



Delivering a world-class charging network by 2030

A UK approach

June 2022

Executive Summary

Building a nationwide, convenient, affordable charging network is essential for the UK's transition to a zero emission fleet of vehicles, and some critics say that the current network is not substantial enough. This is incorrect. Not only does the current public network have enough charge points for the number of battery electric vehicles (BEVs) currently on the roads, but [new research](#) reveals that there are actually more workplace charge points than public charge points: 33,000 vs 31,500. This 'hidden' majority has not been taken into account in society's discussions about charging, and is important: 22 million cars are regularly used for commuting, and 35% of all car and van miles in 2019 were for commuting and business purposes.

That's not to say the current public charging network is perfect: the distribution of charge points is still patchy and a postcode lottery when it comes to availability. Electric car drivers in the North West, South West and East of England are particularly disadvantaged, and the Government needs to do more to 'level up' those regions where the build-out is too slow.

The UK Government has taken a step in the right direction with its recent [Electric Vehicle Infrastructure Strategy](#), which sets a target for the UK to have 300,000 charge points by 2030. But setting a topline target and throwing money at it is not a sufficient strategy to deliver a fit for purpose charging network. Government has a key role to play in ensuring the charging network meets the needs of all types of drivers and ensures sufficient coverage across all regions, by removing existing barriers to installations and providing room for the private sector to grow the charging network.

The Strategy provides a substantial £450m in funding through the Local Electric Vehicle Infrastructure (LEVI) fund looking to alleviate this postcode lottery, with an "obligation" on local authorities to plan for and deliver charging infrastructure. But without a *legal* obligation, local authorities may not undertake this task.

Much of the UK's charging needs can and will be fulfilled at home. Over 65% of households have access to off-street parking¹ and with the average driver only travelling around 130 miles per week,² charging up at home will be more than sufficient. In fact, less than 1 in 20 cars will need to be fully charged twice a week or more. Nevertheless, the public charging network will play an important role to support fleets, people without access to off-street parking and high-mileage drivers.

Currently there are [15 fully battery electric cars per public charger](#) (rising to 27 EVs per charger if plug-in hybrid vehicles are included).³ Contrary to much of the public commentary about the EV charging network, this is currently more than sufficient to support the number of EVs on the road. The number of public chargers installed is continuing to increase, with the [most recent national figures from May 2022](#) showing that the UK has now surpassed the 31,500 mark.⁴ The rate of installation will need to scale up after 2025 as the number of BEVs on UK roads increase significantly.

Where the current network needs improvement is in the regional distribution of available public charging. While some areas like London and the North East have good charge point coverage for the number of vehicles, areas such as the South West, North West and East of England are falling behind. In 2021, London installed 3,002 chargers, compared to only 25 in Northern Ireland⁵. Ensuring that all areas across the UK keep pace should be the main priority for the Government in overseeing the rollout of infrastructure over the next couple of years.

As part of the money committed under the LEVI fund, £50 million has been ear-marked for local authorities to fund staff to produce local strategies, which will help to fill the gaps in capacity and expertise that currently exists. Clear policy instructions, interim targets and guidance must be provided by central Government to ensure success. The LEVI fund rollover after 2025 to ensure local authorities have the time they need to utilise and spend the money provided.

The role of non-residential sites, including workplaces, in supporting the public and home charging network is also important. For fleet operators, installing workplace charging already makes perfect sense as it reduces operational costs. Solutions are readily available to improve the business case for installing charge points for other car park operators and businesses: some are opening up car parks to local fleets and the general public in their area. However, the Government has again fallen

¹ Ministry of Housing, Communities and Local Government, English Housing Survey data on amenities, services and local environments, "DA2203: Parking and mains gas - households"

² Department for Transport, Vehicle Mileage and Occupancy, NTS0901: "Annual Mileage of Cars by Ownership and Trip Purpose: England Since 2002"

³ ZapMap, 'Electric Vehicle Market Statistics', <https://www.zap-map.com/ev-market-statistics/>. Data retrieved 20/05, 17:00

⁴ Ibid

⁵ Ibid

short by failing to require charging to be installed at all non-residential locations, not just new and refurbished sites.

