>18</sup>

- **UK three pin plug** - Power rating of 2.3-3kW AC, Single Phase (Standard Charge):
  - Approx. 5 miles range per 30 mins of charging
  - Standard UK domestic electricity outlet
  - Not designed for prolonged use needed to fully charge an electric car
  - Very slow charging with a maximum power output of 3 kW
- **Type 1 plug** - Power rating of 3-7kW AC, Single Phase (Slow/Fast Charge):
  - Approx. 12 miles range per 30 mins of charging
  - Only available in single phase
  - Less common in modern electric cars
- **Type 2 plug** - Power rating of 3-42kW AC, Single Phase/Three Phase (Fast Charge)
  - Approx. 75 miles range per 30 mins of charging
  - Becoming the standard European charging cable connector type
  - Compatible with both single and three-phase electricity supply
  - Tesla has a 120 kW DC version of type 2
- **CHAdEMO plug** - Power rating of 50kW DC, Three Phase (Rapid Charge)
  - Approx. 85 miles range per 30 mins of charging
  - Older type of charging cable connector for rapid charging
  - Compatible with Japanese vehicle manufacturers
  - Most common rapid connector type due to the popularity of the Nissan Leaf
- **Combined Charging System (CCS) plug** - Power rating of 50-350kW DC (Rapid Charge)
  - Approx. 85-200 miles range per 30 mins of charging
  - The most versatile rapid charging connector

<sup>15</sup> <https://pod-point.com/guides/driver/how-long-to-charge-an-electric-car> [Accessed 26 August 2022]

<sup>16</sup> [https://www.eocharging.com/commercial-solutions?gclid=Cj0KCQjwio6XBhCMARIsAC0u9aElenIECGOmygmVENUwBqWG1Bom3FZEvxSsvIVRHMODiKw3uZ3-SGMaAt6MEALw\\_wcB](https://www.eocharging.com/commercial-solutions?gclid=Cj0KCQjwio6XBhCMARIsAC0u9aElenIECGOmygmVENUwBqWG1Bom3FZEvxSsvIVRHMODiKw3uZ3-SGMaAt6MEALw_wcB) [Accessed 26 August 2022]

<sup>17</sup> <https://www.zap-map.com/statistics/> [Accessed 26 August 2022]

<sup>18</sup> <https://www.edfenergy.com/electric-cars/charging-points> [Accessed 26 August 2022]

- Likely to become the most popular DC connector standard
- Enables a higher power rating to support larger ultra-rapid chargers

There are already thousands of free electric car charge points in the UK, often located in supermarkets, shopping centres, public car parks, hotels, off-street parking (lamppost chargepoints) and sometimes service stations. Overall there are now more public places to charge an EV than there are petrol stations within the UK (8,400 petrol stations compared to well over 15,000 EV chargepoint locations in 2021).<sup>19,20</sup> There may be limitations to the length of time members of the public are allowed to utilise free charging points, or, if the location is onsite for a supermarket or shopping centre, there may be proof required that the vehicle belongs to a customer of the shop in question via in-shop purchasing.

Rapid charging points (c.50kW; receiving 3.5 miles per kWh) available at motorway service stations, for example, typically cost £11 for a 30 minute, or c.90 mile charge; this assumes a tariff of 44p/kWh applicable to most network rapid chargers as of April 2022. Alternatively, Pod Point's rapid chargers cost 28p/kWh at Lidl which is about £6.50-7.50 for 30 minutes of charging and are readily available across the country. On most modern networks one can use a free-to-download mobile app to find chargepoints and begin the charge, from which it is possible to pay for the charge if the host of the chargepoint has set a tariff. Some older public chargepoints require an RFID card (similar to a contactless debit card) to start charging, which can be ordered online.<sup>21</sup>

### 2.3.2 Current coverage

As of July 2022, there were 33,281 charging points available across 20,336 charging locations in the UK. This represents a 35% increase in the number of charging devices since July 2021. In July 2022 there were 1,332 new charging devices added to the Zap-Map database. These figures do not include the many charge points installed at home or at workplace locations, which are estimated to be more than 400,000. Some of these charge points are available to the public via community or visitor charging. Greater London holds the largest number of EV charging points at 10,758 across the region, followed by the South-East with 4,351 and Scotland with 3,012.<sup>22</sup>

Between 2016 and 2021 the charge point network grew four-fold from 6,500 to more than 28,000 devices. Between 2020 and the end of 2021, close to 7,500 charge points were added to the UK network.<sup>23</sup> On average, 100 new rapid chargers were added to the UK network every month during 2021.<sup>24</sup>

Currently, Ubitricity, with its network of lamppost chargers, operates the most public charging devices in the UK, followed closely by Pod Point with their network of destination chargers found

<sup>19</sup> <https://www.edfenergy.com/electric-cars/charging-points> [Accessed 26 August 2022]

<sup>20</sup> [https://www.statista.com/statistics/312331/number-of-petrol-stations-in-the-united-kingdom-uk/#:~:text=Number%20of%20petrol%20stations%20in,Kingdom%20\(UK\)%202000%2D2021&text=The%20United%20Kingdom%20is%20home,stations%20and%20those%20under%20development](https://www.statista.com/statistics/312331/number-of-petrol-stations-in-the-united-kingdom-uk/#:~:text=Number%20of%20petrol%20stations%20in,Kingdom%20(UK)%202000%2D2021&text=The%20United%20Kingdom%20is%20home,stations%20and%20those%20under%20development). [Accessed 26 August 2022]

