



energy
taskforce

Commercial EV Fleet Charging Requirements




Office for
Zero Emission
Vehicles

CATAPULT
Energy Systems

 Zemo
Partnership



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Executive Summary



Executive Summary

This report from Zemo Partnership and the Electric Vehicle Energy Taskforce, with the support of the Electric Vehicle Fleet Accelerator (EVFA), the BVRLA and E4Tech, looks at how the electrification of the UK's commercial fleet market can be accelerated in line with net zero objectives. The findings form a part of the Taskforce's recommendations to Government and industry.

Commercial fleets play a pivotal role in the UK economy and could be in the vanguard of the electrification transition, underpinning public investment in the UK's chargepoint infrastructure.

This report assesses the perceived barriers to electrification of commercial fleet operations, identifying potential solutions and, in particular, the infrastructure developments required over the next decade.

The EV fleet market is currently supported predominantly by private charging infrastructure either on business premises and depots or at the drivers' residence. The growth in the EV fleet market is likely to continue to be reliant on this form of charging infrastructure, with depot based charging set to grow rapidly. However, there are a number of use cases - such as taxis, car clubs, delivery vans and EVs which go home with the driver but have no off-street parking, which will be dependent on the provision of public chargepoints for their primary source of charging or to extend their operational range.

The report identifies barriers to the provision and use of both private and public charging infrastructure for use by commercial fleets as well as to securing the finance that will be necessary to enable the EV transition.

There are currently around 300,000 private and 26,000 public chargepoints in the UK. Private capital is expected to continue to fund the investment in the growth of charging infrastructure. The limited number of public chargepoints - as well as their cost, accessibility and reliability - are seen as particular constraints to the adoption of electric vehicles in commercial fleets.

Public charging solutions are needed in the right locations nationwide, often with rapid charging capability. They need to be reliable, available at scheduled times and accessible to different vehicle types to accommodate the needs of diverse commercial users.

Businesses also need clear pricing and software solutions capable of sending charging data to fleet operators from all types of chargers, facilitating payments and cost control. Where vehicles are charged at home, fleets will also need to record these charging episodes and for the data to be charged and provided centrally to the fleet.

The report finds that the sharing of data between relevant actors locally could remove significant barriers to the investment in charging infrastructure to support commercial fleet EV uptake, by reducing the risk of poor utilisation of the assets. It also finds that there are opportunities for fleets to collaborate in setting up local charging hubs enabling cost sharing and to maximise the utilisation of existing assets.

The reduction in the length of time and the regulatory process required for securing permission to install chargers, would accelerate the provision of charging infrastructure which needs to be deployed at speed in the coming decade. There will be a need for public as well as private funding of charging infrastructure. Better alignment of public funding support processes with investment planning project timelines would be helpful.

There is also need for research into the better integration of fleet charging requirements with flexible energy markets. A greater understanding of the operational profiles and energy consumption patterns, opportunities for on-site energy storage and generation can be more effectively managed, potentially providing benefits to the fleet and the energy system.

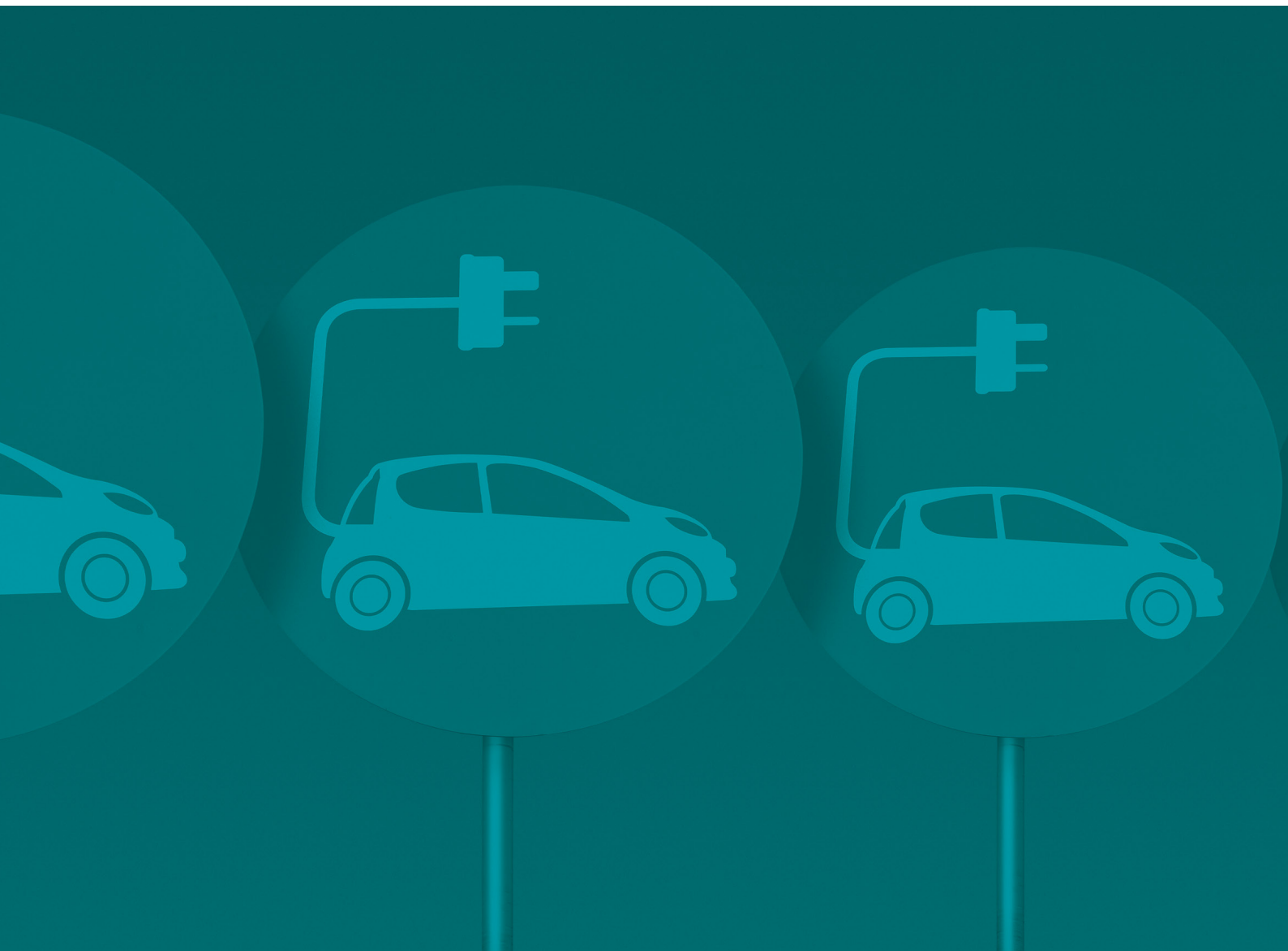
Further recommendations are detailed in the report.

Information was gathered for this report through a multi-stakeholder workshop involving representatives from the transport, automotive, infrastructure and energy sectors along with representatives of consumer groups, local and national governments and through additional interviews and publications.

Objective

This report looks at how the fleet market can be encouraged to switch to electric vehicles by focusing on fleets' current EV charging strategies and how these will need to adapt to allow a significant increase in the proportion of EVs fleets procure and operate.

Switching them to electric alongside the rollout of a national charging network will allow faster public adoption in the mass car market.



Background

Transport accounts for the largest share of greenhouse gas emissions of any sector in the UK: 23% in 2019. The vast majority comes from road transport, in particular cars, vans, buses and trucks which emit 106Mt CO₂e. Emissions from road transport have been stubbornly level since the 1990s, while other sectors have reduced their emissions.

The Government's Transport Decarbonisation Plan calls for a step change in the ambition to tackle transport emissions and to reach net zero. As part of this ambition the UK has committed to phase out non-zero emission cars and vans and to support investment in infrastructure.

