



Great Minster House,
33 Horseferry Rd,
Westminster,
London
SW1P 4DR

7th October 2019

Dear Sir/Madam,

Gemserv's response to the Electric Vehicle Smart Charging consultation

Gemserv is an expert provider of professional services, helping clients make the most of a world increasingly driven by data and technology. We provide professional services across energy, electric vehicles, healthcare, the public sector and a diverse range of industries including water, telecoms and construction. Over the last couple of years, Gemserv has been working with a wide range of EV market participants to better understand developments and trends. In 2018, we established the Electric Vehicle Governance Forum in collaboration with Energy UK and more recently have supported a number of charge point operators with technical consultancy services.

With the view that most vehicles will be electric at some point in time, the embedded energy storage capacity in the electric vehicle parc creates opportunities for smart charging solutions and flexibility services if the consumer sees value in doing so.

There are many ways this can be achieved with or without smart metering.

At a time where 99.9% of the vehicles on UK roads are still 100% fossil fuel powered, it is perhaps too early to consult on smart charging specific implementation options as there are significant uncertainties around:

- (1) infra-structure choices and their respective costs,
- (2) commercially viable business models,
- (3) global trends and consumer behaviour,
- (4) the anticipated rise of connected autonomous vehicles (CAV) that may have different charging needs,
- (5) as well as potential changes to vehicle ownership due to the uptake of Mobility as a Service (MaaS)

Current EV uptake figures do not suggest the view that there is urgency for the legislator to intervene in this nascent EV market which remains subject to fast moving innovation and change.

Market legislative intervention should be deferred to 2025 when the need for intervention should be re-assessed and a more informed decision-making process is possible.

Gemserv Limited, Registered in England and Wales. No. 4419878
8 Fenchurch Place, London, EC3M 4AJ
T: +44 (0) 207 090 1000
F: +44 (0) 207 090 1001
W: www.gemserv.com

A cross-sectorial industry view is essential for shaping smart charging infra-structure and services that will scale globally and will be instrumental in job creation and economic growth.

There is a case to be made to develop smart charging solutions on the merits of:

- (1) being commercially viable,
- (2) future proof to support the migration path toward connected autonomous vehicles,
- (3) providing consumer choice in products and services desired by consumers willing to pay for,
- (4) instrumental in increasing commercial projects to further renewable generation and its utilisation in the UK,
- (5) facilitate UK companies to offer charging services and products as global market propositions,
- (6) facilitate the provision of advanced data services globally as the new oil,
- (7) and integrate the electrification of road transport in such a way that it can support grid stability in the UK and internationally.

The current ambition to ban UK sales of conventional fossil fuel vehicles is set at 2040. This is unlikely to trigger any substantial increase in EVs in the short or medium term with any sold conventional fossil fuel vehicle likely to be on the road for at least 15 years from date of purchase. If there is an ambition to accelerate the transition to electric vehicles the date to stop the sales of pure fossil fuel cars should be brought forward by at least 5 to 10 years. Putting more emphasis on the roll out of transitional technologies such as hybrid vehicles may be instrumental in meeting the challenges of this profound societal transition and UK's climate change obligations.

The practicalities of introducing smart charging propositions to the market nationally and globally need to be considered in the context of travel demand which is an important factor when assessing the impact on the energy supply and the electricity grid:

- (1) the average motorist drives no more than 25 miles per day, creating a daily electricity demand in the order of 6 kWh per day,
- (2) any slow charging infra-structure (16A) at home, at work, at transport hubs for rail, bus, micro mobility, car parks could deliver this charging demand in less than 2 hours,
- (3) if the electricity demand is split between destination charging locations, the actual charging time by location is further reduced to well under an hour in most cases,
- (4) most vehicles will not charge while parked because their batteries are fully charged based on their travel demand which impacts charging point utilisation.

In this context, the grid flexibility in the event of an energy demand peak that can be provided by electric vehicles in the travel demand context

- (1) is very limited for uni-directional charging solutions and very much diminishes the need for legislation,
- (2) while bi-directional charging solutions (V2X) substantially increase the flexing opportunity of energy storage embedded in the vehicle parc,
- (3) assuming that in any case there is buy in from consumers and impacted stakeholders.

Intermittent longer miles journeys will be averaged out by the vehicle battery capacity with EVs converging on an average range of 200 to 250 miles at 100% battery state of charge (SoC). The annual vehicle miles that can be delivered by slow charging infra-structure provision in reference to the vehicle dwell time is substantially greater than the average annual vehicle demand.

There is substantial risk to the UK to prematurely pick and regulate a smart charging solution and it is suggested to wait given the above narrative until a more informed decision-making process is feasible.

Better understanding the future technology roadmaps, infra-structure deployment, travel needs, and consumer behaviour are a pre-requisite prior to considering any legislative market intervention.

Yours faithfully,

Joachim Brandt
Head of Electric and Autonomous Vehicles
E: Joachim.brandt@gemserv.com

Appendix: Gemserv's response to the Electric Vehicle Smart Charging consultation

Q01 Do you agree with the Government's proposed aim (to maximise the use of smart charging technologies)?

(A01.1) We support the view that electric vehicles and connected autonomous vehicles should be integrated as part of smart, value adding products and services to market.

(A01.2) We suggest that the timing for this consultation is too early and that an informed legislative process is not possible until more progress has been achieved with the uptake of electric vehicles. We are very conscious of the risk of stifling UK innovation, futureproofing investment and imposing unnecessary financial burden at this point in the development of the market.

(A01.3) The definition of smart charging is insufficient to deliver intended policy outcome and social benefits. Bi-directional power flow (V2X), integration with onsite generation, onsite energy storage and local energy efficiency measures as well as instrumentation of network assets need to be inclusive to the smart charging definition.

(A01.4) EVs can play an important role to increase renewable generation, but only if the electricity network assets are able to flex generation capacity and demand at scale. Hence, investment in grid infra-structure will be inevitable to avoid the grid becoming a bottle neck. This is even more so the case if electrification of heat becomes mainstream.

(A01.5) The scope of smart charging also needs to mitigate the migration to Connected Autonomous Vehicles (CAV). We do not believe that the current consultation proposal is sufficiently aligned with the emerging technology roadmap.

(A01.6) We would suggest that the whole electricity system should embrace smart technologies including instrumentation of distribution network assets and that smart "behind the meter" is defined in a device neutral way. We would suggest that EV specific solutions mask the bigger picture.

(A01.7) For example, electrification of consumer products such as vehicles, heating, and energy storage alongside white goods should not result into

- (1) different sets of regulations,
- (2) different pricing of electricity dependent on purpose of use (note precedence set with the MRP exemption for Electric Vehicle Supply Equipment (EVSE) by Ofgem),
- (3) different enforcement mechanisms and penalties that ultimately would not stand up to scrutiny in delivering whole system benefits in a systematic, cost effective, sustainable and fair way.

