

# Charging Towards Productivity: Moving Past the Bump in the Road?

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## Abstract

This research uses a qualitative case study to investigate the challenges hindering the development of a digital public chargepoint infrastructure in England, vital for electric mobility transition and a net-zero economy. Despite acknowledged potential, this research uncovered compounding issues in the current context, including obstacles in equitably funding the deployment of on-street chargepoints, convoluted and uncertain governing and regulatory processes, and a lack of consistent demand and engagement with communities. Targeted orchestration by central government could help ensure an inclusive development of on-street charging infrastructure. Opportunities to support the sector include providing equivalent earmarked funding for all local authorities, clarifying subnational administration responsibilities and streamlining processes, and ensuring community engagement in the net-zero agenda.

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# 1. Introduction

The development of a digitally-enabled infrastructure of public chargepoints is urgently needed to facilitate the transition to electric mobility and to a net zero economy.<sup>1</sup> The productive potential of this new infrastructure is recognised.<sup>2</sup> It promises to open up new pathways for future innovations, productivity growth and business opportunities, and to support all cities and regions evenly, ensuring inclusive growth. However, the case of England points to significant obstacles in the development of the nascent industry for designing, financing and installing chargepoint infrastructure in a manner that is conducive to inclusive and sustainable growth. Observed problems include the spatial unevenness of chargepoint infrastructure, under-resourcing of local authorities (as the key procurement actor), instability, incoherence and uncertainty in central government policy on net zero and, relatedly, precarious incentives for private sector investment.<sup>3</sup> Without a much-needed change in policy and practice, mass adoption of electric vehicles is likely to be stymied<sup>4</sup> by the under-development of a public chargepoint infrastructure, hampering England's competitiveness.

A well-developed charging infrastructure is important for productivity because it can catalyse economic growth by creating jobs and fostering innovation in the electric vehicle and energy sectors while reinforcing a country's commitment to sustainability.<sup>5</sup> Reducing dependence on imported fossil fuels ensures energy security and economic stability, which further supports long-term economic productivity as it removes oil price-related fluctuations.<sup>6</sup> Phasing out petrol and diesel cars could have detrimental effects for productivity in a transition to a net-zero economy, unless enough public chargepoints are available across the country. Only with an extensive public charging network will all parts of the economy be able to make the transition to electric mobility and adopt electric vehicles for a myriad of purposes. Overall, the

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<sup>1</sup> See United Nations EMG (2022) International good practice principles for sustainable infrastructure. Second Edition. UN environment Programme. Accessed at: <https://www.unep.org/explore-topics/green-economy/what-we-do/sustainable-infrastructure-investment>.

<sup>2</sup> Alanazi et al 2023; Local Government Association 2020

<sup>3</sup> E.g. LGA (2021) Scoping the role of local authorities in the provision of EV charging infrastructure. London: Local Government Association; EY (2023) Six essentials for mainstream EV adoption. EY and Eurelectric; Which survey (2022) available at <https://www.which.co.uk/news/article/major-flaws-in-charging-infrastructure-causing-headaches-for-electric-car-owners-aPxzp7j9dntf>.

<sup>4</sup> Globisch et al. (2019); Illmann and Kluge (2020); Schulz and Rode (2022).

<sup>5</sup> Küpper et al 2020

<sup>6</sup> Alvis and Sissons 2020; Conzade et al. 2022

development of net-zero infrastructure promotes green growth that is necessary to protect the natural environment and provide pathways for future business development and investment.

Recognising the importance of electric mobility for future productivity, the Productivity Institute funded original research on the rollout of public on-street chargepoints in England. Public chargepoints are the bedrock of the infrastructure and include on-street locations (such as lamp posts) as well as all publicly accessible car parks (including supermarkets and motorway services, for example). They do not include private chargepoints associated with private residences or workplaces designated for employees and designated visitors. This TPI research report draws on interviews with representatives of the main organisations involved in the deployment of public on-street chargepoint infrastructure in England – namely, local authorities, central government agencies and chargepoint companies. We conducted 35 interviews for this report; See Appendix A for more details. These original data are supplemented by secondary data, including central and local government strategy documentation, organisations’ websites, media coverage and publicly available reports, and interviews with a range of stakeholders.

Our empirical analysis reveals three key issues that hinder rapid and inclusive development of a digitally-enabled infrastructure of public on-street chargepoints:

1. **Pocketed investment reinforces inequalities.** Central government designed the initial rounds of competitive funding for the installation of public chargepoints with a focus on the deployment of capital. Only those local authorities with a capacity to take on high levels of reputational and financial risk could capitalise on the funding provided through the competitive bidding process, leading to cumulative advantage in bidding compared to other authorities that fell further behind, generating a growing divide in access to public chargepoints.
2. **A ‘private-sector-first’ policy approach has crowded out local government.** In emphasising private sector initiative to deliver the public chargepoint infrastructure, the government has not adequately considered subnational governance and administration of the rollout of the charging infrastructure nor incorporated local authority expertise (including their statutory responsibilities for governing the public space). This ‘crowding out’ of local government agency has (intentionally or unintentionally) made private sector collaborations with local authorities unnecessarily complex, undermining prospects for a nationally sustainable infrastructure.

3. **Race to market domination versus participation in governance.** Chargepoint companies are tasked with encouraging uptake of EVs while seeking market dominance. Conflicting ‘temporal frames’ mean chargepoint companies and local authorities often focus on future need, which risks downplaying the realities of current levels of local resident needs and their resistance. Examples of company actions to work with and understand the needs of local communities are welcome, yet the race for market domination coinciding with the need to gain a return on private investment undermines the relationship with communities and potential adopters of EVs, slowing the growth of profit margins.

This TPI Insights paper is organised as follows. Section 2 begins with an overview of the current status and characteristics of England’s chargepoint infrastructure. Section 3 assesses the regulatory context, business models and mix of actors associated with the rollout of public on-street charging infrastructure. Section 4 analyses our research data to address our key question - What factors are hindering the development of sustainable infrastructure in England? Finally, section 5 concludes with three key policy recommendations.

## 2. Charging Infrastructure – Current State and Characteristics

In England, the public charging infrastructure constitutes a complex and fragmented sector, which involves several sub-sectors, evolving regulatory standards, emerging business models, and advancing technology. Myriad stakeholders, including central and local government, private firms, and individuals, have an interest in its development. Nevertheless, the pace of the rollout has been identified as a key bottleneck in the transition to net-zero mobility.<sup>78</sup> In the following sections (2.1, 2.2, 3) , we provide an overview of the current state of the charging infrastructure, more generally, before narrowing our focus to the public on-street charging infrastructure. We provide an overview of the different types of chargepoints that constitute the public charging infrastructure before detailing the current state of rollout. We argue that, so far, the public charging experience has been uneven for motorists particularly those without access to off-street charging. Although there has been a recent expansion of the

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<sup>7</sup> See SMMT (2022) Delivering consumer-centric charging infrastructure

<sup>8</sup> OZEV (2022) Taking Charge

infrastructure, the delivery has not been comprehensive, with on-street charging warranting particular attention.

## 2.1 Uneven Charging Experience Complicates Rollout and Adoption of EVs

Unlike traditional petrol and diesel refuelling stations, charging speeds for EVs can vary based on the vehicle type, battery charge status, and chargepoint technology. This diversity in hardware alters the way we think about refuelling habits. EV adopters face a more complicated picture for recharging as they must navigate the different options available. Charging is different from traditional refuelling, and so charging behaviour is evolving and will continue to change. This difference makes predicting the number, location, and types of chargepoints challenging.

Experts who we interviewed for our research mentioned that behaviours around refuelling would need to change as people transition from seeing refuelling as always occurring during their travels to generally happening during dwell times (i.e., car park, workplace, or residence). A chargepoint company argued that it was important for people to understand that ‘this isn’t a light for a light’.<sup>9</sup> The government clearly states in the strategy document *Taking Charge* that predicting the future of refuelling is difficult due to ongoing technology innovations and nascent adoption rates.<sup>10</sup> While extant research has mainly focused on the technical aspects of charging (see Pagan et al 2019; Ashfaq et al 2021; Metais et al 2022), our study underscores the importance of the social dimension. Specifically, the adoption of electric vehicles and charging technology will necessitate a shift in human behaviour.

Understanding how behaviours will change not only plays a crucial role in facilitating the societal acceptance of this technology but also provides valuable insights for driving further technological development. Even if other approaches prove more economical or technologically efficient, expectations regarding the technology will shape its future development. For example, the expectation of being able to charge at home influences the development of residential charging infrastructure. International comparisons and learning also become challenging due to variations in cultural factors such as driving frequency,

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<sup>9</sup> Interviewee 9

<sup>10</sup> Department for Transport (2022)



access to off-street parking, and the willingness of individuals to cooperate within shared spaces.

Drivers' access to different charging devices will affect the longevity of their EV's battery and their convenience. Charging devices are generally categorised by speed, or power rating, into four types: 3-8 kW, 8-49 kW, 50-149kW, and 150+ kW.<sup>11</sup> While rapid and ultra-rapid chargers (50+ kW) offer faster recharging, they are more expensive, too, and frequent use can adversely impact the health of the EV's battery. Consequently, they are typically seen as suitable for long journeys or when drivers need a shorter break. Ultra-rapid chargers are furthermore limiting because, currently, only premium vehicles can be charged above 100kW. Charging devices between 9-49kW increase charging time by about 2 to 4 hours but they reduce cost and impact on the battery. Slow chargers of 3-8kW are cost-effective and have a minimal impact on the battery; yet, they require a significant amount of time to charge, often necessitating extended dwell times, such as overnight charging.