Approximately 60% of new car and van registrations in the UK are fleet and business and so they are going to be vital in delivering the UK's ambition on decarbonising road transport. Fleets have been among the pioneers through company fleets, private lease, rental and car clubs. The BVRLA and its members have adopted a 'Plug-in Pledge' scheme to register 570,000 plug-in cars and vans per year by 2025, and expect to be operating 1.3 million plug-in cars and vans (either battery EV or plug-in hybrid) by then.

Currently the vast majority of EV chargepoints are private, either at residential properties off-street or at commercial premises, in fleet depots or business premises. The number of private EV chargepoints is not known but is estimated to be in excess of 300,000. As of October 2021, there were 26,000 public chargepoints of all charging speeds, however only 25% are slow chargers (ZapMap).

The fleet market has the potential to be a major driver to expanding the use of electric vehicles but to do this the right type of EV charging infrastructure is required in the right place at the right cost. This will require tackling issues to expand EV chargepoints on private premises, residential and commercial, and investment in public charging locations. Equally fleets can provide the utilisation required to make the return on investment for public chargepoints.

A range of fleet operators contributed to this report representing: delivery fleets, public utilities, local authorities, company car, public sector, car rental and car sharing, fleet leasing and taxi operators. A full list and definition of types of fleets is provided in the appendix.

The following definitions were used to refer to rates of charging and types of public and private chargepoints.

EV charging

- Slow – Chargepoints with power output of up to 7kW.
- Fast – Chargepoints with a power output ranging between 7kW and 22 kW.
- Rapid – Chargepoints with a power output greater than 22kW.

Public charging point

- On-street – Chargers installed on the street in a residential area.
- En route / forecourt – Chargers installed along motorway networks or at service stations to provide charging support for drivers on long journeys
- Destination – Chargers installed in car parks at places which consumers have travelled to for example, supermarkets, shopping centres, cinemas, restaurants, and tourist attractions.

Private Charging

- Residential off-street – Charges installed at an EV owners house, where off-street parking is available.
- Business premises – Chargers that are located at businesses and installed on work premises
- Depot – Chargers that are co-located with a place for storing goods or motor vehicles.

Methodology

The report was produced by the Zemo Partnership and the Electric Vehicle Energy Taskforce, with the support of the Build Back Better Business Council. E4Tech assisted in the research for and the production of this report.

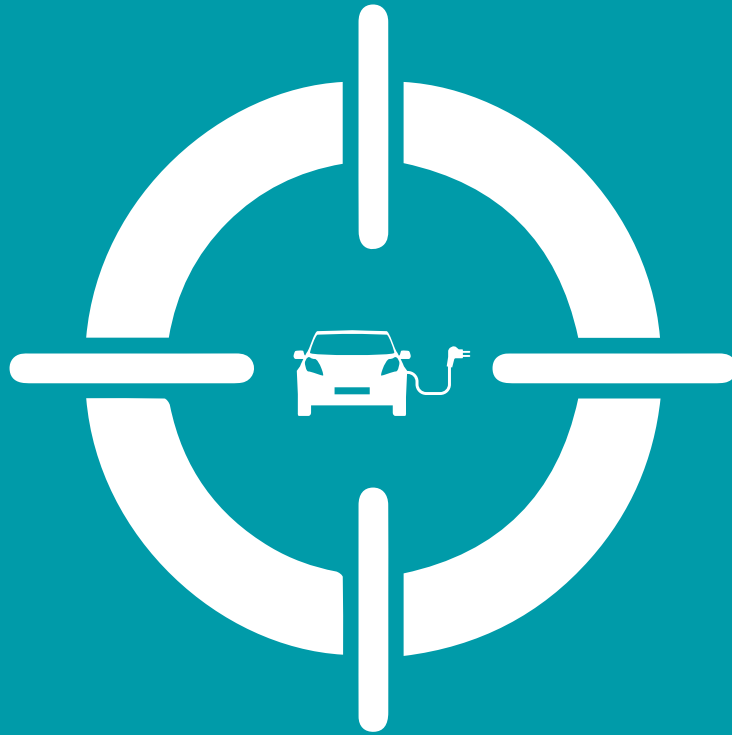
Evidence was collected from a wide variety of stakeholders that own or operate commercial fleets, including utility companies, local authorities, and commercial delivery operators, as well as corporate and private business car fleets. Network and chargepoint operators also contributed. Evidence was collected through interviews, evidence submitted and also gathered through a workshop looking at fleet EV charging strategies today, how they are likely to evolve with the growth in EV fleets and the key barriers that will restrict that growth.

The approach was to undertake a gap analysis of the current situation which EV fleets face and what the unconstrained situation would be in the near future, 2025-2030. Barriers constraining the current deployment of EVs in fleets and as well as future growth were identified, and the potential measures to overcome these barriers along with potential opportunities.

During the period this study was undertaken both Government and Ofgem made announcements which addressed some of the issues raised. Where this was the case, it has been noted and an assessment made of the extent that the announced measure addressed the issue identified.

It should be noted that attendees of the workshop do not represent all stakeholder groups. Notably absent were representatives of SME commercial fleets, which may only operate a handful of vehicles and do not have fully integrated fleet management as part of their operations. There is currently research on-going in this area (see White Van Plan | ENA Innovation Portal). The costs and other obstacles for these smaller fleets could be more prohibitive to adoption of an electrified fleet than for larger operations. Taxis and Private Hire operators were also under-represented at the workshop. Further work should be undertaken to explore the impact on these user groups.

Current EV Strategies Today



Current EV Strategies Today

Key insights

Increasingly UK fleets in both the private and public sectors are adopting EV fleets and with the Government's commitment to phase out the sale of petrol and diesel vehicles, all car and van fleets will need to develop strategies to achieve this transition by 2035. The fleet operators leading the vanguard of the electrification of transport are looking to scale, with ambitious and admirable targets to only purchase electric vehicles by as early as 2025 and to electrify their entire light duty fleet during the following decade.

Where an organisation dictates vehicle procurement, meeting the ambition resolves into a return on investment against the product offering in the market, but where user-choosers are involved, fleets are looking to develop incentive strategies for their employees, such as offering EVs on company car schemes and use salary sacrifice to encourage adoption.

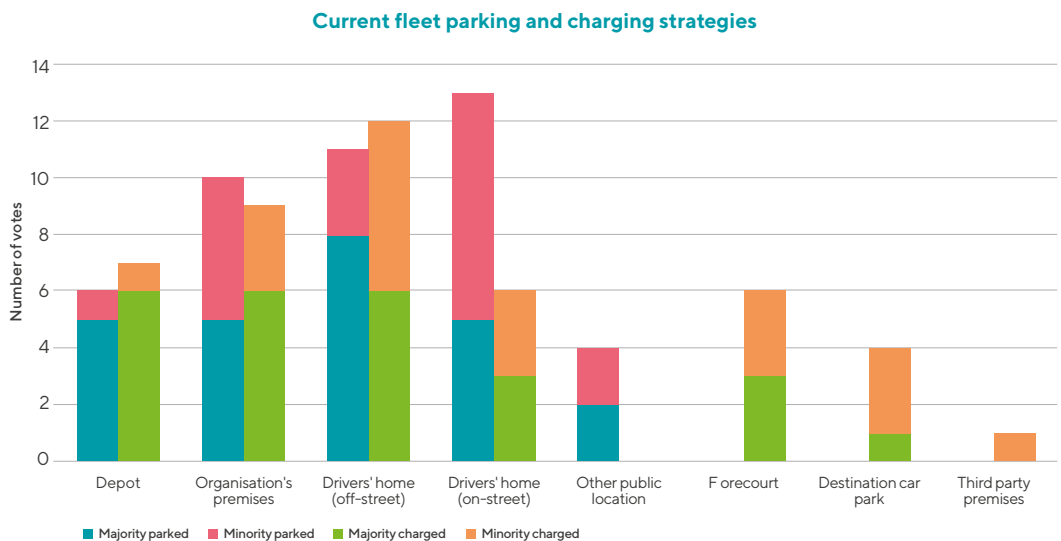


Figure 1: Where fleets are currently parked and charging (for the majority and minority of cases)

For the majority of fleet operators represented, just over half have vehicles kept at the drivers' homes, either off-street or on-street. The rest are equally split between the vehicle being parked at depots or organisation premises, with few parked in other public locations.