<sup>21</sup> <https://pod-point.com/guides/driver/cost-of-charging-electric-car> [Accessed 26 August 2022]

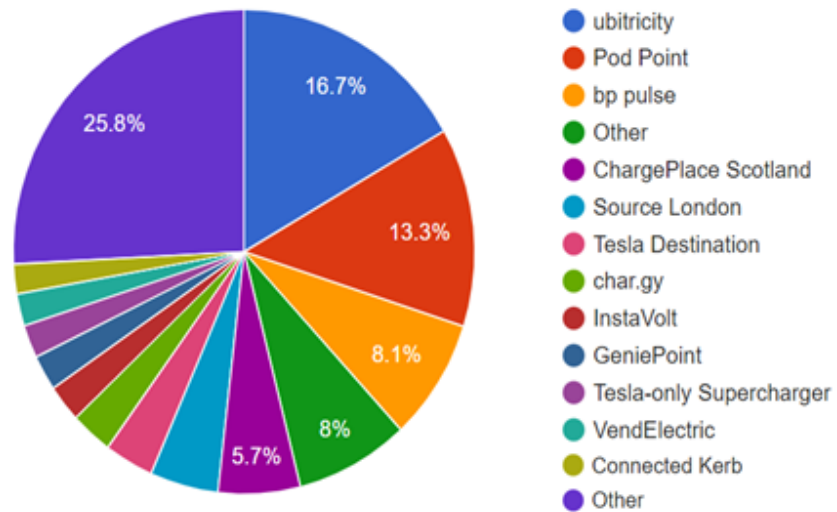
<sup>22</sup> <https://www.zap-map.com/statistics/> [Accessed 26 August 2022]

<sup>23</sup> <https://www.zap-map.com/statistics/> [Accessed 26 August 2022]

<sup>24</sup> [https://fncdn.blob.core.windows.net/web-clean/1/fleet\\_news/hm-government-taking-charge-the-electric-vehicle-infrastructure-strategy-2022.pdf](https://fncdn.blob.core.windows.net/web-clean/1/fleet_news/hm-government-taking-charge-the-electric-vehicle-infrastructure-strategy-2022.pdf) [Accessed 26 August 2022]

mainly in retail and/or supermarket car parks, and bp pulse has an extensive network of rapid and destination chargers across the UK.<sup>25</sup>

**Figure 2 Network market share – all charging points**



Total charge devices: 33281. Source: Zap-Map database, 31st July 2022



Typically, the main locations to find public chargepoints are supermarkets, shopping centres, public car parks or off-street parking (lamppost charging), hotels and sometimes service stations. However, these may not all be accessible based upon their costs to charge. Many public chargepoints offer free charging: for example, 90% of Pod Point units offer free charging and owners of Tesla models registered before September 2018 get free unlimited use of its Supercharger network; however, some public rapid charging operators have a tariff of 44p per kilowatt-hour for electricity (as of April 2022), which can be over twice the cost of a home charger.<sup>26 27</sup>

### 2.3.3 Projections to 2030

The UK Government has pledged to increase the number of EV public chargers across the UK to 300,000 by 2030, backed by £1.6 billion in funding. Within this, £500 million will be dedicated to building competitively priced public-charge locations across the country, and £450 million will go towards a Local Electric Vehicle Infrastructure (LEVI) fund, made available to local authorities to finance projects such as EV hubs and on-street charging solutions. An existing £950 million rapid-charging fund will also be used to roll out at least 6,000 points across England’s motorways by 2035,

<sup>25</sup> <https://www.zap-map.com/statistics/> [Accessed 26 August 2022]

<sup>26</sup> <https://www.whatcar.com/news/electric-vehicle-charging-%E2%80%93-what-does-it-really-cost/n16833> [Accessed 26 August 2022]

<sup>27</sup> <https://pod-point.com/guides/driver/cost-of-charging-electric-car> [Accessed 26 August 2022]

to match predicted future demand for quicker charging times. The Government has additionally promised to remove barriers for the private sector such as delays to planning permission or high connection costs, as noted in the new Electric Vehicle Infrastructure Strategy.<sup>28</sup>

The Strategy concludes that between 280,000 and 720,000 public chargepoints could be needed to support ambitious EV sales trajectories by 2030. The breakdown of what type of public chargepoints are included in these estimates is dependent on three scenarios: a higher preference for workplace charging, a higher preference for on-street charging or a higher preference for charging at destination and on-route. The table below breaks down these three scenarios and the number of each charger type that will be required in a low, central, and high demand case:

**Table 3 Estimated public chargepoint requirements**

Scenario	Charger Type	Low	Central	High
High workplace preference	Residential on street	125,000	155,000	335,000
	Destination	140,000	175,000	220,000
	Transit	14,000	15,000	16,000
	<b>Total public</b>	<b>280,000</b>	<b>350,000</b>	<b>460,000</b>
High On-street preference	Residential on street	270,000	340,000	490,000
	Destination	140,000	170,000	215,000
	Transit	9,000	10,000	11,000
	<b>Total public</b>	<b>420,000</b>	<b>520,000</b>	<b>720,000</b>
High destination & on-route preference	Residential on street	70,000	90,000	130,000
	Destination	300,000	370,000	475,000
	Transit	15,000	16,000	18,000
	<b>Total public</b>	<b>390,000</b>	<b>480,000</b>	<b>620,000</b>

Source: HM Government 2022 Taking charge: the electric vehicle infrastructure strategy

In the 'Low' scenario, mileage, charge supplied, and plug-in duration values are lower than the Central, capturing a scenario reflecting low chargepoint need. Conversely, the 'High' scenario captures high chargepoint need. These scenarios have been repeated across different chargepoint preference sets, outlined above, to provide estimates of low and high chargepoint need.

