

SMMT response to the Competition and Markets Authority's invitation to comment on electric vehicle charging market study

INTRODUCTION

1. The Society of Motor Manufacturers and Traders (SMMT) is one of the largest trade associations in the UK, supporting the interests of the UK automotive industry at home and abroad. SMMT represents more than 800 member companies, including all major vehicle manufacturers, component and system suppliers, the aftermarket, services and engineering firms, technology companies and mobility start-ups. The automotive industry is a vital part of the UK economy accounting for £79 billion turnover and more than £15 billion value added. With some 180,000 people employed directly in manufacturing and 864,000 across the wider automotive sector, it accounts for 13% of total UK exports to over 150 countries, and invests £3.72 billion each year in research and development. More than 30 manufacturers build in excess of 70 vehicle models in the UK, supported by around 2,500 component providers and some of the world's most skilled engineers.
2. Adequate and well-functioning charging infrastructure of the right types in the right places is of paramount importance to driving electric vehicle (EV) uptake in line with the Government's policy to end the sale of petrol and diesel cars and vans by 2030. Along with the issues of vehicle affordability and range anxiety, charging infrastructure adequacy has consistently been cited by consumers as a key barrier in switching to EVs. There should be binding commitments for a massive expansion of future-proofed charging infrastructure of the right types in the right places, regulatory measures to improve consumer experience and enforcement mechanisms to protect consumers that are commensurate with government policy ambition. A properly regulated, well-functioning and competitive charging infrastructure market is fundamental to driving mass market EV uptake and ensuring the UK EV market is highly competitive vis-à-vis international markets.
3. SMMT welcomes the opportunity to respond to this invitation to comment on behalf of the UK automotive industry. We set out below the consolidated and harmonised views of our members. We welcome further engagement with the Competition and Markets Authority on this subject.

RESPONSE TO THE INVITATION TO COMMENT

Theme one: developing competition while incentivising investment

Question 1: How is the EV charging sector developing and how will technological or other developments (for example smart technologies) impact sector development and competition?

4. The UK has come a long way since the first public chargepoints were installed under the Plugged-in Places scheme back in 2011. From just 1,537 connectors at the end of 2011, there are now a total 35,964 connectors made up of 7,242 slow (3-5kW), 19,654 fast (7-22kW), 7,772 rapid (43-

50kW) and 1,324 ultra-rapid (>50kW) connectors on 20,666 devices.¹ The Government, local authorities and the charging infrastructure sector deserve credit for this 2,000% increase in public charging infrastructure in just under a decade.

5. However, the growth of the public charging infrastructure network has not kept pace with the growth of the plug-in car parc. There were 2,646 plug-in cars in the UK in 2011,² which translated into one connector for every two cars (1.72). There are now 359,916 plug-in cars on the road,³ which means one connector for every ten cars, although many newer EV models are able to support higher power charging and therefore incur shorter dwell times. SMMT data shows over 18,000 new plug-in vehicles were registered in November 2020,⁴ whilst just over 600 new public chargepoints were installed in the same month. Competition in the EV charging sector could be more competitive and should intensify in the future.
6. International comparisons in the table below show despite the good progress made, a public slow/fast charger in the UK is shared among 12 plug-in vehicles, compared to just four in the Netherlands and eight in Germany and France. The UK performs better vis-à-vis some other major countries in the public rapid/ultra-rapid category, with 55 plug-in vehicles per charger. This, however, remains high in comparison with China (16:1) and Japan (37:1).

Plug-in vehicle parc and car-to-public charger ratio in selected major countries.

	EV stock		Slow/fast chargers				Rapid/ultra-rapid chargers			
			Number of chargers		Cars to charger ratio		Number of chargers		Cars to charger ratio	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Netherlands	214,800	148,500	49,324	35,852	4.4	4.1	829	819	259.1	181.3
Germany	258,800	177,100	34,203	23,112	7.6	7.7	2,860	2,612	90.5	67.8
France	226,800	165,500	27,661	22,736	8.2	7.3	2,040	1,396	111.2	118.5
China	3,349,100	2,306,300	301,238	163,667	11.1	14.1	214,670	111,333	15.6	20.7
UK	259,200	184,000	22,359	14,732	11.6	12.5	4,735	2,692	54.7	68.4
Japan	294,000	255,100	22,536	22,287	13.0	11.5	7,858	7,684	37.4	33.2
Norway	328,600	249,000	15,466	11,145	21.2	22.3	3,970	1,226	82.8	203.1

N.B. EV stock refers to number of plug-in vehicles in the parc. Slow/fast chargers (3-22kW in UK definition) are referred to as slow chargers by IEA. Rapid/ultra-rapid chargers (≥43kW) are referred to as fast chargers. EV stock and charger figures collected by IEA may differ from official figures published by the government of respective countries, SMMT and ZapMap.

Source: SMMT analysis of data from International Energy Agency (2020), Global EV Outlook 2020, available at www.iea.org/reports/global-ev-outlook-2020.

7. Smart charging technology that facilitates demand side response and flexibility services is expected to be rolled out mainly in private home chargers (i.e. wallboxes) and to a lesser extent

¹ As of 10 December 2020, data obtained from ZapMap, available at <https://www.zap-map.com/statistics/>.

² Department for Transport, Licensed ultra low emission vehicles by body type and propulsion or fuel type: United Kingdom, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/942249/veh0133 ods.

³ SMMT parc data, as of the end of November 2020.

⁴ SMMT car registration data, available at <https://www.smmt.co.uk/vehicle-data/car-registrations/>.

in depot chargers, subject to secondary legislation following a 2019 government consultation and the publication of BSI PAS 1878 and PAS 1879. Given that long dwell times, particularly overnight when there could be excess electricity generation or when tariffs are most attractive, are essential to facilitate meaningful demand side response and flexibility services, smart charging technology is unlikely to be suitable for rapid and ultra-rapid charging.