Not surprisingly, very few vehicles which are kept primarily at depots are parked elsewhere, whereas there is quite a lot of variation in parking location for fleets' parking strategies where the primary location is at the organisation's premises or parked at the driver's home.

Private charging the norm

The majority of fleet operators charged their EVs most commonly at 3 types of locations: fleet depots, organisation's premises, or at the drivers' homes. Most of the fleet operators noted at least some of the fleets were being charged at drivers' homes, with the majority finding off-street charging an easier solution. These were predominantly company cars although there were some vans also.

There is a strong correlation between where vehicles are parked and where they are charged, except for vehicles parked on-street. While fleet operators are able to support installation of chargers at their drivers' home, on-street charging solutions are not within the fleet's control, and these vehicles are dependent on on-street charger availability, which is currently generally lacking.

Role of public charging

Vehicles that start their working day from home appear to have a more varied daily duty cycle and so are less likely to fulfil their daily operations on a single charge. In this case drivers will have to rely on alternative public charging during their working day, or in their own time.

There has been growth in the use of fast and rapid charging (75% of public chargepoints are fast, rapid or ultra-fast: ZapMap). But without a widespread deployment of rapid chargers on-street chargers, fleets are dependent on rapid hubs, or other car parking facilities which can have physical access barriers to use. This is particularly a problem for larger vehicles with a high roof, long wheelbase, or towing a trailer. In addition, public chargepoints have a perception of suffering from poorer reliability and maintenance.

Depot and workplace-based charging are perhaps simpler solutions, more directly under the control of the fleet. However, these can face constraints on the grid connection capacity, physical space and if the land is a leasehold it may be blocked from installing chargers. There are a minority of fleets with special use cases which rely solely on the public chargepoint networks, such as car clubs.

Issues being faced today

A wide range of issues were raised by fleets and the frequency with which they were raised was recorded. This provides an indication of issues that were given the most airtime. The issues were then categorised with input from the participants, who were then asked to indicate the importance of each category of issue by voting for them; these are ranked in Fig 2 below.

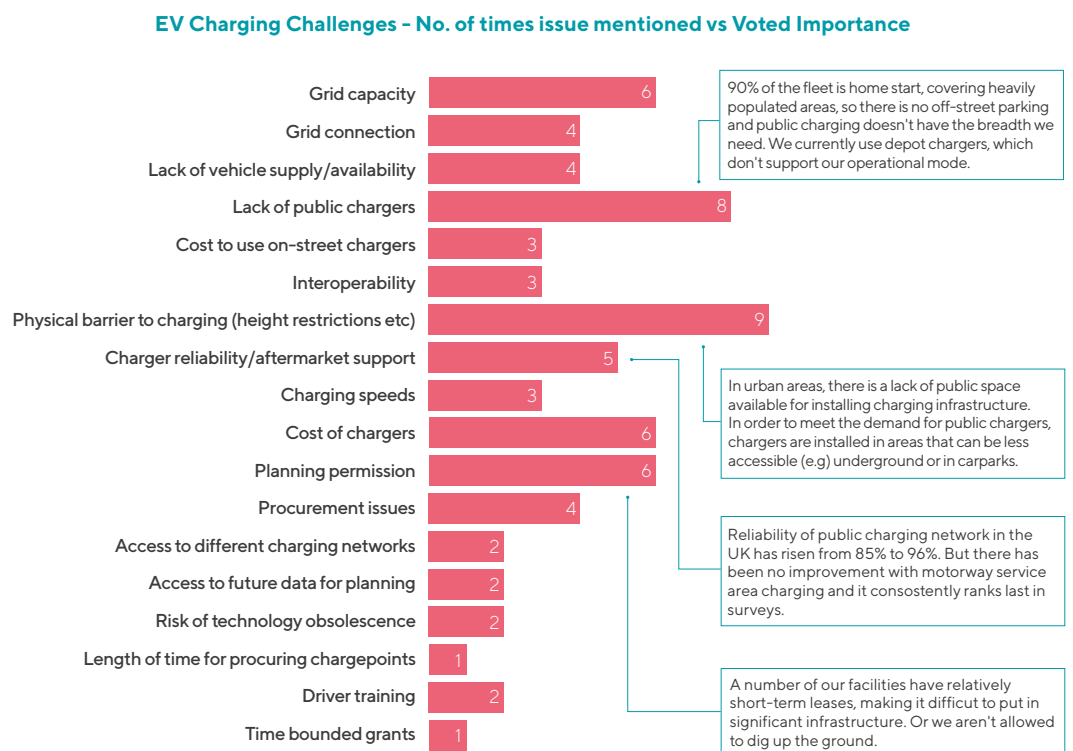


Figure 2: EV charging issues being faced today. Total number of categorised issues mentioned during the workshop and ranked from highest to lowest importance of that category

The most frequent challenges mentioned by fleet operators for private charging were related to depots and business premises and were noted as: grid capacity, cost of infrastructure and issues relating to planning permission. With respect to public charging the main issues were: lack of public chargers and cost to use, accessibility/physical barriers to charge (i.e. height or size constraints) and chargepoint reliability.

Electric light commercial vehicles (LCVs) currently have a shorter range than an ICE equivalent and this results in a higher frequency of charging events. Only some fleet vehicle operations can be electrified currently; longer distances per day and high payloads are barriers to adopting EVs. While the electric car market is developing fast, in terms of the range of models available, the more limited range of

LCV models available for fleets to purchase was a concern to fleets. This is an issue that is even more prominent in the electric van market, which currently has even less choice in terms of makes and models offered to fleets.

Installing private charging

The barrier to private charging which is consistently identified as most important by fleet operators is the cost and process of connecting to the grid. This process can be time consuming and costly to get a grid connection, particularly where there is little headroom on the electricity network.

The cost born by fleet operators at depots and business premises in installing charging infrastructure was seen as a significant issue. The costs including grid connection, civil engineering, along with the capital cost of charging infrastructure can be prohibitive. There is a recognition that there should be a move to private funding as there are issues with the provision of grant support for infrastructure projects and the calculation of the costs borne by the fleet operator for grid connection.

The potentially slow and bureaucratic processes of seeking permission to install charging infrastructure and build on land, and in particular on leasehold land, was seen as being particularly problematic, given the relatively short time that the electrification of transport is intended to occur over.

A lack of space for charging was the most mentioned issue. At depots, parking has been optimised for traditional internal combustion engine (ICE) vehicles. The additional physical space that is required to charge and manoeuvre vehicles around the site to ensure all vehicles are operational is a constraint to electrifying even more of the fleet.

An issue emerged and was echoed by several participants, relating to the legislative barriers slowing down the installation of charging infrastructure on leasehold properties. Fleet owners that want to install chargers may not be legally allowed to in the terms of the leasehold agreement. If they are, the decision to invest in charging infrastructure may not allow sufficient time for a return on investment on properties with a short lease remaining. It should be noted that this is also an issue with installing public chargepoints on leased premises.

For those users who can park off-street at home, the business case for fleet managers is much simpler. By installing a home charger for their driver, this gives the driver and fleet manager access to cheaper electricity (outside of the depot or workplace). When on-street, the public charger cost premium can be a real problem (5-55p/kWh), particularly for those home start fleets with no access to off-street parking.