For the Government to deliver a world-class charging network, we recommend:

- Setting yearly interim targets for the 300,000 public charge points target.
- Introducing a statutory obligation on local authorities to plan and deliver charging infrastructure & provide clear policy direction for what local authorities need to achieve.
- Allow the LEVI fund to rollover after 2025 until the money is spent, to provide local authorities enough time to plan, deliver and spend the committed money.
- Directing the LEVI fund money to local authorities that have the most need.
- Requiring all non-residential sites with over 10 parking spaces to install charging infrastructure (targeting 15% by 2030, not just new and refurbished sites).
- Removing remaining practical, administrative and unnecessary financial burdens to install charge points.

1. State of the current public EV charging network

The number of electric vehicles (EVs) in the country is continuing to accelerate at pace. [14.4% of new car registrations in 2022 so far are BEVs](#), doubling from the previous year.⁶ With the UK phase out of new internal combustion vehicle sales by 2030 - coupled with an upcoming Zero Emission Vehicle Mandate - fast approaching, delivering a reliable, affordable and convenient charging network across the UK is key.

The shift to full electrification of the UK's car fleet is accelerating. Sales of battery electric vehicles are increasing, both in percentage and absolute numbers. This growing fleet needs a growing network of easy-to-use and reliable public charge points and Figure 1 shows that charging installation rates remains more than adequate, with 7,600 chargers installed in the last year. Nationally, this provides adequate charging coverage for the number of EVs on the road right now. The priority for the next two and half years should be to ensure regions don't get left behind ahead of the expected surge in numbers of electric vehicles. Although nationally, the number of BEV cars per charger has gone up (15 per charger, compared to 9 last year), that does not mean that the infrastructure is not sufficient for demand. High utilisation rates of chargers will be important to encourage long-term private investment in infrastructure as it cannot fall on public money to bankroll the network in the long-term.

⁶ Data retrieved for on 06/05, 10:00

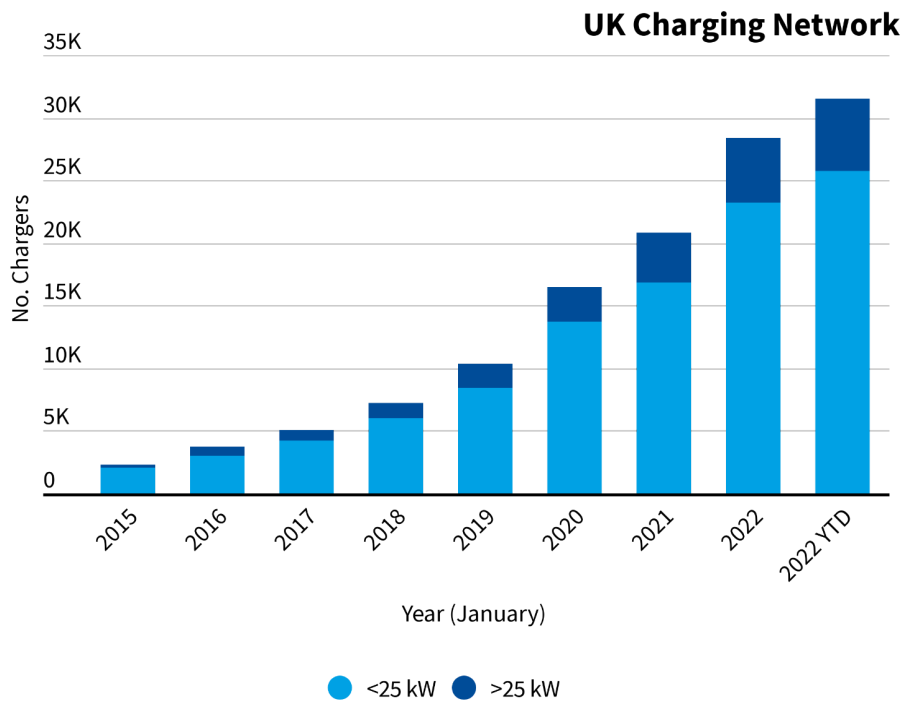


Figure 1. Total number of chargers installed across the UK. Figures are as of January for each year, 2022 YTD is as of 20/05.⁷

1.1. Regional Overview

Although charger installation rates remain at a good level against BEV sales, regional distribution is still an issue. As can be seen in Figure 2, London tops the rankings for number of chargers installed per region by a long way. It also leads in the average power of chargers, with a greater number of rapid and ultra-rapid (>50kW and >100kW) chargers.

