

# 5. Charging Infrastructure



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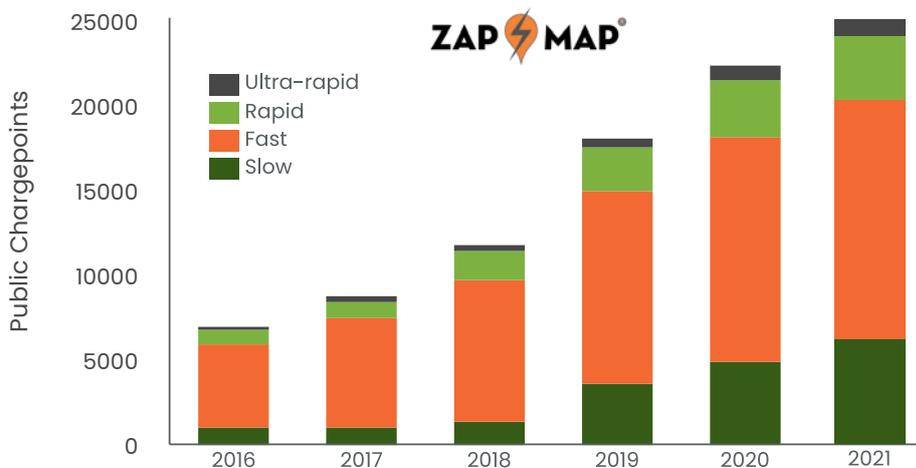
## 5.1 Current Market Context

If the potential market growth forecast for EVs is achieved, there could be as many as 11 million EVs on UK roads by 2030, necessitating significant chargepoint growth, across all locations<sup>37</sup>. As other barriers to adoption, such as cost and availability of vehicles, are addressed over the course of this decade, adequate nationwide charging infrastructure will remain a key barrier capable of derailing mass EV adoption. A chicken and egg situation exists, as an accelerated roll out of charging infrastructure is required to advance EV adoption, yet economically viable investments in EV infrastructure are in turn dependent on the acceleration of EV adoption.

Much progress has already been made in this area, as outlined in Figure 10, with the number of chargepoints having increased from approximately 6,500 in 2016 to 27,000 at the time of writing<sup>38</sup>. However, despite this progress, the UK is yet to have fully rolled out the system-wide infrastructure required to enable mass uptake by consumers and business fleets alike. Roll out to date has been non-systematic based on certain local authorities and private companies championing EV roll out and accessing public funding pots to support charging infrastructure.

**Figure 10<sup>37</sup>**

**Number of public chargepoints by speed (2016–to date)**



Source: ZapMap

The number of chargepoints required by 2030 will depend on the number of EVs on the road and how these vehicles are expected to charge. Whilst the majority of charging is expected to happen within a home and workplace setting, public charging will play a vital role, particularly for the majority of UK drivers without access to off-street parking at home. Charging behaviours are expected to vary significantly by use case. For example, an EV driver with off-street parking who is using their vehicle for school runs and around town driving is most likely to charge overnight at home or during the day at the workplace. An EV driver undertaking nationwide deliveries and covering 30,000 miles per annum is likely to be reliant on public charging for an element of trips undertaken.

<sup>37</sup> CDRT Analysis.

<sup>38</sup> Zap Map (2021) EV Charging Stats 2021.

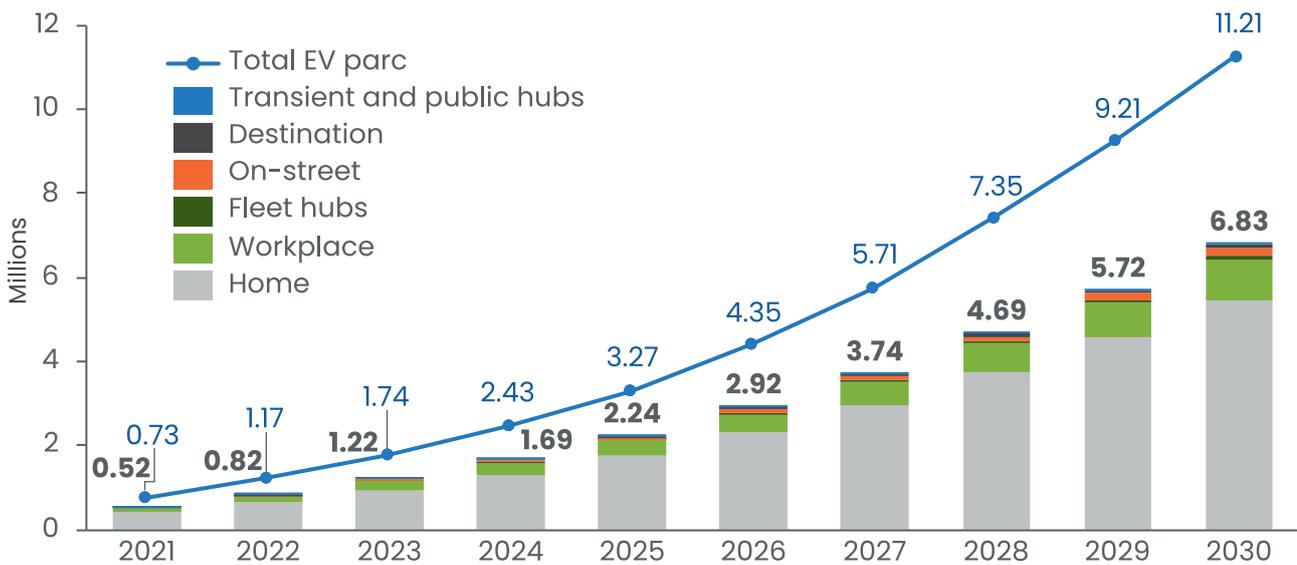
Charging locations can be categorised as private or public and each have different investment requirements as shown in Table 3.