(A01.8) We do not see any evidence that would support the intend and motivation of legislation being able to drive maximisation of smart charging at this very early stage of the EV market. Alternative business models such as workplace charging, wireless charging solution and "battery swap station", will drive changes in consumer behaviour. Autonomous vehicles are anticipated to change vehicle duty cycles and vehicle ownership and would change the energy demand profile and type of charging infra-structure required.

(A01.9) Delayed investment in distribution network infra-structure upgrades may hinder the flexibility services EVs can offer to the electricity system maximising the value creation from renewable generation while further reducing the dependencies on fossil fuels.

(A1.10) As part of the smart charging objectives it needs to be considered that

- (1) the daily charging demand for most vehicle journeys is no more than 6kWh per day
- (2) the average charging time to provide for the daily vehicle energy demand is less than 2 hours on low power (16A) charging at a single destination or considerably less across multiple charging destination
- (3) smart charging functionality also exists in vehicles e.g. programmable charging schedulers and setting of charging current
- (4) vehicle connectivity providing consumers with smart phone app controls and features
- (5) and EVSE does not have access to highly relevant vehicle parameters such as SoC, battery charging profile or travel data.

(A1.11) It is important that the most scalable solution for the UK and globally is spearheaded and it is far too early to derive any viable conclusions at this point in time.

Q02 Do you agree with the proposed Grid Protection objective?

(A02.1) As most vehicles will continue to be fossil fuel powered in the short and medium term the grid protection objectives can be deferred to a later date.

(A02.2) We would suggest that the Grid Protection objective is unlikely to have relevance before 2030.

(A02.3) We share the view that energy smart devices can contribute to grid protection objectives which can be provisioned in many ways. We do not see this being dependent on any smart metering solution specific to EVs and would suggest a more generic approach that can deliver a more sustainable and accountable grid protection objective.

(A02.4) Considering the daily vehicle travel demand, it is unlikely that EVs will be able to provide grid protection capabilities in the limited scope defined by this consultation as for most of the vehicle dwell time the batteries are fully charged.

Q03 Do you agree with the proposed Consumer Protection objective?

(A03.1) We fully support the need for consumer protection and support the services provided by Citizen Advice as well as organisations providing accreditation for product quality and product safety compliance. This includes finding ways to accelerate the transition to electric vehicles in a timely manner, deliver tangible air quality improvements as well as tangible measures to prevent existential threatening climate change.

(A03.2) We would suggest seeking clarification with regards of Charge Point Operator (CPO) switching being a consumer protection objective. We feel there is a double meaning to the term CPO and would not necessarily associate this with cost effective provision the consumer wants. In this context we would suggest that smart functionality as part of a commercial product and services offering may be split between the installed hardware and the provision of platform services. In other words, it may not be possible to maintain the EVSE product functionality when switching

Gemserv Limited, Registered in England and Wales. No. 4419878

8 Fenchurch Place, London, EC3M 4AJ

T: +44 (0) 207 090 1000

F: +44 (0) 207 090 1001

W: www.gemserv.com

the CPO unless subscribing to an expensive CPO platform cloud service pass through. This is an important differentiator compared to energy supplier switching which does not have such a functionality dependency.

(A03.3) We would suggest that smart charging doesn't have CPO dependency and that there are technology solutions that can provide grid awareness and preventive actions independently and autonomously. We would suggest that there is already an emerging market for smart and energy efficient home automation with EVs presenting new opportunities.

(A03.4) Cyber security does need to consider consumer protection and data privacy, but these are not specific to the transition to electric vehicles. It is important that this is considered in the context of the bigger picture with the increase in digital integration and connectivity throughout society and the automated processing of data. Consideration should be given whether EV charging has any dependencies on national critical infrastructure.

Q04 Do you agree with the proposed Consumer Uptake objective?

(A04.1) We fully support smart charging in support of the uptake of electric and increasingly autonomous vehicles as being viable commercial propositions that can unlock whole system benefits.

(A04.2) It cannot be inferred that the uptake of electric vehicles is dependent on this. It is key that the transition away from fossil fuel cars works for everyone in the best possible way and that transitional technologies are leveraged to their full potential to aid that process. A typical example is the hybridisation of powertrains that can deliver large scale societal benefits in fossil fuel reduction right now without any major disruption to the market or the rollout of costly charging infrastructure.

(A04.3) It is not so much a question whether the consumer will opt for a pure electric vehicle rather than what is acceptable to the consumer that will deliver the largest electrification of vehicle miles at any given point in time. From a consumer perspective, there needs to be more clarity around what the path of transition is.

(A04.4) We do agree with the narrative described in paragraph 1.24: If smart charging is too complicated, too inconvenient, or doesn't offer enough benefits to consumers, then consumers will not engage. Smart charging solutions must therefore be affordable; good value; simple to engage with; and convenient. However, consideration needs to be given that smart charging is not purely a utilitarian provision and that it may be motivated by added value services that appeal to the consumer for other reasons e.g. status, lifestyle, tech, etc.

Q05 Do you agree with the proposed Innovation objective?

(A05.1) We agree with the narrative in paragraph 1.25: Smart charging and the EV chargepoint market is a nascent sector and is evolving. Current innovation is already changing the smart charging landscape, with the emergence of vehicle-to-grid technologies and smart charging via vehicles or the cables attached to chargepoints rather than the chargepoint itself. The rollout of 5G could also impact smart charging.

(A05.2) We can't know what new innovation will occur in the future, but we can seek to ensure that smart charging solutions are able to keep pace with, not act as a barrier to, and help act as a catalyst

for, new innovation. This must be done in a way that is compatible with the changes and innovation at the international level.

(A05.3) We would suggest that the use of legal powers to prescribe technical solutions may not be viable and that the legislator needs to be guided by an evidence driven process that is industry informed where the legislator can create market conditions that benefit everyone in a fair and transparent way. We would suggest that the legislative process will struggle to keep up with the pace of innovation and product development.

Q06 Please provide reasons why you agree or disagree with the above aim and objectives, including any objectives that you think should be added or removed.

(A06.1) It is critical to recognise that the disruptive nature of electric vehicles is coupled with rapid advancement in technology and innovation across industry sectors with global dependencies and that EV smart charging should not be legislated in isolation to global trends or from an industry sectorial perspective.

(A06.2) There need to be a clear path of transition that supports all market participants. A scalability test needs to be applied to scrutinise the call for legislation with clear evidence that this is in the interest of UK PLC and will deliver a lead position in global markets.

Q07 Do you agree with the proposal to have a phased approach?

(A07.1) We do not believe that the time scale of the proposed phased approach is realistic. The uptake of EV and CAV is a major opportunity but at this point in time there is not enough evidence for an informed decision-making process. We would suggest that the next five year could still very much change what would be considered a smart charging solution.

Q08 Please provide reasons why you agree or disagree, including supporting evidence or analysis, and suggesting any alternative approaches

(A08.1) We question the premise outlined in paragraph 1.27 that most charging points aren't smart and won't be without government intervention.

(A08.2) There is a principle question as to what "smartness" is required from the charging infrastructure in the context of vehicles being increasingly connected and autonomous as well as what requires a managed service and what can be packaged into the EVSE stand-alone product. This is quite complex and understanding the bigger picture is important.