⁷ Chargers below 25kW in power are either slow chargers, typically for residential and kerbside charging, with some faster chargers (>7kW) for destination based charging such as supermarket car parks. The vast majority of chargers above 25kW in power are ‘rapid’ chargers with power ratings above 50kW, typically installed in service stations and charging hubs.

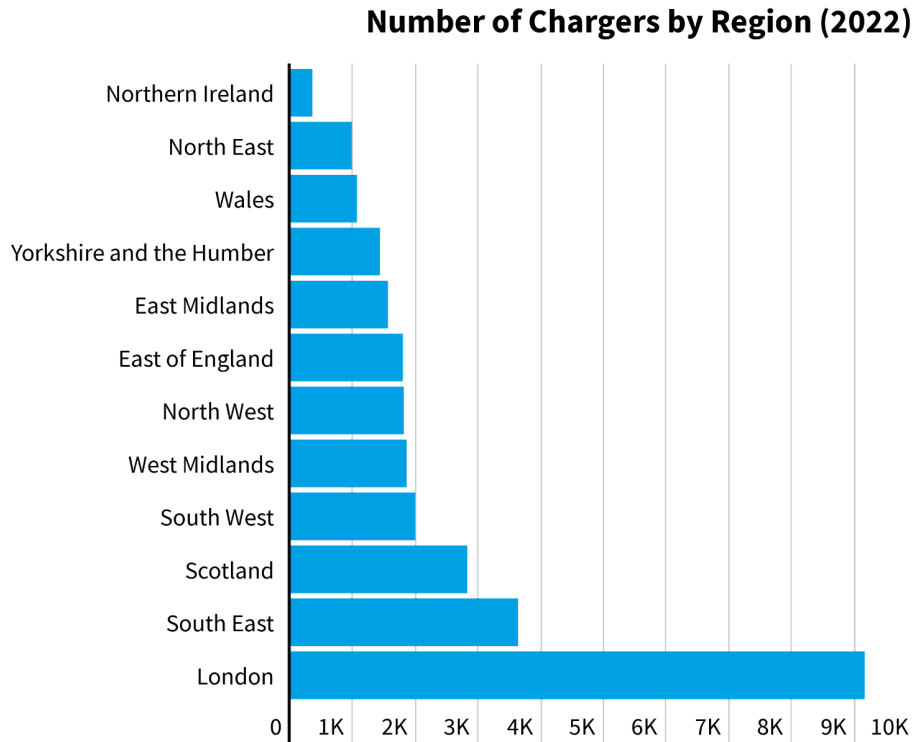


Figure 2. Number of chargers per region as of January 2022.

While the total number of chargers per region tells a story of the charging market being significantly skewed towards London, the total numbers of BEVs per charger tells a slightly different story. Contrary to some public commentary, Figure 3 shows that there is no North-South divide when it comes to charging infrastructure. While London still ranks as the best for BEVs per charger, the North East also performs very well, alongside Wales and Scotland. Meanwhile, the South East and South West rank far lower, alongside the North West and East of England. While there is no “North-South divide” as such, Figure 3 does demonstrate the regional inequalities of charger coverage. While charging coverage even in the lowest ranked regions is still adequate to meet current BEV demand (based on typical charging needs), it’s obvious that there are growing disparities.

