

Electric Vehicle Charging Market Study Case Team
Competition and Markets Authority

15 January 2021

Sent by email to: EVCharging@cma.gov.uk

Dear Case Team,

Response to the Invitation to Comment

Centrica plc (**Centrica**) welcomes the opportunity to respond to the CMA's market study in relation to the electric vehicle charging sector (the **Study**).

Centrica and our EV Business

Centrica is an international energy services and solutions business. Its principal activity is the supply of electricity and gas to businesses and consumers in the United Kingdom and Ireland. In addition to energy supply, Centrica has other units that are focused on connected products and smart services to consumers through our Hive brand, services to businesses, including Centrica Business Services, which supports large energy users in Europe and North America, and Energy Marketing & Trading which provides energy risk management services and energy trading.

Our electric vehicle (**EV**) business offers residential and business customers (including fleet customers) what they need to charge their vehicles in the most cost effective and low carbon way. We provide infrastructure design, installation, operations & maintenance, driver assistance and support collecting payments from drivers. We also offer complementary works and services, including works to alleviate power constraints on site, such as building and running solar and battery solutions, optimised charging and support managing Designated Network Operators' upgrades, and electricity supply contracts to meet the needs of the client, including residential EV tariffs.

Executive Summary of our Response

The Study comes at an important time in the development of a market which is going to significantly impact key parts of consumers' lives in the future and is an important opportunity to take pre-emptive action to facilitate market development. Our response below considers several of the core barriers to development of the EV charging market and the adoption of EVs (which are two intrinsically linked markets). The most important barriers as we see them are:

1. **Lack of customer engagement and confidence:** Whilst our research identifies core groups of business and domestic customers who, for different reasons, have made or are in the process of making the transition to EV, there are overarching concerns amongst these consumers and those who have not yet adopted EV, particularly

regarding the range of vehicles and access to charging points. The growth of smart technology and roll out of both public and private charging infrastructure represent opportunities to alleviate these concerns and should be facilitated.

2. **High cost of transition and uncertainty regarding ongoing costs:** In addition to investing in the hardware and vehicles, in our experience one of the major cost barriers, particularly for business customers, are DNO connection costs. Further, the time taken to obtain necessary local authority consents for DNO works can extend project timetables and impact on business case decisions. For individual consumers, it is often difficult to compare costs for public chargers, where multiple memberships of different providers can cause confusion.
3. **Interoperability and open data:** The rapid development that smart technologies and data represent must be grasped by the industry. This includes ensuring customers are aware of any potential barriers to switching between software providers for their chargepoints and the portability of their data. Open data also has the potential to provide tools to identify charger location and provide data insight and new propositions to users. The adoption of open standards would facilitate the delivery of these benefits.

Next steps

We do not consider that a reference for a market investigation is required and may be damaging if it creates uncertainty at a crucial period in the sector's development. However, there are areas where we consider it would be appropriate for the CMA to make directions and recommendations to government. These includes the following.

1. Creating a forum / task force of relevant public and private stakeholders to prepare an open and transparent plan to address the issues identified in our submission. The terms of engagement of any such group should include the development of an effective engagement strategy to bring the consumer along, covering issues from the benefit of smart meters to optimal charging approaches.
2. Where appropriate, the CMA should consider directing government to provide guidance and provide direction and funding where appropriate. This should particularly cover areas where there is a lack of transparency or uncertainty impacting consumers, such as regarding switching, access to data and costs.
3. The CMA's own policy work on data and technology should include consideration of EV, whilst the opportunity remains to create a market driven by data and smart technologies, which is genuinely competitive.

Our answers to the specific questions in the Invitation to Comment are included in the appendix to this letter.

We hope you find this submission helpful and if you have any questions, please contact me on [✂].

Kind regards

Tim Riisager

Head of Legal – Competition, Centrica plc

Annex 1 Response to Invitation to Comment

Centrica response to Theme 1: Developing competition while incentivising investment

Q1. How is the EV charging sector developing and how will technological or other developments (for example smart technologies) impact sector development and competition?

Q3. How can competition in the different sector segments be strengthened as the sector develops, either by building on current policies and/or through other approaches?

In recent research with our customers we found that around 60% of charging occurred at home, 30% at work and 10% when out and about. We would view the sector through three main categories, which have different requirements:

1. Home charging – long dwell time
2. Workplace charging – long dwell time
3. Public charging & semi-public – mixture of short, medium and long dwell times dependant on location

a. Home charging & workplace charging

Home charging and workplace charging share several similarities with vehicles parking for longer periods. Below we consider some of the issues which are common across these charging locations.