Access to public charging

The most commonly heard problem from fleet operators relating to public charging was the lack of public charger availability and the associated cost of using public chargers for businesses. The lack of off-street parking possibly impacting on electric car uptake slightly differently from electric vans.

Chargepoint availability is a hugely important issue to fleet owners, as is the reliability of those chargers already installed and in use. When out and about, drivers need to be able to charge quickly, and conveniently. Interoperability, not just in the physical connection between charge socket and plug, but between payment systems, is a serious blocker for most fleet drivers. Having to charge on multiple different RFID cards is a major inconvenience to drivers and is often cited as a hurdle to adopting EV fleets. While the UK Government has announced that all new rapid chargers must accept contactless credit card payments from 2020, most fleet drivers are used to using a single 'fuel card' to authorise payment, in an efficient, quick and secure way without the need to claim back individual expenses. Fleet managers and drivers want to be able to have access to as many chargepoints as possible, with the same benefits they are used to, just as they can with fuelling stations now.

“Availability and lack of public EV charging infrastructure, in particular in urban areas where there is not sufficient on-street charging is an issue. The discrepancy in pricing between public and private charging at home ... can range from 5-55p/kWh, which is a major disadvantage to those who do not have access to home [off-street] charging or workplace charging”

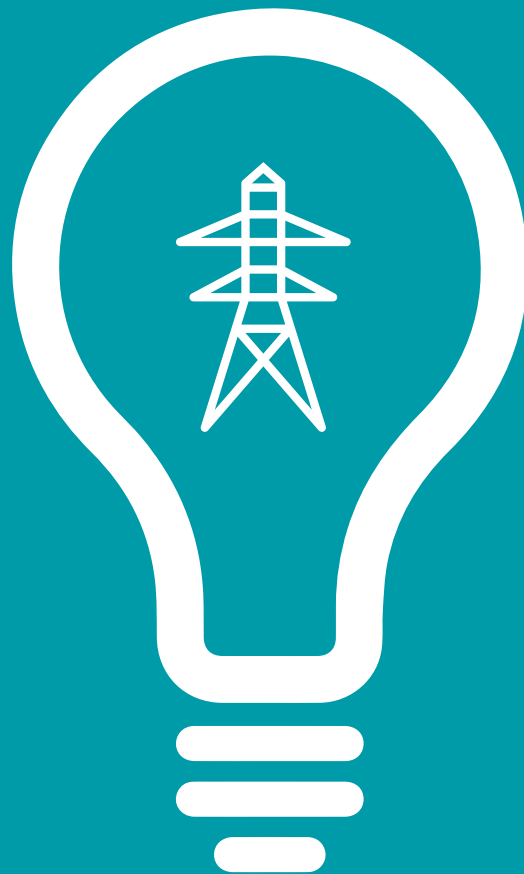
Cross-country charging availability for emergency services: NHS

Being able to charge wherever, without limitation is going to be a crucial part of maintaining the reliability of an EV emergency services fleet.

“Yorkshire ambulance systems, looking at a cross-country system, being technology agnostic. We are having real challenges to implement a system that is open-protocol and having the back-office systems that could help us support ... EV deployment in emergency services (ambulances, police cars etc). We have a lot of challenges for our ambulances being prioritised over other vehicles and lots of issues around capacity at the depot. We want a country-wide solution.”

For public charging, the lack of space for charging has resulted in some chargers being installed out of reach of larger LCVs and vehicles with trailers in carparks with height restrictions to access or underground parking bays, where bays are too small, difficult to manoeuvre into or where the chargepoint doesn't have a long enough cable.

Ideal EV strategies in the future



Ideal EV strategies in the future

Key insights

While there is a current imperative for fleet operators to electrify their car and van fleets, fleet operators are already considering plans for their larger heavy-duty vehicles. There is a ground swell among UK fleet operators who have shown a clear intent to begin to decarbonise and/or electrify their vehicles with ambitious targets to reach net zero as early as 2025, ranging to 2040 for complete fleet migration to alternative fuels, depending on the types of vehicles making up the fleet.

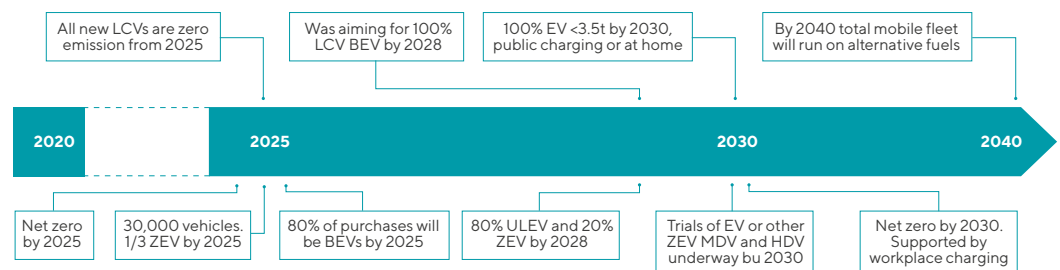


Figure 3: Timeline of various fleet operator targets for decarbonisation mentioned at workshop

Solutions will need to cater for all types of vehicles, from passenger cars and LCVs to medium and heavier vehicles such as buses, bin lorries and HGVs. The heavier vehicles will have a high energy demand and alternative vehicle and fuel solutions are going to be trialled to identify the best powertrain for the job and the solution that gives the fleet manager the right energy balance on-site. Shorter ranges and longer times to recharge could result in some considering fewer bigger vehicles and opting for a larger fleet of smaller, faster charging vehicles. Charging solutions will need to adapt to support operation profiles if they are to speed up the adoption of electrified fleets.

Predictable duty cycles from depot-based operations are easier to model, and may be more suitable to battery electric, vehicle to grid (V2G) or smart charging coupled to onsite battery storage, or even renewable energy generation is being considered. Where EV charging solutions are a difficult fit to a fleet's operations, fleets may look to use alternative fuels instead.

Consolidation at depot and business premises

While fleets’ expectations of future charging strategies did vary, the overall difference between the current and future ideal strategy for parking and charging of EV fleets is expected to see a consolidation of parking and charging at depot and business premises. Companies are already investing in the solutions they need to electrify and understanding how this works and the underlying cost structures. However, having resolved many of the challenges today, this will need to be rolled out across companies’ entire fleet, creating a slightly different picture of where EV fleets will spend the majority of their time parked and their primary source of charging.

Ideal fleet parking and charging strategies

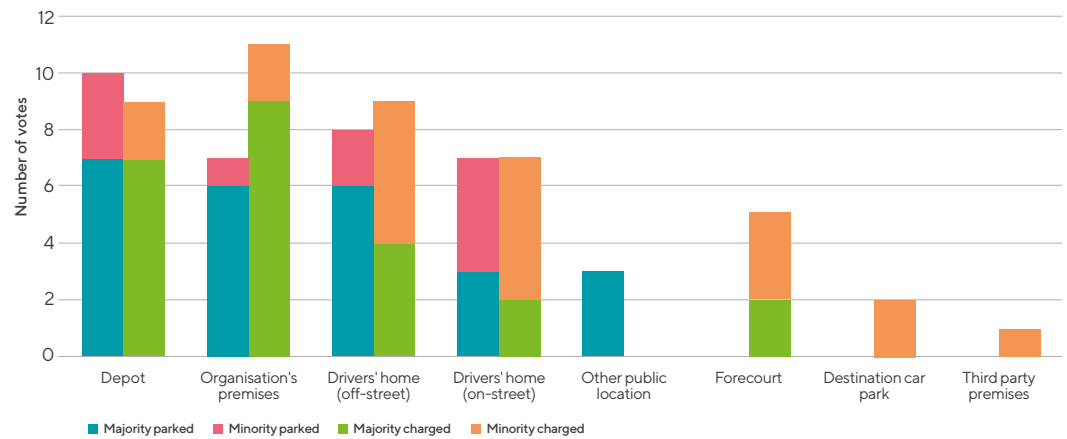


Figure 4: Where fleets are ideally parked and charging (for the majority and minority of cases) with a comparison to today’s strategy

There tends to be more distribution between the top four categories of charging location according to workshop participant expectations, than with the actual picture today. There is expected to be more emphasis on vehicles at depots and owned premises, particularly for the majority of cases, being the primary location where the vehicle is kept and charged. This is partly due to the electrification of fleet depots with a large number of vehicles and the progressive electrification of larger vehicles in those fleets, where fewer solutions exist today. These vehicles aren’t allocated to a single driver and therefore would be parked and charged at depots or business premises.