Research from the EV Energy Taskforce suggests that the UK will need potentially between 253,000 and 661,000 extra chargepoints by the target date. The Electric Vehicle Infrastructure Strategy echoes this figure, stating that the 300,000 public chargepoint aim should be treated as a minimum and potentially up to double this number may be required.<sup>29</sup> There are still concerns regarding the location of public chargepoints, in the sense some people may not have access based upon their

<sup>28</sup> <https://www.bloomberg.com/news/articles/2022-03-24/u-k-targets-tenfold-increase-in-electric-vehicle-charge-points> [Accessed 26 August 2022]

<sup>29</sup> [https://fncdn.blob.core.windows.net/web-clean/1/fleet\\_news/hm-government-taking-charge-the-electric-vehicle-infrastructure-strategy-2022.pdf](https://fncdn.blob.core.windows.net/web-clean/1/fleet_news/hm-government-taking-charge-the-electric-vehicle-infrastructure-strategy-2022.pdf) [Accessed 26 August 2022]

post code region and what power supplies their location has available. The 300,000 estimation assumes that members of the public will use regular home and workplace chargepoints, and lower their milage, however this may not be possible for many people. This is especially the case for the differing needs of company car and commercial vehicle drivers, compared to private drivers who may not need to rely on public chargepoints on a regular basis.<sup>30</sup>

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<sup>30</sup> <https://www.smarttransport.org.uk/news/latest-news/government-ev-charger-target-must-double-to-600-000>  
[Accessed 26 August 2022]

### 3. EV installer team make up

This chapter outlines the makeup of installations teams for both commercial and domestic installations, identifying how many fully qualified electricians are needed for different types of installations and whether there is a requirement for others to be involved, such as an electrical apprentice.

#### 3.1 Domestic

Domestic installations comprise new builds and retrofits (standard and premium).

##### 3.1.1 Standard installations

Our research has found that all domestic chargers use AC power, and manufacturers often make it clear that only qualified electricians should be involved in installing a chargepoint. Our findings from the depth interviews indicate that one fully qualified electrician will perform the installation.

*‘One fully qualified electrician for domestic. One fully qualified electrician plus a labourer for commercial installations.’ Installer*

Pod Point, for example, state that “Pod Point Experts are City and Guilds accredited electricians with thousands of hours of experience installing electric vehicle chargepoints”<sup>31</sup>. ABB Chargepoint state in their Terra AC installation guide that “it is important to emphasise that the installation of an AC charger must always be performed by an authorised electrician”<sup>32</sup>. Andersen EV<sup>33</sup> also state that a qualified electrician must be the one to install the chargepoint, and they send only a single engineer out to install the chargepoint, unless the customer requests or requires a premium installation:

*“Health & Safety stipulation, e.g. working at heights or confined spaces. Complicated and commercial installs, etc will require 2 engineers working together, but this will be discussed in detail with the customer.”<sup>34</sup>*

Standard installations are typically included in the price of the chargepoint, particularly when ordering directly from the manufacturer.

Pod Point’s standard installation package covers “the majority of homes in the UK” and includes the following:<sup>35</sup>

- Fitting of a Pod Point on a brick or plaster wall, or to another suitable permanent structure.
- Up to 15 metres (50 feet) of cable, run and neatly clipped to the wall between the electricity supply meter/distribution board and the Pod Point.
- Routing of the cable through a drilled hole in a wall up to 500mm (20 inches) thick, if this is needed.
- The fitting and testing of electrical connections and protections required for the Pod Point.

<sup>31</sup> <https://pod-point.com/solutions/driver/home-charging> [Accessed 26 August 2022]

<sup>32</sup> <https://search.abb.com/library/Download.aspx?DocumentID=9AKK107991A8056&LanguageCode=en&DocumentPartId=&Action=Launch> [Accessed 26 August 2022]

<sup>33</sup> <https://andersen-ev.com/installation/where-to-start/> [Accessed 26 August 2022]

<sup>34</sup> <https://andersen-ev.com/installation/andersen-a2/> [Accessed 26 August 2022]

<sup>35</sup> <https://pod-point.com/general-terms-and-conditions> [Accessed 26 August 2022]

- Installation of a Miniature circuit breaker (a.k.a fuse) within the existing consumer unit and/or type A RCBO in enclosure.
- Up to 3 metres (10 feet) of plastic conduit to conceal interior wiring.