(A08.3) We would suggest that there is benefit in keeping the EV charging infra-structure simple and consider all options from a digital integration technology landscape point of view.

(A08.4) EVs can act as a smart charging solution even if there is no intelligent control within the EVSE. Charging rates can be controlled by the vehicle onboard charger and vehicles have smart features such as programmable charging schedulers that can take advantage of ToU tariffs. Furthermore, vehicles are likely to include route planners and traffic information and if digitally integrated can significantly reduce duplication of functionality and cost embedded in the infra-structure provision while providing the means for more choice and sophistication of optimisation and flexibility services across the energy and transport sector.

(A08.5) With reference to paragraph 1.28, it is more important for the legislator to create the regulatory framework that permits the forthcoming solutions to deliver commercially viable business propositions while protecting the benefits of the regulated energy market and its investments. We believe it is far too early to take corrective legislative actions at the level of technical standardisation at this point in time.

(A08.6) With reference to paragraph 1.29 there is no urgency for government to intervene in the market with legislative measures for smart charging. We would suggest that the amount of innovation one can expect over the next five years in this area will be crippling to any legislative process.

(A08.7) Government needs to primarily focus on the fundamentals to increase the uptake of electric vehicles and availability of electric vehicles in the market and that the UK is well positioned to compete in global markets going forward. This includes making provisions to accelerate the phase out of fossil fuel vehicles.

(A08.8) With reference to paragraph 1.30 for the reason previously stated hasty intervention will disadvantage the UK as a global lead player. This is too big and too important to be rushed.

(A08.9) We see very little evidence for the narrative in paragraph 1.31 at this point in time and there is a need to quantify the anticipated benefits to the consumer.

(A08.10) We would suggest that the limited definition of smart charging is evidence that it is far from clear what should be legislated in reference to paragraph 1.32.

(A08.11) We would strongly suggest that at this point in time there is no need to intervene based on the assumptions and opinions inferred and lacking evidence surrounding technical specifications. We would suggest accelerating the phase out of pure fossil fuel vehicles and increase the skill levels among the workforce to capitalise on the arising opportunities.

(A08.12) Legislating for a UK smart charging solution needs to be instrumental to job creation and a sustainable path for the transition to EVs and CAVs.

(A08.13) We fully support the narrative in paragraph 1.33 that government should remain technology neutral and allow industry to spearhead technological advancement and commercialisation thereof. It is important to assess the arising smart charging opportunities from a whole system perspective and the added value that can be achieved.

(A08.14) We welcome the governments intend outlined in paragraph 1.34 to address cybersecurity issues in the context of EV charging but would question this intent with the exclusion of the digital capabilities embedded in the vehicles and associated digital services. For paragraph 1.35 to have relevance there is a need to establish a common understanding of the end to end service delivery of smart charging functionality and acknowledge the complexity thereof being cross industry sectors.

(A08.15) We agree with the narrative in paragraph 1.36, there needs to be clarity how the overall solution provisions services in respect to an agreed reference architecture that subsequently can be used to enforce compliance to standards and regulations with agreed test procedures and validation methods.

(A08.16) The narrative in paragraph 1.37 is unclear and doesn't seem to relate to the role of charging point operators. We would suggest the scope of charging operators is quite different to that of a regulated licensed energy supplier.

(A08.17) We agree with the narrative in paragraph 1.39. We would point out that in order to preserve the value and purpose of the national electricity system it does need to deliver electricity to the consumer in the most unconstrained way possible at very competitive pricing as otherwise rising technologies to deliver off-grid solution will easily reach cost parity for a large number of consumers and subsequently render the national grid unsustainable. In this context it needs to be understood that EVs do change the status quo with the ability not just to provide transport from A to B but also to transport large amount of electricity from A to B and store large amount of electricity that can be used to increase self-consumption from onsite or onboard generation.

(A08.18) While a phased approach in paragraph 1.40 seems plausible, we do not see a need for phase 1. The uptake of EVs is not dependent on smart charging and it is more important to focus government effort on the scaling up of vehicle supply.

(A08.19) We would suggest in reference to paragraph 1.41 that the government should delay any attempt to enact smart charging legislation prematurely and instead call for an industry led approach that subsequently can be underpinned with supporting legislation.

(A08.20) We are concerned regarding the timeline suggested in paragraph 1.42, based on the current EV uptake, constraints in supply chain and 99.9% of the cars still being fossil fuel powered.

Q09: Do you agree that the smart regulations should apply to charge points, and to charging cables which contain a smart charging-enabling device?

(A09.1) We would suggest that the motivation outlined in paragraph 1.45 is not the right one. Domestic charging is low power charging and increasingly will be part of domestic solar PV deployment and smart home products and services. As previously stated, the daily travel demand does not create substantial energy supply demand in comparison to what low power EV charging can already deliver and this demand being split across the infrastructure provision as a whole.

(A09.2) While we support standardisation, with reference to paragraph 1.46 we caution legislation to impose technical requirements which are unlikely to be applicable to products and services in the global market. EVs are a global proposition and standardisation should drive global consensus. Single handed UK legislation could be problematic and limiting.

(A09.3) We strongly support safety in terms of products, installation and operation, but don't see what the added value would be in addition to compliance to BSI wiring regulations and the IET code of practise for EVSE installations. Data and cyber security aspects may pose elevated risks and would suggest this being part of the digital integration in general.

(A09.4) We would iterate with reference to paragraph 1.49 that there is no immediate need for short term intervention by government and that it is more important to develop the longer-term strategy for the migration towards electric vehicles across all impacted industry sectors including the approach HMRC will take to compensate for the loss of revenue associated with phasing out fossil fuel vehicles.

(A09.5) In reference to paragraph 1.50 stating GB smart metering as the lead solution, we acknowledge the motivation to capitalise on previous investments but would caution that this could be overall limiting to developing EV lead propositions globally. With the sunset of GPRS and the solution in the north not having enough bandwidth a general overhaul will be required in a few years. We would suggest that this needs considerably more investigation with regards to delivering large scale benefits for the UK as well as global markets and we would advise to look at the smart metering opportunities from a more generic device independent perspective. We are concerned that a bespoke EV smart metering solution may not be the way to go. Considerations should be given to:

- (1) EV charging provision will be inclusive to a wide range of charging solutions that all share in satisfying the charging demand,
- (2) charging solutions may include different battery asset models (commercial vs private ownership) e.g. provision of charging as part of battery rental and battery swap,
- (3) EVs may serve to transport large amount of energy that may be used for transport as well as energy supply at destination,
- (4) where the EV will charge or discharge is likely to be part of a wide service portfolio in the geospatial context the vehicle operates including off-grid provisions
- (5) we see potentially complex interaction between an unregulated market the vehicle operates in and the conventional regulated energy market,
- (6) we are concerned that consumers have yet to embrace smart metering and that this could become a barrier to EV uptake
- (7) there are millions of smart metering devices previously installed that would need upgrading or replacing

Due to the very disruptive nature of EVs and CAVs an in-depth approach is needed to identify what constitutes a smart charging lead solution and it is too early to make this determination at this very early stage of the EV market development.