Access to chargepoints further diversifies the charging experience, particularly as they are further categorized into private and public chargepoints. This report focuses on public on-street charging. Box 1 describes the differences.

### Box 1. Private and public chargepoints

#### 2.1.1 Private chargepoints

- **Home charging:** charging EVs at residences, typically using dedicated chargers installed in private driveways or garages, offering convenience and cost savings. Some home chargers are now being shared in the form of 'community charging'.
- **Workplace/depot chargers:** not open to the public and exclusively installed for the use of employees, business visitors, and back-to-base fleets or depots.

#### 2.1.2 Public chargepoints

- **On-street residential chargers:** catering to residents without off-street parking or those unable to install private chargers and located near or within neighbourhoods/residential areas. Many are stand-alone units thus introducing new 'street furniture', while others are integrated into lampposts or are retractable units.

These chargers are owned by chargepoint operators or local authorities. Charging usually occurs overnight and requires high dwell times as power generally ranges between 3 to 22kW. On-

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<sup>11</sup> These charging categories correspond to the updated Public Charging Regulations, which have replaced the previous designations of slow (3kW – 6kW), fast (7kW – 22kW), rapid (25 kW – 50 kW), and ultra-rapid (150 kW).

street charging is public in two ways: located on public or local authority owned land and accessible to the public.

- **Destination chargers:** offering opportunistic charging while engaging in other activities, found in private or public car parks including parks, train stations, supermarkets, malls, and hotels. Their power generally ranges from 7 to 50kW. Property owners can choose to offer them for free, recoup electricity costs, or attempt to profit from them financially. Operation is often outsourced to chargepoint operators as charging-as-service. In the case of private car parks, there is generally an incentive to attract EV drivers to the business hosting the chargepoint. Destination charging is always accessible to the public but only sporadically located on public land. In the On-Street Residential Chargepoint Scheme (ORCS) funding, allocated in 2022 to 2023, local authorities were allowed to apply for chargepoints situated in car parks including private ones. This was done to recognise that some local authorities, particularly rural ones, may need to use communal space such as village hall associations.
- **Forecourt/hub/motorway charging:** serving transient traffic with short dwell times, aiming to replicate the previous refuelling experience before returning home or embarking on a trip.

The diversity of charging options complicates the development of a national infrastructure for public charging. Central government in England predicts that a majority of drivers will do most of their charging at home. Public charging is mainly for drivers without off-street parking at home and for those who are en route to charge their EVs.<sup>12</sup> Some communities might therefore depend less on the deployment of on-street public charging than others. Overall, the wide range of chargepoint hardware and potential locations complicates the deployment of the charging infrastructure and it increases uncertainty both for those investing in its deployment and for those using it.

## 2.2 Rollout of Public Charging

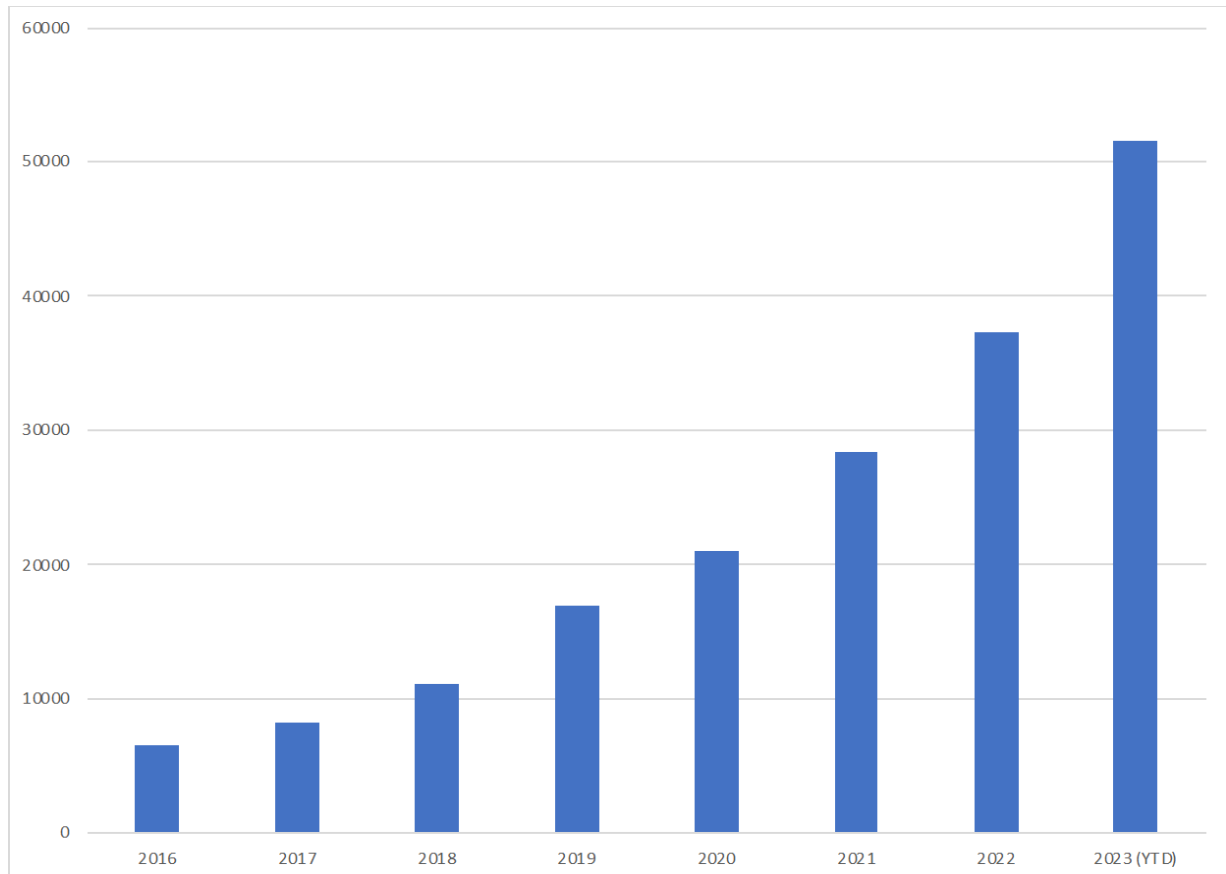
The rollout of the public charging infrastructure ensures that drivers can recharge their vehicles when they do not have access to private charging. The transition to electric mobility requires a charging infrastructure that can meet current customer demand and inspire adoption while also being future proof to meet future demand and expectations around smart and flexible charging services.

Over the past years, the UK, particularly England, has witnessed significant growth in its public charging infrastructure. According to ZapMap, from the end of 2016 to 2022, the

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<sup>12</sup> Taking Charge (2022)

number of chargepoints surged from 6,500 to over 37,261 devices. From the end of 2021 to the end of 2022, the UK incorporated more than 8,600 new chargepoints, marking a 30% growth in the infrastructure. As of October 2023, Zapmap recorded 51,516 chargepoints across 30,360 locations, with 1,634 additions in September alone to the Zapmap database (see Figure 1).



(Source: ZapMap data. Updated October 31, 2023)

**Figure 1:** Number of public UK charging points

Our research explored on-street charging. In our interviews, participants often argued that offering affordable and convenient charging near residential areas is challenging but crucial to promote EV adoption and ensure an equitable transition by providing cost-effective and efficient recharging options for communities. Those who have access to charging at home or near their residence (e.g., through public destination or on-street charging) will face an easier transition because they have access to cheaper charging. One chargepoint operator stated a common motto in their organization:

*...faster isn't necessarily better, but it is always more expensive. There are times when it is better, and there are times when it isn't at all, but it will always be more expensive.*<sup>13</sup>

On-street residential charging offers further convenience for those unable to charge at home because it reduces the distance between car and residence. As a business that had adopted EVs relayed:

*It sounds really stupid, but it didn't occur to us until, most of our managers live in houses where they can charge. (...) the grounds maintenance operatives (...) a lot of them are living in flats or in terraced houses and they don't have charging access at home. (...) it was like 50% were living in places where they couldn't charge at home.*<sup>14</sup>

Data from early October 2023 shows that destination chargers account for 45% of all charging locations, while on-street chargers make up 38%. The remaining part includes en-route charging (7%) and semi-public charging (10%), which could have some access restrictions such as workplace car parks.<sup>15</sup> Of these chargers, 82% are rated 22kW or lower with the remaining 18% rated above 22kW.<sup>16</sup> For comparison, as of 2023, the Netherlands has 147,340 chargepoints with 97% of chargepoints rated 22kW or lower with the remaining 3% including chargepoints above 22kW.<sup>17, 18, 19</sup>

While there has been increased growth in the deployment of chargepoints, significant regional disparities remain (see Figure 2).