**Table 3**  
**Charging locations**

Private	Public
<ul style="list-style-type: none"> <li>Home charging – for those with access to off-street parking</li> </ul>	<ul style="list-style-type: none"> <li>On-street – charging on permissible parking areas on residential streets</li> </ul>
<ul style="list-style-type: none"> <li>Workplace – charging solutions available at office car parks for employees</li> </ul>	<ul style="list-style-type: none"> <li>Destination – charging at destination sites with amenities and parking</li> </ul>
<ul style="list-style-type: none"> <li>Fleet hubs – dedicated overnight or rapid charging hubs for corporate and public sector fleets</li> </ul>	<ul style="list-style-type: none"> <li>Transient and public hubs – en-route charging, mostly on primary roads, or public access hubs</li> </ul>

Analysis supported by KPMG’s Future Mobility team forecasts the need for up to 6.8 million electric chargepoints in total in the UK by 2030, of which 300,000 to 400,000 would be at public locations (see Table 4), 5.5 million at-home and approximately 1 million at workplace, including fleet hubs<sup>39</sup>. This is to support a forecast parc of around 11 million electric passenger cars and light commercial vehicles.

**Figure 11**  
**Forecast EV Parc and Chargepoints**



**Note:** EV parc includes passenger vehicles and LCVs

**Source:** CDRT analysis

<sup>39</sup> Ibid.

Over the years, measures to accelerate the roll out of charging infrastructure have included:

- 1. Fiscal policies**, such as the On-street Residential Chargepoint Scheme, Workplace Charging Scheme or the EV Homecharge scheme, which offer grants of up to £350 (or 75% of the total cost, whichever is lowest) for the purchase and installation of chargepoints. These are targeted at individual consumers, companies installing chargepoints or local authorities, and generally come in the form of partial grants, but also include enhanced capital allowances and public-private funding partnerships.
- 2. Regulations** setting the direction of travel for the sector, including the 2030 ban on the sale of new petrol and diesel vehicles and requirements for new homes or renovated buildings to be fitted with chargepoints, as proposed in the recent Transport Decarbonisation Plan (TDP)<sup>40</sup> published in July 2021.
- 3. Measures to improve user-friendliness** announced in the TDP policy paper include making all rapid chargepoints accept card payments and making chargepoint data freely available so drivers can more easily locate chargepoints.

In its Ten Point Plan<sup>41</sup>, the UK Government has committed around £1.3 billion for the deployment of charging infrastructure, which can be broken down as follows: £950 million for chargepoints along motorways and key A roads (the Strategic Road Network), £275 million for homes, workplaces and on-street and £90 million for local infrastructure.

Beyond the Ten Point Plan, the Government has shown increased ambition and further funding, including in the net zero strategy, to deliver additional chargepoints. This is especially important now the phase out of petrol and diesel vehicles has been brought forward from 2040 to 2030.

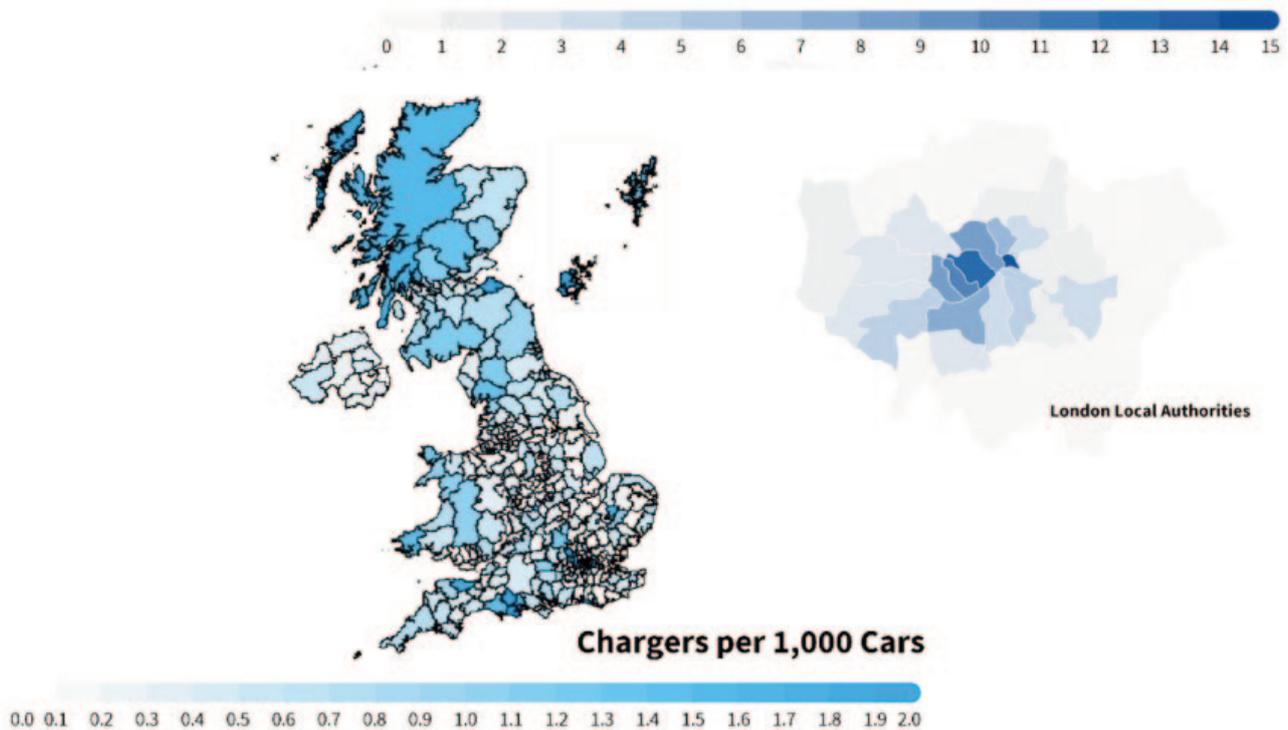
The availability of government grant and subsidy mechanisms for both local authorities and private sector organisations is a positive start, however there is no requirement for local authorities to provide electric charging points. It is up to them to decide, based on local priorities, whether to do so. Without a national EV infrastructure strategy<sup>42</sup> there is a risk that the UK's public charging network becomes unequitable and unevenly distributed, which ultimately risks slowing mass EV uptake. Public funds to date have been universally offered but as the market evolves should be focused on those areas where the commercial case is harder to achieve in the short term. This includes rural and disadvantaged areas of the country, where the economic case for installing charging is less compelling today. Failure to do so will mean a widening gap in access to chargepoints which will hinder the universal roll out of EVs. This gap is already starting to emerge, with significant variability of chargepoint distribution across the country, as shown in Figure 12. A national strategic approach, which includes access to data about future mobility patterns and expected utilisation rates will be needed to address these issues and ensure a comprehensive network is rolled out across the UK.