8. With the introduction of smart charging technology, it is expected that the charging infrastructure market will continue to see new entrants that will compete with traditional electric vehicle supply equipment (EVSE) manufacturers. New entrants include electricity suppliers, aggregators, flexibility service providers and car manufacturers – some of these may offer bundled combinations of a vehicle, hardware (i.e. the chargepoint), energy services and access to public charging networks.
9. The Office for Zero Emission Vehicles (OZEV), aided by the work of the EV Energy Taskforce (EVET), is currently developing secondary legislation and a roadmap for residential smart charging. OZEV is also considering using smart metering infrastructure to facilitate smart charging. While smart charging is capable of protecting the grid and avoiding premature costly grid upgrades that will burden bill payers, regulation on smart charging should be carefully developed to ensure it is future-proofed and does not stifle innovation. The Distribution Network Operator's (DNO) ability to influence load must be limited to the boundary of the home only, and not exercising control beyond the meter. This allows the consumer to prioritise load within the home at times of constraint to meet their immediate needs. The DNO must not be allowed to exercise direct control of the load to the chargepoint, which effectively discriminates against the use of electricity for charging EVs and treats EVs as “second class citizens/loads”.
10. The development of smart charging regulations must follow established international standards and protocols to ensure there is international harmonisation, which is of paramount importance to vehicle manufacturers, who produce vehicles for international markets. European and global standards for interaction between vehicles and charging infrastructure (e.g. ISO 15118, IEC 63110) are meant to enable harmonisation of functionalities such as smart grid integration and vehicle-to-grid. As such, country-specific short-term solutions are likely to become obsolete, potentially resulting in costly stranded investments.

Question 2: 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)?

11. In the public charging network segment, competition is now healthier than before, with an increasing number of players entering the market in the last few years, thus resulting in no single player controlling more than 15% of the market.⁵ However, the intensity of competition is uneven. Competition among private chargepoint network operators is most intensive in areas with historical or anticipated high throughput of customers, for example high-traffic sites and certain locations with much potential for destination charging. For obvious commercial reasons, competition is sluggish in some other areas, for example rural and certain on-street locations.

⁵ As of 10 December 2020, data obtained from ZapMap, available at <https://www.zap-map.com/statistics/>.

Unless these commercially less attractive areas are also served with adequate charging infrastructure, it would be difficult to convince consumers in those locations to switch to EVs. On the whole, however, competition is expected to intensify as the overall market will enlarge as a result of the increased need for public charging infrastructure following the Government's decision to end the sale of stand-alone internal combustion engine cars and vans by 2030.

12. The Government's requirement for all rapid chargers to provide ad-hoc payment options augurs well for competition, which could be further enhanced should the full ad-hoc access and payment requirements of the Alternative Fuels Infrastructure Regulations (AFIR) 2017 be implemented across all public chargers. Charging networks, however, could be more competitive in terms of reliability, pricing and quality of service.
13. There have been mixed views regarding the potential impact of network roaming on competition. On the one hand, network roaming could arguably increase competition by encouraging operators to offer competitive rates when bidding to become partners of choice on certain platforms. It could also help operators focus their geographical coverage to reduce deployment costs. On the other hand, ultra-competitive roaming rates could lead to a race to the bottom where it is no longer commercially viable for certain operators to continue operating, thus leading to market exit which in turn decreases competition. Some chargepoint operators have also voiced concerns that roaming could disincentivise infrastructure investment and encourage economic rent-seeking through free-riding.
14. Competition in the private home, workplace and depot charging segments is likewise expected to intensify as the rollout of chargepoints is expanded. As alluded to above, the private home charging segment is likely to see a number of new market entrants with bundled offerings. The workplace and depot charging segments are more likely to continue to be served by traditional EVSE manufacturers, the number of which has increased in recent years. Meanwhile, some chargepoint network operators have also complained of high barriers to entry in the motorway charging segment as a result of monopoly by first movers.
15. We fully support the Government's proposals to amend building regulations to require all new residential buildings with a dedicated parking space to be fitted with a chargepoint. However, we suggest caution needs to be exercised to ensure this does not lead to an unintended consequence of housing developers awarding contracts to EVSE manufacturers/suppliers offering the most economically attractive home chargers that meet only the most basic specifications set out by the Government, i.e. 7kW AC, Mode 3 and untethered. This could price EVSE manufacturers/suppliers with better or more sophisticated products out of the market.

Question 3: 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?

16. Competition can be strengthened through the mandatory introduction of pricing transparency and standardisation (e.g. p/kWh), minimum reliability rates, ad-hoc access and payment options, and real-time data sharing requirements. These are set out in our answer to Question 2 of Theme 2 in paragraphs 46-57 below.

17. The affordability of on-street residential charging should be reviewed to ensure EV users are not effectively “penalised” for not having a private driveway or garage, an issue that we revisit in paragraph 57 below. As we also set out in paragraph 63, some 17.3 million dwellings in the UK are not able to have a dedicated private home charger.

Question 4: What are the main existing and potential barriers to entry and expansion for EV charging providers and how can these be addressed?

18. In the public charging network segment, low utilisation rates in certain locations mean it takes a very long time to achieve break-even. This suggests huge upfront investments are needed with a long-term outlook for return on investment. In addition, the fact that there are now many market players but none controlling more than 15% of the market suggests it may take longer for some to achieve positive ROI. However, some operators are able to offset lower utilisation rates in some locations by also installing infrastructure in other locations with higher customer throughput. In any case, the Government’s policy to end the sale of petrol and diesel cars and vans by 2030 has given the charging sector a clear future demand curve to respond to.
19. In the sub-segment of ultra-rapid charging hubs or forecourts, regardless of whether these are on motorway service areas or urban conurbations, the main barrier to entry and expansion is the cost of connecting to the grid or upgrading the local network to ensure there is adequate capacity and power. This is also the same barrier to installing depot chargers, although this is not relevant to chargepoint network operators.
20. The sub-segment of destination charging is one that has a tremendous potential to reduce range anxiety and an overreliance on en-route charging. Located mostly at off-street locations such as supermarkets, retail parks, hotels, train stations and car parks, destination chargepoints are often installed by businesses to provide an additional benefit, or incentive, to customers who are visiting. However, the biggest barrier to entry in this sub-segment appears to be funding. As most destination chargers are self-funded, some smaller businesses and organisations may struggle to fund such capital expenditure, particularly if installing multiple chargepoints incurs huge sums to connect to the grid. Funding support should be extended to businesses and organisations to install destination chargepoints.