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<sup>13</sup> Interviewee 13

<sup>14</sup> Interviewee 5

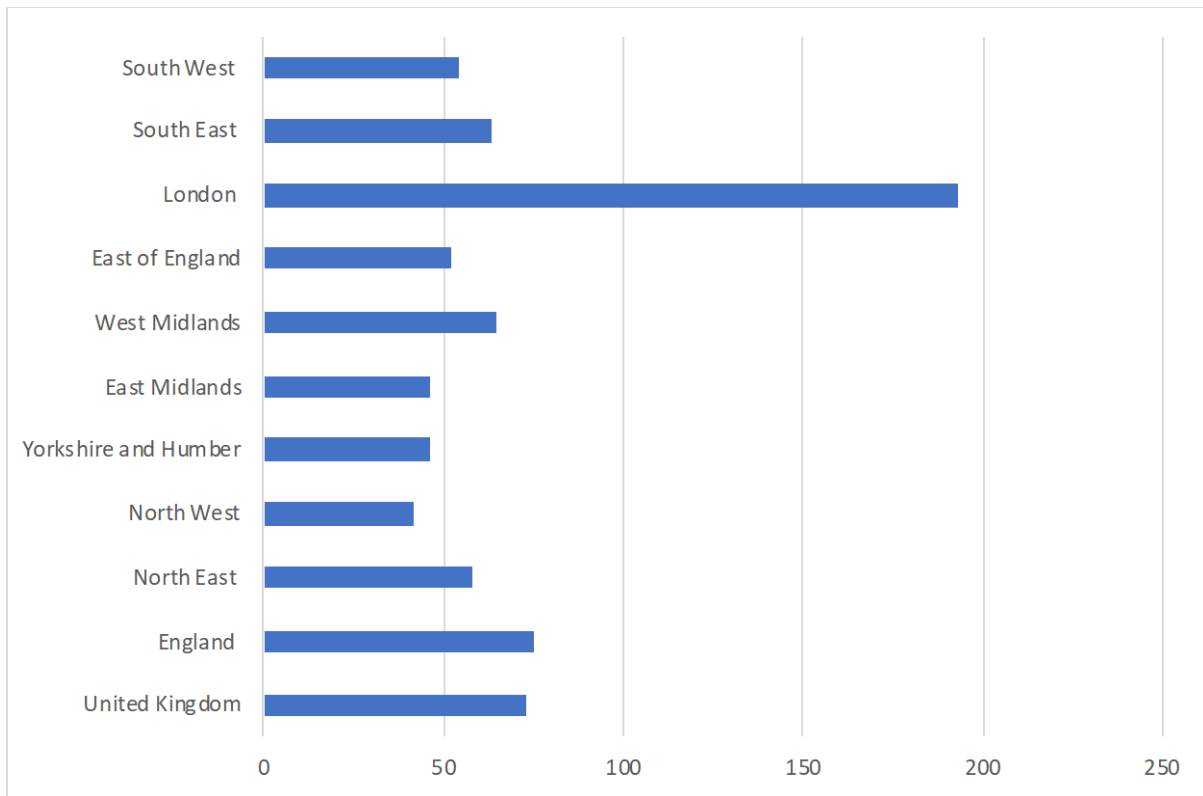
<sup>15</sup> DfT (2023b); Zapmap statistics September 2023

<sup>16</sup> DfT (2023b); Zapmap statistics September 2023

<sup>17</sup> Netherlands Enterprise Agency (2023) Electric Vehicles Statics in the Netherlands

<sup>18</sup> Important to note is the Netherlands Enterprise Agency has different breakdown of charging speeds differentiating only between 'regular'  $\leq 22\text{kW}$  or 'fast'  $>22\text{kW}$ , while the U.K. currently has four.

<sup>19</sup> This is not meant to offer a direct comparison in terms of the speed of the rollout; rather, it highlights how countries have approached the rollout differently. The Netherlands, as in the example, has dedicated significant resources to ensure the deployment of standard chargers (3-22 kW). In 2022, the UK ranked lower than the United States, Germany, Sweden, and Denmark but higher than France and the Netherlands in terms of the ratio of plug-in vehicles to charge points (see IEA 2022; FT 2024). However, in markets characterized by widespread availability of home charging (e.g., the United States), the number of EVs per public charging point can be relatively high.



(Source: Department for Transport, 2023b; ZapMap data. Updated September 31, 2023)

**Figure 2: Public chargepoints per 100,000 of population by region**

According to government estimates, by 2030, there could be up to 10 million EVs on the road.<sup>20</sup> To ensure sufficient charging infrastructure for these vehicles, the government predicts that a minimum of 300,000 public chargers is needed.<sup>21</sup> Achieving this goal by 2035 would require an approximate sixfold increase in the current number of chargepoints.

The high diversity of charging options complicates the deployment of the charging infrastructure. That is, it leads to a hyper-localization of the infrastructure while it should also meet the needs of the national economy. For public charging on public land, deploying the infrastructure also requires coordination with local authorities, as they have responsibility for the management of this land. Regional disparities in the rollout raise concerns that a localized infrastructure will fail to meet the demands of a nationwide transition to electric mobility.

The transition to net-zero transport is important in its own right providing the opportunity to design more resilient infrastructure, ensuring healthier communities, and encouraging more sustainable business practices (Hannon et al 2022; LGA 2020). Charging infrastructure will

<sup>20</sup> OZEV (2022)

<sup>21</sup> OZEV (2022)

therefore become part of the national infrastructure, ensuring that communities can adapt to sustainable mobility. As more people adopt EVs, residential charging (at home or on-street) will become a key utility. However, the failure to ensure inclusive and equitable access may lead to limited opportunities for mobility for people, businesses, and public institutions, such as blue-light services, that are dependent on failing or non-existent infrastructure, thereby constraining productivity. It is important, therefore, to understand how the context has shaped the transition to electric mobility, both at national and local levels.

### 3. How the regulatory context, business models and mix of actors shape the deployment of a public chargepoint infrastructure

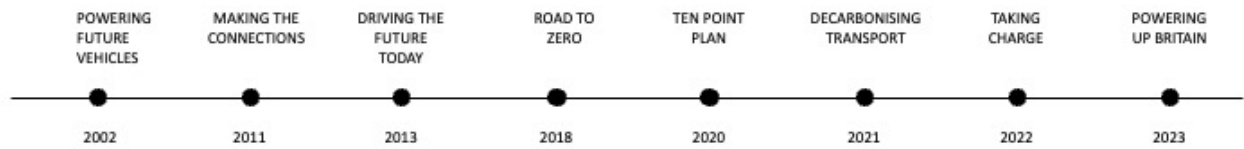
Given the many options to charge EVs, countries will need to develop a charging infrastructure that meets the needs of citizens based on the viability of home and workplace charging. This section delves into the approach that central government has taken to roll out the public charging infrastructure. First, we explore how central government has set the direction by presenting a chronological overview of the main strategies and policies. We show how central government has sought to encourage private sector initiative; that is, it intervenes in cases of market failure, convened actors, and only recently has started regulating the public chargepoint sector. Next, we detail how local conditions have shaped the rollout of public on-street charging. We emphasize that a bottom-up approach to infrastructure development is affected by local authorities' resources, capabilities, and interests. We also show how chargepoint companies have approached these conditions. We conclude by explaining how the interests, resources, and capabilities of these different actors intersect.

#### 3.1 Policy Context

Central government has shaped the transition to electric mobility through a series of strategies and mandates that focused on inspiring private sector initiative. Given the complexity of the transition, the government has also encouraged local initiatives to test a range of solutions. The government emphasised that their role would be to encourage private sector initiative, intervening only where private initiatives failed.

A central government official explained that central government saw its role as divided between 'crunchy' and 'softer' bits: the crunchy related to funding market failures and implementing necessary regulation and the softer referred to their role in influencing relevant

actors. Figure 3 presents a chronological overview of the main government strategies and policies that frame how central government has sought to stimulate action from the private sector and local authorities, both key actors in the rollout of on-street charging.



**Figure 3:** Policy Context Key Strategies Timeline

In 2002, central government initially set the direction towards low-carbon technology for mobility through the *Powering Future Vehicles* initiative. This strategy aimed to incentivise the private sector to prioritize the development and adaptation of innovative vehicle technology and fuels, as central government saw an opportunity for the UK to 'lead the global shift to clean, low-carbon transport.'<sup>22</sup> In 2009, to support this strategy, the Office for Low Emission Vehicles was founded to provide a bridge between the Department for Energy and Climate Change, the Department for Business Innovation and Skills, and the Department for Transport.

By 2011, the central government had narrowed its focus to plug-in vehicles. In *Making the Connection*, it argued that charging would occur primarily in the workplace and at home. Public charging infrastructure would only be needed to fill gaps in the provision. To test different approaches to public charging, the Office for Low Emission Vehicles (OLEV) implemented the Plugged-In-Places scheme which provided £30 million in matched funding to regional schemes, inviting local governments to apply with partners.

In 2013, a follow-up strategy titled *Driving the Future Today* reiterated that the government's role was one of addressing areas where the market alone may not yield optimal results within the shortest timeframe. As such, the government invited local authorities to participate in a second round of bids for funding aimed at supporting the installation of chargepoints in residential streets and public sector car parks.

<sup>22</sup> HRM Government (2002) Powering Future Vehicles. p. 4

In 2017, facing public health concerns and legal actions around air quality, the government announced a plan to ban the sale of new petrol and diesel cars by 2040.<sup>23</sup> Recognising the need for a better developed charging infrastructure in residential areas to encourage EV adoption, the government introduced the On-Street Residential Chargepoint Scheme (ORCS). To encourage private investment, the Chancellor of the Exchequer also announced a new EV charging infrastructure investment fund in partnership with the private sector. In 2018, the **Road to Zero** strategy reaffirmed the government's ambition to position the 'UK at the forefront of the design and manufacturing of zero emissions' vehicles confirming the deadline for all new cars and vans to be 'effectively zero emission' by 2040.<sup>24</sup> In the **Road to Zero**, the government confirmed that £4.5 million in grant funding would be available until 2020 for the ORCS programme and emphasized the crucial role of local authorities in the rollout of charging infrastructure on publicly owned, residential streets. Funding was also allocated to the Energy Savings Trust to support the dissemination of best practices to local authorities and the launch of an R&D programme of up to £40 million by 2018 to develop and test innovative on-street charging solutions.