<sup>40</sup> Department for Transport (2021) Decarbonising Transport: A Better, Greener Britain.

<sup>41</sup> UK Government (2020) The Ten Point Plan for a Green Industrial Revolution.

<sup>42</sup> OZEV are expected to launch an EV Charging Infrastructure Strategy in 2021.

**Figure 12**  
**EV chargers per 1,000 cars**



**Source:** Transport & Environment using Department for Transport (2021) Electric vehicle charging device statistics: January 2021.

It is also critical to have an appropriate mix of charging speeds to suit different locations and use cases. Charging speeds have been defined in this report as:

- 1. Slow: 3.7–7kW AC charging**
- 2. Fast: 7–22kW AC charging**
- 3. Rapid: 50–150kW DC charging**
- 4. Ultra-rapid: 150kW+ DC charging**

For passenger vehicles, the majority of charging is expected to take place at home or in the workplace, accounting for around 70% of charging demand. The remaining 30% of demand will rely on a mix of public infrastructure, with on-street charging effectively acting as an overnight solution for those without access to off-street parking.

For fleets however, it is forecast only up to 50% of charging power demand will come from home and workplace locations, as vehicles do a significantly higher number of annual miles and will need to rely more on public infrastructure. Many businesses are starting to install a mix of charging solutions at their own hubs and depots, where vehicles are often parked overnight, reducing private charging needs.

With all public charging infrastructure, there will be a trade-off between cost and suitability. Rapid and ultra-rapid chargepoints often require electricity grid reinforcement, which can be costly. In return for the higher speed of charging, drivers typically pay a higher cost per kWh for charging, and the ability to fulfil multiple vehicles within a day means revenues are higher. Conversely slower chargers, which may only be used by 2-3 vehicles per day, typically cost less to install but generate significantly lower daily revenues.

By 2030, our analysis suggests the resulting mix of public chargepoints could be as shown below in Table 4.

**Table 4**  
**Forecasted mix of public chargepoints**

Chargers in 2030 (000's)	Slow	Fast	Rapid	Ultra-rapid	Total
<b>On-street</b>	80-120	80-130	15-30	-	<b>175-280</b>
<b>Destination</b>	15-20	40-60	15-25	0-5	<b>70-110</b>
<b>Transient and public hubs</b>	-	-	15-30	5-15	<b>20-45</b>
<b>Total</b>	<b>95-140</b>	<b>120-190</b>	<b>45-85</b>	<b>5-20</b>	<b>265-435</b>

**Source:** CDRT Analysis

- **On-street:** A close to even split of mostly slow and fast chargers is forecast, with more fast chargers rolled out as costs decrease and on-street adoption increases. A very limited number of on-street rapid chargers is anticipated, depending on the location and grid constraints.
- **Destination:** Given users are likely to stay on location for a few hours, it is predicted that the majority of chargers will be fast. The additional cost to install rapid chargers is not typically justified unless a premium offering or where visitor turnover is high and charge time less than one hour (such as a supermarket or council car park). The forecast includes some slow chargers, many of which are legacy, and a very limited number of ultra-rapid chargers in locations with more premium offerings.
- **Transient and public hubs:** Enroute users are likely to expect rapid charging and minimal waiting time. Rapid chargers will dominate due to the price differential versus ultra-rapid options. However, a growing number of high-powered charging solutions are being deployed and this is expected to continue, particularly in premium, high traffic sites.

## 5.2 Barriers

The Coalition has identified the main financial and non-financial barriers that are slowing down private investment into public EV charging infrastructure. For drivers with access to off-street parking at home<sup>43</sup>, the cost of installing a chargepoint is usually relatively low<sup>44</sup>. In some instances however, there may be other more significant factors at play for consumers wishing to install home chargers. This can include homes where electricity supply needs to be upgraded to allow for an EV charger to be safely installed; where the consumer is a leaseholder; or where the user lives in accommodation with shared parking. In instances where the expected cost of installation is high, or where for example homeowners wish to also install complementary solutions such as solar panels linked to wider home energy efficiency retrofitting, there may be a role for consumer finance solutions such as demonstrator solution 15 (Property Linked Finance), demonstrator solution 16 (Demand Aggregation Finance) and further ideas being developed by the Green Finance Institute's Coalition for the Energy Efficiency of Buildings<sup>45</sup>.

Barriers to the roll out of public charging and business workplace or depot charging are more complex, with public charging infrastructure involving a larger number of stakeholders and typically significantly higher costs. These barriers are summarised as follows.