Smart meters and aggregation

Home and workplace charging have the most opportunity for aggregation (whereby multiple assets are combined into a demand side response service and remotely dispatched, in order to control the demand/generation balance) and therefore chargepoints must be smart to capture these benefits. However, in practice we know that not all consumers have installed smart chargers, which are necessary to make this possible. Changes to Office for Low Emission Vehicles (**OLEV**) rules that make smart chargers compulsory to obtain the grant will however help in the domestic charging sector.

At Centrica we see the future as connected and support the use of smart devices which OLEV facilitates. We therefore only use chargers with smart capabilities, due to their clear benefits to consumers. These include enabling better interaction with the charge scheduling, giving end users access to cheaper tariffs such as time of use (**ToU**) tariffs, aiding flexibility (including Demand Side Response services provided to the Electricity System Operator and Distribution Network Operators (**DNOs**)) and ultimately helping to reduce CO2 emissions further. We are often being asked by customers to replace their existing “dumb” EV chargepoints with our own new, smart connected EV chargepoints. It may be useful to undertake a consumer campaign to provide clarity and understanding of the benefits of moving to smart charge points to help encourage uptake of smart chargepoints.

We are at the start of using our aggregation capabilities to provide managed charging services for homes and workplaces. As part of this, it is important that only aggregators, suppliers and Chargepoint Operators (**CPOs**) manage EV charging. Regulated monopoly networks must not be allowed to own or operate EV charging points, in line with the requirements of the 2019 EU Electricity Directive 2019/944, for the same reasons that they are not allowed to engage in competitive electricity supply, generation and storage activities. This is one of the core principles that energy markets in Great Britain have been built on, where monopoly networks are regulated and kept separate from competitive activities of electricity supply, trading and generation.

If DNOs are allowed to manage charging directly in customers' homes and can therefore deal with network constraints for "free", amongst other concerns, this would undermine an energy flexibility marketplace and remove any potential benefits for consumers. Indeed, the importance of flexible procurement was reflected in a new Distribution Licence condition that has been created to implement the 2019 Electricity Directive, which requires DNOs to procure flexibility services using transparent market-based principles. The 2019 Electricity Directive also says that DNOs can't own or operate EV chargepoints, except in cases of market failure where an exemption is granted by Ofgem.

Another component of smart charging is the ability to switch CPO to provide the aggregation service. At present there are mixed standards around software which prohibit some customers from switching. Where software does not enable a customer to switch, at the very least, they should be made aware that they cannot switch operator without removing hardware, where that is the case.

Installations and hardware

In terms of installations, we are aware that not all installations meet regulations for earthing or other safety requirements. We have encountered lots of installations where installations have been completed with the wrong components; for example, incorrectly selected Residual Current Devices and Miniature Circuit Breakers; and earth rods used where simultaneous contact with a Protective Multiple Earthing system is possible, where the electrical load is significantly higher than the DNO's limit. Although this is anecdotal, it is a commonly encountered issue. This is a safety issue first and foremost, but in addition ultimately leads to additional work, time and inconvenience for consumers to remedy.

In terms of the chargepoints, our technology team investigate prospective chargepoints from different manufacturers before incorporating them into commercial propositions, to ensure quality assurance and standards are met by manufacturers. Our process has identified some EV chargepoints that do not comply with UK electrical regulations or DNO standards, yet we see other installation companies still installing these technologies. Therefore, we would like to see steps to ensure consistent safety of chargepoints and installations.

DNO Connections

A key component for workplace charging that is different to home charging, is around the number of chargers that may be required and the resultant barrier of connection and related charges. The examples below illustrate how these charges can significantly impact business cases for installing workplace charging solutions.

Costs for connections

Example 1

Sites across a number of car dealerships were costed for the installation of several AC chargers (less than 50kW, not high-powered DC chargers). A total of c.£500,000 was quoted by the DNO in upgrades. Works were delayed for months whilst the various permits were obtained for DNOs to dig the road up.

The DNO was re-approached for costs, which subsequently reduced from a total of c.£500k to c.£40k.

Although this was a substantial decrease, we have experienced substantial increases. This lack of certainty and transparency around costs shows how uncertain the transition is for customers.

Example 2

A project for a depot servicing 32 buses. The DNO quote to cover the cost of peak load overnight for 32 buses for a new 2.5MVA Connection was £1.3m ((Aug 2019). The connection cost was higher than the overall cost of the project, which was c.£900k. (excluding the buses and the connection)

We believe that a more transparent and timely process for DNO connections is required to facilitate the roll out of chargepoints en masse. DNOs currently do not have the consistent capability to automatically identify headroom on the network, this needs to be addressed. Further, in our experience there are often delays whilst waiting for Local Authorities (LAs) to issue the relevant permits for works to be carried out (for example, digging up roads). Delivery of solutions in a timely manner is essential for customers to satisfy the financial cases for capital investment. A system wide approach needs to be adopted to develop responsive processes.