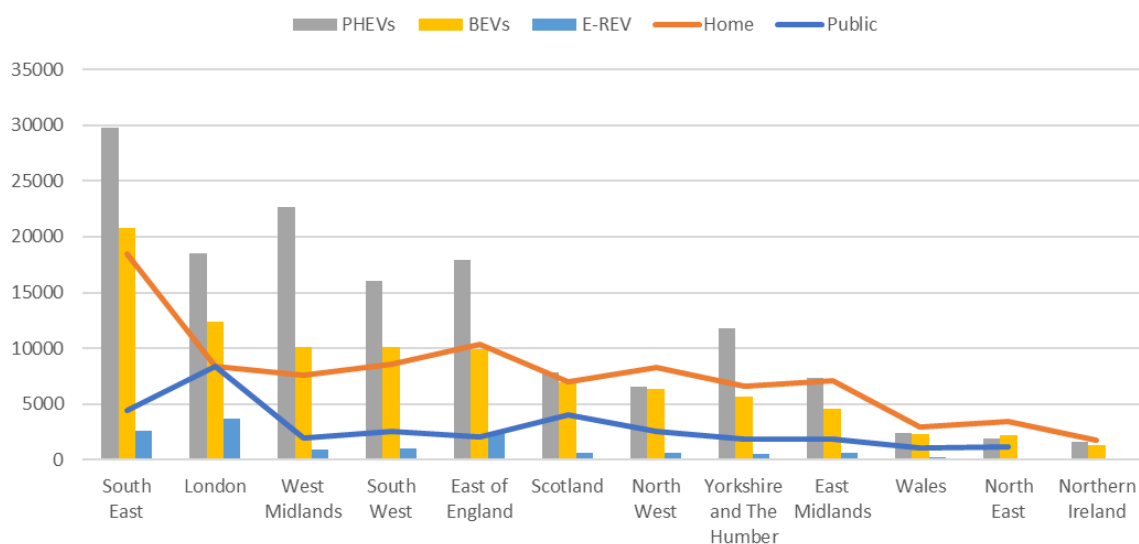
Question 5: How can chargepoints be effectively deployed to ensure there is sufficient supply to meet future demand? What factors need to be taken into account?

21. As the automotive industry is investing billions in bringing EVs to market even when there is yet a clear path to profitability, the Government and the charging infrastructure sector must play their part by equally investing boldly in expanding public charging infrastructure **ahead of need**. Despite most plug-in vehicle users charging at home, public chargepoints remain critical for

consumer confidence. An RAC Foundation report shows that even though 80% of plug-in vehicle owners have access to home charging, 93% use the public charging network.⁶

22. A sporadic and disjointed approach to providing funding and local authority rollout has resulted in a patchwork of chargepoint provision across the country. Although the national distribution of public chargepoints is far from even, neither installing a public chargepoint in every street and corner nor assessing adequacy by the number of chargepoints per 100,000 population is necessarily the right way forward.⁷ There are streets with very few inhabitants or plug-in vehicles, or very low daily throughput of plug-in vehicles. Not everyone in the population owns a plug-in vehicle, or a vehicle at all for that matter.
23. A better way to analyse the adequacy of public charging infrastructure is to map the plug-in vehicle parc against the number of public chargepoints. Data from OZEV and ZapMap visualised in the chart below shows there is clear regional disparity in terms of the plug-in vehicle parc and the number of public chargepoints available. While the proliferation of private home chargepoints correlate with battery electric vehicle (BEV) registrations, it is obvious that certain regions with a relatively high plug-in vehicle parc, such as the West Midlands, the South West and the East, have a disproportionately lower number of public chargepoints.

Plug-in vehicle parc and home and public chargepoints by economic region, 2019*



* Plug-in vehicle parc data from SMMT. Public chargepoint data from ZapMap. Home chargepoint data from OZEV EV Homecharge Scheme grants issued.

Source: SMMT analysis of ZapMap data, available at <https://www.zap-map.com/statistics/#region>, and Office for Zero Emission Vehicles data supplied to SMMT.

⁶ Dermott, H. (2017), Ultra Low Emission Vehicle Infrastructure: What Can Be Done, RAC Foundation, available at http://www.racfoundation.org/assets/rac_foundation/content/downloadables/Ultra_Low_Emission_Vehicle_Infrastructure_Harold_Dermott_September_2017.pdf.

⁷ Government analysis, for example <http://maps.dft.gov.uk/ev-charging-map/> and <https://www.gov.uk/government/statistics/electric-vehicle-charging-device-statistics-july-2020>, assesses the distribution of public chargepoints by local authority in terms total devices and devices per 100,000 population.

24. While some local authorities have been sluggish in rolling out on-street chargers, the pace of rollout has been far greater in other segments, particularly where chargepoint network operators are competing with each other for high-traffic locations and contracts for destination charging. To ensure future supply matches anticipated demand, there needs to be a nationally coordinated but locally delivered infrastructure plan involving all key stakeholders to ensure a national network of public chargers of the **right types** are found in the **right places** – serving the right needs and achieving as high utilisation as possible.
25. Instead of simply providing funding to local authorities, or other organisations, that may sometimes result in chargepoints being installed where convenient or where there is least local resident resistance, this strategic plan has to be led and orchestrated by central government, although implementation and tactical decisions may be devolved to local authorities. There is also a need to harmonise the fragmented system of obtaining planning permission for charging infrastructure installation across different local authorities. Centralised coordination raises the prospect of leveraging economies of scale and achieving interoperability by design.
26. To this end, the Government should convene all key stakeholders including local authorities, chargepoint network operators, electricity suppliers and distribution network operators, vehicle manufacturers, fleet operators, fuel retailers and highway authorities. The London EV Infrastructure Delivery Plan is an exemplar of such a coordinated approach, albeit at the regional authority level, that brought together disparate stakeholders to achieve consensus on planning and delivery of future chargepoints.⁸

Question 6: 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?