**Table 5**  
**Barriers to the roll out of public charging infrastructure**

		Private	Public
1	Revenue uncertainty (linked to utilisation of charging points)	N	Y
2	Capital cost of installation, including grid upgrades	Y	Y
3	Planning rules	Y	Y
4	Local authority capacity	N	Y
5	Technology obsolescence	Y	Y
6	Regulatory barriers	Y	Y

### 1. Revenue Uncertainty

There exists a chicken and egg situation with the speed and roll out of EVs and charging infrastructure. An acceleration in charging infrastructure build out is key to giving larger numbers of consumers the confidence to switch to an EV<sup>46</sup> (and anecdotally in some areas more chargepoints are already required to service existing user demand). However, investors and local authorities are reluctant to invest without reliable data on expected revenues (of which traffic flows and utilisation rates are the key driver), which relies on anticipated EV adoption. This is holding back investment. In addition, for residential on-street charging, the payback period can be lengthy and is typically longer than the period over which local authorities have historically been willing to contract with chargepoint operators. This increases the risk for investors.

Solutions that provide information on expected future charging demand across locations or ensure some level of base utilisation (revenue) through agreed target metrics are needed. Demonstrator 10 (EV Infrastructure Investor App) aims to provide investors with trusted curated data on costs and revenues to aid decision making. Demonstrators 14 (Utilisation Linked Loans) and 17 (Revenue Guarantees) aim to provide solutions for revenue uncertainty, either through linking loan repayments to minimum utilisation rates or through guaranteeing a minimum contractual revenue.

<sup>43</sup> The Electric Vehicle Homecharge Scheme grant provided by OZEV for home chargepoints will be refocused to renters, leaseholders and those living in flats from March 2022.

<sup>44</sup> NatWest has teamed up with Octopus Energy to offer discounted rates on chargepoints <https://www.natwest.com/banking-with-natwest/our-purpose/climate/travel/home-charging.html>

<sup>45</sup> Green Finance Institute (2020) Financing energy efficient buildings: the path to retrofit at scale.

<sup>46</sup> 37% people cite lack of charging as main reason <https://www.kwik-fit.com/press/pandemic-has-caused-almost-14-million-uk-drivers-to-change-their-car-buying-plans>

## 2. Capital cost of installation, including grid upgrades

For all types of charging, the cost of installation can be significant, particularly if a new or upgraded connection to the national grid is required. Installation costs can range from less than £100k to over £1m<sup>47</sup> and this cost is typically unknown until an application is made to the Distribution Network Operator (DNO), which can take a number of weeks to complete. In addition, existing regulations require the organisation requesting a grid upgrade to make the entire capital outlay required, regardless of the proportion of grid capacity they plan to utilise, although Ofgem are currently considering changes to this approach<sup>48</sup>. There is also uncertainty about whether the costs of any excess capacity secured will be repaid by other parties sharing the additional grid capacity, which introduces further risk when considering investment. Infrastructure installers can be faced with a choice of either locating charging points where there is grid capacity but low demand or locating at sites where demand should be high but where higher upfront investment is needed. Data providing visibility on where EV charging is required to inform grid capacity upgrades is needed.

There is an opportunity to reduce the need for building new grid capacity in some areas by using smart pricing mechanisms to incentivise drivers to charge off-peak when surplus green energy supply exists, or through the use of battery storage solutions which can sometimes be installed at a lower cost. However, historically these have not qualified for grant funding. The focus of developers needs to widen from options looking at increasing grid capacity to also consider the development of smart and flexible capacity.

For the majority of home and workplace chargers, cost is not the most significant barrier, particularly as government support has been widespread to date. However, in some instances where installation is complex or electricity supply needs upgrading, additional capital costs can be significant and government support limited. Demonstrators 7 (Bundled Finance Solutions) and 15 (Property Linked Finance) could help consumers and businesses spread this cost, and demonstrator 9 (Transport Infrastructure Facility) aims to reduce the cost of capital for chargepoint operators or installers through de-risking investment.

Demonstrator 16 (Demand Aggregation Finance) can establish demand for EV charging solutions in a local area or for a group of businesses (such as car rental companies or holiday cottage owners), bringing down the upfront cost of chargepoints for those registered in the scheme.

## 3. Planning Rules

An issue highlighted by both residential and commercial property leaseholders, is the challenge of obtaining landlord permission to install charging infrastructure, even when the tenant is willing to bear the cost. These are similar issues to those facing the building retrofit market, as highlighted in the Green Finance Institute's Coalition for the Energy Efficiency of Buildings report<sup>49</sup>. Either regulatory changes (such as requiring energy inefficient property to be upgraded before they are next rented) or financial incentives will be needed. Local authorities often own significant land and property, including local car parks and other buildings. These locations have the potential to host chargepoints of all speeds, depending on what grid connection upgrades are needed. Planning rules to build charging stations on these sites can be complex, and each local authority may have its own rules and processes.

To move forward, regulatory change is needed to mandate inclusion of charging infrastructure where feasible for new residential and commercial developments. This is currently being considered by Government and new regulations are expected by the end of 2021 following a consultation in October 2019<sup>50</sup>. The complexity in relation to the processes to obtain necessary grid upgrades and connections, including local authority planning permission constraints, also needs to be addressed.

<sup>47</sup> CDRT Analysis.

<sup>48</sup> Ofgem (2021) Access and Forward-looking Charges Significant Code Review – Consultation on Minded to Positions.

<sup>49</sup> Green Finance Institute (2020) Financing energy efficient buildings: the path to retrofit at scale.

<sup>50</sup> HM Government (2019) Electric Vehicle Charging in Residential and Non-Residential Buildings.