The prohibitive costs of distribution connections for non-household EV chargers should be tackled. There should be a focus on the next few years where most impact will be felt. We support Ofgem's review of the connection charging boundary as part of its Access and Forward-looking Charging SCR which could limit the contribution connecting parties are required to make towards wider network reinforcements and bring these costs down, but this will not be implemented before April 2023 at the earliest.

This year, due to Covid-19, unsurprisingly there has been an overall impact on workplace charging projects. However, we expect installations to increase and to be undertaken in 2021 as the positive impact of the covid-19 vaccine is delivered.

b. Public charging

We have seen increasing numbers of fleets pledging to electrify and evaluating their options for charging infrastructure. We expect this to translate into workplace and depot installs next year however, there is still a need for public charging, especially for those who have return to home

fleets. We consider that the use of open data and roll out of rapid chargers are key factors in this area.

Open data

Reliability and the ability for consumers to easily understand where public chargers are without using multiple applications is key to developing competition. We therefore support mandating availability of open data for dynamic and static data for the market to deliver useful tools for consumers.

Rapid chargers

Rapid chargers enable customers to charge quickly and therefore will be better for short stops on longer journeys (as opposed to home or workplace charging, where vehicles are idle for longer so have additional charging time). The speed of charge varies by car and battery capability and naturally charger speed. Rapid chargers are rated at 43kW and above, ultra-rapid is considered anything above 100kW. Clearly the quicker the charger the more power demand it has. Therefore, the cost to connect them will cost more given the power demand. The units themselves also become more expensive.

This issue is being partially addressed through Project Rapid for motorways and strategic roads. However, the issue exists in locations outside of motorways and strategic roads, the £90m fund announced by HMG to address other locations should be increased. Similar to the issues encountered with workplace charging, we have frequently seen projects hindered by the cost of connections. One example where connection costs have proved prohibitive, is a recent project in Hitchin, close to the strategic road network, but not on it. This project would enable 46% of residents to access charging within a 5 minute walk (increased from just 6%) and deliver a charging hub for buses. However, it is not clear how funding can be secured to address any prohibitively expensive connections charges.

Overall, investors are increasingly investing in public charging, despite low utilisation today, which is positive. However, increasing the speed that the DNOs / LAs respond to requests for capacity on site and the speed of delivering any new connection/connection upgrade works would also be beneficial.

Q2. How well is competition between EV charging providers working at present in the different sector segments and what are the key risks to effective competition (including any emerging competition concerns)?

There are various providers for consumers to choose between, however improvements to competition can be made across switching, cost transparency and payments.

a. Switching costs

Competition can be improved by ensuring individual and business consumers can switch home and workplace charging operators easily. Whilst some chargepoint operators use open software systems, others used closed systems, creating barriers to switching. Consumers of workplace and home charging are not necessarily aware of the impact on future value, potentially because the market is still nascent and communication on benefits of managing charging solutions have not become mainstream. However, there is a risk of consumers being locked into one operator due to closed

software systems that do not allow hardware to be managed by other providers. Once hardware costs have been paid and initial contractual obligations have been met the chargepoints (hardware) should have the ability to be managed by any operator ideally. This is akin to mobile phones, whereby consumers paid for the hardware (mobile phone) but could not switch the network they used, clearly this has now been addressed and should be considered for EV charging.

Whilst innovation occurs in this nascent market, there should of course be a balance between innovation and regulating too soon. Therefore, at a minimum, if consumers should wish to purchase a closed system product the impact should be communicated clearly upon agreement to installation (i.e. consumer access to just one chargepoint operator unless the chargepoint is replaced, which may incur financial charges).

b. Cost transparency and payments

From a public charging perspective, transparent pricing will be important to ensure consumers understand the price of a charge. Public charging costs should be transparent and have a consistent unit to enable consumers to understand and compare costs. Public charging should have a low barrier to use (i.e. not contingent membership for use). At present this is not the case. Although rapid public charging is opening up to ensure card payments are accepted, the best prices are still obtained through membership models, of which consumers will need multiple to receive the best price, adding complexity and friction to the experience.

Q4 What are the main existing and potential barriers to entry and expansion for EV charging providers and how can these be addressed?