27. SMMT is not in a position to comment on this matter.⁸

Question 7: What impact does public subsidy have on private investment incentives; are there any areas/gaps where public support is most likely to be needed?

28. As we alluded to above, public support is most likely to be needed in part-funding the cost of connecting to the grid or upgrading the local network to ensure there is adequate capacity and power for ultra-rapid charging hubs or forecourts. The Government's £950 million commitment towards this cause in the recent Spending Review is a step in the right direction.
29. Public investment in the Plugged-in Places scheme was a catalyst to the proliferation of an embryonic network of public chargepoints. However, neither historic nor recently committed public funding is enough to support the delivery of additional on-street chargepoints, particularly for residents who are unable to have a dedicated private wallbox or charge off-street, required to

⁸ Transport for London (2019), London Electric Vehicle Infrastructure Delivery Plan, available at <http://lruc.content.tfl.gov.uk/london-electric-vehicle-infrastructure-taskforce-delivery-plan.pdf>

meet the Government's ambition to end the sale of petrol and diesel cars and vans by 2030. Our views on the upper threshold of on-street chargepoints required are set out in paragraph 32 below.

Question 8: What is required in order to ensure that rural / remote communities and those without off-street parking are well served by charging infrastructure?

30. In order to ensure there is ultimately a right mix of charger types (fast, rapid and ultra-rapid) for the right use cases (on-street home, off-street home, on-street opportunity, motorway en-route, destination, workplace/depot) in the right locations, a holistic national charging infrastructure plan must also contain **binding commitments** for the charging infrastructure sector to deliver with regular review points. This will ensure adequate infrastructure is in place to give the UK the best chance to support the mass market uptake of plug-in vehicles.
31. In order to meet the needs of EV users in rural areas, it is important to ensure there is adequate coverage and reliability targets in place. As we explained in paragraph 22 above, this must not be simply based on a number of chargepoints per 100,000 population approach. Instead, a more sensible approach is to prioritise infrastructure deployment in areas where people's mobility is car-dependent but where little home charging is available. The overall number of EVs in rural or remote areas might not be attractive enough to warrant large-scale private investment in public charging infrastructure, which is an example of a genuine market failure. In such instance, the Government should intervene by providing public funding support to ensure access to charging infrastructure is not a barrier to EV uptake and positive consumer experience. An alternative is the "corridor tender" model successfully deployed on the West Coast of the United States. Tenders issued by local authorities require both urban and rural coverage, thus resulting in successful bidders operating high-utilisation urban chargers that offset the losses from low-utilisation rural chargers. The reliability of public chargepoints in remote areas is critical to consumer confidence, particularly if there are fewer chargepoints overall, or if they are sparsely distributed, relative to urban areas.
32. Our modelling of the **upper threshold** of chargepoints required to support government policy to end the sale of petrol and diesel cars and vans by 2030 suggests a total of 9.18 million chargepoints of all types are needed by 2030 to support an EV fleet that makes up **28%** of the entire car parc. However, the majority of these chargepoints (5.85 million) are private home wallboxes, whereas **1.95 million** are **on-street** 7-22kW public chargepoints, the vast majority of which are in residential areas to serve the needs of those without off-street parking. Our analysis also suggests this translates into one on-street residential charger for every **nine dwellings** in the UK that cannot have a private home wallbox for various reasons, including the lack of off-street parking.
33. These upper threshold figures in our analysis are based on today's charging behaviour and preferences and the prevailing charging models. At this point, there is no industry consensus on what the predominant model would be in the future or the likely mix of different types of chargers a decade from now. Should consumer preferences and charging models change in the future, for example if forecourt charging at ultra-rapid rates becomes the predominant model, or if the vast majority who drive to work are able to charge at the workplace, we anticipate fewer on-street

residential chargers will be needed. However, the desired end-state should be that consumers consider the charging experience, which includes finding an available and functioning public chargepoint on demand, as easy as refuelling today.

34. A purely demand-led approach to expanding infrastructure provision will not be adequate to convince mass market consumers to switch to EVs, as their confidence is often shaped by their perception of infrastructure adequacy. Uplifting the number of **on-street and rural** chargepoints must therefore follow an **anticipatory demand-led approach**, aided by an easily accessible **online portal** that enables user logging of chargepoint requests ahead of actual need. This is an adapted version of the Dutch model where new chargepoints follow user demand. Consumers **intending** to purchase an EV within the next six months should be able to log requests online to indicate future need in areas where there are insufficient chargepoints. Targeted installations of chargepoints that then follow will give consumers the confidence to proceed to purchasing an EV. While initiatives like Charge My Street are commendable, they are but disparate efforts by either local communities or local authorities that will still leave plenty of not-spots in the country.⁹ What is needed is a national online platform that is capable of logging requests from anywhere in the country to ensure breadth of coverage and signposting them electronically to the appropriate local authorities for action. This also gives visibility to where demand is most acute and holds local authorities accountable for delivering on local residents' charging needs.

Question 9: What role should local authorities play to help deliver EV charging in a way that promotes competition? What support would they need?