#### 4. Local Authority Capacity, including access to finance

As local authorities take on more responsibility for the roll out of charging infrastructure in their area, there will be greater demand for the requisite skills and capacity to support the process. To date, the uneven roll out of EV infrastructure reflects the varying financial and resource capacity in local authorities across the UK. Those local authorities that have been successful in drawing down grant funding typically have the capacity to draw up a local EV infrastructure strategy, draft lengthy written business cases and have experience of the complex procurement processes needed to realise the required investment. Many local authorities aren't in a position or are yet to appoint dedicated personnel to roll out EV infrastructure, with responsibility falling between planning, highways, environment and parking teams. Given their critical role in EV infrastructure deployment, it is essential local authorities receive the support required to address this capacity gap. This applies equally to capacity within the financing teams. Given the overall scale of investment in public charging infrastructure needed, the infrastructure funding model will need to shift from being primarily based on securing government grants to accessing alternative sources of affordable capital to finance the infrastructure roll out, which in some cases may be more complex or require specific financing expertise.

Solutions which provide local authorities with information about how to roll out and finance a local EV infrastructure strategy are needed. Demonstrators 11 (Local Authority Toolkit) and 12 (Regional Area Tendering) are designed to provide guidance and frameworks for local authorities looking to finance local charging infrastructure. Demonstrator 13 (Community Municipal Investments) can provide a scalable and cost-effective source of funds for local authorities to complete infrastructure projects.

#### 5. Technology Obsolescence

As for all infrastructure there is a risk of asset stranding – in this case as faster chargepoints become available, reducing the time drivers take to charge. As noted earlier, typically, faster chargepoints are more convenient for users but are higher cost and often require grid reinforcement, in turn requiring further investment. It is currently unclear to what extent consumers are willing to pay for the convenience of faster charging, and there is likely to be a mixture of responses with some prioritising convenience over cost and vice versa. More data to enable informed decision making on the right option in the face of rapid technology evolution will help. Demonstrator 10 (EV Infrastructure Investor App) is focused on the provision of such data.

#### 6. Regulatory Considerations for a functioning market

Akin to the broadband rollout of the 2000s, the forthcoming EV infrastructure strategy is needed to ensure a cost effective and comprehensive investment programme is delivered. As part of this, greater visibility for consumers on the cost of charging and service provision will be required. In due course, considerations should be given to managing the risk of geographic monopolies emerging that lock out competition, for example by focusing on bringing capacity to motorway service areas and strategic road networks.

### 5.3 Demonstrator Solutions

The Coalition has put forward several demonstrator solutions that could overcome the barriers identified to facilitate universal EV charging infrastructure roll out.

Solutions focus on supporting greater capacity building within local authorities, signalling expected market demand through better data provision, regulatory changes and financial innovation. Some solutions put forward by Coalition members build on existing market offerings that exist in other sectors or jurisdictions; others originated through their collective creativity.

The following section sets out the list of potential demonstrator solutions in more detail and provides further information on each. Each template includes an overview of the project, its intended outcomes, key delivery partners and potential policy levers. The template also identifies which market segment would be impacted by the development of the different solutions.

Demonstrator Solution 9: <b>Transport Infrastructure Facility (TIF)</b>	<b>Consumer</b> ✓	<b>Local Authorities</b> ✓	<b>Fleets / Rapid</b> ✓
<p><b>Overview:</b> The Transport Infrastructure Facility seeks to bring together public and private capital to support the roll out of system wide EV infrastructure in the UK, focusing on areas of market failure which are not expected to be addressed through current available solutions. Public finance could be used to de-risk incremental private capital to supplement existing government funds such as the Rapid Charging Fund (RCF) and Charging Infrastructure Investment Fund (CIIF), leveraging this capital. Several options for structuring a facility are being explored with key stakeholders, including revenue and credit guarantees, financial loss against construction risk or first loss mechanisms to create financeable charging infrastructure projects.</p> <p>Beyond transport, the TIF could create a template that could be replicated across other key areas within the net-zero agenda.</p>			
<p><b>Outcome:</b> Provide essential funding for the market failures within system wide EV charging (including rural and poorer areas, which would remain unprofitable) required to enable mass adoption of EVs in the UK.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>• Public finance</li> <li>• Financial institutions</li> <li>• Institutional investors across private equity and infrastructure</li> <li>• CPOs</li> <li>• National Grid</li> <li>• DfT</li> </ul>	<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>• Clarity and longer-term plan on fiscal incentives for installing chargepoints</li> </ul>		

Demonstrator Solution 10: EV Infrastructure Investor App	Consumer	Local Authorities	Fleets / Rapid
		✓	✓
<p><b>Overview:</b> A new application (being actively developed by Zuehlke<sup>51</sup>) aiming to simplify the processes involved with charging infrastructure investment for investment groups and provide data to support revenue forecasts. The application will provide trusted data and models for prospective EV infrastructure investors and local authorities. Open-source data provides up-to-date information around current and planned initiatives and energy system capacity as this change to achieve the UK’s net-zero goals. The application would include a mix of free-to-use data and additional paid/premium features to share the core knowledge held by the technical leadership within DNOs.</p> <p><b>Outcome:</b> Increases the number of investable opportunities by increasing the certainty of utilisation. For operators, it reduces the cost and time of dealing with DNOs and local authorities.</p> <p>For local authorities and corporate fleets, it can help identify suitable low-cost sites for development or installation of infrastructure without the need for lengthy application processes.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>• Zuehlke</li> <li>• UK Power Networks, DNOs</li> <li>• Financial Institutions</li> <li>• Data providers</li> </ul>		<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>• N/A</li> </ul>	

Demonstrator Solution 11: Local Authority Toolkit	Consumer	Local Authorities	Fleets / Rapid
		✓	✓
<p><b>Overview:</b> Many local authorities lack the resources necessary to roll out EV charging infrastructure effectively, leading to inequitable roll out across the 408 Local Authorities. A best-in-class framework and toolkit would help non-expert resources in businesses and local authorities navigate the process behind charging infrastructure, reducing time and cost, as well as breaking down the complexity of planning and permission processes. The resource would build on existing materials such as those provided by Energy Savings Trust<sup>52</sup> and include access to an approved supplier framework, identify relevant sources of data<sup>53</sup>, ensure alignment with national strategy, provide details of financial providers/solutions and offer best-practice examples of how to roll out local infrastructure.</p> <p><b>Outcome:</b> Support local authorities looking to implement charging infrastructure to start EV roll out, accelerating demand for infrastructure installation and facilitating greater EV adoption by local residents without access to off-street parking. The framework would reduce time taken and capacity needed for local authorities to prepare high quality applications to National Grid/DNOs, expediting the installation process.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>• Local Authorities</li> <li>• New Automotive</li> <li>• DNOs</li> <li>• DfT</li> <li>• CPOs</li> <li>• Local Enterprise Partnerships</li> <li>• Energy Savings Trust</li> </ul>		<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>• Streamlined planning processes across different local authority boundaries</li> </ul>	

<sup>51</sup> Zuehlke (2021) Data for Electric Vehicles.