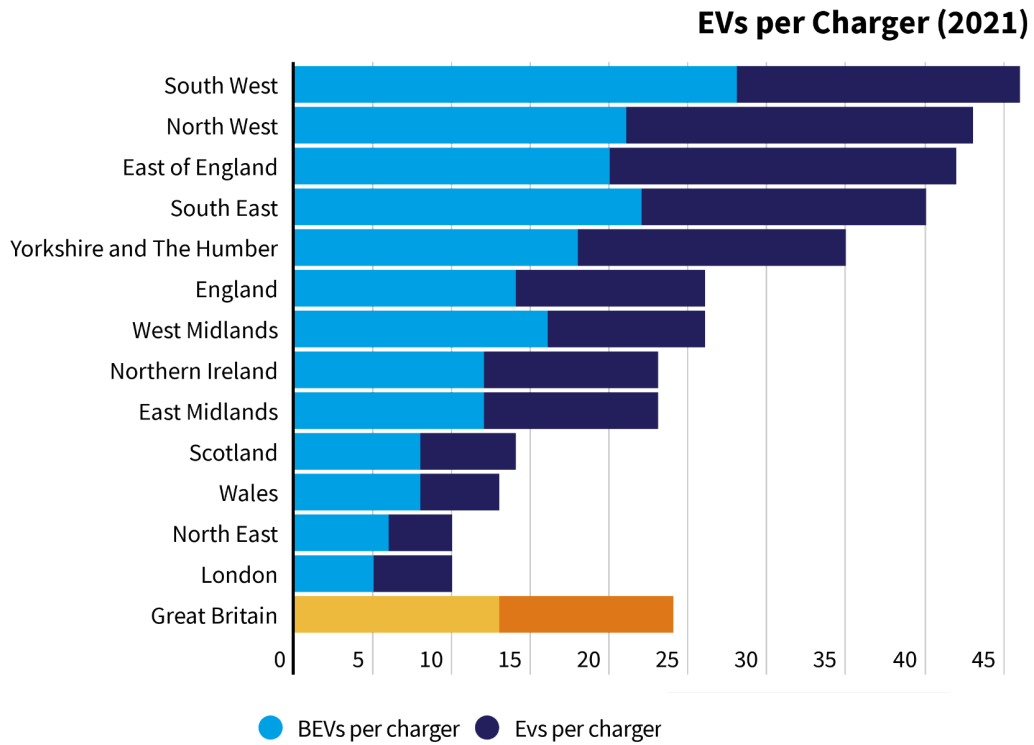


Figure 3. Current number of chargers installed per EV car by region. “EVs” include PHEVs.