We consider that connection costs, DNO connection time, low utilisation and obsolete charging speeds are the main existing and potential barriers.

a. DNO Connection costs and time

Connections costs and connection time have been cited in Q1 as an obstacle to new projects. These inevitably reduce the opportunities for EV charging providers, creating a barrier to entry and expansion. The key issue is that currently the asset that requires reinforcement upgrades to the wider network in order to connect must pay for these and as illustrated in previous example, the costs are often prohibitive. This may be ameliorated in 2023 at the earliest when these costs may be better socialised if there is a move to a shallower distribution connection charging boundary for distribution network connections, as part of Ofgem's Significant Code Review (**SCR**) of network access and forward-looking charge arrangements. However, there is a currently a risk of market failure in this case which should be urgently addressed to avoid stalling the roll out of EV charging infrastructure until the connection cost regime can be changed. This has been partially addressed through Project Rapid (connection costs for motorways and strategic roads) and the further £90m for local infrastructure but as noted above, this is not sufficient to unlock the latent demand.

Regarding the DNO connection process, this must be more transparent with accurate costs cited early and the time to process improved. We are currently working with one large UK car dealer franchise who needs power now due to the arrival of electric cars but is having to wait three months for that final DNO connection. This is mainly due to the time required for the Local Authority to give permission to close the highway. If this is replicated across the UK, this will have wide reaching

delays and ultimately an impact on the EV transition and meeting the needs of 2030 date for the ban of new petrol and diesel cars.

b. Utilisation of public infrastructure

Currently, there is low utilisation of public infrastructure, we assume between 10% and 20%, which can make entry / expansion difficult due to the risks associated with a business with high upfront capex. However, there is a circularity to this issue: the rate of return required to justify the initial financial investment naturally becomes more of an issue as the speed of charge increases due to the capex costs required to install faster charging. Therefore, it is easier and cost effective to install slower chargepoints. However, slower chargepoints may not be fit for consumers' needs due to the lack of meaningful charge, which keeps utilisation low, further disincentivising investment in the faster chargepoints which would drive utilisation.

c. Obsolete charging speeds

Directly linked to the issue of utilisation is charging speeds. We need to ensure that the incentive is to install helpful charging infrastructure to support vehicles roll out, not chargers that are too slow and become obsolete. Slow charging in homes clearly has a role (3 kw/7kw) given the long dwell times, however we believe a minimum of 22kw for public charging is helpful to support those without driveways (which includes large parts of major urban centres such as London, Birmingham, Manchester etc... where a significant proportion of the population live). Although 22kW may not be that appealing in 5 years, it raises the bar in the immediate term.¹ As noted above in the response to questions 1 and 3, in respect of public charging infrastructure, there has been limited financial commitment to aid the rollout of faster charges but more still needs to be done. A tax relief system could be considered to drive incentives for higher speed chargers.

In addition, relying solely on investors delivering charging, will not ensure locations with a potentially poor utilisation will have charging infrastructure installed. HMG should intervene and could mandate a portfolio approach to locations, ensuring a percentage of rural/underserved locations receive charging infrastructure in order to access HMG charging funds such as Project Rapid.

Q5 How can chargepoints be effectively deployed to ensure there is sufficient supply to meet future demand? What factors need to be taken into account?

Electric Nation (WPD)² and National Grid have consistently stated that provided that all EV charging does not occur at the same time, the network will be able to deliver the energy required (with some reinforcement in key constrained areas). The use of flexibility services and dynamic charging tariffs to incentivise charging across the day will also be a key component of delivering the power effectively, without it, those with home charging will likely charge overnight creating a well cited spike. Government can play a key role in ensuring this message is consistent and consumers understand the role of energy flexibility in managing the system in a way that provides the energy

¹ The majority of onboard chargers are around 7 kW. There are some exceptions for example Tesla, which have 11 kW onboard as standard and a other manufacturers where the owner pays more for the option when ordering. Therefore, this means a 22 kW AC charger is capped at the maximum limit of the onboard charger.

For 22 kW DC chargers, this can add around 80 miles per hour (based on average driving efficiency). DC charging is not capped by the onboard charger and so can deliver the maximum power.

² [Smart Charging Project | Electric Nation](#)

needed at a price that is not prohibitive (reinforcing the entire network is not viable and moreover with the use of and integration of new technology is not needed)

Regarding public charging, although there is a risk that 22 kW AC chargers may not be that attractive in the future, installation at this stage in locations that will have longer dwell times (e.g. workplaces, car parks, residential roads), rather than 7kw or less in public places will be advantageous. This will encourage 'grazing' charges where small amounts of charge can be delivered at lower impact to the grid, similar to charging a phone for short period as and when there is an opportunity to keep the battery in a reasonable range. High Power Chargers in strategic locations will then support longer journeys, where dwell times can therefore be very short. The market should decide where the best locations are subject to ensuring a base level of access. As noted in the response to Q4, where there is unlikely to be a business case in more remote areas HMG should intervene to ensure charging infrastructure is installed as previously mentioned.