Workplace charging is seen to be the most favoured location for charging, overtaking home charging today. For fleets parking and charging at depots and at workplaces, there is more certainty over the utilisation of the assets, and a better business case for investment. There is also an expectation that as on-street public charging networks grow, there will be a much closer match between parking and charging at home for personal vehicles where there is no off-street parking available.

Public Charging, vital for some

On-street solutions will need to improve coverage compared to today in order to serve a larger national EV fleet parc, although this will still represent a minority of the EV fleet vehicles in circulation and will spread across a large number of fleets. This may make the concept of using fleets to build utilisation of on-street charging networks difficult without localised co-ordinated investment by fleets and chargepoint networks.

The picture for forecourts, destination car parks, and third-party premises remains broadly unchanged. The commentary regarding these solutions from fleets is that they represent a 3rd option for most fleets, suitable for rapid ‘top-up’ or opportunity charging, to be used during the working day to extend range. They are still important for fleet managers, even vital for some, but were considered to be less important for fleets as a whole where there is a clear focus on future growth of an overnight charging use case. However, there is significant variation in the vehicle use cases and the chargepoint infrastructure required to support them.

For those fleet operators without large depots or a use case which requires fast charging times, a national public network of fast and rapid chargers will be central to the scale-up of EV fleets.

“Workplace charging targeted at those without home charging; access to reliable high-speed charging both local (to help enable those without off-street parking) and on motorways (to support higher mileage drivers); Ultra-fast charging hubs with speeds of up to 300kW and a significant number of bays to provide greater redundancy; we expect the vast majority of our own fleet public charging to be 50kW or higher.”

The relative perception of rapid forecourt charging solutions may be as a result of fleets’ assumptions regarding the pricing of this charging solution. The EV Energy Taskforce report ‘Business models and barriers to finance for public electric vehicle charging infrastructure in the UK’ indicated that the forecourt as a result of a higher utilisation than slow on-street charging may be more cost effective than many assume.

Barriers to the ideal strategies

A wide range of issues and barriers were raised by the fleet operators interviewed. The frequency with which issues were raised and the overall importance of each issue was ranked by the fleet operators involved. The chart below ranks most important barriers to least important, from top to bottom. The frequency with which issues were raised is indicated by the width of the bar.

EV Charging Barriers to Ideal Strategies - No. Times Issue Mentioned vs Voted Importance

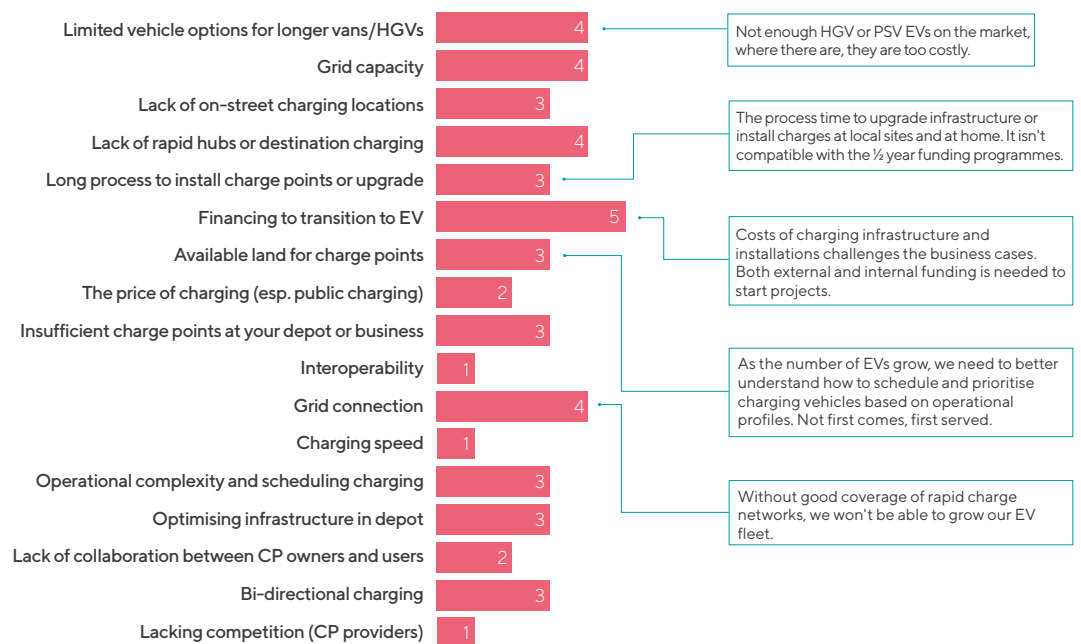


Figure 5: Barriers to achieving ideal EV charging strategies. Total number of categorised issues mentioned during the workshop and the number of votes for the importance of that category

A number of challenges which are being faced today by fleets, are expected to continue to present barriers to fleet managers achieving their future ideal charging strategies. This included grid capacity, connections, and the associated costs of upgrading infrastructure, which were considered to be of high importance by the fleet operators. The lack of vehicle availability was also expected to be a continuing major issue; however, the focus instead is on larger and heavier electric options for commercial vehicles. The availability of space for charging, and the length of time and processes to deploy charging capability, be it on public sites, at depots or for rented accommodation was also revisited as a blocker. Emphasis was also put on the regulatory processes for securing permission to install chargers.

Fleets requiring public charging

On-street and public charging availability was stated as a fundamental need in order to move beyond depot, business and home-based fleets. The group explored the gaps between the needs of on-street charging and the provision of chargers. Fleet operators and local authorities identified that there wasn't good information being shared between those deploying EV vehicles and those who can install the charging infrastructure to support them, resulting in a mismatch of vehicles and charging networks. The need to ensure public charging is provided with the right solution in the right location, and the importance of rapid charging was raised. This highlighted a need for better planning for the provision of public charging infrastructure and the potential role for local authorities.

Mobility as a service use case: Zipcar

Zipcar, among others, has set out a vision to be fully electric by 2025. Currently they operate a fleet of around 3,000 vehicles, with ~10% of them BEVs.

"Our vehicles are used by our members to rent by minute, hour or day so it's a unique example for this group. We own a fleet of vehicles, but they are used by our members and customers rather than our own staff. Achieving this vision is dependent on availability of public charging infrastructure. Charging will be done solely by public on-street chargers. For in-trip charging, [during the rental] priority will be for rapid and ultra-rapid chargers. It needs to be as fast as possible as customers will be paying for the time the vehicle is charging. Fast and slow will have a role to play but only as a top-up charge overnight. The key point for us is to get vehicles charged and back available to rent as quickly as possible."

Financing the Transition

Several new issues were presented whilst exploring the barriers to achieving ideal fleet charging strategies. Whilst costs had been mentioned previously, there are still concerns around the financing to enable the EV transition. Some participants recognise there is a need to move towards self-funded solutions, but currently the consensus is that there needs to be a mix of both public and private funding to support projects. A specific issue was highlighted that there is a limitation to the number of chargepoints a business can receive grant funding for, which is a challenge to installing workplace charging. While it was recognised that public funds should be equitably distributed, this was seen as an important constraint in the rollout of fleets' electrification strategies.