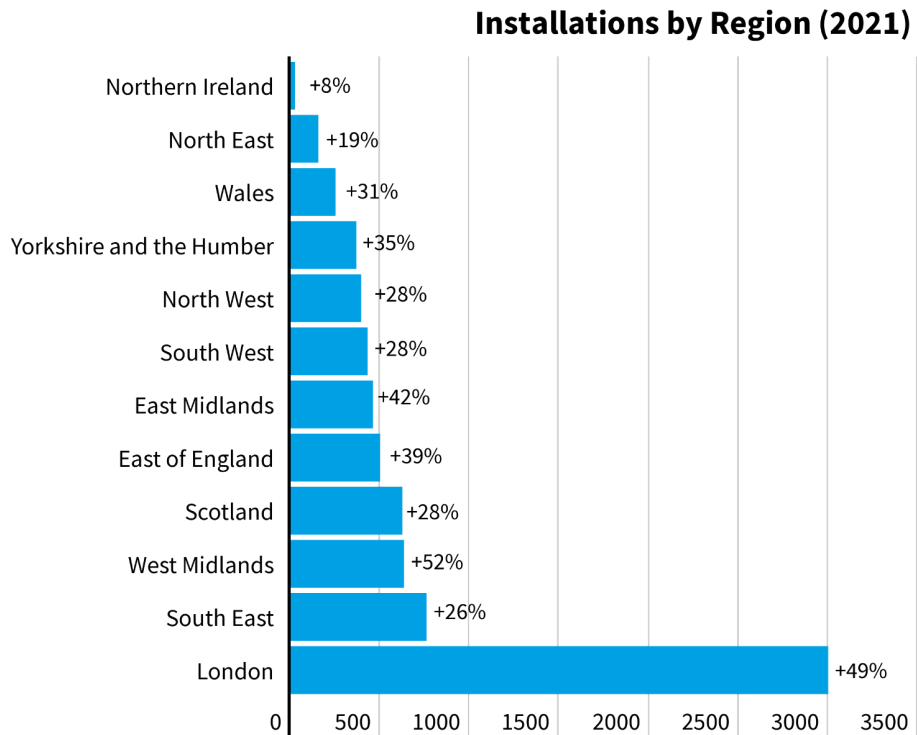


Figure 4. Additional chargers installed in 2021, by region.

Policy should be directed to ensure that regions that are falling behind in the rate of installations and chargers per BEV catch up. Northern Ireland, for example, is not only the lowest in the absolute number of chargers already installed (Figure 2), it is also adding them at a slower rate than any other region (Figure 4). This needs to be picked up significantly if the region is to be prepared for 2025 and beyond.

Many local authorities have no strategy for how they will deliver EV charging infrastructure in their area. Following a Freedom of Information request, it was reported in April 2022 that [only 28% of local authorities have published EV transition strategies to date](#), showing the scale of the issue.

£50 million from the LEVI Fund will be put aside to enable local authorities to fund the staff and training needed to plan and deliver local charging infrastructure, but this must be accompanied by resources and best practice - coordinated by central government. To deliver a world-class charging infrastructure, the Government cannot afford to take a backseat role and hope that throwing money at the problem will be enough.

2. Role of workplace charging

To gain a better understanding of the UK's workplace charging network, T&E commissioned Cenex to produce a [report to understand the current state of workplace charging in the UK](#), what the key drivers and barriers are to installation, and what else could be done to further facilitate and support the expansion of the network.

Workplace charging can play a key role in underpinning the UK's charging network, alongside other destination sites, slow kerbside chargers and rapid chargers at urban hubs and highways. According to Cenex, there were 21.7 million commuting vehicles on UK roads in 2021: many of which will spend much of the day parked at workplaces. This highlights the importance workplaces can play in optimising the UK's charging network to support the EV transition. By installing charging at workplaces, businesses can equip themselves better to support company car and van drivers, as well as other employees, to switch to an EV.

The Government's Workplace Charging Scheme (WCS) has provided funding for the installation of workplace charging, allowing recipients to claim for multiple charging sockets across multiple sites with a single voucher. The scheme has been successful. Each year since its inception in 2016, the number of sockets installed using the scheme has increased. This was even true in 2021 following the reduction in grant funding in April 2020. Most businesses have used the scheme to install just one or two sockets per location. Going forward, the Government has decided to refocus the WCS towards businesses that need it most before phasing it out entirely. In the long-term, funding workplace charging schemes will have to finish, for the simple reason that the financial demand on the public finances will become too high (particularly considering that publicly accessible charging is not eligible for funding through the scheme). Instead, the Government should prioritise removing the barriers and unnecessary costs associated with charging installation for businesses.

2.1. Key findings of the Cenex report

The best estimate for the number of workplace chargers in the UK is 33,000, slightly more than the total number of public chargers on the UK network. By not counting workplace charging in assessing the wider UK EV charging network, the availability of infrastructure has clearly been underestimated. Although much of this is for private use by employees and fleets, it provides a crucial top up to the UK's public and home charging network potentially supporting the transition of millions of commuters, company car and van drivers.

The analysis has shown that for businesses with their own fleets, especially those that do high mileage, deploying workplace charging is an easy business decision: the reduction in operational costs for the vehicles covers both the higher upfront price of the vehicle and capital and operational costs of the charging infrastructure. By allowing staff and visitors to use this infrastructure when not in use by their own fleet (e.g. restricting fleet usage to overnight charges only, allowing staff and visitors to use during the day), the business case can become even more attractive.