Q6. What incentives are there for private investment in EV charging infrastructure including within the different sector segments? How might incentives need to change for the future growth of the sector and development of competition?

Incentives can be grouped into, home and workplace, public on street, public hubs, public rapid charging.

a. Home and workplace

For home and workplace charging the incentives are by way of grants, these are helpful to reduce costs of the charger and should remain. However, they will not cover any additional costs to home electric upgrades (consumers may not be aware that electrical works could be required to allow their home system to accommodate a charger), or connection upgrades from the DNO, which can be costly as covered in the examples in Q1 in respect of business customers. Costs can also be significant for individual consumers, particularly for DNO connections, which in our experience can be between £3,000 and £11,000.

b. Public on street charging

Public on street charging is largely the same regime as home and workplace, with costs associated with the charger being reduced through a grant through the On Street Charging Fund. This is largely driving one off installations.

c. Public hubs

Public hubs currently have minimal incentives. Although a £90m fund was recently announced for local charging and hubs, dependant on the design of the fund this may produce some incentive. However, it should be noted that the £90m fund is dwarfed by the £950m announced for rapid charging on motorways and strategic roads. Hubs will also need to rely on utilisation to build the business case for investment, which at present remains difficult with just 320,000 EVs on the road in June 2020³, the majority of which will charge at home.

d. Public Rapid Charging

³ Source: Department for Transport, Vehicle Licensing Statistics: table VEH0130

In relation to public rapid charging, the focus is on motorway service stations and strategic roads, and as such a fund of £950m through Project Rapid has been assigned. This should provide incentives for installations. However, to support low utilisation locations that will struggle to deliver a business case, HMG should consider that access to the Project Rapid fund is reliant on delivery of a percentage of chargers for underserved/low utilisation locations.

Q7. What impact does public subsidy have on private investment incentives; are there any areas/gaps where public support is most likely to be needed?

Public transport and rural installations are where utilisation risk is higher in the early days. As discussed in Q6, access to public funds should include a clause to ensure that underserved locations receive charging infrastructure, to avoid cherry picking of just the best locations.

Q8. What is required in order to ensure that rural / remote communities and those without off-street parking are well served by charging infrastructure?

Are responses to Q6 and Q7 address our proposals regarding these customers and locations.

Q9. What role should local authorities play to help deliver EV charging in a way that promotes competition? What support would they need?

Modelling to deliver a whole system approach will be required and whilst Local Authorities (LAs) should be well placed to undertake this exercise, they may not have the capacity or capability to undertake this. Therefore, guidance and support will be needed for LAs in any targets. The Energy System Catapult, for example, has modelling capabilities through their EnergyPath® Networks (EPN) tool. This takes a whole systems approach to understand the characteristics of the local area, including the type of building stock, heating technologies, existing energy networks, electrification of cars, as well as local spatial constraints and opportunities. This type of approach and tool could help LAs with delivering EV charging in support of driving EV uptake.

We know that access to charging is a problem for those without off street parking, which is a barrier to EV uptake. Therefore, as part of the design of any platform, consideration should be given to a target to deliver charging where a “high” percentage of residents can reach a chargepoint within an “optimum” amount of time. This could be a 5-10-minute walk (both elements would need to be modelled). As noted above in response to Q4, consideration will be required on the speed of charge and a specification to ensure chargepoints would not be obsolete once we reach 2030, when no new petrol or diesel vehicles can be sold.

In the immediate term the issue of road orders must be addressed due to the delays caused in installations. As noted in response to Q1/3, one immediate problem we are experiencing when connecting customers who require an upgrade to their connection, is the length of time it takes for LAs to approve and provide the relevant consents for road closures for the DNOs (i.e. whilst the DNO works are given the go ahead by the customer, permission to close the road to undertake the new connection can take three months to gain, even for small amounts of increased power). This is taking up to 12 weeks for relatively small increases in power. This is unsustainable and we need a process that allows the DNO to undertake the works in a timely manner.

Q10. What can be learned from the different policy approaches taken in the devolved administrations for the EV charging market's development?

We have no further comments in relation to this question

Centrica response to Theme Two: Effective consumer interaction with the sector

Q1. What challenges or difficulties related to chargepoints might act as a barrier to consumers switching from a conventionally fuelled passenger vehicle to an EV and how might these be overcome?

The challenges are slightly different depending upon whether the user is an individual consumer or a fleet customer.