Beyond the financial aspects of funding, the timing and period of applications was also seen as problematic. Projects related to infrastructure can take a long time to set up and complete. The half-year funding programmes supporting infrastructure upgrades are currently too short, and do not line up with timelines of infrastructure projects. There were also calls for greater transparency on the timeline from application to funding decision for grants to assist in planning investments.

Operational Complexity

For those with larger fleets and a range of solutions for various vehicle types, and operating profiles, the picture will become more complex as the EV fleet grows. A lack of experience in planning operations and managing the scheduling of charging is expected to be a barrier to a smooth transition and it will likely impact on operations. At the depots, scheduling could be more manageable but a solution for planning and scheduling charging is needed to meet (or exceed) operational efficiency. Highly utilised vehicles would need priority and top-up charging at hubs will support the rest of the fleet. However, there is uncertainty around the pricing at rapid hubs, so companies prefer to rely less on these until there is more pricing clarity and confidence. Vehicles in use 24 hours a day will need very fast charging, ideally done whilst loading or unloading, but there are health and safety issues to overcome with trailing cables.

Generally, reliability of the public network is expected to improve, the barrier to this would be a lack of competition, which could impact on reducing charging pricing and improve the customer service offering.

Solutions



Solutions

Having considered the issues EV fleet operators are facing today and the barriers preventing them implementing their ideal EV fleet recharging strategies, the group explored the potential solutions. The types of solutions were categorised, and votes were given to the solutions that would best help to achieve the ideals. There was a range of solutions discussed, and again the frequency of the mentions showed how thoroughly the topics were discussed.

The fleets involved identified two broad areas where the provision of public charging could be improved. These were to ensure public charging was deployed in a manner to support fleets operation efficiency, and secondly to de-risk the investment for all stakeholders involved in providing EV charging infrastructure for fleets.

EV Charging Solutions - No. Times Issue Mentioned vs Voted Importance

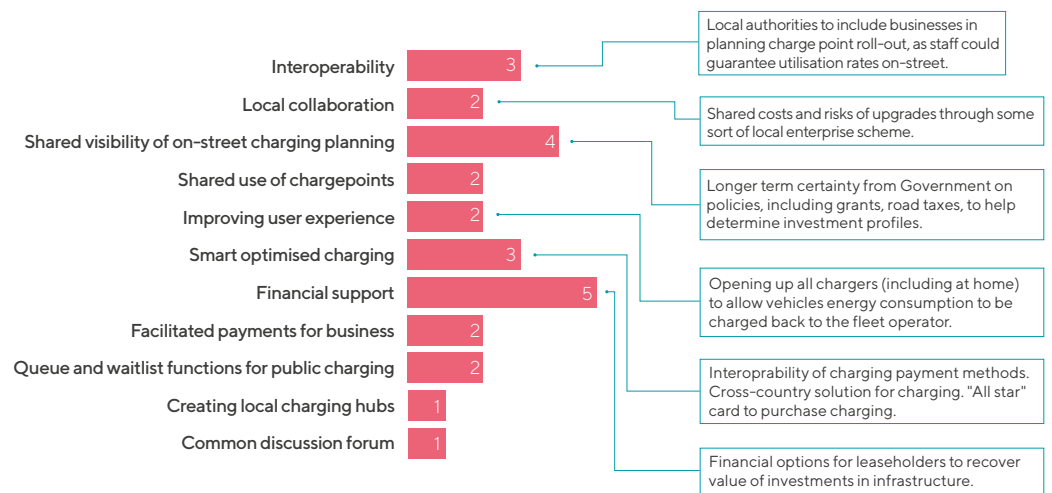


Figure 6: Solutions and opportunities to resolve issues and barriers to ideal EV charging strategies

A network of public chargers is fundamental to keeping fleets running. Field solutions will be required to allow EV fleets to operate at scale whether to provide a fleets primary charging option or to allow fleets to extend their operating cycle. One participant stated: "We will all be relying on the public charging network", some more than others. Whilst this is not news, focus should be on a strategic rollout of the right solutions in the right places which are capable of supporting EV fleets to operate efficiently.

Supporting Operational Efficiency

Nationwide access to public charging for commercial fleets that will help keep businesses running is fundamental, with clear pricing and software solutions sending charging data to fleet operators from all types of chargers, thereby facilitating payments and cost control. For those fleets where the vehicles are charged at the drivers' home or at 3rd party premises with charging available, an extension to the solution would be one that allowed even those charging episodes to be recorded and charged back to the company centrally. A number of use cases are particularly exposed to using a range of chargepoint networks, this includes national operators, such as the NHS, and Mobility as a Service (MaaS) models, such as Zipcar. For these use cases roaming access is fundamental and they will be more reliant on rapid and ultra-rapid charging whilst in use. Government consulted on the consumer experience at public chargepoints and the need for roaming during the spring of 2021; at the time of writing the government's response has not been published. Centralised billing or a single 'all-star' payment card will be vital to allow efficient administration and cost control. In addition, there was a clear preference for contactless or automated payments rather than RFID cards or multiple apps.

Fleet operators expect the landscape of the public charging networks will look quite different to the current fuelling networks, with the potential for fleet-only charging or the offer of a priority for certain vehicles. This could be particularly important for emergency services vehicles. The use of booking systems where a vehicle could virtually 'queue up' or a 'waitlist' function for defined periods of time at charging sites would be helpful to plan routes and alleviate problems of charger availability.

To further facilitate fleet planning and scheduled charging, developing capability about how to effectively plan and allocate the use of chargepoints would be a benefit to fleet operators. The more predictable operating profiles could be modelled, but more complex operating profiles or large fleets will need to consider the prioritisation of vehicles that cannot easily charge en route. With increased understanding of the operational profiles and energy consumption patterns, depots can be more effectively planned. Grid constraints could be managed with on-site power generation, battery installations and the introduction of smart charging and it may even be possible for V2G to shift usage to off-peak and save on operating costs.

Sharing Information

A strong theme was the greater sharing of data between relevant actors in order to de-risk investment, assist fleet operators in developing the business cases and rollout plans to meet their ambitious targets. Making DNO data around capacity and reinforcement costs more readily accessible and transparent to fleet operators was seen as an important step in simplifying the process of future fleet electrification planning. Initiatives from the ENA and a number of DNOs to make electricity heat maps available are seen as an important step in the right direction. In addition, Ofgem has proposed a package of connection incentives intended to drive timely and efficient connections for EVs and the network license condition to publish digitalisation strategies under RII0-2.

Within local authorities there is also an opportunity to align planning of charging roll-out with local businesses knowledge of vehicles it is deploying to help guarantee utilisation of the chargepoint infrastructure and help ensure infrastructure is going into the right place. Guidance for local authorities could be prepared by fleet operators to indicate what their requirements would be, and local authorities could equally share their plans for chargepoint deployment in their area. To facilitate this, local forums to exchange data between the public and private sector would be needed.

Beyond public-private collaborations, there are opportunities for businesses to collaborate to set up local charging hubs, either to investigate sharing costs and risks for new infrastructure, or for maximising utilisation of existing assets. To facilitate this, forums for communication will need to be established, and if there are already places where these discussions take place, e.g. UK100, these need to be made available to all those intent on building out EV fleets at a local level.

The constraints of available land for installing charging solutions were a frequently mentioned challenge to overcome. Innovative space saving solutions may be needed at depots to facilitate charging activity within current depots. Ideas or shared experiences of space optimisation and solving logistical challenges for parking and manoeuvring vehicles around the site should be considered. Where vehicles are in constant use, or they are large, alternative charging methods may need to be considered, such as overhead cables to avoid trip hazards. If the charging is less accessible for large vehicles, improved information for EV drivers of oversized vehicles would make planning and scheduling easier. Forums for fleet operators to share best practice could facilitate this. There are a number of potential bodies which could fulfil this role including trade bodies, Local Enterprise Partnerships or Local Energy Hubs.