The financial business case for workplace charging for just staff and visitors is less clear, however. In these scenarios, high utilisation rates and low energy costs would be needed to cover the investment, although potential solutions such as opening sites up to public or fleet use would cover these costs over time. Workplace charging for staff use could lead to greater staff satisfaction and retention, as well as be an attractive benefit to prospective new employees.

Prohibitive costs associated with installation and scaling up of some electricity delivery infrastructure contributes to the weaker business case in some scenarios. The cost of accessing and upgrading grid connections is a widely cited barrier by businesses looking to install charging infrastructure, particularly those looking to install depot-based charging for larger fleets. However, [Ofgem's Significant Code Review](#) has proposed to reduce the "contribution to reinforcement within the upfront connection charge for generation and removing it completely for demand", essentially meaning that reinforcement costs for shared distribution network operator assets will not be payable by the customer. Businesses will only be liable to pay for costs associated with their specific network. Once implemented in 2023, this will have a significant impact on costs and therefore help to strengthen the business case for workplace charging in all use cases.

The Cenex analysis also shows that the average cost per socket increases as deployment increases in scale, which may be inflated due to costs such as electrical cabling, new distribution equipment or civil engineering works or that customers with larger deployments have specific additions to design. This indicates that larger charging deployments don't benefit from economies of scale; however, this may also be due to businesses future proofing their charging needs by installing additional capacity that can be easily accessed as demand increases, as well as additional requirements on installations, such as for chargers to be "smart". Overall, the median cost of a workplace charging socket is just over £1,500.

3. Role of non-residential car parks

The Government has proposed that new and refurbished non-residential sites will need to install charging. However, by not implementing a legal requirement for an increasing share of charging to be installed at *all non-residential car parks* with 10+ parking spaces (aiming for 15% by 2030), the UK will miss out on a significant number of additional chargers. By only requiring new and majorly renovated sites to install charging, it's estimated that it would only mandate the installation of approximately 60,000 sockets by 2035, which is only 2-4% of the totals that are estimated if the whole of the UK followed the EU's Energy Performance for Buildings Directive's 2021 proposal (1 in 10 spaces with a charger for car parks with 20+ spaces), and 23% of the total expected from an unregulated market.

This proposal would help to remove one of the significant existing barriers to workplace charging installation; that many businesses lease their buildings and as such require landowner cooperation to install charging, which often is not straightforward. A requirement for all car parks to install charging would put the onus on the landowner.

The costs associated with the installation and management of the chargepoint would be covered by use over time and a commercial chargepoint operator could install and manage the equipment themselves if needed.

A way for car park operators, landowners and businesses to help cover costs of installation and management of charge points would also be for them to open up their sites to fleets for overnight charging. Although the majority of drivers have access to off-street parking to charge their vehicles at home, it still leaves a large number of fleet drivers that do not. Car parks may also be better suited to provide charging solutions to larger vehicles, such as vans, compared to on-street or driveway charging due to the space available. Enabling fleets to use empty car parks will help increase utilisation rates of charge points and provide additional income to car park operators.

A business could also explore opening up their sites to the general public in order to generate additional revenue and provide societal benefit, although this could come with additional security issues for some sites.

4. Shared private charging

There are increasing numbers of shared or community charging systems, where charge point hosts can rent out charge points to the general public and fleet drivers, setting available hours as well as payment and usage conditions. Typically they have been used to date to enable homeowners to rent out their private charger to people in their neighbourhood, but the idea can be (and is already in some cases) easily used by businesses with car parks. Using these types of systems would allow workplaces to reserve charge points for staff and visitors at certain times of the day, but open up availability to nearby residents and fleet drivers who don't have access to off-street parking in the evening and overnight.

One example of this is shared charging site [JustPark's](#) "JustCharge" that enables spaces to be listed on their site and to be booked in advance by EV drivers needing a reliable place to charge. Just Park's "FleetCharge" program supports fleet drivers to find overnight charging solutions 10-15 minutes walk away from their home, either by reserving a spot for a driver every day or sharing that slot with other fleet drivers in their area. As well as driveways, JustPark identifies non-residential parking spaces that could be used by fleets.