(A09.6) The narrative in paragraph 1.51 and 1.53 do not consider the technology roadmap from a cross-sectorial industry view. There is a high risk that if the consumer does not see value from managed charging services that the consumer will opt out.

(A09.7) With reference to paragraph 1.60 we would agree in general but would point out that the dysfunctional EV market is largely due to the path of transition not reaching a commercially viable milestone. This is more to do with creating an effective policy framework that spells out how the transition from fossil fuel vehicles to electric ones is accomplished rather than giving justification to impose legislation. The very small EV parc does not provide the commercial basis to increase managed charging solutions. Until the phase out of fossil fuel vehicles gains tractions this is unlikely to change any time soon.

Q10: Please give reasons, including any supporting evidence or analysis, for your answer.

(A10.1) There are barely 70,000 pure EVs on UK roads, most plug-in vehicles being hybrid that have no dependency on any charging infrastructure and have a limited all electric range of around 30 miles which matches the average daily travel demand of 25 miles in the UK.

(A10.2) In this transition period there is no urgency to intervene into the market and there are no tangible benefits to impose additional costs for smart charging onto the consumer.

Q11: Do you agree that the regulations should require that all new chargepoints except for public chargepoints (as defined in the AEV Act) are smart?

(A11.1) We do not see the need to mandate charging points to be smart in view that there are a range of options to deliver the desired outcome.

(A11.2) There is a high likelihood that most charging points are going to be smart anyway as part of a competitive product feature list between EVSE suppliers and similar this will be the case for smart charging features provided by the vehicle suppliers.

(A11.3) A significant proportion of the vehicle parc will be using public chargers in locations with high vehicle dwell time; as stated previously any low power charging solution (16A) will replenish the daily vehicle travel demand in less than 2 hours.

(A11.4) Smart charging will evolve naturally as added value proposition where there is money to be made. Consideration needs to be given that there is no obligation to use a smart mode 3 charger and that low power mode 2 solutions will set the base line. For a vehicle parc that is largely Plug-in Hybrid Electric Vehicle (PHEV) during the transition period this will be the most cost-effective charging solution.

Q12: Please give reasons for your answer, including explanations of any other types of chargepoints that you think should or shouldn't be smart and evidence for any exemptions needed.

(A12.1) Legislation should not discriminate a subset of EV chargers to be smart as smart charging capability is an added value commercial feature.

(A12.2) It is the consumer's choice what type of charger they wish to purchase or subscribe to and what they are willing to pay for it on the merits of the product or service. The same argument goes for any charging capabilities and functionality offered as part of the vehicle parc including technologies such as wireless charging and battery swap.

(A12.3) It is the CPO's choice to create flexibility services offers as part of their charging infrastructure portfolio and customer base.

Q13: Do you agree that public chargepoints that are smart should comply with the relevant elements of the regulations?

(A13.1) We see smart charging as a commercial opportunity, we do not think that this should be mandated through legislation.

(A13.2) In principle public charging points already have the necessary technical specifications as these are usually OCCP compliant and have back office functionality which allows to constrain remotely the charging current.

(A13.3) We would however point out that any constraining of charging power to or from the vehicle is the equivalent of lost revenue.

Q14: Please give reasons for your answer, including identifying which of the proposed regulations should or shouldn't apply to public chargepoints.

Gemserv Limited, Registered in England and Wales. No. 4419878
8 Fenchurch Place, London, EC3M 4AJ
T: +44 (0) 207 090 1000
F: +44 (0) 207 090 1001
W: www.gemserv.com

(A14.1) There is no urgency to mandate for any segment of charging infrastructure smart charging capabilities until a large enough vehicle parc represents a viable commercial market and the general direction of travel for charging technologies and service provision becomes much clearer. With the current regime of government policies, it is unlikely to reach a tipping point prior to 2025.

Q15: Do you agree that a smart chargepoint should be defined as being communications enabled and able to respond automatically to remote signals by adjusting the electricity consumption flowing through the chargepoint?

(A15.1) The definition describes a managed charging solution with back office functionality. It does not infer that the charging point is smart, in fact it suggests that this functionality is provisioned remotely.

(A15.2) An EVSE can be smart without satisfying any of the suggested criteria and operate stand-alone, taking into account onsite generation, the amount of exported or imported electricity and any grid parameters indicating a stress situation for any smart appliance to throttle/defer consumption to avoid black out scenarios. This is not to say that smart and managed solutions can deliver compounded whole system benefits. We would suggest that the definition should be more inclusive and described in context of use cases.

Q16: If not, how should it be defined instead?

(A16.1) We would suggest a definition more along the line of, EVSE in combination with vehicle charging features will provide smart optimised charging capabilities taking advantage of static ToU tariffs, dynamic ToU tariffs, integration with onsite generation and storage to maximise self-consumption, support off-grid solutions and mitigate electricity network failure conditions pre-emptively and autonomously. SMART EVSE as any managed EVSE may integrate with managed back office services for the creation of aggregated whole system benefits in the context of smart buildings, smart cities, smart grid, if the consumer has chosen a managed charging solution and wishes to do so.

Q17: Do you agree with our approach of having both outcome-based security requirements alongside technical security characteristics from the BSI standard or a proven equivalent?

(A17.1) While we fully support BSI to anchor new standards for the UK, we do not believe it would be beneficial for BSI to develop these standards in isolation to the global market and that any UK only standards will be a supply constraint of products and services to the UK as well as a limiting factor for UK industry to scale up on a global basis.

(A17.2) BSI standardisation should be linked to use cases that will directly benefit the scaling up of products and services in the UK and globally.

(A17.3) BSI needs to be supported by a cross sector industry forum with a global presence in order to ensure that standards can be developed in an accelerated and targeted way. This does not necessarily infer that the legislator should mandate the use of these standards as there may well be other technical solution that may supersede current standards and may be preferable.

(A17.4) With regards to the security aspects, this infers a certain type of solution under the smart label which we believe cannot be assumed. Data security and cybersecurity is not specific to EVSE and should be covered in general under connected devices. Again, at this early stage in the market it

would be presumptuous to assume how a commercially viable solution looks like nationally and globally.

(A17.5) BSI should be given significantly more time to navigate the standards landscape taking into account the pace of innovation in these sectors and for an industry led forum in collaboration with BSI to advise the legislator whether or not legislative intervention is required and if so, what this should be.

Q18 Please give reasons for your answer.

(A18.1) We support BSI and standardisation bodies worldwide in collaboration with industry to come up with commercially viable and scalable solution that work globally.

(A18.2) Given the current landscape of EV charging and the fast pace development of standards and charging technologies the legislator should defer binding decisions until more clarity of needs, use cases and solutions has been gained.

(A18.3) We would suggest focussing the discussion on how to achieve the societal change needed in the context of climate change, road congestion and air quality.

Q19: Do you agree with the proposed list of outcome-based security requirements?

(A19.1) We believe a more generic approach with regards to connected devices is needed and that this should take into account what is already available today.