### 3.1.2 Premium installations

Premium installations are those that typically involve groundworks, installations above 1.8m drilling through more than one wall, working in confined spaces, or at height. Most manufacturers seem to suggest that any installation requiring more than one installer elevates the installation from standard to premium. In the vast majority of cases one fully qualified electrician is required for the EV chargepoint installation, but they will also need a labourer to prepare the site.

*'They prepare the groundworks ahead of the electrician going in.'* Installer

### 3.1.3 New build

As part of Building Regulations (Part S) on electric vehicle charging<sup>36</sup>, from April 2022, all new builds must have an EV charger included for all associated parking bays (parking created for the use of the new builds). One installer suggested that he needs only a two-person team, one electrician and one labourer, to install multiple EV chargepoints (such as for a block of flats). New build installations are unlikely to be more complex than retrofits, it is fair to assume that one fully qualified electrician will be required per installation.

## 3.2 Commercial

Our research has found that many commercial chargepoint installer organisations claim to have full teams of qualified experts and professionals to undertake the installation. However, companies rarely describe in greater detail what qualifications are specifically held. The primary focus is on ensuring the company holds health and safety certificates and general electrical accreditations (e.g., BS 7671:2008 standard for wiring regulations, NICEIC certifications etc.) rather than specific EV chargepoint installation qualifications. One exception is Fleet EV, which highlights that their lead engineer holds a City & Guilds certification for EV installation.

Government targets are broken down into three types of installation

- Residential on street
- Destination
- Transit

Our calculations for the number of installers required to meet government targets are based on the numbers required for residential on street and destination chargepoints.

**Destinations chargepoints** include

- Supermarkets
- Shopping centres
- Public car parks

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<sup>36</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1057375/AD\\_S.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1057375/AD_S.pdf)  
[Accessed 26 August 2022]

- Hotels
- Workplace

Whilst site preparation times and the number of people required may vary for different types of destination chargepoints, findings from our depth interviews indicate the actual number of installers required is similar: one fully qualified electrician is needed to do an installation.

**Table 4 Number of installers per team for destination chargepoint installations**

Organisation	Installation type	Number of electricians in team
Company 1	Car parks	2
Company 2	Workplace	1
Company 5	Car parks, workplace	1
Company 7		1
Company 8		1
Company 9	Car parks, workplace	1

#### Residential on street

Ubriticity<sup>37</sup> state that one installer is required to install lamp post chargers.

<sup>37</sup> <https://www.ubriticity.com/how-to-get-ev-charge-points-in-your-street/> [Accessed 26 August 2022]

## 4. Number of installations per day

### 4.1 Domestic

#### 4.1.1 Standard

Our findings for installation times from depth interviews are listed in the table below, they are broadly in line with three of the major players in the sector. In the vast majority of cases installations are carried out by one fully qualified electrician, and they would expect to do an average of around two installations per day.

*'We aim to do installations in four hours, sometimes it is done in two or three hours, some other jobs run over a little. Depends on installer's experience.'* Installer

**Table 5 Number of domestic standard installations per day**

Organisation	Installations per day	Number of electricians in team	Installations per electrician
Company 1	1	1	1
Company 2	3	1	3
Company 3	2	1	2
Company 4	4	2	2
Company 5	2	1	2
Company 6	2	1	2
Company 7	2	1	2
Company 8	2	1	2
Company 9	2	1	2
Average number of installations per day			2

#### Desk research

**Pod Point** indicates that a solo electrician will be responsible for installing the domestic chargepoint, and they schedule 2 hours to do so for a standard installation<sup>38</sup>. BP chargemaster states that a standard installation will take between 4 and 6 hours.

**Andersen EV** state that in a standard installation, which 85% of their installations fall into, no more than 4 hours will be needed.

#### 4.1.2 Premium

Premium installations will take longer. Andersen EV say they can be more than 4 hours, but as any installation other than a standard is by nature bespoke, it is difficult to pin down exactly the length of time required. Findings from the depth interviews indicate that the installers expect to do between one and four installations per day depending on the complexity of the work involved – in particular, the amount of cabling that is required. A labourer may also be needed to carry out some of the groundworks.

<sup>38</sup> <https://pod-point.com/general-terms-and-conditions> [Accessed 26 August 2022]

We have based our calculations for premium installations on one installation per day.

*‘Depends on the install, standard, non-standard. Geography as well. Installing on your own, you could get two domestics done if they’re local, if you have everything you need. But that’s not the real world.’ Installer*

#### 4.1.3 New build

New build EV chargepoint installations are now part of the build process, consequently they are likely to be a more straightforward installation, and so it can be expected they will take no longer than the scheduled two hours quoted by Pod point for a standard retrofit installation. Based on a seven-hour working day, that will mean 3.5 installations per day.

## 4.2 Commercial

Research indicates that once site preparation and groundworks have been carried out installation times are similar for the different types of destination chargepoints. Labourers will be needed prior to the installation taking place, though in the vast majority of cases one fully qualified electrician is needed to carry out the installation. The main barriers are planning and the power supply available for multi-point installations.