Individual Consumers

Our customer research⁴ tells us that charging and vehicle range are two key issues that dominate thinking. Individuals are concerned that journeys require more planning, especially longer ones, routes are dictated by charging opportunities and journeys can take longer when you allow for charging stops.

Our research found that charging events broadly occurred or were likely to occur as 60% at home, 30% at work and just 10% out and about. Despite this split there was a large emphasis (80% of conversations) on charging out and about during customer research conversations, compared to just 20% of conversations about home charging issues.

In the research some of our customers who own EVs have never had to charge away from home, with just 3 in 5 charging in a public place in a typical week, and 1 in 4 charging their car at work in a typical week (pre-Covid). Unsurprisingly, some drivers are concerned about finding an EV chargepoint or are worried it will be out of order so rely on home charging. It is worth noting that charging tools to help with these issues such as ZapMap had a low awareness (35-55%) in our research. More awareness and more tools should be established by the market, in a similar manner to tool such as City Mapper that uses TfL data, to represent all charge points using open dynamic and static data from chargepoints. We therefore support HMG progress on mandatory open dynamic and static charging data.

From our research we also found that there is an opportunity to help owners understand how to prolong their battery life. There are varied approaches on what charge level is optimum for long-term battery life and for guidance on whether vehicles should be kept plugged in or not. This can be important for optimum health of the smaller 16V battery that usually communicates with the larger battery to enable charging events.⁵ Clear consumer guidance in this area would help to reduce the need for charging and give individual consumers greater confidence in the range of their vehicles.

⁴ Research conducted with 200 EV/PHEV owners and considerers over 11 research activities over 11 weeks until Oct 2019

⁵ Some OEMs recommend keeping vehicles plugged in even after the charge level is reached to stop the main battery being used to keep the smaller 16V battery often used for the vehicle's management charged. There have been some instances where the smaller battery runs out of charge when left for prolonged period (months) and therefore lead to difficulty charging.

Fleets

Public, home and workplace charging are all important to support fleets. In the initial phase of electrifying fleets occurring today, those employees with driveways will find it easier to opt for an EV. We have seen this with our 11,000 strong British Gas fleet, that we have pledged to electrify by 2030. Home charging is key to uptake and we estimate that around 40% of our vans are return to home with the ability to charge at home on a driveway. The other 60% will need to solely rely on public charging. However, public infrastructure will be important for the fleet as a whole, regardless of access to home charging, ideally this would be rapid charging to minimise dwell time, especially for customer emergency visits.

Q2. What are the key challenges for consumers already interacting with the sector and how might these change over time as the sector grows?

Vehicle range and factors relating to the chargepoints themselves, including charging availability, speed and reliability remain issues.

a. Vehicle range

EV range remains a concern even though 8.4 miles is the average journey in the UK. Many opt for EVs as a second car for shorter journeys. Requiring a minimum public charge point speed of 22kW will assist with delivering meaningful charge. Charging times vary on unit speed and the vehicle, but a 7 kW charger will recharge a compatible EV with a 40 kWh battery in 4-6 hours, and a 22 kW charger in 1-2 hours⁶.as discussed in Q4. However rapid charging along key routes will be paramount for long journeys and confidence in charging. We found that 3 in 4 of those surveyed thought long journeys would be fine with careful planning and 1 in 5 thought there was nothing to worry about. A key learning was that confidence grows with experience.

As the range increases on vehicles and/or more reliable charging of varying speeds is delivered these concerns are likely to disappear. This is indeed the case for petrol and diesel vehicles that can refuel only at fuel stations and we do not see range anxiety. This is due to accepted reliability, abundance and visibility of fuel stations. In fact, there are more chargers than fuels stations in the UK, the key issue this underlines, is current charging infrastructure is not deemed fit for purpose and consistent enough to drive consumer confidence. A focus should also be given to visibility of charge points.

b. Chargepoints

Whilst prospective buyers feared running out of charge, once they discovered the number of chargepoints, the issue became one of quality not quantity. We found that key issues were around charging speed, out of service chargers, already in use chargers or a requirement for a particular subscription. Although HMG is making movements to ensure new rapid chargers must accept card payments with no need for subscriptions, it remains the case that the best prices are obtained through a membership. Therefore, for consumers to receive the best prices they must still sign up to numerous memberships and apps⁷.