In the **Ten Point Plan** (2020), the government confirmed £1.3 billion in funding to accelerate the rollout of charging infrastructure, focusing on rapid chargepoints on motorways and major roads and installing more on-street charging. With this funding, the government hoped to encourage EV adoption and reduce range anxiety. In 2020, Prime Minister Boris Johnson brought forward the ban on the sale of new petrol and diesel engine cars to 2030. In line with these ambitions, OLEV was rebranded to the Office for Zero Emission Vehicles (OZEV). In 2021, the government positioned the electrification of cars at the core of the UK's net-zero policies as part of the **Decarbonising Transport** plan. However, car manufacturers expressed concerns about a lack of charging infrastructure as a significant barrier to EV adoption.

Responding to this, in 2022, the government released the **Taking Charge** strategy, describing the UK as the 'vanguard' of decarbonizing transport. By confirming the extension of the ORCS funding and launching the Local EV Infrastructure (LEVI) funding, the government reiterated its role as the one reducing barriers and ensuring that private initiative is more straightforward. In 2023, the government released the Public Charge Point Regulations which

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<sup>23</sup> Pickard and Campbell (2017)

<sup>24</sup> Department for Transport (2018) The Road To Zero. p. 2



focused on improving the customer experience by providing targets around reliability and transparency of pricing. New public chargepoints of 8kW and above are required to offer contactless payment and data must be accurate and reportable. Chargepoint operators also need to follow the Open Charge Point Interface to ensure that data can be made available to government bodies, District Network Operators (DNOs), Transmission Owners, and Electricity System Operators.

These ongoing strategies of the government have provided some assurance to the burgeoning EV market, as seen in the growing private investment for the public charging infrastructure. Local authorities have also developed net zero transport strategies based on the overarching direction set by government and have used biddable funding to develop their infrastructure. However, Prime Minister Sunak announced in September 2023 a five-year delay in the plan to ban the sale of new diesel and petrol cars. Framing this decision as an effort to mitigate pressures on families and businesses struggling with the cost of living, Sunak stated that England's public charging infrastructure was underdeveloped.

### 3.2 Local Conditions Shape the Rollout of On-Street Charging

Our research found that local conditions, in particular, technical and commercial expertise and administrative capabilities and the presence of other low-carbon travel options, played a significant role in shaping the rollout of on-street charging. Local authorities play a pivotal role in the rollout as they are responsible for ensuring that the infrastructure responds to residents' needs, especially residential on-street chargepoints. They are also custodians of the public spaces where the hardware is based. Local authorities across England, however, have varied financial resources, administrative capabilities, and interest in net zero initiatives. The rollout of charging infrastructure requires new technical and commercial expertise.<sup>25</sup>

However, local government in England has been significantly impacted by underinvestment, which has led to a hollowing-out effect. Smaller and rural councils face particularly severe resource constraints. The centralization of funding from Westminster has left many councils struggling to provide essential services, even when they are now expected to support the

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<sup>25</sup> See Grimshaw et al 2023; Pinkse 2023 for more insight into the need for new skills and Net Zero commercial opportunities

delivery of public charging. A participant from a chargepoint company empathized with this conundrum:

*And therefore, where's EV charging in that list of that menu of things they need to get done? In reality? Of course, it's wherever the residents are shouting loudest. So, it is potholes? Is it bin collections? Is it child services? Let's be really honest. There's some really important stuff that local authorities are doing. Is EV charging as important at all? Compared to those other things? Probably not.<sup>26</sup>*

Moreover, the administrative capabilities required to implement technically novel innovation plans have been eroded. Within the rollout of on-street charging, local authorities must meet standards for equity, transparency, and accountability. They must go through the procurement process when hiring chargepoint operators and follow planning processes. Finally, they must mitigate reputational and political risks, while ensuring public interest. Yet, there are marked differences between local authorities regarding their human resource capacity and expertise as it depends on local interest in infrastructure and net zero initiatives.

Appetite for delivering public on-street charging also varies across local authorities, as it relates to several factors such as the presence of other low-carbon travel options, political and democratic interest in net zero initiatives, and concerns about relationships with communities. One local councillor highlighted a key concern around the monitoring of space near residencies:

*...what we don't like is people thinking they own the road, if I'm blunt about it. So, if we put a chargepoint outside somebody's house in a lamppost we're going to have difficulties managing those spaces because the people who live directly next to it are going to assume that space is for them, when actually it would be a public chargepoint, and there's concerns about how you manage the space.<sup>27</sup>*

Local authorities are necessary actors in the delivery of on-street charging. However, their financial resources, administrative capabilities, and interest in net zero initiatives varies greatly. These conditions shape the rollout of on-street charging given the localised nature of the infrastructure. Thus, public chargepoint companies must choose how they approach these conditions when attempting to build their businesses.

### 3.2.1 Chargepoint Companies' Role and Relationship with Local Authorities

Chargepoint companies choosing to enter the public charging market work with local authorities to deliver either destination or on-street chargepoints. This means that their

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<sup>26</sup> Interviewee 10

<sup>27</sup> Interviewee 23

current business models are inextricably connected to the local conditions. In other words, public chargepoint companies must be flexible in their approach and balance their private interests with responding to the local conditions. Our interviewees viewed deploying on-street chargepoints as the most challenging market, as they need to strike a balance between gaining scale to meet future uptake while maintaining current commercial viability and managing complicated relationships with local authorities.

Chargepoint companies need scale to ensure future profits while maintaining current commercial viability. While chargepoint companies deploying on-street infrastructure face high levels of bureaucratic processes, those able to gain long-term contracts with local authorities may gain monopolistic control over certain areas. It is currently unlikely that multiple chargepoint companies will deploy on-street charging on the same street. If chargepoint companies can build strong relationships with local authorities, they may be able to gain control over certain areas guaranteeing customers over the long term as drivers are unlikely to walk far to gain access to residential charging. Chargepoint companies aim to increase the utilisation of their charging points, not only to generate revenues from tariffs but also to open doors for future business models using the data generated by the digital infrastructure. As the transition to EVs shifts from early adopters to mainstream customers, chargepoint operators are likely to evolve into a commonplace utility service provider which addresses growing demand for reliable and convenient EV charging solutions.

Given the market approach, charging companies can seek out regions with greater adoption of EVs, generally centred around London. Charging companies have also become less dependent on government grant funding and the restrictions it imposes by securing private investment instead. This means that they will have more control over site selection. Current utilisation rates, however, provide thin margins. Chargepoint operators must carefully navigate achieving scale while gaining a return on investment. Unlike chargepoints on private land, where there is a clear incentive to install a chargepoint, companies rolling out on-street hardware must navigate public interests, inspire uptake to ensure future profits, and achieve commercial viability.

Compared to installing chargepoints on private land to deliver on-street chargers, charging companies must respond to bids and go through extensive planning processes which extends the rollout period. The chargepoint operators that we interviewed argued that while they saw

local authorities offering what they viewed as untenable commercial deals in the early rollout, most now went out to tender with accepted models, though expertise of local authorities still varied. A representative for local governments revealed that local authorities expressed concern over entering long-term contracts when the technology was still evolving.<sup>28</sup>

Interviewees from local governments however argued that there are now more resources and information-sharing networks to support councils which are seeking to roll out public charging.

Interviewees revealed that local authorities and chargepoint operators had iteratively developed business models for on-street public charging. In Box 2, we present the common models used by chargepoint operators and local authorities. Each model presents advantages and disadvantages in terms of the risk shared, resource intensity to arrange, and income generated for involved actors.

## Box 2. Business Models<sup>29</sup>

### 3.2.1.1 *Local Authority Owned and Operated*

- This approach fits under the more traditional contracting out of infrastructure development. Local authorities procure the hardware and software separately or together. The local authority retains full ownership of the charging infrastructure and collects revenue which allows it to have full flexibility on site selection, back-office operations, and tariffs. However, the local authority must fund this solution and cover ongoing operation, maintenance, and upgrade costs. There is a political risk associated with accountability to taxpayer money, particularly regarding stranded assets and unexpected costs, and reputational risks if the infrastructure is unreliable.

### 3.2.2.2 *Concession Models*

- This approach results in the development of long-term partnerships in which chargepoint companies become integrated into the design and delivery of local utility services. In this approach, chargepoint companies enter long-term contracts with local authorities based on the amount of funding provided. Chargepoint companies are increasingly offering fully funded concession contracts, where they cover most of the capital costs, fully cover operating costs, and retain ownership of the assets. Since this approach entails higher levels of commercial risk, chargepoint companies prefer larger scale projects over longer timeframes. They also expect to have greater control over site selection. Local authorities may also use grant funding from central government to ensure that underserved areas have chargepoints installed to promote EV uptake and guarantee a fair distribution. This 'matched-funding' or 'top-up' funding approach is often combined with a longer-term concession agreement, resulting in a profit-sharing arrangement that depends on the commercial model selected,

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<sup>28</sup> Interviewee 27

<sup>29</sup> See Energy Savings Trust (2020)

including revenue-sharing options or guaranteed rent for the local authority as chargepoint host. Local authorities must also consider the connection between the chargepoint and the electricity network. This connection can be handled separately, allowing the local authority to retain ownership, or through the concession contract. In cases where the chargepoint companies fund the below-ground infrastructure, it can charge for the use of the connection and enabling infrastructure, if the local authority decides to switch chargepoint operator at the conclusion of the contract.

In Table 1, we highlight how different interests and resources intersect providing the context that shapes the deployment of on-street charging.