35. Local authorities need to do more to encourage and facilitate the installation of chargepoints and should receive greater support from central Government to do so. In order to support an accelerated uptake of EVs and the expansion of chargepoint provision, local authorities must not consider allocating resident parking bays to EV charging as a zero-sum game. If a portal-facilitated anticipatory demand-led approach as described above is adopted, local authorities will be better able to proportionately allocate resident parking to EV charging based on genuine need.
36. Local authorities must be given greater support to plan for and approve the installation of chargepoints. Charging infrastructure expertise within local authorities varies markedly across the country, as evidenced by the variance in the number of chargepoints available in local authority areas. While some London boroughs and Milton Keynes already have a sizeable network of public chargepoints, many other local authorities are still conducting feasibility studies on chargepoint installation. The average time taken for local authorities to install an on-street chargepoint is around six months once funding has been received, although this may take longer if planning permission is also required. The Government's own On-Street Residential Chargepoint Scheme (ORCS) assumes a 12-month project plan.
37. The Government should look into providing clear and consistent guidance for local authorities to align technical standards, minimum access requirements and planning regulation, with the primary aim of speeding up the approval process. This should include a procurement framework

⁹ Charge My Street is a community benefit society operating in Lancashire and Cumbria that installs and operates community chargepoints, raising money through community shares. See <https://chargemystreet.co.uk/>.

and best practices that set out minimum information requirements to be displayed on chargepoints. Guidance should also be provided on planning for adequate parking provision, access requirements, the ease of handling charging cables in restricted spaces and access to the chargepoint interface, while mitigating the potential for conflict between vehicle charging and other public highway users. The overall process for local authorities to provide on-street residential charging should be simplified and harmonised, with clear and consistent guidance on things such as consultation, planning permission and access requirements. Plans to provide charging infrastructure should be considered as part of wider local authority regeneration, place-making and energy infrastructure policies.

38. The Government's ORCS, which pays 75% of the capital costs (up to £6,500) of procuring and installing on-street chargepoints in residential areas, plays an important part in supporting local authorities to roll out charging infrastructure. The ORCS was initially undersubscribed, but has now supported over 60 local authorities to fund over 2,000 chargepoints. The Government's doubling of funding to £20 million for the ORCS to fund up to 7,200 chargepoints in 2020-21 is welcome, as is the additional £90 million announced in the Spending Review to support the rollout of larger on-street charging schemes.
39. However, as we alluded to in paragraphs 29 and 32 above, this is unlikely to be enough to support the delivery of on-street charging infrastructure to meet the Government's own 2030 end-of-sale policy. Moreover, public capital funding alone is not enough to ensure the public charging network is well maintained. Since the end of the Plugged-in Places scheme, most local authority-owned infrastructure has been transitioned to private operators and new networks are mostly commissioned to be operated privately. While strict service level agreements could play a part in ensuring these networks are well maintained, a more effective approach is for the Government to put in place regulation for minimum reliability levels in consultation with industry.
40. Workplace charging could help ease the pressure on local authorities to install on-street chargepoints. Local authorities may wish to consider encouraging and supporting local businesses to install workplace chargers. In addition, when processing and approving new planning applications for depots, regional distribution centres and/or commercial vehicle parking, local authorities should insist provisions are made for the installation of charging infrastructure for light commercial and heavy duty vehicles and electric plug-in points for transport refrigeration units. Future-proofing charging infrastructure for a fleet of commercial vehicles by planning for it during initial development is less expensive than retrofitting electrical installations. Local authorities should also look into providing adequate charging facilities for light commercial vehicles where there are impediments to accessing on-street chargers designed for passenger cars. Measures could include dedicated commercial vehicle parking with chargepoints, or simply widening and lengthening on-street parking bays with chargepoints to accommodate the sizes of most light commercial vehicles.

Question 10: What can be learned from the different policy approaches taken in the devolved administrations for the EV charging market's development?

41. The Scottish Government funds and manages the ChargePlace Scotland charging network. Its success can be partly attributed to a framework within which all locally deployed chargepoints are

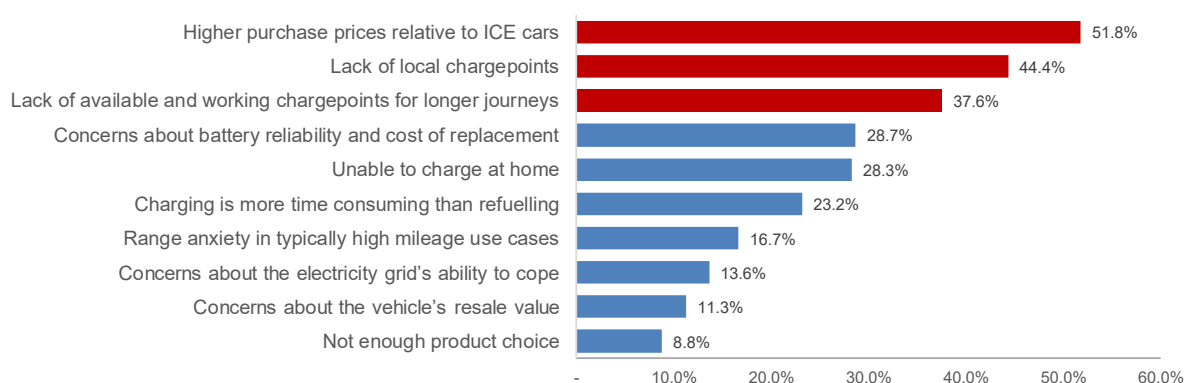
operated as a single network. This network currently has over 1,500 public chargepoints, all of which are displayed on a live map with details on location, type, status and availability. Its most attractive feature to consumers is that most chargepoints are free to use as long as the user pays an annual membership fee. However, this is commercially unattractive to many private operators and is sustainable only as long as the network continues to be funded by the Scottish Government. The network is also not capable of inter-network roaming.

Theme two: effective consumer interaction with the sector

Question 1: 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?