*‘With EV chargepoints, the installers are underestimating the power they use. A standard 7kW pulls 32 Amps for five or six hours. If you have a building with ten chargepoints, for bog standard, you’re pulling 320 amps. Not many have that spare. You have to balance the loads, and that’s more specific than the skills of a general electrician. It’s different and needs more training.’ Installer*

**Table 6 Number of commercial installations per day**

Organisation	Installations per day	Number of electricians in team	Installations per electrician
Company 1	2	2	1
Company 2	0.5	1	0.5
Company 5	1	1	1
Company 5	1.25	1	1.25
Company 8	0.33	1	0.33
Company 9	1.25	1	1.25
Average number of installations			0.89

**On street** chargepoints include lamp post and kerbside charging. Ubitricity<sup>39</sup> say this requires:

- one experienced installer,
- one hour – 5.5Kw installations, and

<sup>39</sup> <https://www.ubitrlicity.com/how-to-get-ev-charge-points-in-your-street/> [Accessed 26 August 2022]

- the recommendation is for multiple installations per street, requests need to be made to the council by local residents. Approval process can take a long time.

Given an installer can do one installation per hour, working seven hours per day, they will be able to do seven installations per day.

It is important to mention the process of installing a commercial chargepoint has more complex stages than the installation of one that is domestic. This is due to issues that may arise from planning permissions and delays, potential significant groundwork requirements, a larger number of chargepoints being installed in one location and their types and gaining access to a connection to the power network. London's EV chargepoint installation guidance notes that the planning application validation and determination by the planning authorities can take approximately 8-12 weeks. For example, on the Transport for London Road Network (TLRN) it has taken an average of 38 weeks to install rapid chargers on private land. Where wayleaves are required, this can take considerably longer. The overall installation of the chargepoint can be done within 6-8 weeks, but often planning needs to occur at least six months in advance to avoid significant delay issues. Typically, for a smaller connection (1-3 fast chargepoints or one rapid) it will take 8-12 weeks for a connection. For a large connection (multiple fast/rapid chargepoints) it can take six or more months.<sup>40</sup> In contrast, Chargemaster claims that, depending on the complexity of the work, an installation will take only around 4 working days. They are the UK's largest manufacturer, supplier and operator of electric vehicle charging equipment, and are currently manufacturing over 2,000 units per month.<sup>41</sup> Further to this, the company Fleet EV claim that standard installations usually only take half a day overall.<sup>42</sup>

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<sup>40</sup> Transport for London 2019 London's electric vehicle charge point installation guidance [Accessed 26 August 2022]

<sup>41</sup> <https://bpchargemaster.com/wp-content/uploads/2018/02/Network-offer-brochure-final.pdf> [Accessed 26 August 2022]

<sup>42</sup> [https://fleet-ev.co.uk/commercial-charging/?gclid=Cj0KCQjwio6XBhCMARIsAC0u9aGKepQjGlyRlubb1xSrIcn2e3oW8TO87gYslRZQaljbgpNPwabPnBzAaAtHUEALw\\_wcB](https://fleet-ev.co.uk/commercial-charging/?gclid=Cj0KCQjwio6XBhCMARIsAC0u9aGKepQjGlyRlubb1xSrIcn2e3oW8TO87gYslRZQaljbgpNPwabPnBzAaAtHUEALw_wcB) [Accessed 26 August 2022]

## 5. Number of installers required

We have calculated the number of installers required to meet both government targets of 300,000 commercial installations and the ongoing needs of the domestic market. Whilst the UK government has set a fixed target of 300,000 commercial chargepoint installations by 2030, due to the relative infancy of the sector, projections vary for the number of EVs on the roads, the demand for commercial installations and the number of new builds. Due to the uncertainties around demand for EV chargepoint installations, it is prudent to provide calculations based on the 300,000 fixed target and the mid-level of projections, whilst also looking at the highest (top end) projections to give an idea of the maximum number of electricians which will likely be required to carry out the installations.

### 5.1 Domestic

Whilst government targets are based on commercial installations, the domestic market will still need servicing.

The number of chargepoint installations that will be needed by 2030 will primarily be determined by the number of EVs on the roads. Projections vary from as little as two million up to 11 million, and we have therefore based our calculations on seven million (mid-level) and also looked at the most conservative top-end estimate of 11 million. We know that 76% of households have access to off-street parking and will likely need access to EV chargepoints at home. Further consideration is given to the amount of work involved in retrofit installations, with Andersen EV stating that 85% of retrofit installations are classed as standard, leaving 15% as premium installations which require more time per installation.

Currently legislation dictates that new builds must have EV chargepoints installed as part of the build process. The government's ambitions are to see 300,000 new builds per year by the mid-2020s, though current rates are approximately 200,000 per year. We have incorporated the current level of new build installation into our calculations, whilst making an extra allowance should the target of 300,000 be met.

We have made the following assumptions when calculating the number of fully qualified electricians that will be needed to carry out EV chargepoint installations.

- Total installations are based on a time frame of seven and a half years, in line with when the government needs to hit its 300,000 commercial chargepoint installations by 2030.
- There are 250 working days per year.
- Where we have data on the time per installation, we have assumed a seven-hour working day, enabling us to calculate the number of installations per day. For mid-level projections we have assumed electricians can move seamlessly between jobs.
- For top-end projections we make the assumption that electricians only work at half rate, i.e. with time lost in between jobs (for instance due to travel or other commitments) thus ensuring a true range for number needed can be established.

### 5.1.1 Standard

Whilst government targets are based on commercial installations, the domestic market will still need servicing.