**Table 1:** Key actors for on-street public charging rollout

	Central Government	Local Government	Charging Company
Interest	<ul style="list-style-type: none"> <li>Inspire green growth while reducing public spending on the development of the infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Meet strategic plans around net zero</li> <li>Improve economic and health outcomes for communities</li> <li>Improve access to electric mobility to the community, including disabled people and the elderly</li> <li>Gain a source of revenue</li> </ul>	<ul style="list-style-type: none"> <li>Decision-making based on market analysis of return on investment</li> <li>Support the uptake of EVs among residents without off-street parking to gain future customers</li> </ul>
Roles	<ul style="list-style-type: none"> <li>Provide funding to initiate market and respond to market failures</li> <li>Convene actors to respond to policy and implementation problems</li> <li>Encourage private sector and local government engagement</li> <li>Regulate to ensure a cohesive national infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Putting out a bid for chargepoint infrastructure</li> <li>Overseeing procurement and planning process</li> <li>Depending on contract, councils install, maintain and oversee chargepoints and underlying grid connections</li> <li>Analyse data on electric mobility to oversee development and rollout</li> </ul>	<ul style="list-style-type: none"> <li>Write a tender for the bid</li> <li>Depending on contract, install, maintain and oversee chargepoints and underlying grid connections</li> <li>Provide data to councils and government agencies</li> <li>Meet standards set by Public ChargePoint Regulations 2023 and set in procurement contract</li> </ul>
Resources and capabilities	<ul style="list-style-type: none"> <li>Dependent on Treasury budget</li> </ul>	<ul style="list-style-type: none"> <li>Dependent on Treasury budget (e.g. grants), council tax and fees and charges</li> <li>Developing technical expertise</li> </ul>	<ul style="list-style-type: none"> <li>Private investment</li> <li>Innovate UK Funding</li> <li>Profit generated</li> </ul>
Regions	<ul style="list-style-type: none"> <li>England with devolved transport policies in Scotland, Wales, and Northern Ireland</li> </ul>	<ul style="list-style-type: none"> <li>Geographic monopolies with different regional tiers of government depending on devolution deals</li> <li>Two-tier councils: county councils and district councils</li> <li>Single-tier councils: unitary authorities, metropolitan districts, London boroughs, City of London, Isles of Scilly</li> </ul>	<ul style="list-style-type: none"> <li>Dependent on chargepoint operators' application and winning of tender</li> </ul>

		<ul style="list-style-type: none"> <li>• 10 combined authorities alongside ongoing devolution deals</li> </ul>	
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The central government set the direction of innovation towards EVs, necessitating the development of the chargepoint infrastructure. The government's steering approach, which focuses on stimulating private sector initiative, while devolving responsibility for rollout to local authorities. This set up means that the on-street charging rollout is greatly affected by local conditions. However, England has faced significant challenges addressing spatial inequality that has exacerbated large gaps in regional productivity.<sup>30</sup>

#### 4. Three key factors hindering the rapid deployment of public chargepoints in England

In this section, we ask, what factors are hindering the rapid deployment of a digitally-enabled infrastructure of public on-street chargepoints in England? Overall, we identify positive instances of learning from local level experiments, yet these are overwhelmed by critical pressure points that result from incoherence in the orchestration of the transition to a public on-street chargepoint infrastructure. We identify three key obstacles.

First, the policy reliance on a competitive bidding process has exacerbated inequalities among local authorities, because it fails to recognise that some organisations were better resourced to capitalise on an iterative, and mostly collaborative, experimental approach to developing a digitally-enabled, public on-street chargepoint infrastructure.

Second, the government's focus on incentivising private sector initiative ignored the complicated and often convoluted structures of subnational administration . Our data suggest growing instances of local collaboration, which are mostly effective, but the absence of better informed and balanced administrative processes, boundaries, and roles is hindering the speed of deployment.

Third, chargepoint companies are tasked with incentivising uptake of EVs while attaining market dominance and ensuring a return on private investment. However, conflicting 'temporal frames' mean chargepoint companies and sometimes local authorities focus on

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<sup>30</sup> Westwood (2021) et al

future need, which risks downplaying the realities of current levels of local resident needs and resistance and makes compromise more difficult. This has had the unintended consequence of injecting uncertainty in planning for private sector investment, which is critical for long-term sustained transition. Moreover, it creates a combative relationship with some communities where chargepoint companies (and local authorities) hope to inspire adoption of EVs.

#### 4.1 Pocketed Investment: Leaving Regions Behind

From the government's perspective, a significant risk of the transition to net zero is that investing in the rollout of innovative infrastructure, which is technologically novel and rapidly developing, potentially leads to the creation of 'stranded assets' once the infrastructure no longer meets user needs.<sup>31</sup> This issue is compounded with on-street chargepoint technology, as it is embedded in public spaces outside residences. Given these challenges, central government used competitive funding processes to trial technology and business models across England to encourage chargepoint companies and local authorities (and sometimes other tiers of local government) to engage in experimentation.<sup>32</sup> This approach to some extent enabled England to test innovative approaches such as inductive and 'smart' charging,<sup>33</sup> provided chargepoint companies the opportunity to iteratively develop their business models and hardware, and allayed some concerns about the efficacy of this transition. There was – and remains – however an underdeveloped strategy for the diffusion of these innovations. By using a competitive funding approach, central government advantaged better-resourced local authorities as they had the opportunity to develop their infrastructure over time, resulting in a patchwork of infrastructure delivery across England. Recognising this issue, the government recently introduced LEVI funding that provides funding for capital and funding for local authorities to employ and train staff to plan and deliver the chargepoint infrastructure. Nevertheless, concerns remain that this funding is

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<sup>31</sup> See Building Digital UK (2023)

<sup>32</sup> We use 'local government' rather than local authorities as different tiers of local government could apply funding.

<sup>33</sup> Smart charging refers to charging a vehicle at times where demand for electricity is lower. Software on chargepoints can allow CPNOs to monitor and communicate with energy operators to ensure resilience of the grid and allow the driver to save money by charging at times when energy consumption is lower or there is a high amount of renewable energy on the grid. The future of this technology allows for energy stored in EV batteries to be exported and used to balance the grid. See: <https://energysavingtrust.org.uk/advice/smart-charging-electric-vehicles/>

inadequate to meet the needs of all local authorities and has failed to address underlying issues inherent to competitive bidding processes.

Given the novelty of chargepoint technology, local authorities deploying chargepoints take on high levels of reputational, financial, and political risk. Initial competitive funding for this transition solely focused on the deployment of capital. Only those local authorities with an interest, capacity and expertise to address these risks could capitalise on the funding provided through the competitive bidding process, leading to cumulative advantage in bidding compared to other authorities that fell further behind. One interviewee from a district network operator - a company licensed to distribute electricity - summed up this issue:

*So, we saw then some of the funding that was opened up and out of that emerged a couple of local authorities that had the expertise or experience and just the time to tackle some of these challenges. So you ended up with the likes of Oxford being one of the prime examples of really driving their way forward.<sup>34</sup>*

As of April 2023, On-Street Residential Charge Scheme (ORCS) had funded the installation of 4,235 public chargepoints with £16.1 million of grant funding, provided across 115 councils. Approved applications in London outnumber the rest of the country and account for 56% of approved applications.

Conversations with local authorities involved in many of these initial funding tranches revealed that they were able to iteratively develop their infrastructure as they continuously accessed funding, whether through Innovate UK projects or different biddable funding projects such as Go Ultra Low and ORCS. For example, one unitary council first deployed chargepoint technology using the Plugged-in-Places scheme. They were then able to upgrade, expand, and change chargepoint operators after winning Go Ultra Low funding. Interviewees also revealed that their councils providing time to learn about the technology and commercial models was integral to the development of their local chargepoint infrastructure. One interviewee commented that they understood that the approach their council had taken would be difficult for smaller or rural councils with less capacity.<sup>35</sup> Still, even these local councils were highly dependent on the funding provided; they were merely better prepared to go through the bidding process given their local expertise and experience. Interviewees from

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<sup>34</sup> Interviewee 17

<sup>35</sup> Interviewee 15



both chargepoint companies and local authorities emphasized that proactiveness often boiled down to engaged individuals in local authorities.

Despite their best planning, chargepoint companies nevertheless face the risk of having to take on ‘stranded assets’. As the government has encouraged a competitive, market-driven approach, early chargepoint operators that tried to gain an advantage in the market focused on deployment of hardware while the financing of ongoing development and maintenance varied between contracts with local authorities.<sup>36</sup> Interviews revealed that some local authorities struggled to maintain hardware or gain access to data during these initial rollouts.<sup>37</sup> Two government officials – one involved in the early implementation – revealed that expectations were that because the market was small, paying off the hardware was going to take time. However, they differed in their opinion about how difficult updating the technology would be. One argued that ‘it was not the end of the world’ if the chargepoint was underutilised as it could be easily updated, while the other said that it would be costly and also likely involve updating the underground grid connection.<sup>38</sup> Given that technology and need will evolve as motorists adopt EVs, chargepoint operators and local authorities must negotiate at a local level the problems related to adoption of stranded technology:

*A lot of local authorities who went early and bought both hardware and software are now suffering stranded assets and they may then win [award] a tender to us, but that area will come with some existing chargepoints, which is a pure software play for us to manage unless the worst has happened, and we have to take the hardware responsibility for them or even [take them] out.<sup>39</sup>*

The rollout and maintenance of on-street charging infrastructure necessitates an ongoing relationship where both chargepoint companies and local authorities (and other tiers of local government) can actively engage in the development of the infrastructure.