De-risking Investment

The investment case for fleet managers is not easy, there is a need to assist fleet managers and businesses to de-risk their investments. Technology needs to be able to serve the needs of the business for the duration of its installation and investments in infrastructure would need to allow the headroom to grow. Technology is improving, which brings opportunities for performance improvements and more choice, but also brings the risks of obsolescence, and solutions should be compatible with technology growth and development. A longer time certainty around policy, grants and taxation would also support businesses in their decision-making processes.

The super-deduction tax relief scheme was introduced in April 2021 to support businesses investing in productivity-enhancing plant and machinery. This scheme allows companies to cut their tax liability against investment in qualifying assets. Government should consider extending the scheme to cover grid upgrades, connection and charging infrastructure. Other financial support opportunities would lie around reducing the gap between on-street and off-street charging prices for commercial vehicles parked at home.

Given the importance of electrifying transport at pace over the coming decade it was proposed there was a clear need to overcome the potentially slow and bureaucratic processes of seeking permission to build on land, and in particular on leasehold land. Government should ensure that the role of local planning is clearly defined in the strategies, plans, policies and funds which will help provide clarity in local and strategic planning. This will be particularly important in the OZEV EV Infrastructure Strategy. In addition, Government should consider whether local EV charging infrastructure plans can be assigned as a nationally significant infrastructure project (NSIP), which would allow the planning permission process to be streamlined for installing chargers or upgrading infrastructure. It could also be investigated to ascertain what financial options are available to leaseholders to recover the value of investments in infrastructure. Ofgem's announcement that grid connection costs will in future be socialised rather than born by the organisation connecting. This is broadly welcomed although there can be significant additional costs involved. Finally, funding programmes could consider extending timelines for grid upgrade projects that are likely to exceed the length of the programme.

Consumer Experience

Other opportunities lie in the consumer experience of EV adoption and use. Coventry City Council launched their "[Try before you buy](#)" scheme where interested business can try EVs before they commit to a change in their fleet. Innovative schemes which demonstrate benefits should be replicated. These programmes, along with more in-depth driver training would be welcome to resolve the negativity towards EVs by some, and encourage drivers to make the best of their vehicles through driving techniques. Finally, on improving the customer experience of charging, fair competition is encouraged to improve services and reduce prices, focus should be directed towards on-street and public charging en route, for example at motorway services.

Conclusions



Conclusions

Vehicle fleets, in particular public and large private sector fleets, are at the vanguard of adopting electric vehicles. However, this may be constrained depending on the growth of charging infrastructure. There are opportunities to support both fleets and chargepoint networks, through the co-ordination of the right charging infrastructure in the right places, thereby de-risking the investment by fleets and chargepoint operators. This will help the development of public charging infrastructure, which in turn will encourage the growth of mass electric vehicle market.

The growth in the fleet electric vehicle market has predominantly focused on a limited number of use cases, in particular company car fleets, depot-based van fleets and vehicles, both car and van, which are able to charge at company premises. These use cases all have access to private charging facilities, whether it be at residential premises with off-street parking, vehicle depots or business premises. While there are barriers to providing charging infrastructure for fleets at these locations, these are well understood and are more directly under the control of the fleet. It is expected that these use cases will see the greatest growth initially.

It is clear, however, that there are a number of use cases which require public chargepoints to extend the electric vehicle fleets' operational range or duty cycle together with a small minority of specialist use cases which are likely to be specifically dependent on public charging. These use cases either require the vehicle to be kept on-street or the daily duty cycle requires top-up charging. The provision of charging infrastructure in these cases, is not under the control of fleets and so deployment in these areas will be dependent on investment by local authorities, DNOs and chargepoint operators.

There are a number of supply and operation barriers identified which were outside the scope of the study. These included the currently limited supply of EVs in terms of numbers, delivery times, range of models and specifications. In addition, many fleet depots lack space and are ill-suited to installing chargepoints or to manoeuvring vehicles to allow charging to take place. While important, these issues are beyond the scope of this study.

Barriers to private charging

The most frequent challenges mentioned by fleet operators for private charging have been well documented previously and relate to understanding how and where to connect to the electricity network, the cost of getting a grid connection and of the charging infrastructure, issues relating to planning permission, as well as legislative barriers slowing down the installation of charging infrastructure on leasehold properties.

Securing financing to enable the EV transition was also seen as an important issue. While fleets recognise there is a need to move towards self-funded solutions, the current consensus is that there needs to be a mix of both public and private funding to support investment. Specific issues identified were limitations in the number of chargepoints a business can receive grant funding for, and the timing and period of applications was also seen as problematic.

Barriers to public charging

Key issues identified to fleet operators utilising public chargepoints included the lack of public chargers and their cost to use, physical accessibility of the chargepoint and the uncertainty of being able to use public chargepoints and therefore the inability to build their access into a vehicle's operation schedule.

The need was identified to ensure public charging is provided with the right solution in the right location, and the right rate of charge, with greater emphasis on rapid and fast charging. This highlights a need for better local planning in the rollout of public charging infrastructure and the potential role local authorities should play, together with DNOs. In addition, fleet operators need to be able to have reliable access to chargepoints and therefore greater emphasis must be placed on maintaining chargepoints, the ability to schedule charging at public sites or facilitating priority and top-up charging at hubs.

Recommendations

Government should continue to push to ensure commercial solutions to nationwide access to public charging networks are implemented. This should include clear pricing and software solutions sending charging data to fleet operators from all types of chargers, thereby facilitating payments and cost control. Where vehicles are charged at the driver's home, fleets will need to record these charging episodes and for the data to be provided centrally to the fleet.

Chargepoint operators should provide fleets with certainty of access to public charging infrastructure at specific times and locations to allow fleets to operate efficiently. This may manifest as specialised fleet-only charging, the offer of a priority for certain vehicles, or a virtual queuing function through chargepoint apps during defined periods of time at charging sites.

Regional or local forums should be established to allow the sharing of data between relevant actors to assist in planning. These would focus on DNO data around capacity, reinforcement costs and energy planning, local authorities transport and chargepoint alignment planning, local business knowledge of vehicle numbers and charging strategies.

Fleets should collaborate to set up local charging hubs, either to investigate cost and risk sharing for new infrastructure, or for maximising utilisation of existing assets. To facilitate this, forums for communication will need to be established.

Government should issue guidance on the design of public charging bays to ensure accessibility to the full variety of fleet vehicle types and avoid the predominance of charging bays only accessible to cars. In addition, Government could award a design award for innovative space saving solutions needed at depots for charging. Ideas or shared experience of space optimisation and solving logistical challenges for parking and manoeuvring vehicles around the site should be considered.

DNOs and fleets should undertake research into better integration of fleet charging requirements in flexible energy markets. Greater understanding of the operational profiles and energy consumption patterns, opportunities for on-site energy storage and generation can be more effectively managed, potentially providing benefits to the fleet and the energy system.

Through the OZEV EV Charging Infrastructure Strategy and to support businesses in their decision-making processes, Government should provide greater certainty around policy, grants and taxation. The Government should consider extending the use of the super-deduction tax relief scheme to cover grid upgrades and charging infrastructure.

Government should investigate if it is able to assign charging equipment as 'critical infrastructure' to expedite the process of seeking planning permission for installing chargers or upgrading infrastructure.

Finally, the study identified a number of extreme use cases which were dependent on public charging infrastructure provision. Further work should be undertaken to identify other use cases and to understand their infrastructure requirements. In addition, it should be noted that the SME experience of using electric vehicles and the issues they face in securing chargepoint infrastructure were underrepresented in this study and further work should be undertaken in this area.