⁶ [EV Charging connectors - Electric car charging speeds \(zap-map.com\)](https://zap-map.com)

⁷ Example of membership from the UKs largest network: <https://www.bppulse.co.uk/charging-on-the-go>

In addition, non-rapid chargepoints, do not need to have card payments enabled at present and these chargepoints represent 81% of all current public chargepoint devices, each device may have more than one connector and therefore 75% of current connectors are non-rapid.⁸ There is a low-cost solution that could enable all chargepoint to take card payment, this is through an RFID or QR code. This costs in the region of just 35p, when compared to £500-£1000 to install a point of sale device (chip and pin device). RFID or QR enable a link to apple or android pay, or the ability to input card details at the time with no need to download anything.

As we wait for the roll out of more public charging, peer to peer (P2P) charging could have a role. We found that P2P could have some appeal as EV drivers wanted “to do their bit to help”, although this may be less relevant once public charging is considered sufficient. We found that 2 in 3 had heard of P2P charging and only 1 in 5 opposed the idea. Opposition tended to be due to practical reasons such as no space for additional cars on a driveway or issues around privacy.

We’ve heard customers say that interacting with multiple apps is not ideal. Our managed charging app that we’re developing is part of solution to make it simpler. We plan to incorporate home charging and public charging into the one app for customer convenience.

Q3. How do consumers decide which chargepoint services and providers to use? What information do consumers need to make this decision and at what stage in the decision-making process?

a. Homes and workplace

In terms of deciding on home charger installation there are many points to consider. Dealerships / retailers / lease company conversations and purchase are a key point in journey but our own research highlights consumer lack of knowledge/certainty about where to procure home charging, outside of undertaking this through dealerships.

Many consumers will do their own research, but even with the OLEV backed website Go Ultra Low, our research suggests that there is no single source of trusted information for consumers to turn to about home charging solutions. Like many companies with installation capability we are also partnering with car manufacturers and leasing companies to offer installation services, whilst further developing our direct to consumer proposition. Within our customer journey we aim to help educate customers about the right home charging solution for their specific scenario.

A key issue, as discussed in Theme 1, Q2, is that consumers are unlikely to be aware of the difference between CPO hardware providers and software providers. Some CPOs use closed software systems and others open systems. Consumers of workplace and home charging are not necessarily aware of the impact on future value, potentially because the market is still nascent and communication on benefits of manage charging solutions have not become mainstream. We do however need to protect against consumers being locked into one operator due to closed software systems that do not enable hardware to be managed by other providers. Once hardware costs have been paid and initial contractual obligations have been met the charge points (hardware) should have the ability to be managed by any operator ideally. This is akin to mobile phones, whereby consumers paid for the hardware (mobile phone) but could not switch the network they used, clearly this has now been addressed and should be considered for EV charging. Whilst innovation occurs in this nascent

⁸ [How many charge points are there in the UK 2020 \(ZAP-MAP.COM\)](https://www.zap-map.com/)

market, there should of course be a balance between innovation and regulating too soon, therefore at a minimum, if consumers should wish to only use one provider the impact of this should be communicated clearly upon agreement to installation.

Consumers of course are not all uniform and will have different drivers. Careful consideration should be given with interventions that do not lead to one size fits all. Largely we see 4 main categories.

1. **Eco Obsession** - Users are interested in environmentally friendly solutions and tend to be early adopters. Green energy and emissions are important and are interested in smart energy management and balancing the grid through Demand Side Response (**DSR**). Cost is important to these eco conscious early adopters but not the first priority.
2. **Frugal Green Family** - Users where economic reasons are the key driver but also have an interest in the environmental aspect. They need more information on services that DSR and learning how to charge their vehicle in more responsible ways.
3. **Money Conscious** - Drivers largely focused around financial savings in fuel costs. Yet we see limited understanding on EV tariff rates and the consumer benefits of flexibility and DSR. Features that enhance the cost effectiveness are key drivers.
4. **Status Symbol** - A belief that the future is EV only and don't want to miss out. Quality of the charger and its compatibility with vehicle are key areas, as it is most likely an expensive car.

b. Public

Public charging and costs associated with charging should be transparent and consistent to enable consumers to understand and compare costs. At present this is not the case. Although rapid public charging is being opened up to ensure card payments are accepted, the best prices are still obtained through membership models, of which consumers will need multiple to receive the best price.

Card payments at rapid public charging are likely to be mandated as part of the consumer experience government consultation expected before the end of 2020. However, as discussed in Theme 2, Q2, non-rapid charging currently does not need to accept card payment and this should be addressed.

A tool to identify all chargers easily will be crucial for consumers. Therefore, open dynamic and static data will be key, ZapMap is an example of one provider. As an EV driver matching, charging power requirements to dwell time is important as is the ability to quickly find the right charger for the situation.

Q4. Can consumers easily understand and compare charging tariffs in this sector and what barriers, if any, do they face?