42. All credible studies have consistently shown that the lack of charging infrastructure is the greatest concern among UK consumers.¹⁰ An AA-Populus Driver Poll earlier this year found that more than half of respondents would not consider buying a plug-in vehicle as their next car. Almost seven out of ten respondents stated their top reason for not considering a plug-in vehicle was a lack of public charging infrastructure.¹¹ In another study, 40% of respondents cited charging infrastructure as a barrier, second only to vehicle purchase cost.¹² Similarly, a recent SMMT-commissioned survey reveals, as shown in the chart below, the lack of local chargepoints (44%) is the second biggest factor holding consumers back from switching to a BEV after higher purchase prices (52%).¹³

Key factors holding consumers back from buying EVs



Source: Savanta ComRes for SMMT, 2020.

¹⁰ See Deloitte (2020), Deloitte Global Auto Consumer Study 2020, available at <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/electric-vehicle-trends-2030.html>; and Department for Transport and Kantar (2019), Transport and Technology: Public Attitudes Tracker – Wave 4 summary report, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847653/Summary_Report_of_Wave_4_of_the_Public_Attitudes_Tracker.pdf. Additionally see Transport Research Laboratory (2019), CVEI - D5.2 Consumer Uptake Trial Report, available at <https://trl.co.uk/reports/cvei-d52-consumer-uptake-trial-report>.

¹¹ The AA (2020), AA-Populus Driver Poll, February, summary available at <https://www.theaa.com/about-us/public-affairs/aa-populus-driver-poll-summaries-2020#february2020>.

¹² SYSTRA (2019), On the Move: Navigating the Future of Road Transport, available at https://www.systra.com/IMG/pdf/navigating_the_future_of_road_transport.pdf.

¹³ Savanta ComRes survey for SMMT between 21-24 August 2020.

43. While some consumers may cite range anxiety as a barrier to switching to EVs, range anxiety is partly related to chargepoint anxiety, which is the ability to find an available and functioning chargepoint on demand. While most people do not drive long distances every single day, few people buy a car for their shortest journeys. Innovators and early adopters are likely to be more savvy in planning their use of their EVs around the need to charge and where to charge. They are also more likely to put up with inconveniences that come with using early-stage infrastructure, such as unreliable chargepoints, multiple network membership RFID cards, or waiting for in-use chargepoints to become available. Some of them are also more likely to be able to afford EVs in the upper segments that offer longer driving range.
44. However, the early and late majority, i.e. the mass market, are unlikely to be as savvy, forgiving or indeed affluent. For every EV enthusiast, or innovator or early adopter, who claims the charging experience is straightforwardly simple, there is a sizeable number of people who complain EVs do not work for them due to painful charging experiences. These mass-market consumers, who make up the vast majority of motorists, are those who need to be won over by giving them the peace of mind and confidence that there is adequate charging infrastructure **on demand**. Consumer education also has a critical role to play in addressing misconceptions about running and charging an EV. For instance, some consumers are still wondering whether they could charge an EV in the rain.
45. We believe the key to driving steeper levels of EV uptake is the massive expansion of charging infrastructure across the country. This includes significantly uplifting the number of public chargepoints to the extent that there is perceived overprovision among mainstream consumers. In addition to being extensive and ubiquitous, public charging infrastructure must be visible, accessible, reliable and affordable. The litmus test that must be passed if we are to give consumers the required confidence is that the charging experience, which includes finding an available and functioning public chargepoint on demand, must be as easy as refuelling.

Question 2: What are the key challenges for consumers already interacting with the sector and how might these change over time as the sector grows?

Ad-hoc access and payment option

46. Despite the AFIR 2017 require infrastructure operators to provide ad-hoc access to all chargepoints deployed after 17 November 2017 and to all legacy chargepoints by 18 November 2018, many EV users are still required to have a membership account with various public chargepoint networks. Users risk being stranded and unable to charge their vehicles if they do not have an account.
47. A ubiquitous open access (implying ad-hoc access and payment) and/or interoperable (implying ad-hoc access through roaming) network of public chargepoints is essential to providing a coherent user experience. The Government announced in July 2019 that all newly installed rapid and ultra-rapid chargepoints should provide debit/credit card payment from April 2020. We believe

all public chargepoints, and not just rapid and ultra-rapid ones, must offer ad-hoc access and payment to all users via debit/credit card payment and/or network roaming. Legacy chargepoints must be retrofitted to offer these ad-hoc options. This does not preclude the operator offering a membership option, which may provide the consumer with additional benefits, but using and paying for public charging must be as easy as paying for fuel today, where downloading an app or taking up membership is not a prerequisite for access.

48. The lack of proper enforcement of the ad-hoc access and payment requirements of the AFIR nearly three years after they came into force and differences between local regulations have resulted in continued inconvenience for EV users. As such, for the sake of ensuring the best customer experience and to drive uptake of EVs, an increasing number of vehicle manufacturers are partnering with chargepoint network operators to provide drivers with seamless access to a wide number of chargepoints operated by various network operators. However, these are proprietary solutions, and the Government must not relent in fully enforcing the AFIR. We suggest the Government should not rely on the Office for Product Safety and Standards (OPSS) to enforce the AFIR, but set up a new **regulatory body** to monitor for compliance and for enforcement.

Real-time data availability

49. The availability and accessibility of real-time information about public chargepoints is important to enable EV drivers to plan their journeys and charging needs, or access infrastructure on demand. EV drivers need to know not just where chargepoints are located, but also information on power ratings or pressure, connector type, price, payment options available, state of repair, availability, physical access restrictions and operating hours (if applicable). Such information is also useful for the development of apps, integration into navigation systems and fleet management.
50. We believe the Government should create, fund and maintain a national platform that collects and displays static and dynamic information on all public chargepoints. Such portal is to replace the National Chargepoint Registry, which does not provide real-time data and is not fit for purpose; the fact that ZapMap remains the go-to source for consumers, industry and stakeholders is testament to this. The Government must set clear data sharing standards, including a common data format, that infrastructure operators can adhere to and that will facilitate the integration of information into navigation systems or apps. In addition, the Government, through the regulatory body we proposed above, must monitor for compliance and strictly enforce the requirements for data sharing by operators.
51. However, the real-time data sharing architecture that will be developed must be future-proofed for changes in the mobile communications sector. Due to the relatively low data throughput and bandwidth requirement for transmitting real-time data from public chargepoints, it would seem reasonable to install basic circuit switching technology that underpins 2G and 3G equipment. However, given that these mobile networks are likely to be switched off by the end of this decade, public chargepoints should be equipped with packet switching technology that enables LTE (4G) and 5G communications.