(A19.2) In the absence of an agreed reference architecture which clearly shows the merits, scalability and global commercial traction this will disadvantage industry and consumers in the UK.

Q20: Please give reasons for your answer, including any other requirements you think are necessary.

(A20.1) Our view would be for the legislature not to introduce an unnecessary patch work of standards and regulations that cannot keep up with global technology advancement. There is no evidence that the proposed regulations will yield any benefits for the UK and drives uptake of EVs and economic growth. We would be keen to see some clarity and rationale be established with regards to a scalable, long-term strategy.

Q21: Do you agree with the proposal that chargepoints should undergo mandated security testing and assurance before they are installed or sold?

(A21.1) We would suggest that there are use cases which would warrant security testing and assurance in a more targeted way compared to the blanket approach proposed in this consultation.

(A21.2) User input into charging must also be evaluated and secured.

Q22: Please give reasons for your answer.

(A22.1) We will see a wide range of charging infra-structure solutions which can deliver large numbers of electrified miles. It is not clear yet where the legislator should mandate regulation that would be helpful to scale the market.

Q23: [For chargepoint companies only] Which of these outcome-based security requirements do you already comply with? Please explain how you meet them.

(A23.1) Please be aware that this is a global proposition and that a “chargepoint company” could be operating in UK markets from outside the UK.

Q24: Do you think any other data privacy requirements are needed either from these regulations or from other methods?

(A24.1) Data privacy requirements should be considered in the wider whole system context. In this context it may be beneficial that certain data is being shared for the greater good. However, there is a need to clarify how this would be accomplished and how commercial sensitive aspects and privacy aspects would be accommodated.

Q25: Do you agree with the proposed requirement that the chargepoint is capable of retaining smart functionality if the chargepoint operator is changed without the need for a visit to the premises?

(A25.1) We would suggest that there is a misconception that a managed backend service is required in order to deliver smart functionality. As previously stated, a charge point can be smart without being part of a managed charging network.

(A25.2) If the consumer/customer so wishes a smart charger can be part of a managed network in order to deliver other bundled services for example a single tariff to use home charging, public charging and workplace charging within the commercial sphere of that chargepoint operator. There is no rational to infer a chargepoint switching service as it is implemented with licensed energy suppliers.

Q26: If not then please give reasons for your answer.

(A26.1) It would be commercially unviable to provide cloud service pass through among participating charging point operators which would be required if functionality of that manufacturer’s EVSE has functional platform dependencies. Consideration should be given as to what large scale chargepoint deployment would look like from a global business perspective and what features or service offers the consumer might find attractive and would pay for.

Q27: Do you agree that compliance with interoperability requirements of a BSI standard, combined with a certification and assurance regime, could help ensure interoperability?

(A27.1) While we think interoperability is critical to the commercial success and scalability of the market, for the same reason it is unlikely that it will need legislating. There is no money to be made if interoperability is lacking. However, there are benefits to drive standardisation, certification and assurance regime on a use case basis led by industry. We do not recommend the legislator engaging in this activity at this early stage of the EV market development.

Q28: If not then please give reasons for your answer.

(A28.1) We would very much caution that the proposed approach of mandated standards at such an early stage is likely to be detrimental to the UK market and economy and that the UK need to focus effort to drive consensus in global markets. That is not something that will be achieved by the beginning of 2020 and likely to be superseded by the pace of innovation in this space.

Q29: Do you agree that the regulations should include a requirement for a randomised delay function?

(A29.1) We do not agree with a randomised response delay that is either hosted in the ChargePoint or in the Smart Meter to achieve a controllable ramp up or ramp download curve.

(A29.2) This also doesn't consider the varying flex capability of the EVs, the EVSE supply point and any other devices able to flex load.

(A29.3) A more controlled ramp up or ramp down approach should be pursued with a more predictable outcome taking into consideration that there is no obligation on the consumer to opt in for smart charging functionality.

Q30: Do you agree that a randomised delay function for smart EV chargepoints should have a maximum delay of 10 minutes?

(A30.1) No, this is an arbitrary value that may or may not be enough pending on what charging assets and vehicles are connected.

(A30.2) We would suggest that everyone should equally participate in the benefit of pricing signals and that to that effect power should be modulated to receive the desired or permissible ramp up / ramp down profile. The bottom line is that the control approach should maximise flexibility values for all parties i.e. consumers, grid operators, renewable generation and investors growing the uptake of renewables.

Q31: Please give reasons for your answer, including evidence for any impacts on benefits to consumers and any suggested exemptions.

(A31.1) In the context of large number of assets, with a control granularity of 10 minutes this could defer ramping up or ramping down of large quantities of energy, unpredictable due to the random nature and lack of visibility of the asset's capabilities. This introduces a level of uncertainty that could destabilise the grid supply. This needs to be considered in the context of whole system benefits and value attached to the asset landscape.

Q32: What other methods could achieve the same outcome of ensuring electricity system stability in response to numerous chargepoints turning on or off at the same time?

(A32.1) In principle each device that has ramp up or ramp down capability could take direct influence on stabilising the grid by monitoring frequency and voltage drift and modulate power accordingly.

(A32.2) The distribution network should not become a bottle neck due to lack of investment and should thrive to deliver whole system flexibility rather than constraining it.

(A32.3) In the managed services provision, the ramping up of load can be optimised in the same way as the ramping down. We would suggest that the asset base recruited to provide flexibility services can be controlled accurately to harvest the maximum value from the provisioning of such services.

Q33: Do you agree that the regulations should include a requirement for a minimum charging current (or power)?

(A33.1) It is suggested that standards would define minimum charging current and that EV charging should not be controlled in a repeated on/off manner.

(A33.2) EV charging should be controlled by ramping up or ramping down the charging or pause the charging according to agreed communication protocols between the vehicle and the EVSE.

Q34: If so, please provide suggestions for an appropriate minimum amount of current or power.

(A34.1) It is suggested that default minimum charging is the same as mode 2 charging using a 3-pin domestic socket to deter consumers opting for non-smart charging solutions. However, in doing so the ramp up / ramp down flexibility is very much diminished for domestic low power charging.

(A34.2) We would draw attention to the fact that actual travel demand will constrain the available flexibility that can be derived from EV batteries that tend to retrain high levels of SoC daily. This is due to the battery charging profile. Wireless charging technologies would decouple the vehicle from needing to be plugged in by the user and hence increase the charging connectivity wherever it may be available and further enforce this premise.

Q35: How else do you think this issue could be addressed?

(A35.1) It is not an issue. However, it is an extremely bad way to continuously control power flow in terms of switching power off or switching power on as the repeated nature of the control action could be interpreted by the connected device as a faulty, unsafe or unreliable power supply which could then drive the undesired outcome to discontinue charging from this power source by the device.

(A35.2) We would urge to take a more comprehensive technology assessment into consideration to deliver much more elegant and optimised charging solution that scales nationally and internationally in a wide range of transport and energy scenarios.

Q36: Do you agree that the regulations should include a requirement for a default off-peak charging mode?