Central government decided on an iterative approach so that learning from experimentation could be shared among local councils, which did occur. However, there was - and remains - a knowledge gap. An interviewee from a public funding body articulated this concern as a regional issue, which particularly affected rural communities:

*So, there will always be some who are behind and some who are ahead, and the idea is that those who are ahead produce learning that will help those who are*

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<sup>36</sup> Energy Saving Trust (2020)

<sup>37</sup> Interviewees 2, 21

<sup>38</sup> Interviewees 18, 20

<sup>39</sup> Interviewee 7

*behind – that has always been the plan. Not sure it...again I am speaking out of turn – it was worked to some degree, but the conditions and the circumstances of different local authorities are not equally represented – very, very poor local authority for instance, local authority areas in very rural locations have very, very different needs for capabilities and capacity to the TFLs of this world and the Milton Keynes of this world that was built for a car, for instance. Compare that to Cumbria and there is no comparison whatsoever!*<sup>40</sup>

These sentiments were echoed by a chargepoint company interviewee who stated that the transition was London-centric.<sup>41</sup>

Central government recognised shortfalls in solely investing in capital. Thus, OZEV released LEVI funding that provides selected local authorities funding both for capital and the employment and training of staff to plan and deliver the chargepoint infrastructure.

Interviewees were generally positive about this approach as it allows local authorities to gain the human capacity to better integrate resources and learning. One government official aptly summed up the capability part of the fund as providing ‘leg power in the local authorities’ to ensure that all local authorities could equally capitalise on the transition.<sup>42</sup> This funding responded to the need of greater human resource capacity so that local authorities can effectively oversee the delivery of the installation of on-street chargepoints.

However, LEVI funding has a set period while interviewees consistently commented that this was a long-term change. A participant, aware of funding for charging infrastructure, related:

*Demand isn't there yet in necessary volume for the private sector to take on the continuing energy innovation role because even providing charging services now is not a profit-making exercise for anybody yet. The cost of the infrastructure and the low frequency of use massively kills the business model for now, and there is no firm opinion as to when those different business models will actually stack up still.*<sup>43</sup>

A lack of ongoing support for innovative approaches to charging may leave the UK dependent on older approaches to charging infrastructure. Besides, funding to support the deployment of public chargepoints only covers *new* hardware. This fails to recognise that some of the current hardware is not fit for purpose, placing the onus on chargepoint companies that are already operating within thin margins. One chargepoint company stated that the focus on new hardware failed to account for the need to provide a consistently well-maintained infrastructure:

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<sup>40</sup> Interviewee 18

<sup>41</sup> Interviewee 11

<sup>42</sup> Interviewee 20

<sup>43</sup> Interviewee 18

*It's [LEVI funding] very much focused on deploying new. I would argue if there's a charger that is not working or if so unreliable, replacing that is the same, right? If there's no capacity there now and the contract to maintain it expired four years ago, you're effectively creating the same thing. So, I would argue that, but I would say that we're a long way from that decision being made.<sup>44</sup>*

As well, LEVI funding inherently fails to address issues endogenous to using competitive bidding processes to allocate funding for infrastructure that needs to be rapidly and sustainably developed. The announcement of LEVI funding in 2021 delayed ongoing chargepoint procurement processes as local authorities established whether they could use LEVI funding. This delay has also affected the pipeline of new tenders as local authorities apply for LEVI funding.<sup>45</sup> Local authorities have a clear incentive to apply for funding as it provides them the opportunity to have greater say in the deployment of infrastructure as they can provide funding for capital. LEVI funding further incentivises applications as it ensures staffing for deploying chargepoint infrastructure does not come from other essential services. LEVI funding also provides local authorities the opportunity to upskill staff. This also reveals a tension, however, as staff hired using LEVI funding to oversee the rollout of charging infrastructure will still need to be upskilled. Tenders may therefore still widely vary and/or occur across a wide time period. This may make it difficult for chargepoint companies to strategically plan over the next few years.

Infrastructure is an investment that can generate long-term benefits including economic growth. Resilience is crucial in the development of infrastructure, ensuring its adaptability to evolving needs, a particularly significant aspect in charging infrastructure amid rapid technological advancements.<sup>46</sup> Resilience, simply defined, is the “ability to absorb and adapt in a changing environment”.<sup>47</sup> While local authorities may now have the resource to install the chargepoints, this funding only provides a short burst of momentum. The need to prioritise essential services due to limited financial and human resources will arise again without a more strategic, coordinated approach. Consequently, inequalities will become endogenous within the system as local authorities with more resources can maintain and

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<sup>44</sup> Interviewee 09

<sup>45</sup> See ChargeUK (2023)

<sup>46</sup> OECD 2021

<sup>47</sup> ISO 2018

develop their local charging infrastructure and provide a better service, ensuring resiliency. The overall result is a fragmented system resulting in stymied inclusive growth.

#### 4.2 Private sector first: Crowding out local government

The government's approach has consistently emphasised private sector initiative to deliver the public chargepoint infrastructure and to oversee the delivery of chargepoint services. In doing so, it has failed to adequately account for local authority expertise in local governance and, in particular, their statutory responsibilities for governing the public space within which on-street chargepoints are located. This approach has generated unintended consequences. In their collaborations with local authorities, chargepoint companies have needed to navigate a constellation of diverse local approaches to laws and administrative practices that circumscribe the delivery of infrastructure. These include differences in regional governance and varying levels of contractual and technological expertise within each of the authorities.

This complex and time-consuming process has hindered the rollout of chargepoints and slowed the pace of growth of company profits, which risks undermining confidence in sustained private sector investment. While local actors such as different tiers of local government are increasingly strategic and collaborative in their approaches, at the time of writing there is still no unified framework that adequately embraces the varied roles and responsibilities of local government in a way that bolsters secure joint initiatives between chargepoint companies and the range of subnational administrative bodies to ensure rapid and sustainable rollout of on-street public chargepoint infrastructure.

Central government has sought to play a steering role rather than providing a blueprint for how the infrastructure should develop. This is because central government viewed public infrastructure - particularly on-street charging- as a stopgap resource for drivers unable to access private charging. As stated in the 2011 *Making The Connection* strategy:

*'We do not want to see a chargepoint on every corner; this is an unnecessary and expensive approach to allaying range anxiety. The majority of recharging is likely to take place at home and at work, so an extensive public recharging infrastructure would be underutilised and require a level of public subsidy that is neither sensible nor affordable. Instead we want public infrastructure that is targeted at those places where it is needed and is commercially viable.'*<sup>48</sup>

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<sup>48</sup> Office for Low Emission Vehicles (2011) p. 42

One central government official argued that the private sector was better placed to deliver the infrastructure as *'government is slow and clunky at doing things'*.<sup>49</sup> Local authorities are therefore positioned as creating an 'attractive investment environment' for public charging rollout that will 'continue to be led by the market' while ensuring 'access to public charging infrastructure is widespread'.<sup>50</sup> However, as one of the chargepoint company interviewees put it, on-street charging necessitates more active engagement of the *'custodians of the public realm'* as the *'owners'* of the streets.<sup>51</sup> This engagement is made more complicated however by the often incoherent character of subnational governance that increases confusion and uncertainty within an already fragmented chargepoint market. While the government has provided strategies for how the transition should occur, it has thus far failed to develop a plan that considered the different tiers and statutory and democratic roles of local government that necessarily circumscribe the delivery of the new infrastructure.

The role for the different tiers of local government in the delivery of EV charging infrastructure has often been unclear. Within England, local government consists of at least one or two tiers of authorities. Two tiers include county and district councils that have different responsibilities while single tier includes unitary authorities, metropolitan boroughs, and London boroughs. There are also ten combined authorities that can be set up by two or more local authorities which does not replace existing authorities but gains various powers devolved by central government. Two tier local governments – often containing a mixture of rural and urban locations - have the relevant powers and responsibilities related to EV infrastructure separated between the two tiers. County councils have responsibility for highways and roads and parking, while district councils are responsible for housing and local planning applications; see Table 2.

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<sup>49</sup> Interviewee 20

<sup>50</sup> Department for Science, Innovation and Technology (2023) p.12

<sup>51</sup> Interviewee 12

**Table 2:** Types of Local Authority and Relevant Role in Deployment of EV Charging Infrastructure

Type of Authority	Relevant EV charging infrastructure responsibility/power
Highways Authorities (County, Unitary, Metropolitan boroughs, London boroughs)	<ul style="list-style-type: none"> <li>• Transport planning</li> <li>• Responsible for managing parking and street works licensing</li> <li>• Ownership of street lanterns</li> </ul>
Non-highways authorities (District, Unitary, Metropolitan boroughs, London boroughs)	<ul style="list-style-type: none"> <li>• Ability to set EV planning policies for new development</li> <li>• May be parking agency under parking agreements; local parking plans</li> <li>• District transport plans</li> </ul>

(Source: based on Local Government Association, 2021 )

Thus, chargepoint companies have to navigate a constellation of diverse local administrations to rollout their hardware and gain access to their end-customer, the EV driver.