Reliability

52. There is nothing more disappointing for EV drivers than to turn up at a chargepoint only to find it is out of order or in a state of disrepair. Infrastructure reliability is absolutely vital to improving overall consumer experience. Some operators have struggled to maintain legacy infrastructure, or failed to uphold maintenance agreements with local authorities, resulting in legacy infrastructure falling into a state of disrepair.
53. While the reliability rates of public chargepoints in the Netherlands regularly hit an enviable 99%, one study discovered the average reliability rate of chargepoints in the UK was just 91.7%.¹⁴ EV drivers in the UK should expect reliability from the public infrastructure network. Having a significant number of public chargepoints out of action is frustrating and inconvenient for EV drivers and sends the wrong message to other motorists who are considering switching to EVs.
54. The Government must therefore regulate for a **minimum reliability rate** and the regulatory body we proposed above should be tasked with monitoring for compliance and enforcing regulatory standards. These standards should include penalties for repeated non-compliance. To be on par with the reliability rate commonly seen in the Netherlands, the mandated minimum reliability rate should be 99%. The Government's ambitious and world-leading 2030 end-of-sale policy should be matched by an equally ambitious and world-leading reliability target. This minimum reliability rate could be measured per operator per annum. However, the exact metrics underpinning the measurement of the mandated reliability rate should be developed in consultation with industry.

Pricing transparency

55. There is currently no consistent approach to pricing at public chargepoints. Some operators charge for electricity drawn (p/kWh), while others the time spent charging (p/minute, or £/30 mins, or £/hour). Some also charge a membership subscription or connection fee. This can be confusing and makes it difficult for plug-in vehicle users to compare the costs of charging between different public charging networks.
56. We take the view that all chargepoint network operators should charge for the electricity they provide in p/kWh, commensurate with how drivers are charged to refuel internal combustion engine (ICE) vehicles today (p/litre) and, for those who also charge their vehicles at home, consistent with the pricing format for domestic electricity use. This, however, should not preclude operators from charging additional fees to discourage undesirable consumer behaviour, such as overstaying the charging event. These fees, along with any parking charges, should be displayed in a standardised way to avoid confusion.
57. Affordability of public charging could also be a barrier to EV uptake for less affluent consumers. It would be highly unfortunate, as well as detrimental to social equity, if less affluent consumers who do not have off-street charging at home and own lower priced or used earlier generation EVs have few other options but to pay considerably more to use certain public charging networks. For some less affluent consumers, the cost of taking up multiple network memberships could be a barrier to EV uptake, while others are put off by some rather steep pay-as-you-charge rates.

¹⁴ Dermott, H., Development of the UK Public Chargepoint Network, RAC Foundation, 2018, available at https://www.racfoundation.org/wp-content/uploads/Development_of_the_UK_CPN_Harold_Dermott_December_2018.pdf.

Question 3: 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?

58. For unplanned charging events, especially those occasions where a chargepoint is required on demand, consumers are usually signposted to the nearest available public chargepoints by an app that is either integrated into their vehicle satellite navigation system or on their smartphones. If their EV has an intelligent range predictor, they may be signposted to chargepoints closest to their pre-set minimum remaining range they are comfortable with. Consumers must then determine if they are a member of the available chargepoint network(s) or if ad-hoc access and payment is available. Unless real-time information on which chargepoints are in use is available, consumers may arrive at the nearest available chargepoints only to find they are all in use and may therefore need to look for the next nearest alternative.
59. For most planned charging events, consumers either opt for their familiar charging locations where they have membership of the network or have pre-planned their charging to synchronise with arrival/brief stop, parking and dwell time.
60. As we set out above, the availability and accessibility of real-time information about public chargepoints is important to enable consumers to plan their charging events and/or access infrastructure on demand. Consumers need to know not just where chargepoints are located, but also information on power ratings or pressure, connector type, price, payment options available, state of repair, availability, physical access restrictions and operating hours (if applicable).

Question 4: Can consumers easily understand and compare charging tariffs in this sector and what barriers, if any, do they face?

61. Some operators charge for electricity drawn (p/kWh), while others the time spent charging (p/minute, or £/30 mins, or £/hour). Some also charge a membership subscription or connection fee. Findings from OZEV's own research disclosed at stakeholder workshops revealed as of 19 August 2020 there were 150 pricing options across 48 networks, with eight operators charging on a time or per session basis and 12 operators charging connection fees. In such a confusing landscape, it is difficult for consumers to compare the cost of charging between different networks.
62. We think it is therefore important that all public chargepoint network operators charge for the electricity they provide in p/kWh, commensurate with how drivers are charged to refuel ICE vehicles today (p/litre) and, for those who also charge their vehicles at home, consistent with the pricing format for domestic electricity use. This, however, should not preclude operators from charging additional fees to discourage undesirable consumer behaviour, such as overstaying the charging event. These fees, along with any parking charges, should be displayed in a standardised way to avoid confusion.

Question 5: Do particular groups of consumers face additional challenges to interacting with the sector and if so, who and why? How might these be overcome?