If solutions such as these are scaled up, they can play an important role in ensuring that charging at non-residential sites is well-utilised and generates revenue for the landowners over time. Platforms like these will help to manage utilisation through booking systems and help to advertise slots to wider audiences.

[Zap-Map estimates](#) there to be around 400,000 residential charge points in the UK. Even if 10% of these joined a shared charging system, it would double the number of publicly accessible chargers available in the country, which would unlock the ability for many more people to switch to a BEV.

5. What is needed for 2030

The Government's role now is to set the UK up for success. The UK Infrastructure Strategy looks to try and achieve this, and the target of 300,000 public chargers by 2030 is about right. Calls from sections of the automotive industry and other sectors for significantly higher charging targets are ill-informed, and would leave the UK with thousands of under-utilised, stranded assets that would deter post-2030 private investment in the charging network.

There is no easy way of determining what will be needed over the next 8 years. Charging habits and patterns may develop over time as people adapt to charging from home; vehicle ranges may continue to improve; and car dependency and use may decrease. The number of chargers needed also partially depends on the share of plug-in hybrid vehicles (PHEVs) sold in the UK. To predominantly run in battery mode, PHEVs require a more extensive charging network (due to having a shorter electric range). Most PHEV models are also currently unable to use faster charging speeds meaning they are reliant on slow chargers. Meanwhile, almost all BEVs can use rapid chargers. Therefore, to avoid situations where drivers are unable to access a public chargepoint, the Government's targets should be flexible enough to respond to demand. Considerations should also be given to what is needed to encourage non-BEV drivers to switch, particularly for those that see access to infrastructure as a leading barrier. Although [less than 1% of existing BEV drivers want to switch back to an ICE vehicle](#), the charging network must keep ahead of demand in the coming years to eliminate some of the remaining perception barriers for those that have not yet made the switch.

The current absolute number of chargers installed may be adequate given the current number of EVs, but if individual areas do not keep up with the rate of installation required, then there will be problems as EV numbers start expanding greatly post-2025. Targeted support should therefore be given to areas that have low uptake rates, whilst taking into consideration that charging at non-residential sites - including

workplaces - can and should play a significant role in supplementing the wider public charging infrastructure. This support should be backed up by legally obliging local authorities to plan, publish and deliver local charging infrastructure plans. The Government's commitment to provide funding for staff in local authorities to deliver these plans is promising, but it remains to be seen how this funding will be allocated.

Last year, the UK Government [confirmed that it will introduce a Zero-Emission Vehicle \(ZEV\) Mandate](#), requiring manufacturers to meet increasingly stringent ZEV sales targets from 2024 to 2035, when all new vehicles sold must be ZEV. This regulation will enable the UK to more easily project the number of plug-in vehicles entering the market each year and, as a result, the number of chargers needed to support them.