<sup>52</sup> Energy Savings Trust (2021) On-street Residential Chargepoint Scheme: Information Pack 2021-2022.

<sup>53</sup> New AutoMotive (2021) Toolkit for local areas.

Demonstrator Solution 12: Regional Area Tendering	Consumer	Local Authorities	Fleets / Rapid
<p><b>Overview:</b> A national procurement framework to enable local authorities to aggregate and tender for larger scale charging infrastructure arrangements, bundling together lower and higher utilisation sites. The framework will be developed with local authorities to help address differing capabilities and resourcing among local authorities and replicate best practice to accelerate chargepoint network expansion. A tendering process could be structured to ensure a commercially viable package of chargepoints are identified, which is crucial for delivering a full network coverage. High utilisation charging sites will only be allocated if balanced with low utilisation sites, with sufficient modelling to provide adequate business cases and help address revenue uncertainty.</p>			
<p><b>Outcome:</b> The tendering procurement framework would enable the deployment of lower utilisation chargepoints, predominantly in rural areas, to expedite EV adoption. An example of a potential approach could be inspired by the German government model to tender 1,000 fast charging parks<sup>54</sup>.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>Local Authorities</li> <li>Subnational Transport Bodies</li> <li>CPOs</li> <li>Strategic body to plan the tendering process</li> <li>DfT/OZEV</li> </ul>		<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>Streamlined planning processes across different local authority boundaries</li> </ul>	

Demonstrator Solution 13: Community Municipal Investments	Consumer	Local Authorities	Fleets / Rapid
<p><b>Overview:</b> A crowdfunding approach to create an efficient, scalable and cost-effective source of funding for local authorities to finance capital expenditure on local chargepoints. The funds would be raised directly from local residents through a platform (such as the Abundance<sup>55</sup> CMI methodology). The funds raised by the local authorities could be used in conjunction with On-Street Residential Chargepoint Scheme funds or for active travel infrastructure.</p>			
<p><b>Outcome:</b> Community Municipal Investments create a powerful new model for Local Authorities to engage with local citizens as investors, thereby raising capital and awareness among the local community. Widespread adoption of this model offers a financing route for the two-thirds of Local Authorities that have declared a climate emergency and could foster a new community investment culture for retail investors.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>Local Authorities</li> <li>Abundance Investments</li> <li>DNOs</li> <li>DfT</li> <li>CPOs</li> <li>Local Enterprise Partnerships</li> <li>Energy Savings Trust</li> </ul>		<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>Streamlined planning processes across different local authority boundaries</li> </ul>	

<sup>54</sup> electrive.com (2021) Deutschlandnetz: Germany to tender 1,000 fast-charging parks.

<sup>55</sup> Abundance Investment (2021) About our new Community Municipal Investments.

**Local Climate Bonds Initiative**

Local Climate Bonds, a type of ‘community municipal investment’<sup>56</sup>, allow local authorities to identify specific initiatives in their neighbourhoods, from wind farms to solar panel installations, rewilding and EV charging infrastructure and raise investment in increments as little as £5 through a crowdfunding model. They offer a source of funds cheaper than the Public Works Loan Board, a way to diversify a council’s funding base, and a valuable way to engage local people in plans for decarbonisation and projects identified in their environment strategies, encouraging wider collective action.

For citizens, the Local Climate Bond provides a lower-risk and fixed return investment, comparable to other Government-backed investments such as Gilts, and a way to mobilise their savings to help tackle the climate emergency in their area.

The Green Finance Institute and Abundance Investment have launched a national campaign to encourage and support the 300 local councils in England, Scotland and Wales who have declared a Climate Emergency to launch a Local Climate Bond in the 18 months following the critically important COP26 summit in November. The first five pioneering councils signed up to the campaign in September 2021.

Demonstrator Solution 14: <b>Utilisation Linked Loans</b>	<b>Consumer</b>	<b>Local Authorities</b> 	<b>Fleets / Rapid</b> 
<p><b>Overview:</b> Loans for chargepoint operators or installers (such as local authorities) that are repaid based on utilisation. In a similar way to student loans, repayments would not commence until a base utilisation was achieved. This would offset the risk of loan repayment liabilities not matching revenues inflow – a particular risk for chargepoints in some rural communities for example.</p> <p>The income-based ratcheting repayment mechanism proposed would be structured to incentivise the installation of chargepoints initially expected to have lower levels of utilisation, increasing the overall network coverage ahead of demand ramping up.</p>			
<p><b>Outcome:</b> Utilisation Linked Loans encourage supply of charging infrastructure ahead of demand, de-risking investment in areas where future utilisation is more uncertain over longer-term horizons and enabling the roll out of a UK-wide network.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>• CPOs</li> <li>• Delivery body for loans (akin to the Student Loan Company)</li> <li>• Data providers</li> <li>• Local Authorities</li> <li>• Financial Institutions</li> </ul>	<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>• Government underwriting of loans may be required</li> </ul>		

<sup>56</sup> Green Finance Institute (2021) Local Climate Bonds a cost-effective way to raise billions for councils’ green plans, says new campaign.