Projections vary for the number of EVs on the roads by 2030. We have based our projections on seven million (mid-level) as there are wide ranging estimates from as little as two million (though it is widely accepted that this is too low) to 11 million (top end). We know that 24% of households do not have access to off-street parking, leaving an estimated 5.32 to 8.36 million owners who may need EV chargepoint installations.

There are currently 200,000 new builds per year. If this rate is sustained until 2030, seven and a half years from now, a further 1.5 million new builds will have EV chargepoints already installed, leaving a further 3.82 to 6.86 million retrofit installations required.

Andersen EV states that 85% of their retrofit installations are classed as standard. If we base our projections on this, that leaves 3.25 to 5.83m *standard* installations in total.

For the mid-level scenario, to find the number of installers required, we have taken total installations (3,247,000) and divided it by 7.5 years resulting in the average number of installations per year (432,934). This was then divided by 250 (workings days in one year), which results in the number of installations required per day (1,732) across the UK (this is not necessarily going to be the case if there is any surge in demand due to changes in government policy or economic circumstances, etc.). If we divide this by two (number of average installations per day per installer), we find that 866 installers are required per day.

We then undertook a similar calculation, making allowances for electricians only working half time, i.e. with time lost in between jobs (for instance due to travel or other commitments) to arrive at the top-end scenario, resulting in a conservative estimate of 3,110 installers being required.

**Table 7 Number of installers required for domestic standard installations**

	Mid-level	Top-end
Projected number of EVs on the roads by 2030	7,000,000	11,000,000
76% have access to off street parking	5,320,000	8,360,000
Less new builds	3,820,000	6,860,000
85% of retrofit installations are standard installations	3,247,000	5,831,000
Number of standard installations per year (over 7.5 years)	432,934	777,467
Number of standard installations per day (250 day working year)	1,732	3,110
Number of installations per installer	2	1
Number of installers required for standard installations	866	3,110

### 5.1.2 Premium

There are forecasted to be 573,000 to 102,900 premium installations. This represents 15% of the total retrofit installations, which is in line with Andersen EV's published numbers on their website.

To work out the mid-level scenario, we have taken the total premium installations (573,000) predicted to be needed by 2030, divided by 7.5 years, resulting in the required number of installations per year (76,400). To arrive at the number of installations per day, we have divided 76,400 by 250 (number of working days in one year), meaning 306 installations per day will be needed. Given that that average number of installations per day per installer is one, we can conclude we will need 306 installers to service premium domestic installations.

We then undertook a similar calculation to arrive at the top-end scenario, resulting in a conservative estimate of 1,098 installers being required.

**Table 8 Number of installers required for domestic premium installations**

	Mid-level	Top-end
Projected number of EVs on the roads by 2030	7,000,000	11,000,000
76% have access to off street parking	5,320,000	8,360,000
Less new builds	3,820,000	6,860,000
15% are premium installations	573,000	1,029,000
Number of premium installations per year (over 7.5 years)	76,400	137,200
Number of premium installations per day (250 day working year)	306	549
Number of installations per installer	1	0.5
Number of installers required for premium installations	306	1,098

### 5.1.3 New build

For the mid-level scenario, the projected number of new build installations by 2030 is 1.5 million. We have assumed that installer will be working seven hours per day, 250 days per year. We have taken the total number of new builds (1,500,000) and divided by 7.5 resulting in the number of installations required per year (200,000). To break this down into the number of installations per day required, we have divided 200,000 by 250 (number of working days in one year), meaning 800 installation per day are needed. By dividing 800 by 3.5 (number of installations per day per installer), we can conclude 229 full time EV chargepoint installers will be needed for the new build market.

A similar calculation for the top end estimate indicates that 686 installers will be required.

**Table 9 Number of installers required for new build installations**

	Mid-level	Top-end
Number of new builds by 2030 (over 7.5 years)	1,500,000	2,250,000
Number of new builds per year	200,000	300,000
Number of new builds per day (250 day working year)	800	1,200
Number of installations per installer	3.5	1.75
Number of installers needed	229	686

## 5.2 Commercial

The demand for commercial chargepoints will also depend on the number of EVs on the roads by 2030. There are three different projections for the numbers of commercial installations required by 2030 (laid out in section 2, Table 1). The lower end of the projections will enable the government to meet its targets of 300,000 but may not be sufficient to meet demand. Our calculations are based on the government meeting its target and the top end of demand for public chargepoints.

We have made the following assumptions when calculating the number of fully qualified electricians that will be needed to carry out EV chargepoint installations.

- Total installations are based on a time frame of seven and a half years, in line with when the government needs to hit its 300,000 commercial chargepoint installations by 2030.
- There are 250 working days per year.
- Where we have data on the time per installation, we have assumed a seven-hour working day, enabling us to calculate the number of installations per day. For mid-level projections we have assumed electricians can move seamlessly between jobs.
- For top-end projections we will make the assumption that electricians only work at half rate, i.e. with time lost in between jobs (for instance due to travel or other commitments) thus ensuring a true range for number needed can be established.

Our findings in section 4.2 inform our calculations which are based on 0.89 installations per day for destination and seven per day for on street charging. Our findings indicate that the minimum number of full-time fully qualified electricians required will be 94, and to meet the upper end of projected demand this figure could rise to 590.