This already complex environment is made more complicated due to a lack of cohesion within the different tiers of local administration. Our research suggests that different regions will have more or less cooperative relationships with contiguous councils and regional tiers of government. Interviewees described tensions within regions where there are two tiers of local government as the delivery of the new service necessitated coordination between county and district councils. While district councils might be interested in the rollout of some on-street charging, they might be unable to do so as they lack the authority. A representative for local government emphasised why this was a particular issue in England:

*‘Sometimes government departments don’t necessarily understand how the local authority sector works on a day-to-day basis. So they don’t understand, for example, what the different tiers of government do very well at the local level. So, if you’re looking at something like ORCS [original competitive bidding process for on-street charging] as an example, they would be looking to interface with the county councils, because they see them as the transport authority. But actually in reality, what you’re doing is putting charging infrastructure close to people’s homes. And that actually is a housing district’s responsibility and actually, knowing your neighbourhoods to that kind of micro level as to where to put things and where the pocket of lands are [for public chargepoints]. (...) [But], that’s quite a detailed level with central government - explaining to them, you know, that they might want to think about both layers, because the other thing is classically both layers of government don’t necessarily get on terribly well.’<sup>52</sup>*

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<sup>52</sup> Interviewee 27

The delivery of on-street charging intersects with several different local government powers and responsibilities that do not necessarily sit within the remit of one local authority. Central government's focus on creating a conducive environment for private initiative ignored the relationship between tiers of local government that would hold responsibility for overseeing the delivery of on-street charging.

Concurrently, local authorities will have varying expertise and approaches to tendering, permitting, and licensing processes related to EV charging infrastructure. Central government centrally sets the permits and licenses processes. However, local authorities will have different teams to oversee the rollout of charging infrastructure which leads to divergence in experience and expertise regarding the intersecting policies that affect the rollout of on-street charging. One chargepoint company, we interviewed felt that the siloed coordination affected scale and acceleration of the rollout:

*So, we have 418 local authorities all procuring their EV strategy independently. I think central government, that's a miss, and the same as in parking, the same as in various services.<sup>53</sup>*

This lack of streamlining and standardisation of the permit and licensing processes protracts implementation of the on-street charging infrastructure.

Despite the above evidence of non-coordination and varieties of experimentation, our evidence also suggests some local actors are working together more collaboratively to speed up the rollout. Some local authorities are increasingly working together across regions to deliver the charging infrastructure, including county councils coming together to discuss regional delivery. OZEV has also encouraged sub-national transport bodies to provide more strategic transport governance support, particularly around site selection. Alongside this are Local Net Zero Hubs that have transport working groups to support chargepoint infrastructure initiatives across the South East, South West, North West and North East of England. Thus, the network of actors needed to deliver the infrastructure underpinning the new service of charging are learning to work more collaboratively. In addition, central government has introduced Public Charge Point Regulations 2023 with the aim to provide a more coherent experience for consumers using public chargepoints. The regulations include transparency,

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<sup>53</sup> Interviewee 7

experience, data and performance requirements that were previously overseen at local levels.<sup>54</sup>

There is a growing consensus on the need for bottom-up initiatives driven by an empowered local government. While the 2022 *Taking Charge* strategy reiterates that most motorists in England have access to off-street parking, the strategy recognizes that this is not universal and so states that central government ‘will focus efforts on installing more on-street chargepoints, providing convenient and affordable charging, ideally on the street where you live.’<sup>55</sup> Recognising the need of on-street hardware in some areas, *Taking Charge* describes local authorities as ‘fundamental’ given their knowledge of local charging needs. A central government official echoed this sentiment stating that local authorities contained key knowledge about local parking, travel patterns, and topography.<sup>56</sup> However, there is a lack of clarity about how the various tiers of regional and local government will continue to work together particularly as further devolution occurs with more combined authorities and new roles for regional transport bodies and Net Zero Hubs. The idea that local government would be best placed to understand the needs of their residents has been noted. Nevertheless, the permitting and licensing processes remain centralised while failing to account for the changing structures of subnational administration and the intricacies of the novel chargepoint infrastructure that intersects current policies. Productivity in the public sector has often led to a focus on doing more with less, resulting in service reductions and poor policy implementation.<sup>57</sup> However, institutional instability and a lack of coordination may lead to a failure to address fundamental issues in developing this infrastructure that will further constrain economic growth and productivity.<sup>58</sup>

#### 4.3 The race to market security versus public interest, inclusion, and engagement

The government’s ‘private-sector-first’ policy approach has placed unnecessary stressors on the rollout of a public chargepoint infrastructure. Chargepoint companies are competing in order to secure a dominant market share by establishing a network of local authority contracts and sustaining commercial success. This race for market domination, however, is

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<sup>54</sup> See Public Charge Point Regulations 2023  
<https://www.legislation.gov.uk/ukdsi/2023/9780348249873>

<sup>55</sup> HM Government (2022) p. 3

<sup>56</sup> Interviewee 20

<sup>57</sup> Dunleavy 2021

<sup>58</sup> Westwood 2021



complicated by the fact that the rollout of on-street charging is also expected to incentivise uptake of electric vehicles. This means that chargepoint companies (working with local authorities) need to install chargepoints in locations where anticipated (future) demand is high to encourage uptake, yet residents' current actual demand may be low. Despite examples of company actions to work with and understand the needs of some local communities, as our evidence reveals below, a major tension remains at the heart of the matrix of incentives facing chargepoint companies and local authorities in the rollout of public chargepoints.

Chargepoint companies deploying on-street are tasked with balancing needing to encourage adoption and achieving scale to gain a return on investment and commercial viability. This has placed undue pressure on local actors to address citizens' rejection (in some areas) of the rollout of on-street chargepoints. Much of the *green growth* promise associated with this new infrastructure depends on achieving sufficient scale for on-street chargepoint companies - both in terms of the number of local authorities with which they have a contract (for chargepoint installation and services provision) and the volume of chargepoints within a local area. The government's approach to encouraging private investment has been partly successful; chargepoint companies have secured private investment to install on-street chargers. For example, Aviva invested up to £110 million in Connected Kerb, while the Zouk Capital managed Charging Infrastructure Investment Fund has invested in Charg.y, Zest, and Believ.<sup>59</sup> However, this focus on encouraging private investment without proactive, inclusive public engagement has led to precarity of the system as on-street chargepoint companies exist on thin profit margins. One chargepoint company stressed that the commercial deployment, not the technology, was causing a strain on the system:

*The big challenge becomes how do you justify investment for this? Because fundamentally you're exposed to a merchant risk for installing this stuff. And when you go into the market, it's going to funders and saying, "I want to deploy millions of pounds, billions of pounds worth of infrastructure". And then our hope is that people will get over the hurdle and adopt EVs and start using this".<sup>60</sup>*

Nevertheless, residents view public space – particularly outside of residencies - as a personal right within local communities. This means there are sometimes acts of local resistance – for example, to defend street parking capacity for residents without home parking. The problem is in part one of conflicting frames of temporality that is made concrete in the changing

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<sup>59</sup> See Connected Kerb (2022); Grundy (2021)

<sup>60</sup> Interviewee 09

nature of pavement outside of residencies. While residents typically defend their right to control public space of today, chargepoint companies are modelling likely public demand of the future. An interviewee from a chargepoint company articulated this dilemma:

*'Local authorities are not designed to roll out infrastructure. You know, a 35-year infrastructure programme per local authority - that pace, you know the government [capacity] isn't there, the decision-making process isn't there, so you get local authority residents who resist having charging points put there and we've had multiple occasions where we've been literally the diggers ready to go and the residents come out of the house and go, "No, you can't put that there!" And not quite laid out in front the digger, but not far off it. And we've had to pause and stop. At which point the local authorities [have] got to be determined if it is going to push through the political world that says, "No, guys, look, you are going to need this infrastructure"'.<sup>61</sup>*

Local authorities are compelled to navigate the intricate task of advancing infrastructure deployment amid potential discord with their local constituents and residents. Consequently, the rollout of public charging infrastructure becomes intertwined with local politics and electoral timetables. This dynamic exerts notable pressures on local authorities, that must concurrently uphold their democratic mandate and while remaining receptive to the interests and needs of chargepoint companies, as partners in the implementation of critical infrastructure.

Our interviewees expressed their concern that the transition to electric mobility is overly politicised and poorly understood, and local communities need to be better engaged. This issue was recognised as particularly pernicious to this transition as public benefits from the service, namely outcomes associated with achieving net zero, are long-term and difficult to measure for individuals and communities who feel that their current needs are underserved. Quite simply, they do not understand how the new charging infrastructure will work in practice. An interviewee from a chargepoint company stressed that this was a pertinent issue for their business:

*We win the contract with the local authority, all of the legal landscape is set up for us to install and we know there's power there and then we write to you, and say, "Congratulations, Britt. We're working with the local authority. We're coming to put a chargepoint outside your house". Nationally, Great Britain is not ready. I think there's lots of headlines, there's lots of great uptake, but the stats are still against us. An example again in [council], I would say the local residents of [council] are clearly not ready for the mass rollout of EV chargepoints. They have plenty of off-street parking and they see this as a constraint on the on- street*

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<sup>61</sup> Interviewee 10

*parking domain and an unnecessary constraint rather than any particular value. Now that's a broad statement. But what we're really suffering with is resident rejection.*<sup>62</sup>

The issue of resident rejection was felt to be exacerbated by negative press that highlighted difficulties with the rolling out of the public infrastructure and the price of EVs. Interviewees expressed the need for greater ‘championing’, ‘educating’ or ‘campaigning’ to clarify how the transition would occur and allay concerns around social equity issues.<sup>63</sup> One interviewee from a chargepoint company stated that people viewed this new service often as only working for a portion of the population:

*The biggest concern is where can I charge? And that concern comes from the people without driveways in the main and if you go to the voting, the electorate, that is two thirds of them say ... they don't believe that electrification of transport can happen because you can't gather your energy equally in an easy or low-cost fashion.*<sup>64</sup>

In light of these perceived challenges, chargepoint companies and local authorities have become increasingly strategic about their engagement with local communities. Chargepoint companies deploying on-street engage local communities during events with the aim to reduce concerns through conversation and to gain traction through visibility. One chargepoint company interviewee argued that engagement was extremely important for on-street chargepoints because the insight gained into the transition reduce uncertainty for communities and local government officials.