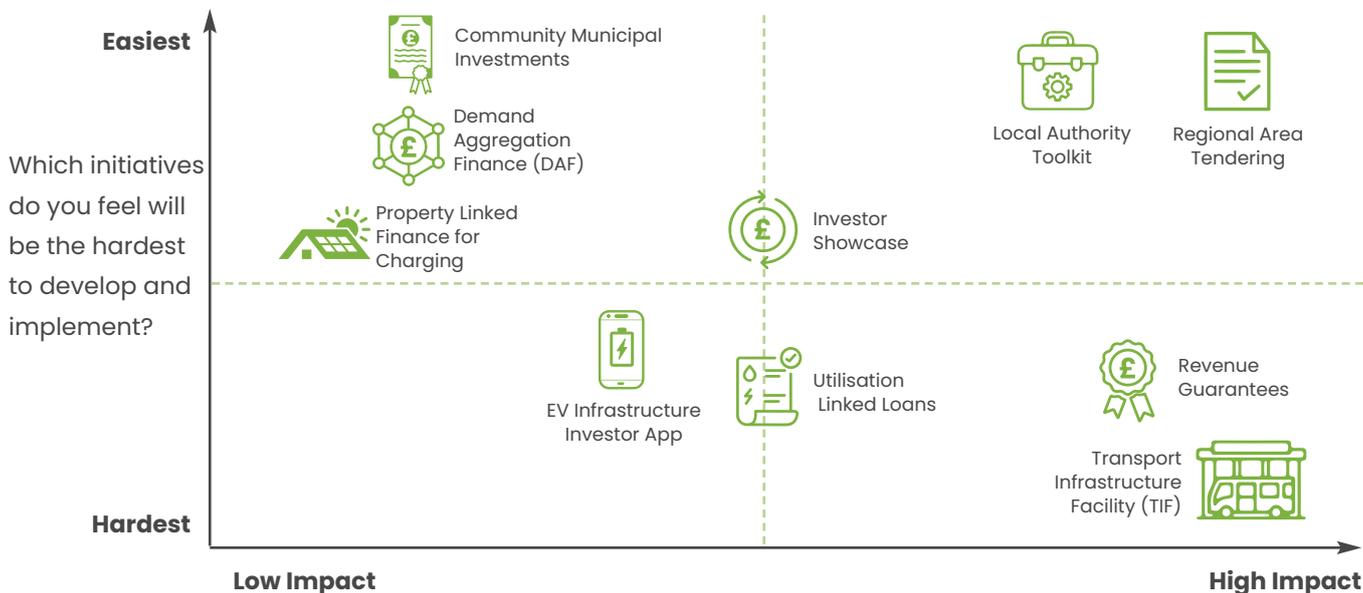
Demonstrator Solution 15: Property Linked Finance	Consumer ✓	Local Authorities	Fleets / Rapid ✓
<p><b>Overview:</b> Property Linked Finance enables building owners to access 100% upfront funding to install EV chargepoints through finance attached to the property. The responsibility for repayments remains with the property and is passed on to subsequent owners who are benefitting from the chargepoint. This model is based on the success of Property Assessed Clean Energy (PACE) financing in the USA.</p> <p>Property Linked Finance overcomes several market barriers:</p> <ul style="list-style-type: none"> <li>• Temporal split incentive: Obligations are transferable to subsequent property owners</li> <li>• Preference for short payback period: Financing terms can extend to +20 years</li> <li>• Limited cash/savings: Requires no upfront capital contribution</li> <li>• Owner-renter split incentive: Allows owners and tenants to share the costs and benefits of infrastructure</li> <li>• Programmes typically use private sector funding to finance the upfront cost of the infrastructure</li> </ul>			
<p><b>Outcome:</b> Property Linked Finance overcomes the cost barrier to installing charging infrastructure for consumers and businesses and can unlock demand, particularly for property owners with limited debt capacity. The ability to transfer obligations to subsequent property owners and finance terms of 20+ years can improve the investment case where payback time is long. Lenders can support customers with a low-risk financial product, while the aggregation and securitisation of loans provides a route to lower cost of capital for lenders and borrowers alike.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>• Local Authorities</li> <li>• Financial institutions</li> <li>• Financial regulators</li> <li>• Law firms</li> <li>• Mortgage holders</li> <li>• CPOs and installers</li> <li>• Utilities companies</li> </ul>	<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>• Legislative amendments to enable finance to be attached to properties</li> <li>• Financial regulations that ensure robust consumer protections and allow scope for financial innovation</li> <li>• Standardised definitions of qualifying infrastructure costs</li> </ul>		
Demonstrator Solution 16: Demand Aggregation Finance (DAF)	Consumer ✓	Local Authorities ✓	Fleets / Rapid ✓
<p><b>Overview:</b> An online service platform, coupled with new financial products that establishes and aggregates demand for EV infrastructure in a local area, bringing down the upfront and financing costs for those that register in the scheme and enabling supply to be scaled. Capturing local demand data from residents, local businesses and community groups in an online database can signal an investment need to local authorities and allow for better modelling of likely chargepoint utilisation in certain locations.</p> <p>For businesses and local authorities, it could be a Special Purpose Investment Vehicle, enabling multiple colocated businesses, potentially in designated green development zones or corridors, to finance EV infrastructure. For consumers, aggregating demand could signal the need for chargepoint finance solutions to financial institutions yet to offer this.</p>			
<p><b>Outcome:</b> Enables consumers and/or local authorities to access chargepoint solutions at a lower cost, and with cheaper financing if coupled with a financial product suite. Financial institutions can benefit from a guaranteed level of demand for loans and manufacturers/installers have a guaranteed level of demand for equipment.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>• Online service/platform</li> <li>• CPOs</li> <li>• Consumer groups</li> <li>• Financial institutions</li> <li>• Local Enterprise Partnerships</li> <li>• Local Authorities</li> </ul>	<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>• Overarching national strategy (National Grid, Ofgem) for future cases</li> </ul>		