**Table 10 Number of installers required for commercial chargepoints**

Scenario	Charger Type	Low	Central	High
High workplace preference	Residential on street	10	12	52
	Destination	84	105	264
	Total public	94	117	316
High On-street preference	Residential on street	21	26	76
	Destination	84	102	258
	Total public	105	128	334
High destination & on-route preference	Residential on street	6	7	20
	Destination	180	222	570
	Total public	186	229	590

To meet government targets and mid-level projections for the number of EVs on the roads and the number of new builds by 2030 our estimate suggest that **1,495** fully qualified electricians will be needed as EV chargepoint installers to both meet government targets and service the domestic market, It is important to point out that these figures are based on installers working full time, that

is 250 days per year, seven hours per day. Should the top-end projections come into play, we have assumed that electricians will be working half their time on chargepoint installations, we find that **5,484** fully qualified electricians will be required. However, the market is currently dominated by big players who are often both manufacturers and installers relying on a bank of electricians around the country to carry out installations once they have signed up with them.

## 6. Conclusions

To answer the question of how many fully qualified electricians will be required to meet government targets of 300,000 commercial installations whilst also servicing the domestic market, we have based our calculations on the number of fully qualified electricians required per installation and times per installation on a combination of our desk research and findings from depth interviews.

Whilst UK government targets are fixed at 300,000 for the number of public chargepoints required by 2030, the makeup of the type of chargepoint is not fixed, and so we have relied on the projections in chapter two which are for residential on street and destination installations. Further consideration is given to fact that the EV market is still in its relative infancy, and we have therefore endeavoured to provide an estimate of numbers of fully qualified electricians required to install EV chargepoints by looking at both the mid-level and top end projections based on the number of EVs on the roads, the number of new builds and the demand for commercial chargepoints by 2030.

- Installers work seven hours per day if they have not stated the number of installations per day they carry out.
- Installers work 250 days per year.
- On street installations are based on the time per installation for a lamp post installation.
- Destinations installations, though varied, seem to involve the same amount of work for the actual installation.
- There will be seven million more EVs on the road by 2030
- New builds will continue at current rates of 200,000 per year

Our findings indicate

- Domestic standard installations – two per day per installer.
- Domestic premium installation – one per day per installer.
- New build installations – 3.5 per day per installer.
- Residential on street (lamp post) installations – seven per day per installer.
- Destination installations – 0.89 per day per installer.
- For mid-level projections, the domestic market will require 1,401 fully qualified electricians, retrofit (1172), new build (229).
- To meet government targets, the commercial market will require 94 fully qualified electricians.
- **The total number of fully qualified electricians required for the domestic and commercial markets is a minimum of 1,495 working full time on EV installations every day of the year.**
- To meet the top end of projections, the domestic market will require 4,894 fully qualified electricians, retrofit (4,208), new build (686).
- To meet top end projections the commercial market will require 590 fully qualified electricians.
- **Working to current top end projections, assuming electricians will only spend half their time on chargepoint installations, the number of fully qualified electricians required for the domestic and commercial market is 5,484.**

## Considerations

- Whilst our estimates are way below some industry estimations (in the tens of thousands) for the number of EV installers required, it is important to point out our estimates are based on the number of EV installers who would be working full time. Obviously if EV installers were fully qualified electricians working on such installations for just one day per week it is possible that the above figures could be multiplied by five to arrive at the number of electricians who would require EV installation knowledge and skills.
- The sector seems to be dominated by large players who have banks of electricians they can call on to do their installations. We do not know how many installations per week each of these electricians is doing.
- If an electrician is doing one retrofit installation per week, equivalent to half a day's work, and industry estimates are based on this that would imply ten times as many installers (15,020) are needed, 20 times (30,040) the number if one installation per two weeks.
- Demand has dropped for domestic installations since the OZEV grants stopped.
- Margins are being squeezed on domestic installations, this could well be affecting the recruitment of electricians by the big players, who are more than likely self-employed as they do not have other commitments. They will be less likely to sign up for lower fees.
- Multiple chargepoint installations require access to greater power supplies.
- The use of fully qualified electricians (gold card standard) is essential if the health and safety of both installers and the public is to be protected.
- The geography of the installations seems to be a barrier to companies taking on installers full time, the travel to work times and uncertainty about pipeline of future work will be added costs and risks for a business.
- There will be further demand for fully qualified electricians as the demand for heat pumps and solar PV grows. To maintain standards and skill levels in the sector further bolt on qualifications may be needed.

The EV chargepoint installation sector is in its infancy, and to some extent is still finding its way as to how to best service the needs of the country. Currently, the major players in the sector are involved in manufacturing and installation of chargepoints, in effect taking a slice of two different pies. Due to tighter margins, things may need to change if installers are to be encouraged into the sector. Our findings indicate that as few as 1,495 – or at the top-end, a maximum of 5,484 – fully qualified electricians will be sufficient for the government to meet its targets and meet the top end of projections for the domestic and commercial markets.. It would seem the best way to achieve this would be for existing electrical contractors to put their electricians through the EV course. In this way a large number of smaller businesses around the country will be able to act as installers servicing the needs of their locality while maintaining flexibility in the way they make use of their skilled staff. In this scenario the focus shifts to high quality training provision (public and private) that can flexibly provide EV installation skills to a relatively diverse sector of multi-skilled installers thus ensuring high standards of work and consequently the safety of both installers and consumers.