Appendix

Workshop Participant Organisations and Example Use Cases



Appendix

Workshop Participant Organisations

Representatives of the following organisations attended the workshop and provided feedback for this report:

Aberdeenshire Council	National Grid
Arval UK	Nexus
BP Pulse	North Ayrshire Council
BT	Nottingham City Homes
BVRLA	Office for Zero Emission Vehicles
Calderdale Council	Openreach Ltd.
Campbells Consultancy	Renfrewshire Council
Centrica / British Gas	Sainsbury's & Argos
Chargepoint	ScottishPower
Comhairle nan Eilean Siar	Severn Trent
Coventry City Council	Stirling Council
Darlington Borough Council	SYPTe
Department for Transport	Tesco
Dumfries & Galloway Council	Transport for Greater Manchester
East Dunbartonshire Council	Transport for London
East Renfrewshire Council	The Climate Group
Energy Saving Trust	Translink
Energy Systems Catapult	Transport For West Midlands
Falkirk Council	UK Power Networks
Green Finance Institute	Urban Transport Group
Lex Autolease	Yorkshire Ambulance Service NHS Trust
Liverpool City Region Combined Authority	Yusen Logistics UK
London Borough of Hackney	Zemo Partnership
MITIE Group PLC	Zipcar

Use Cases

The following use cases were identified; the majority were represented by company car, parcel delivery, utility van and local authority car and van. However, a number of outliers were identified also.

Parcel delivery

Average mileage 20,000 – 30,000 per year

Daily distance 80-120 miles

Primarily used during workday – 7am-5pm

Able to charge overnight, may need opportunity charging during day.

Delivery and collection of goods to and from distribution hub. Multiple calling points before returning to base multiple times a shift. Vehicle is operated regionally, greater than 15 miles from base.

Grocery deliveries

Average mileage 25,000 – 50,000 mileage per year

Daily distance 100–200 miles

Primarily used during workday – 7am–5pm

Able to charge overnight, may need opportunity charging during day.

Collection of groceries from retail outlets and delivery to residential homes and business premises. Multiple calling points before returning to base. Used regionally travelling more 15 miles from base.

Public Utility Van Fleets

Average annual mileage 15,000–25,000

Daily distance 60–100 miles

Primarily used during workday – 7am–7pm

Able to charge overnight, unlikely to need opportunity charging during day.

Carrying tools, equipment and materials to site. Return to base after each calling point. Driver may take home vehicle or kept at depot. Used regionally travelling in excess of 15 miles from base.

Local Authority Van Fleets

Average annual mileage 10,000–15,000

Daily distance 40–60 miles

Primarily used during workday – 8am–5pm

Able to charge overnight.

Carrying tools, equipment and materials between local authority facilities. Multiple calling points before returning to base, used locally typically less than 15 miles from base.

NHS Patient Transport

Average annual mileage 10,000-20,000

Daily distance 40-80 miles

Primarily used during workday - 7am-7pm

Able to charge overnight. May also need to charge to extend range.

Carrying patients from home to NHS and between NHS facilities. Return to base after each calling point multiple times. Used locally and regionally however, may be called to travel nationally and will need to be interoperable at all NHS sites and public charging facilities.

Community and Staff Transport

Average annual mileage 10,000-15,000

Daily distance 40-60 miles

Primarily used during workday - 8am-5pm

Able to charge overnight and during middle of day.

Return to base, typically a depot, after each calling point multiple times. Used predominantly in morning and late afternoon. Used locally, typically traveling less than 15 miles from base.

Company Car Essential User

Average mileage c20,000 mileage per year (significantly reduced during covid)

Daily distance c100 miles

Primarily used 7 days per week - 7am-9pm

Able to charge overnight, may need opportunity charging during day.

Company provided car for user who requires a vehicle as part of their job. Typical business mileage will be half of total mileage. Return home with driver at end of day, multiple calling points, typically business premises, limited dwell times. Main charge overnight but may require top-up charge during day to extend range. Currently predominantly off-street parking.

Company Car Non-Essential User

Average mileage c8,000 mileage per year (significantly reduced during covid)

Daily distance c30 miles

Primarily used 7 days per week – 7am-9pm

Able to charge overnight, may need opportunity charging during day.

Company provided car for user who doesn't require a vehicle as part of their job. Limited business mileage. Return to base at end of day, commute to business premises with a significant dwell time during the day. Main charge overnight, opportunity to charge at business premises if required but unlikely to be necessary. Currently predominantly off-street parking.

Car Rental

Average annual mileage 20,000

Typical daily mileage c100 miles

Primarily used 7 days per week – 7am-9pm

Charging during turn around between rentals, may need opportunity charging during rental.

Unlike petrol and diesel vehicles, rental companies typically don't charge customers for returning EVs not fully charged. EV charging typically done on site by rental staff. For airport car rental the typical turnaround time can be as little as 30mins, at non-airport locations, longer turn around periods apply allowing longer to charge EV.

Car Club

Average annual mileage 20,000 (prior to Covid-19)

Typical daily mileage 10-50 miles

Primarily used 7 days per week – 10am-10pm

Charging between rentals

Vehicle is kept on street or public location. Trip length on average 33 miles. Car clubs typically used for short trips less than 10 miles or long trips 25 miles and over. Typically used off peak or at weekends. Typically kept on-street or public location. Charging is typically done by staff using public charging facilities.

Taxi/Mini Cab – Single Shift

Average annual mileage 20,000-40,000

Daily distance 80-160 miles

Primarily used during workday – 8am-8pm

Able to charge overnight.

Public and private hire vehicles used for passenger transport. Single driver returning to base, typically driver's home, at end of shift, typically 4-5 days per week. Usually use morning or afternoon/evening multiple pick up and deliver of passengers. Used locally but can be regionally or even national. Typical trip length 5 miles.

Taxi/Mini Cab – Double Shift

Average annual mileage 30,000-70,000

Daily distance 120-280 miles

Primarily used morning and evening shift 6am – 12am

Charge time two 1 hour slots, plus 30 mins during shift.

Public and private hire vehicles used for passenger transport, operated by fleet and operated by 2 drivers on shifts of up to 11 hours, 7 days per week. Depot based, returning to base after each shift calling at point multiple points twice daily. Limited dwell time at base. Driver required to take 30 min break after 5.5 hours. Used locally but can be regionally or even national. Typical trip length 5 miles.

Definitions

Fleets

- Bus – Mini-bus to single and double decker bus fleets, providing public transport service to carry passengers in bulk from one place to another over a route defined by the service provider.
- Haulage – The commercial transportation fleets for goods in bulk by road over long distances. Vehicles include 24 ton to 40 ton GVW.
- Delivery – The commercial delivery fleets of goods to retail outlets, businesses, and private residences over shorter distances than haulage. Vehicles typically 5 ton to 24 ton GVW.
- Taxi – Public and private hire vehicles including a driver, that conveys a single passenger or small group of passengers between locations of their choice. Vehicles typically special design taxis or passenger cars and mini-buses.
- Car Rental – An agency which rents automobiles for short periods of time to the public.
- Public Utility – An organisation that maintains the infrastructure for a public service, usually subject to public control and regulation.
- Public Sector – The part of the economy which includes public goods and services such as emergency help, provided by governmental or local authorities.
- Company Car – A car that is owned or paid for by a company provided for the personal use of employees.

EV charging

- Slow – Chargepoints with power output of up to 7kW.
- Fast – Chargepoints with a power output ranging between 7kW and 22kW.
- Rapid – Chargepoints with a power output greater than 22kW.

Public chargepoints

- On-street – Chargers installed on the street in a residential area.
- En route / forecourt – Chargers installed along motorway networks or at service stations to provide charging support for drivers on long journeys.
- Destination – Chargers installed in car parks at places which consumers have travelled to for example, supermarkets, shopping centres, cinemas, restaurants, and tourist attractions.

Private Chargepoints

- Off-street – Chargers installed at residential premises on private land. This includes; driveways, garages and private car parks and parking bays.
- Business premises – Chargers installed at business premises on private land including company car parks.
- Depot – Chargers installed at fleet depots catering for a large number of vehicles on private land.



Zemo Partnership
3 Birdcage Walk,
Westminster,
London SW1H 9JJ