(A36.1) No, this may interfere with the charging scheduler in the vehicle that will also take into consideration the travel demand of the vehicle.

(A36.2) It may not be beneficial to defer the EV charging to off-peak grid periods if plenty of onsite generation is available. In the context of onsite PV, this resource has maximum availability outside conventional off-peak grid periods. This illustrates that there is a high risk of legislation mandating sub-optimal solution not considering all the actors relevant to smart EV charging.

Q37: Alternatively, would it be better for the regulations to require reduced peak charging by default?

(A37.1) This is unlikely to be beneficial to anyone. We would point out that the daily travel demand is mostly less than 25 miles and will incur only low power charging for less than 2 hours using a single charging location or considerably less using multiple charging locations.

(A37.2) Off peak charging may not align well with the availability of renewable generation and that smart charging should facilitate further growth and utilisation of renewable generation sources such as wind and solar.

Q38: Please give reasons for your answers, including your consideration relating to a combination of the two options.

(A38.1) We would suggest that this is a fruitless area for legislation. There are no beneficial ToU tariffs that create the desired benefits in terms of the total household consumption profile i.e. unless enough demand can be shifted into the off-peak period ToU tariffs are more expensive overall.

(A38.2) The daily EV charging demand for most charging events will be less than 6kWh which may be shared across several charging locations. This leads back to points previously made that smart charging should not be treated in a siloed manner and needs to be enabled from a whole system perspective including onsite generation and storage, renewables and energy efficiency measures.

(A38.3) There is also the issue of charging point utilisation. Constraining the charging point increases the dwell time of the vehicle and reduces the utilisation of the EVSE. In the use case where the EVSE is a shared resource; this can be very unfavourable.

Q39: What time should be the specified off-peak period?

(A39.1) We would suggest that the term “off-peak period” is not static and is strongly influenced by the variability of renewable generation locally and nationally as well as electricity supply available through the interconnects with other countries. This would suggest that it would be beneficial to achieve a very high connectivity of the vehicle parc in terms of EV charging which would point to wireless charging solutions instead of plug-in conductive charging solutions and that in this context the embedded energy storage capacity in the vehicle parc should maximise utilisation of renewable generation.

(A39.2) EV charging should not be treated in a siloed manner and needs to be enabled from a whole system perspective. Inevitably energy network investment is necessary not to constraint the phase out of energy generation from fossil fuel as well as supporting electrification of heat and transport.

Q40: Do you agree that chargepoints under these Regulations should be required to be safe, with due regard to the existing safety framework?

(A40.1) All charge points including “smart charging solutions” should be inherent safe and compliant to current standards and legislation. However, there are additional aspects that may arise from remote control capabilities and it should be assessed where this is covered or whether there is an emerging gap. Perhaps the question should be, are EV charging platforms and their associate services safe?

Q41: Please give reasons for your answer.

(A41.1) It is likely that there are gaps from a whole system perspective as standards tend to emerge in a very specific siloed way. This would suggest that standardisation needs to step up with the arising new market opportunities before any consideration is given to legislate in these areas.

(A41.2) There is a risk that the goal post is moved at the same time in multiple industry sector and that poses a lot of challenges. It comes back to the previous point that this needs to be considered from a whole system perspective to see how all the moving parts and changes are taking effect.

Q42: Do you think any other safety requirements should be included in these Regulations?

(A42.1) Firstly, there needs to be clarity as to what smart chargers are meant to achieve in the context of all market actors.

(A42.2) With regards to what is currently proposed in this consultation there seem to be very little scope for regulations with enforcement needs.

Q43: Please give reasons for your answer.

(A43.1) Much more clarity is required from a whole system perspective with regards to EV charging technologies, EV charging demand, digital integration in terms of vehicles, infra-structure, energy system and consumer actions.

(A43.2) There is not enough evidence for an informed decision-making process.

Q44: Are you aware of any important safety factors that are not being sufficiently considered in relation to EV charging?

(A44.1) We would suggest that broader considerations should be given to the scalability of charging solutions and risks associated with that from a holistic digitally integrated systems approach. This may also include assessment of environmental risk factors that may occur due to mass products and services being subject to mandated regulations. For example, such an environmental impact could be if the shortened longevity of batteries due to inappropriate control mechanism mandated as part of smart charging regulations that subsequently would significantly increase the need of raw materials and the volume of industrial battery disposal. These types of issues may not be immediate apparent if there is no joint up thinking between all the market actors.

Q45: Do you agree that any smart charging regulations should provide adequate space for V2G solutions and other advanced smart charging, such as flexibility and balancing services, to develop?

(A45.1) Yes, on these grounds we would recommend not to prematurely start legislating smart charging. With regards to paragraph 2.43 V2G has been around for some time in Japan using CHAdeMO and hence it would be inaccurate to describe V2X business models as immature in the global market context.

(A45.2) A vehicle battery that can double up for transport and domestic storage will be more beneficial and commercially viable than used in segmented single use applications. For example, PV + EV are complementary to each other. However, if external factors would constrain the power flow

between the vehicle and the EVSE that would very much undermine V2X products and services to market.

Q46: Do you believe that smart charging regulations should include specific requirements for V2G solutions and other advanced smart charging, such as flexibility and balancing services, to develop?

(A46.1) As previously mentioned, we suggested that any legislation in the smart charging context is being deferred at least post 2025. There is no urgency to drive legislation of this kind while 99.9% of the vehicle parc are fossil fuel.

(A46.2) We would suggest that longer term lined up policy making is needed around electrification of transport and heat, the phasing out electricity generation from fossil fuel and a more distributed energy system with substantially more actors i.e. smart grid.

(A46.3) We would suggest that bi-directional charging solutions are much more capable of delivering commercially viable smart charging solutions.

Q47: Please provide reasoning for your answer, including reference to any consultation proposals that could potentially conflict with V2G or other smart charging services and suggest any specific requirements.

(A47.1) We would suggest that a major omission is not considering bi-directional power flow and the value it carries for the consumer and the market. Similarly, the value of onsite generation and energy storage has been omitted. Many of the use cases are interlinked and mandating regulations for a singular use case may risk undermining the value creation of use cases with interdependencies such as V2X.

Q48: Do you agree that these regulations should include a requirement to monitor and record electricity consumed and/or exported, and that this information should be available for the consumer to view?

(A48.1) It is unlikely that additional legislation is needed here. If this is a billable service then by default it must be metered and shared with the consumer for payment processing.

Q49: Please give reasons for your answer and specify what format should be required for the consumer to view the information.

(A49.1) It is unlikely that this is of interest to the consumer other than payment purposes.

Q50: Do you agree that the Office for Product Safety and Standards should be the enforcement authority for the regulations?

(A50.1) We would suggest that there is no need for enforceable regulation until there is a substantial electric vehicle parc present in the UK. This is likely to be post 2025 at which point the need of legislation could be revisited. It is therefore premature to name any enforcement organisation at this point.

Q51: Please give reasons for your answer.