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## Appendix 2: List of organisations participating in depth interviews

Charge Easy

Chris Connolly

Ecotech

EV Comply

EV Power Point

EV Smart

Impra Charge

Karl Harvey

MM Electrical Contractors

Office for Zero Emission Vehicles (OZEV)

## Appendix 3: Interview topic guide

### TESP – EV charging study

#### Introduction

Pye Tait Consulting has been commissioned by The Electrotechnical Skills Partnership (TESP) to gain a deeper understanding of the amount of EV chargepoint installers that will be required to meet the government’s target of 300,000 public chargepoint installations by 2030.

Whilst work is carried out to meet the government’s targets, there is also the need of the ever-growing domestic market to consider. TESP is hoping to gain a deeper understanding of the nature and extent of the training provision that will be required to meet targets and demand across both sectors.

Many thanks in advance for your time – we anticipate our discussion should last a maximum of 30 minutes.

#### Reassurances

Your views will be treated confidentially by Pye Tait Consulting and reported to the TESP anonymously in line with the General Data Protection Regulation, Market Research Society Code of Conduct, and the Data Protection Act 2018. No individuals or organisations/institutions will be identified in our resulting report unless explicit permission has been given. We may ask permission to record this conversation, but the recording will not be shared with any external parties.

For any queries about the research, please contact Andrew Dodsworth via [a.dodsworth@pyetait.com](mailto:a.dodsworth@pyetait.com) or by telephoning 01423 509433.

Name of the interviewer	
Date of the interview	
Name of the interviewee	
Role of the interviewee	
Organisation	
Sector	
Country	
Purpose of the document	Interview notes

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**General overview of the sector**

1. Can I just confirm the capacity to which you are involved in EV installations?

Prompt: In what capacity are you involved eg. business, govt department, council (from prefilled box above)

2. What are the main challenges the sector currently faces?

Prompt: lack of skilled staff, lack of investment (govt, private) planning, connecting to grid etc

3. How do you see the sector changing in the years leading up to 2030? What is driving this?

Prompt: business conditions, legal and political influences, global competition, new technologies (increased demand for faster charging points, SMART charging etc)

4. What do you feel are the main implications of these changes for skills and training in your sector?

**Recruitment and training**

5. How are you currently sourcing your EV chargepoint installers?

Prompt: are they part of your current workforce who are electricians previously working on other projects? Are you recruiting qualified electricians (ie to ECS gold card standard) or non-electricians such as smart meter installers to become EV installers, apprentices or people looking to be retrained from other sectors?

6. If you are providing training, what routes are you offering to people (staff or others wanting to join the sector) to become EV chargepoint installers? What are the barriers/drivers/perceptions of the training provision you have mentioned? What is the minimum pre-requisite skill level you ask for?

Prompt: bolt on qualifications for qualified electricians, apprenticeships, 22 day Domestic Electrical & EV Charging Package offered by Trade Skills 4 U (Awarding organisation C and G) SMART reader installers

7. Do you think the sector can recruit enough staff to meet government targets by 2030? If not, why not? What further action is needed and by whom to help meet targets

Prompt: are there enough fully qualified electricians, how many staff do you think you'll need to train yourself. Can industry by itself support these needs, or is further support needed at a local or national level from government

8. What training provision do you think should be put in place to ensure the sector is well placed to meet government targets by 2030?

Probe: is the current offering sufficient or is something new/different needed, (such as enhanced entry requirements to ensure a sound foundation of electrical knowledge and embedding EV within the Domestic and Installation Elec apprenticeships)

**Current work**

9. What type of installations are you involved in domestic/commercial, roughly what percentage of work on each? Please provide a rough percentage breakdown of each type

Prompt: domestic – retrofit/new build single phase/three phase

Commercial: Slow/standard (6kW AC or lower), Fast(,between 7-22kW AC) Rapid(between 43KW AC-50kW DC), Ultra-rapid(over 100kW). Infrastructure type – destination, on street/community

Domestic –

Commercial -

10. How many people do you employ to work on chargepoint installations?

Probe: Full or part time

11. Do they work in teams/gangs, if so, how many per team/gang?

Prompt: how many per team for different installation types

12. What is the makeup of the team/gang and how much experience do they tend to have of EV installations?

Probe: How many fully qualified/electricians (have they taken the bolt on qualification), how many apprentices, others

13. How much of your work is on multipoint installations/ single point installations

Prompt: multipoint for new builds (large developments), destinations chargepoints, community, single points for domestic newbuild/retrofits

14. How long does each installation take? How many installations per day can each team do?

Prompt: by infrastructure type domestic new builds/retrofits, commercial – destination/community, slow/fast/rapid/ultra-rapid

Prompt – link answers to team sizes for different installation types in Q11, eg domestic premium installations may require more people if so, who are they electricians/apprentices. What are issues that cause installations to take longer, do they require more people to work on the installation, if so who.

Domestic

1. Type of installation -

2. Time per installation –

3. Number of installations per day -

Commercial

1. Type of installation -
2. Time per installation –
3. Number of installations per day -

15. Do you have any other comments or suggestions on the subject of EV chargepoint installations