At present it is not easy for consumers to compare public charging costs. Comparisons are more straightforward with home tariffs as the format follows energy bills usage of figures per kWh. Although, for some uses a kWh doesn't give clarity and they may struggle to understand how much of the battery will be charged. As most EVs have a lower driving range, referring the charging or percentage of battery charged back to mileage and range can be helpful.

In our research on home charging, some customers were concerned about the unexpected charges and wanted to feel more in control with fixed rate tariffs, therefore we found more education and evidence is needed to support the benefits of multi rate for costs and the balancing of the energy system. Managed charging through suppliers, aggregators and CPOs who hold the relationship with

customers, will play a key role in delivering flexible energy use, through managed charging solutions and education. It is therefore important for consumer confidence that customer facing companies continue to hold this relationship and that DNOs do not manage EV charging at any level (as discussed further in the response to Theme 1, Q1 / Q3).

Q5. Do particular groups of consumers face additional challenges to interacting with the sector and if so, who and why? How might these be overcome?

We have considered three distinct customer groups below.

a. Consumers with lower household incomes

This group will struggle to switch to EVs until the cost of ownership reduces drastically and reliable access to public chargers is delivered. The second-hand market has a role to play in reducing ownership costs, as well as technology developments that will drive down battery costs. More broadly, vehicle ownership models are also changing, which can benefit everyone, therefore increasing EV numbers in car clubs and ride sharing and hailing services should be incentivised. These “fleets” will require charging infrastructure so any incentives must account for the end to end service, not just the vehicle. Fleet vehicles will often trickle into the second-hand vehicle market, providing a dual benefit. Lastly, electric public transport will also be key, enabling the transition for buses and the related infrastructure must be addressed. Connection costs for these high-powered projects is a key issue and is often a limiting factor for switching to electric in our experience (as illustrated in our response to Theme 1, Q2/3).

b. Urban areas with no off-street parking

This group will need public solutions as discussed previously. Local Authorities need to ensure the “On Street Charging” fund is used (see Theme 1 Q6).

c. Rural and low utilisation areas

This group will need support as described in Theme 1, Q7, to ensure charging infrastructure is installed where a business case will be hard to deliver due to low utilisation. This could be solved by ensuring access to HMG funds is conditional on support for low utilisation areas (these would need to be defined).

Q6. Are there any technological developments or tools that could support consumers to navigate the sector, for example by helping to make more informed choices?

We partner with the Go Ultra Low campaign who seek to provide information to the public on vehicles and tariffs. This was extended in the last two years to energy suppliers, we were one of the first to provide our support. This campaign should continue as an impartial site for information on transitioning to EVs.

We are aware of a start-up who match customers EV charging solution needs with a suitable charge point / installer, most recently they have effectively become a price comparison site for EV tariffs. We are aware that current price comparison websites cannot support ToU tariffs today. In addition to this we have been working with the Carbon Trust who on behalf of BEIS are creating a new

comparison tool for EV tariffs. There are obvious benefits for this type of site for consumers, however we should ensure that the energy sector does not continue as structurally loss making.

It is also important to consider the upstream supply market and the incentives which suppliers have to invest in the necessary technology to deliver the transition to EV (as part of a low carbon economy). In particular, we consider that the government needs to consider the implications of regulatory interventions, including the design of the default price cap. The existing margin afforded under the cap is not creating the conditions in which long term investment in technology and innovation is possible. If future regulatory intervention is required, it must be designed to provide proportionate allowances for the necessary investment.

Q7. Are existing protections offered by consumer law and other measures (such as sector regulations) sufficient?

We consider that existing protections and a healthy competitive market will be sufficient to protect consumers. Additional protections should only be brought in if clear evidence can be provided to demonstrate instances of consumer harm. The regulatory and legislative framework should facilitate innovative propositions coming to market, which can deliver value to consumers.

Q8. What, if any, open data measures are needed to support consumer interaction, such as through the growth of comparison sites and apps?

As highlighted in our responses to various other questions, we support open data. Any consumer data stored by CPOs should allow for customers to request their data in a portable and usable format. It should also allow other third parties to use this data to offer customers data insight and propositions.

ZapMap is a useful app but currently dominates. As discussed previously, open static and dynamic data should allow other apps to come through to provide customers with useful services. For example, the ability for consumers to quickly identify locations of chargers fit for their charging requirements, which will include the speed of charge.

Comparison sites should take account of the impacts to the energy market as outlined in the response to Theme 2 Q6.

Q9. What else is required to help ensure that the EV charging sector develops in a way that is responsive to consumer needs?

We have no further comments in relation to this question