Demonstrator Solution 17: Revenue Guarantees	Consumer	Local Authorities	Fleets / Rapid
		✓	✓
<p><b>Overview:</b> To enable mass roll out of EV infrastructure through guaranteeing a base level of utilisation and revenue for investors in EV infrastructure where the business case is not immediately commercially viable. A revenue floor mechanism guaranteed by the UK Government would provide utilisation revenue for chargepoints where the commercial business case is yet unclear/marginal. The guarantee could be structured as a Contract for Difference mechanism guaranteeing a minimum payment for installers regardless of actual utilisation.</p>			
<p><b>Outcome:</b> A revenue guarantee could provide a minimum level of revenue to private sector investors if utilisation dips below market expectation, or the EV market fails to develop in time to achieve the 2030 phase out date. The guarantee mitigates utilisation risks in the short term, with visibility to making multiple chargepoint investments profitable.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>Public Finance</li> <li>Intermediary body to verify guarantee</li> <li>CMA</li> <li>CPOs</li> <li>Data providers</li> <li>DfT / OZEV</li> </ul>		<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>Regulation of the market to avoid market abuse</li> <li>Competition law verification</li> <li>Ability to structure guarantee price flexibly</li> </ul>	

Demonstrator Solution 18: Investor Showcase	Consumer	Local Authorities	Fleets / Rapid
	✓	✓	✓
<p><b>Overview:</b> An interactive knowledge hub to connect businesses seeking investment to knowledgeable investors looking for investment opportunities and upskill new investors interested in the opportunities the sector offers. The knowledge hub would help distinguish between organisations across the charging infrastructure market, at different stages of maturity, allowing for targeted pitching and investment. While there is no guarantee of investment, such a tool could provide an opportunity for organisations to get in front of the right investors and could provide organisations with access to non-financial support.</p>			
<p><b>Outcome:</b> Ultimately, the showcase would help match companies or projects with investors and assist companies struggling to raise investment. Further, the concept identifies domestic finance funding pools and could be expanded to other green tech sectors.</p>			
<p><b>Delivery partners include:</b></p> <ul style="list-style-type: none"> <li>Software designers</li> <li>Investor community</li> <li>Renewable Energy Association</li> <li>CPOs</li> </ul>		<p><b>Policy levers to support demand and scale up:</b></p> <ul style="list-style-type: none"> <li>N/A</li> </ul>	

Coalition members evaluated these solutions based on greatest impact and ease of implementation. Those that crowded in private capital to support public funding; reduced revenue risk for investors; and helped local authorities overcome resource and cost challenges were assessed to guide prioritisation of the Coalition’s work. The results are set out below.

**Figure 13**  
**Impact vs Ease of Implementation**



Source: CDRT

### 5.4 Policy Recommendations

In addition to the market-led initiatives we set out above, a policy and regulatory environment conducive to accelerating the transition to zero emission vehicles is needed.

- **A planned approach to EV infrastructure roll out**

A national infrastructure delivery plan is a top priority and will need to be underpinned with an EV ‘heat map’ indicating where EV chargepoints are currently located, and also where they will need to be installed to create a fully functional UK-wide network. This should be underpinned by data on traffic flows and forecast utilisation over the next 5, 10 and 15 years – which can then be used to inform the development of policy and financial instruments required to deliver the investment needed through mechanisms outlined above.

The delivery of the EV charging network **should be treated as a national infrastructure project**, led by central government, with increased and ongoing coordination with local authorities and the private sector. For private sector actors looking to invest in public charging infrastructure in particular, having to understand the **different costs and planning requirements of 408 different local authorities** can act as a barrier. Such a coordinated approach would help address these issues – and has worked well in Norway, which now has one of the highest rates of EV adoption in the world<sup>57</sup>. Germany has also announced a plan to tender 1,000 fast charging parks<sup>58</sup>, demonstrating growing acceptance of the value of a more coordinated approach.

<sup>57</sup> Norsk Elbilforening (2021) Norwegian EV policy.

<sup>58</sup> electrive.com (2021) Deutschlandnetz: Germany to tender 1,000 fast-charging parks.

- **Addressing planning issues relating to grid upgrades and infrastructure roll out**

Because success in scaling the EV market will be heavily determined by the rate of grid upgrade, thought needs to be given to how this will be delivered in a proactive fashion that does not hold back EV roll out. This could be achieved through replicating the Offshore Transmission Network Review process, where the Government **brought together DNOs, chargepoint operators and businesses to conduct a review of onshore infrastructure needs. The process informed the streamlining of planning and consenting processes for grid upgrades and capacity expansion.** The same approach applied to EV charging infrastructure could transform the roll out process, particularly for installations such as multiple chargepoints in depots or business parks or ultra-rapid chargepoints across the Strategic Road Network.

The Government should also work with local authorities to **review and streamline local planning rules to ensure the installation of on-street charging is accelerated** and to reduce the timelines given to landlords to approve chargepoint installations on their land.

- **Market integration and transparency**

As the market develops, and as set out in the recent OZEV consultation<sup>59</sup>, market integration should be a priority to integrate the services of **different chargepoint operators** to facilitate price transparency through offering comparable pricing information at chargepoints and making payments easier for consumers.

The priority of the Coalition in the short term is to deliver the highest impact/most immediately achievable demonstrators. Alongside this, an ongoing dialogue with Government will continue, with the support of Coalition members, on developing policy solutions to aid delivery of the full suite of demonstrators set out above.

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<sup>59</sup> HM Government (2019) Electric Vehicle Charging in Residential and Non-Residential Buildings.