63. Not all EV users are able to have a dedicated private home charger, i.e. a wallbox in a driveway or garage. Our estimates suggest a third of all dwellings in the UK do not have off-street parking. However, among the two-thirds who have off-street parking, about 40% are not able to have a dedicated private home charger due to various reasons including the lack of wiring, communal garages and shared parking for multi-dwelling residential buildings (e.g. flats). This means overall approximately three in five of the 28.7 million dwellings in the UK are not able to have a dedicated private home charger. EV users in these dwellings will have to use public (on-street, destination, forecourts, motorway service areas) or workplace chargepoints.
64. While some stakeholders believe the predominant charging model of the future is the same forecourt model where consumers today refuel their ICE vehicles, this is nonetheless predicated on the assumption that most EVs across all price points in the future are capable of supporting ultra-rapid charging (150-350kW). This means there is less need for other types of chargers, especially on-street residential chargers to cater for those without off-street parking.
65. However, although an increasing number of new EV models coming to the market are capable of supporting ultra-rapid charging, it remains unclear if future mass market models at the lower-end segments will also have relatively large batteries and be equipped with architecture that is capable of ultra-rapid charging. It is also anticipated that by 2030 there will still be earlier generation EVs on the road, changing hands in the used car market. Many of these do not support ultra-rapid charging. It would be highly unfortunate, as well as detrimental to social equity, if less affluent consumers who own lower priced or used earlier generation EVs that do not support ultra-rapid charging are left with relatively far fewer on-street residential or opportunity chargers, while the more affluent consumers avail themselves of the convenience and abundance of ultra-rapid charging forecourts.
66. A related issue is the price differentials between on-street and forecourt charging. Certain rapid and ultra-rapid chargers are more expensive to use. The promise of significantly lower EV running costs compared to ICE vehicles is largely predicated on the savings accrued from home charging versus refuelling. Such savings will no longer be as significant should consumers regularly recharge at certain ultra-rapid forecourts. Even if most EVs at all price points are capable of supporting ultra-rapid charging, the less affluent may find themselves being forced to regularly pay more to charge at forecourts if the cheaper to use on-street residential chargers are in short supply. That said, the affordability of on-street residential charging itself, which is in addition to residents' parking permit, should be reviewed to ensure EV users are not effectively "penalised" for not having a private driveway or garage.
67. We think it is therefore important to ensure the predominant charging model of the future reflects the charging capabilities of the majority of EVs on the road. However, there must also be regulatory mechanisms to ensure there are adequate chargers of the type(s) that cater to the charging capability of other EVs, thereby safeguarding social equity.

Question 6: Are there any technological developments or tools that could support consumers to navigate the sector, for example by helping to make more informed choices?

68. Improving access to public chargepoint information through a unified, reliable and up-to-date platform is crucial to supporting EV users and encouraging uptake. A national platform that reliably collects and displays static and real-time dynamic information on all public chargepoints is needed to replace the National Chargepoint Registry, which is not fit for purpose. Open application programming interfaces (APIs) can then ensure app developers are able to draw on the information from the platform to provide customised information to consumers, enabling them to plan their charging events more optimally. Coupled with AI-enabled range predictors that are already available, these could help gradually eliminate range and charging anxiety, as well as enhance the consumer experience in interacting with the charging infrastructure.
69. As mentioned in paragraph 44 above, improving consumer education is crucial to addressing misconceptions regarding running and charging an EV and concerns about the source of energy used for charging. The Government should now play a more proactive role in informing and educating mass market consumers, who may not be as willing or interested to undertake extensive research on EVs for themselves. The Go Ultra Low initiative, which is jointly funded by government and industry, should be extended and properly resourced to ensure its communication campaign is more effective and reaches the broadest audiences possible.

Question 7: Are existing protections offered by consumer law and other measures (such as sector regulations) sufficient?

70. The **lack of regulation** in the charging infrastructure sector is a key factor in the progress in consumer experience failing to keep pace with consumer needs and uptake of EVs. As we have opined above, we think the AFIR 2017 should be implemented and enforced across all public chargepoints. A new regulatory body, and not the OPSS, is needed to monitor for compliance with and enforcement of any regulation that will be introduced to improve consumer experience, particularly in relation to ad-hoc access and payment, information provision, reliability and pricing transparency. Social media is littered with numerous complaints of broken down public chargepoints, poor customer service and consumers left in the lurch, but with no recourse to formal complaint mechanisms or protections. However, it should also be mentioned that poor consumer experience could sometimes be attributed to some operators with legacy infrastructure that does not have the ability to perform remote diagnostics.

Question 8: What, if any, open data measures are needed to support consumer interaction, such as through the growth of comparison sites and apps?

71. We believe once there is a national platform that collects and displays static and real-time dynamic information on all public chargepoints and from which app developers can draw information

through open APIs, there will be a natural, potentially exponential, growth of market comparison apps, sites and tools.

Question 9: What else is required to help ensure that the EV charging sector develops in a way that is responsive to consumer needs?

72. Adequate, fit-for-purpose and well-functioning charging infrastructure is a key prerequisite for the transition to a zero emission heavy goods vehicle (HGV) fleet. As the operational needs of this vehicle segment differ significantly from passenger cars, the segment's charging infrastructure requirements must be considered separately. HGVs simply cannot use passenger car infrastructure because of their much higher power and energy demands. While high-power ultra-rapid chargepoints of up to 350kW are being rolled out for cars, these cannot be used by HGVs as they do not fit into the daily operation of the vehicle, given the larger battery capacities needed. Industry believes that long-haul HGVs will require a charging provision of more than 500kW along the motorways and major routes to satisfy the significantly higher power and energy demand from these larger, heavier vehicles.
73. Long haul HGVs do not all operate on a back-to-base model, but instead will remain in operation until their scheduled maintenance check. Therefore, any charging infrastructure model for HGVs needs to consider natural rest stops and locations, alongside drivers' hours restrictions, so that charging can take place conveniently. Alternative models that could be considered include dynamic charging methods such as induction or catenary systems. Given the long haul nature of these vehicles, the charging model should be such that it is aligned with Europe to ensure compatibility as well as ease of charging. This should also enable economies of scale to minimise costs and reduce unnecessary duplication.
74. The charging infrastructure sector generally needs an adequate regulatory framework and a fit-for-purpose regulatory body, both of which are currently lacking, to ensure consumer needs are met.

CONTACT

David Wong
Senior Technology and Innovation Manager
[redacted]