(A51.1) We would suggest that at this point in time there is no rational for enforcement of smart charging. Consumer can charge the vehicle safely with the products and services currently available in the market. Vehicles have been sold with mode 2 chargers for many years allowing vehicles to be charged from a domestic 3 pin socket.

(A51.2) Smart charging functionality, if desired is provided by the vehicle charge controls such as charging schedulers, charge power settings and other smart app features sold with the vehicle. This is the base line and common denominator in the marketplace. This type of charging solution can provide more than twice of the average vehicle miles driven in the UK per year. Mode 3 EVSE are largely installed for convenience further increasing the provision of EV charging and the amount of vehicle miles that can be electrified as part of infra-structure provision.

(A51.3) This is not to say it wouldn't be worthwhile to investigate opportunities and the cost benefits of smart controls embedded in the charging infra-structure and provide clarify of the additional value that can be created from a whole system value pool perspective. This perhaps could set expectations with regards to the features and business models smart charging should deliver in relation to the size of an electrified vehicle parc and type of charging infrastructure deployed.

(A51.4) We do support the product and services development towards smart charging as we feel there is commercial value consumers are willing to pay for. This however does not require enforcement of technical specifications now and government should focus on accelerating innovation of products and services that scale and address global markets.

Q52: Do you agree that the penalty for non-compliance should be a fine for each non-compliant charge point sold or installed?

(A52.1) No, you can charge your car safely from a 3-pin domestic socket using a mode 2 charger. As long as this option is being sold as the base charging products the proposed penalty does not make sense.

(A52.2) The narrative to impose fines on charger functionality that the consumer is not obliged to use and is not needed to charge an electric vehicle safely doesn't send the kind of message that would gain consumer trust and cooperation to buy electric vehicles. We would suggest that this is unhelpful at this time.

Q53: Please give reasons for your answer.

(A53.1) We would firmly suggest that there needs to be a body of evidence that clearly underpins the need to introduce the proposed legislation.

Q54: How long should sellers or installers have to comply with the requirements once the final version has been published?

(A54.1) As previously suggested, there are issues in terms of consumer optionality as well as the time it will take before a commercially viable market has been established.

(A54.2) We recommend there should be no restriction to sell any type of charging infrastructure as long it is safe to use and compliant with existing safety standards and regulations.

Q55: Please give reasons for your answer.

(A55.1) None of the proposed is needed in the current nascent electric vehicle market and by the time it might become relevant we are confident that the technical solutions delivering real value to market will have superseded any legislation that is currently being considered.

(A55.2) We suggest parking this consultation for now and revisit this post 2025. We would also recommend that this should be aligned with the government's intention to lead the market with connected autonomous vehicles (CAV).

Q56: [For chargepoint companies only] What would the impact be on your business

(A56.1) Increase further losses incurred due to the extremely slow uptake of electric vehicles and create further barriers by limiting the addressable market for innovative smart charging solutions with global reach. We do not see how this proposal enhances commercial viability and creates economic benefit at this point in time.

Q57: [For chargepoint companies only] Subject to passing the testing schemes for security and interoperability, are any of your chargepoints likely to comply with these requirements either currently or with minor modifications?

(A57.1) We would suggest that there needs to be clarity as to why a consumer would pay for this given the previously described base line of mode 2 EVSE supplied with the vehicle. The technology is available today but is unlikely to be market competitive if the EV can be plugged into any dedicated 3 pin socket at a fraction of the price more than able to deliver the average annual vehicle mileage in relation to the vehicle dwell time.

Q58: Are there any suggested requirements that you think could disadvantage people with particular protected characteristics, as defined by the Equality Act 2010, or could otherwise cause equality issues? Please explain any issues and any potential solutions.

(A58.1) No, although some people may find it difficult to use plug-in charging equipment. Wireless charging would be a much more generic charging solution.

(A58.2) We feel it unjustified to increase the cost to the consumer incurred by the proposed solution and the infringement of consumer's choice what products and services to choose and pay for to safely charge their vehicles.

Q59: Do you think we should have specific energy efficiency requirements for chargepoints?

(A59.1) We would suggest assessing the energy efficiencies of products and services prior to introducing energy efficiency requirements. It is likely that due to the scale of charging infrastructure the energy demand of the infrastructure itself is significant if smart functionality is embedded in the infra-structure itself.

(A59.2) Different types of infrastructure provision may have different user requirements to accommodate and there may not be a simple one fits all rule.

(A59.3) Energy efficient products should be highlighted for informed customer choice. We would however point out that from an energy efficiency perspective duplication of smart controls should be avoided.

Q60: Please give reasons for your answer, including suggestions for any specific requirements.

(A60.1) We suggest deferring any actions until we see progress in phasing out fossil fuel cars and evidence has been obtained that would support a more informed proposal for EV smart charging.

(A60.2) We would also suggest seeking clarity as to which charging technologies are best suited to scale nationally and internationally to deliver vehicle miles cost effective and environmentally sustainable. In the UK alone, there are over 324 billion vehicle miles a year to be electrified.

Q61: How will different parties be affected by the proposed measures outlined in the first two chapters of this consultation? For your answer, please consider consumers, charge point manufacturers, DNOs, energy suppliers, charge point operators, government (local/national) and any other relevant party. Please provide evidence and analysis to support your answer where appropriate.

(A61.1) Consumers:

The consumer is still at a very early stage in terms of awareness and what the transition to electric vehicles means to them. We would suggest that the trust level towards key stakeholders to facilitate this transition is low within automotive, energy and UK government. Influencing factors are Diesel Gate, lack of reliable information and insights, reluctance towards smart meter roll out, the lack of long-term policies and incentives and failures to deliver air quality and climate change obligations.

This proposal may further alienate the already sceptical consumer and reinforce a “wait and see” attitude toward the purchase of electric vehicles.

Considering that the consumer is not obliged to accept the smart charging proposal the added complexity is likely to drive the consumer towards use of 3 pin sockets mode 2 charging as the default.

If the consumer is reverting to mode 2 charging to avoid costly honours legislation, then this could seriously undermine the business case for charge point manufacturers and a digital integrated service provision.

(A61.2) Charge Point Manufacturers:

If the consumer does not see value in the smart metering rollout this could be a major barrier for creating EVSE sales compliant with this proposal and could massively constraint the sales of alternative smart EVSE products. This could become a major barrier to achieving sales for higher value products that are digitally bundled with other infra-structure products and services. We would suggest that the proposal is unfavourable for the charge point manufacturers at this point in time.

(A61.3) DNOs:

This will have limited impact on the DNO due to the low energy / power demand created by the fairly small daily travel demand. There is a lot of uncertainty around what the charging behaviour

will be pending on type of infrastructure and business models deployed to market and the pace of innovation for connected autonomous vehicles. Investment will be needed with regards to instrumentation of distribution network assets. There is an inherent control barrier with regards to the “smart charging infrastructure” being unaware of the charging status of the connected vehicle parc, travel demand and potential changing energy use behind the meter caused by V2X products and services. We would suggest that DNOs would not be disadvantaged if this legislation is deferred to be re-evaluated post 2025. This may also provide some time to upgrade grid assets to be more digitally integrated that could be leveraged as part of a smart charging solution.