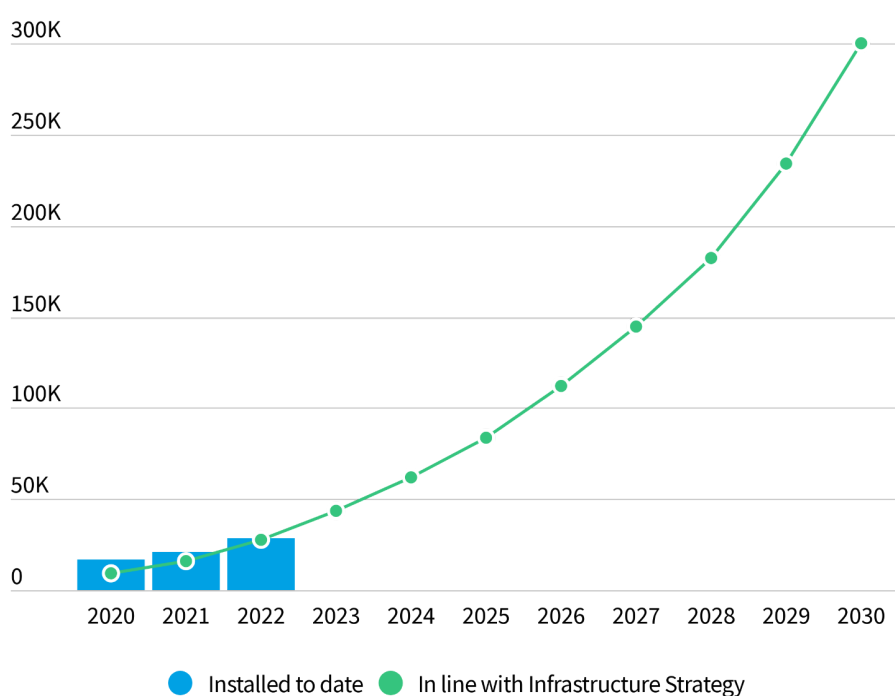


Figure 5. Projected growth of EV charging market each year in order to meet the 300,000 target outlined in the Infrastructure Strategy..

6. Delivering charging - conclusion

With the UK's charging network at a key stage of its development, it is the role and responsibility of the Government to ensure that we have a world-class charging network ahead of the end of sale of internal combustion engine vehicles in 2030. While the Government's role has to date largely been to facilitate early adopters and stimulate innovation, it must now become an effective regulator of the market. Contrary to criticism by some groups and commentators, the UK's current charging network is sufficient to support the EVs currently on the roads. But to ensure the EV transition can continue to accelerate at speed, the next 3 years are crucial to ensure that all regions have adequate coverage for anticipated

future numbers. Beyond then to 2030, the installations of charging in local areas, along major highways and at destinations must be scaled up significantly to meet the expected numbers of EVs entering the UK car and van fleet. With the proposed Zero Emission Vehicle Mandate, the UK will be able to better project how the EV market will expand over the coming decade. This will help to inform decision making on charging needs.

The EV Infrastructure Strategy showed some promising signs, with policies to ensure accessibility and interoperability at charge points for consumers and strong financial commitments to speed up delivery of charge points at local level. Other policies will boost the rapid charging network along the UK's strategic roads, while allowing room for private investments to grow the wider network. However, the Government must ensure that local authorities have a statutory obligation to plan for and deliver EV charging in their jurisdictions, in-line with local transport needs. That obligation must be backed by concrete measures of support, resources and policy direction from the Government to ensure consistency across all regions. Support must be directed to areas that have fallen behind in the early years to ensure fair and equitable access to charging infrastructure for people regardless of where they live. The lack of interim targets included in the Government's strategy is a disappointment and doesn't provide enough clarity to local authorities in charge of the delivery of much of the strategy. It is also concerning that the Government has set such a short timescale to spend the money committed in the LEVI fund - there is understandable concern that between now and 2025 is not enough time to spend £450m. The fund should rollover until the money is spent.

Destination charging, including at workplaces, will play a key role in the transition. For businesses with fleets, it is an easy decision to make to install charging infrastructure at their premises. Even for businesses without fleets, car parks could be utilised by other local fleets that are unable to charge at a depot or home. In both cases, enabling employees, visitors and even the general public to charge at certain times would provide higher utilisation rates of charge points and help to cover the costs. With the high costs of upgrading some grid connections being addressed, there is no reason why car park operators shouldn't be obliged to provide a small amount of charge points. By not mandating existing car parks to have to install charging, the Government is missing a big opportunity to ensure the public and home charging network is supplemented by additional sockets at workplaces and other non-residential sites, particularly when these sites could be utilised by fleets and local residents through shared charging systems.

For the Government to deliver a world-class charging network, we recommend:

- Setting yearly interim targets for the 300,000 public charge points target.
- Introducing statutory obligation on local authorities to plan and deliver charging infrastructure & provide clear policy direction for what local authorities need to achieve.
- Allow the LEVI fund to rollover after 2025 until the money is spent, to provide local authorities enough time to plan, deliver and spend the committed money.
- Directing the LEVI fund money to local authorities that have the most need.

- Requiring all non-residential sites with 10+ parking spaces to install charging infrastructure (15% by 2030).
- Removing remaining practical, administrative and unnecessary financial burdens to install charge points.

Further information

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