Local authorities also use consultations and interactive site selection maps to better understand current local demand.<sup>65</sup> A chargepoint company interviewee described the overall approach of engaging residents as ‘getting smarter’:

*'A lot we now see where we're bidding on new opportunities, they [local authorities] will have surveyed residents. So, their map where they say, "we want chargers, here, here, here and here is because we've had respondents' written response to surveys to say we would like a charger here. I don't have a driveway." So, we're getting a little bit more data led. (...) We're definitely getting smarter now'.*<sup>66</sup>

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<sup>62</sup> Interviewee 7

<sup>63</sup> Interviewee 10, 20, 24

<sup>64</sup> Interviewee 12

<sup>65</sup> See Greater Manchester site selection map: <https://electrictravel.tfgm.com/greater-manchesters-ev-strategy/>

<sup>66</sup> Interviewee 09

Over time, local authorities and chargepoint companies have learned to better balance the tension between commercial viability, securing a return on private investment, and the race to market domination, on the one hand, and, on the other, local authority accountability and its democratic mandate. Our research suggests that some chargepoint companies have move towards a longer-term partnership model where hardware is either designed to be scaled to meet demands, contracts stipulate extended implementation processes, or both. Nevertheless, the current formalised approach to engaging citizens is reactive rather than inclusive and participatory. The process of consulting with residents – either at the discretion of the local authority or as part of the statutory process – begins after the awarding of a contract and initial site selection discussions. See Figure 4.



**Figure 4:** On-Street ChargePoint Site Selection Process

The current approach engages citizens to determine whether they will reject a site that has been selected. This often creates a combative relationship with residents as citizens’ reject sites that chargepoint companies have predicted will have high (future) utilization. These sites may also have support from other community members who choose not to engage as they do not have problems to raise. While local authorities and chargepoint companies have begun more proactive engagement, consultations and public engagement activities are costly and time consuming for local authorities and chargepoint companies.

While the transition to EVs is often portrayed as inevitable, the absence of a clear government plan for the rollout of the necessary infrastructure has created challenges for local authorities and chargepoint companies. This lack of clarity not only places undue pressure on local entities but also results in inconsistencies in how they engage with the public. For chargepoint companies, experimenting with local engagement becomes increasingly difficult when returns are low, highlighting a core tension between their financial models and the government's mandate to evenly serve citizens.

Concurrently, scholars in sustainable business innovation, such as Pinkse et al. (2023), recognize that businesses face high levels of uncertainty in pursuing radical innovation, as it necessitates systemic and complex change. This uncertainty is evident in the adoption of EVs, where businesses which align with sustainable transport goals must ensure that drivers can conveniently access charging at home. The absence of this access not only affects individual drivers but can also lead to reduced productivity of communities, as individuals need to travel longer distances for work. Ensuring inclusive engagement is essential for a more equitable pathway to net zero. It goes beyond serving only those who can currently afford personal EVs and requires addressing the challenges faced by all communities. By doing so, businesses and governments can work together to create a sustainable and inclusive future.

## 5. The Way Forward

It remains to be seen whether the rollout of public on-street charging will result in a comprehensive infrastructure accessible to all or a fragmented system that further exacerbates inequalities. Research thus far has presented significant challenges for local government and industry, but there have been important learnings, too. We believe that the following three recommendations for central government can help support the delivery of a national public chargepoint infrastructure at the pace required.

1. **Provide equivalent earmarked funding for all local authorities.** Local authorities would benefit from having consistent long-term funds especially tailored for chargepoint infrastructure. While overseeing public charging is not currently mandated, local authorities must meet the 2050 mandate for net zero. Initial funding advantaged local authorities with the organizational capacity to bid for the new resources made available by the government. Yet, consistent funding is necessary to ensure that all local authorities have equal opportunity to develop their public charging infrastructure and capitalise on the benefits from the new services that it provides.
2. **Clarify responsibilities and streamline processes.** The implementation and regulation of the public charging infrastructure currently happen in silos which constrains pathways to net zero and green growth. There is much variation between the type and availability of public chargepoints across regions. While some of this variation

is the result of the early uptake and pilots, continuing this fragmented approach to the rollout risks being a significant barrier to a just transition as it will hinder inclusive growth and productivity. The government should work with local authorities and chargepoint companies to provide a clear structure of responsibilities of the actors involved across regions to ensure equal access to public on-street charging. The government should also streamline regulatory frameworks and the approval process to meet the increasing demand when the infrastructure is scaled up across regions.

3. **Ensure community engagement in the net-zero agenda.** While the government set the mandate of net zero by 2050, local authorities are responsible for the delivery in local regions and chargepoint operators try to get a return on investment. So far, though, the deployment of the new charging infrastructure has led to some community rejection because residents have doubts about whether the transition to electric mobility will transpire and the benefits it might have for them. It is critical that the government provides a coherent picture of the development of net-zero policies over the next few years, including a skills agenda. Further education and communication can alleviate tensions that emerge when deploying the new charging infrastructure.

These three actions – providing earmarked funding, clearer coordination and streamlined planning processes, and ensuring inclusive public engagement – will pave the way for the transition to net-zero mobility. While this report does not suggest a purely top-down approach, it calls for central government to become a better orchestrator who recognizes that local authorities will need continued resources and support to work with private chargepoint operators to make this transition a success.

Our recommendations align with others who advocate for clear centralized targets, the breakdown of silos, engaged stakeholders, and support for local governments to ensure an equitable and inclusive charging infrastructure.<sup>67</sup> This Insights Paper builds upon these suggestions by deriving insights from interviews with various stakeholders. It also illustrates how neglecting these factors can exacerbate existing inequalities within the current system.

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<sup>67</sup> see Birkett and Nicolle 2021; LGA 2021; OFGEM 2021; Jackson 2021; SMMT 2022; Hopkins 2023,

Feedback on this report and its recommendations can further our understanding and advance work to push the development of the new on-street public charging infrastructure that will underpin the transition to inclusive electric mobility. Future longitudinal research will be important to understand the productivity implications of novel infrastructures to promote *green growth*. The change to EVs forms just one part of wider strategic plans to change towards sustainable mobility. Local authorities also plan to promote bicycles, mobility-as-a service, and greater public transport.

Successfully delivering public on-street charging infrastructure is important to ensure that the transition to net zero leads to *inclusive green growth*. The failure to rollout a comprehensive charging infrastructure that covers all regions and socio-economic demographics can constrain productivity by putting breaks on a widespread adoption of electric vehicles. This lack of accessibility hinders the potential economic benefits associated with the electric vehicle market, impacting job creation, innovation, and the overall growth of sustainable transport. Additionally, it perpetuates disparities in mobility options, hindering individuals in underserved regions and diverse socio-economic groups from fully participating in the transition to cleaner and more efficient transport, impeding overall economic productivity.

Overall, charging infrastructure not only provides a means to recharge EVs but also opens pathways to more resilient and efficient energy systems, as well as health and social benefits associated with improved local environments. Importantly, while the hardware allows for local adaptation, together it forms a national infrastructure. Success is dependent on central government, local government, and chargepoint companies working together so that the system is not fragmented and the matrix of incentives is more evenly balanced and representative of private and public interests. Much has been learned in the early stages of this rollout. Greater orchestration of this complex, multi-actor process is urgently needed to ensure sustained investment in this new technology and that the new public chargepoint service is accessible for all.

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## Appendix A Interviews

Table 1: List of Interviews

	Interview	Interview Type	Number of Interviews
1	Business	Local business (non-adopter)	1
2	Business	Local/regional business (EV-adopter)	1
3	Business	Local business (EV adopter)	1
4	Business	Local business (non-adopter)	1
5	Business	National/regional business (EV adopter)	1
6	Public Body	EV adopter	1
7	Chargepoint company	– On-Street 1 <sup>68</sup>	2
8	Chargepoint company	– On-Street 1	1
9	Chargepoint company	– On-Street 2	2
10	Chargepoint company	– On-Street 3	1
11	Chargepoint company	– On-Street 4	1
12	Chargepoint company	– On-Street 4	1
13	Chargepoint company	– Destination and Private	1
14	Chargepoint company	– Destination	1
15	Chargepoint company	Publicly owned and operated	1
16	District Network Operator	Company licensed to distribute electricity in the UK	1
17	District Network Operator	Company licensed to distribute electricity in the UK	1
18	Government agency	Funding body	1
19	Government agency	Supports public private partnerships	1
20	Government agency	Supports development	1
21	Local government	London borough	1
22	Local government	Unitary -1	1
23	Local government	Unitary -2	1
24	Local government	Unitary -3	1
25	Local government	Metropolitan district	1
26	Local government	Unitary	1
27	Stakeholder	Local government representative body	1
28	Stakeholder	Local government partnership body	1
29	Stakeholder	Business Improvement District	1
30	Stakeholder	Industry Association	1
31	Stakeholder	Body representing service users	1
32	Stakeholder	Body representing service users	1
33	Stakeholder	Chargepoint Installer (private and highway)	1
			Total: 35

<sup>68</sup> While this interviewee and others are generally associated with 'on-street' charging, most of them have expanded their services to include other charging options, such as destination charging, fleet charging (especially for public fleets), and in housing developments.