(A61.4) Energy Suppliers:

This may complicate matters as use of electricity may be regulated differently by type of device. This could open a Pandora’s box in terms of the management and implementation of future regulations. We would suggest that this should be avoided. There is a risk that pricing models and revenue streams could be negatively affected. We would suggest that from an Energy Supplier point of view the proposed legislation should be deferred to be re-evaluated post 2025 at which point hopefully a more informed decision can be reached.

(A61.5) Chargepoint Operators:

Chargepoint operators, who are likely to have an infra-structure portfolio business nationally and internationally could be constraint in delivering a seamless consumer experience the consumer is willing to pay for. We see arising conflict between highly regulated utilitarian charging provision in relation to a highly competitive, innovative and cross sector bundled offerings. We would suggest that Chargepoint Operators are likely to be negatively impacted. We would also draw attention that the term Chargepoint Operator (CPO) may have a different meaning in terms of operators who manage a large charging-infrastructure portfolio across sectors nationally and internationally; and the term CPO in the inferred lead solution where charging points are controlled via the smart metering infrastructure.

(A61.6) Government

We feel that the proposal is unhelpful to accelerate the uptake of electric vehicles and as such undermines national and local government policies. We would suggest that the proposed timeline for this proposal is not suited and that delivery of policy outcome and societal benefits may be negatively impacted. There also needs to be a more aligned approach with CAVs and MaaS.

(A61.7) Other relevant parties

This proposal does further enforce the industry segmentation rather than promoting cross sector collaboration needed to grow quickly in global markets. It will also constraint innovation and research as in fact the government has mandated what the solution looks like. In this context the automotive sector, digital sector, R&D and many other market participants are likely to be negatively impacted. We would suggest that there is little to gain by enforcing the proposed regulation on to a very immature market while there is much to lose in terms of pace of innovation and unlocking global markets for a broad range of new products and services for most market participants.

Q62: Do you agree that, in order to implement a long-term approach to smart charging by 2025, Government should make a decision between 2020 and 2022? Noting the example stages in the chart set out in paragraph 3.6.

(A62.1) No, the EV market in the UK is literally non-existing with barely 70000 pure electric vehicles on the road in July 2019. This proposal has not presented any evidence that would justify picking a lead proposition for smart charging at this point in time.

(A62.2) Smart metering could be playing a supporting role, but for a start there is no obligation for consumers to install a smart meter and many SMETS 1 smart meters have already been rolled out that would not be able to support the envisaged functionality. It needs some more in-depth thinking how the smart metering investment could be leveraged to deliver the envisaged outcome benefiting many market participants.

(A62.3) Without a policy step change in the phase out of fossil fuel vehicles, there is no real driver for this proposal.

(A62.4) Until considerable progress has been made with phasing out fossil fuel vehicles, we do not know which charging solutions will provide the bulk of vehicle miles in the UK or globally and hence could misdirect substantial investment leading to stranded assets and substantial cost to the consumer not delivering the desired benefits.

(A62.5) We noticed that this consultation does not take account of the anticipated travel demand which is a primary influencing factor for choosing infrastructure solutions for energy and transport.

Q63: What is your preferred year for a decision?

(A63.1) This should be linked to the uptake of EVs, and given the progress made so far, this is unlikely to be of any relevance before 2030. We would suggest that within this timeframe there will be significant technological advancements that will change the narrative of this consultation. Nevertheless, regular monitoring as to how the market develops is recommended.

(A63.2) We would suggest deferring any decision making to 2025 where the situation should be reassessed.

Q64: Please provide reasons for your answer, including evidence (where relevant) of the impact that an earlier or later decision could have.

(A64.1) From an EV charging point of view, low power domestic or workplace charging could provide the bulk of vehicle miles in the UK supported with existing standards. This is based on the premise that many cars have long dwell times at these locations. Hence even as the EV parc increases there is no real pressure on early decision making in this consultation context.

(A64.2) The average daily car travel demand is in the order of 25 miles which may be shared across a number of charging infrastructure assets. In the nascent EV market with 99.9% of vehicles on UK roads being fossil fuel powered, there is insufficient evidence for informed decision making in the context of this consultation. The proposed timeline of this consultation is unrealistic and should be deferred for at least 5 years.

(A64.3) Mode 2 low power charging (as low as 6A) for cars will increase the EV range by 5 to 6 miles per hour. With an 8-hour dwell time at home and an 8-hour dwell time at work, this would provide a daily vehicle range of approximately 100 miles per day. The average daily journey demand in the UK is around 25 miles. Even the intermittent longer miles journeys will be averaged out by the vehicle

battery capacity if we assume that EVs will converge on an average range of 250 miles at 100% battery state of charge (SoC). Hence there is no urgency in regulating charging provision in the context of this consultation and the market should have time to develop the charging infra-structure portfolio as technologies advance and commercially viable business models emerge. This would provide evidence for a more informed decision-making process and de-risk undermining innovation and the development of viable business models by a wide range of market participants.

(A64.4) We believe that this sets the rational as to why the consultation proposal is poorly timed from a market assessment point of view. There is no emergency in the energy system or immediate benefits to the UK as a nation to prematurely pick and regulate a smart charging solution that has no market or consumer need and would discriminate against many market participants being able to generate economic growth from new business opportunities.

(A64.5) There is significant uncertainty around the future choices of types of infra-structure deployment, scalable technology solutions, and business models that will ultimately deliver over 324 billion vehicle miles driven on UK roads every year in the most optimised and beneficial way. We need to ensure that the UK capture the full benefits of the innovation and R&D investment to reach a competitive global lead position.

Q65: Do you agree that the factors listed in paragraph 3.5 are the key criteria to consider in determining a decision point?

(A65.1) No, although they are highly relevant (Grid Protection, Consumer Protection, Consumer Uptake, Innovation)

(A65.2) As previously stated, preparing the market for the transition to electric vehicles is critical to maximise the economic opportunity for as many market participants across sectors. This still needs to be very much addressed.

(A65.3) There needs to be an evidence base to describe the needs and benefits and whether these need to be enabled by legislation or are better left to the market. As we outlined in answer to Q64, the national need and case for regulations does not have clear supporting evidence at this point in time.

(A65.4) The need for Grid Protection specific to EVs lacks substance ignoring the actual travel demand and the uncertainties as to how vehicles will be charged in the future. It is unlikely that the EV parc prior to 2025 or even 2030 poses a threat that would warrant legislative intervention based on this aspect of the energy system. However, in the smart grid and connected devices context in general, certainly there is opportunity to develop and commercialise features that would deliver grid protection.

(A65.5) Consumer protection is important but more so to engage the consumer and inform the consumer how to accomplish the transition from fossil fuel vehicles to electric ones, what are the choices and what is in it for them. The consumer protection aspect falls somewhat short in this consultation as it is geared to a very specific solution that may never be used in such a way with reference to CPO switching.

(A65.6) We would suggest learning lessons from the current difficulties with the roll out of smart metering before adding any further burden in this area. In the context of consumer choice,

consumer trust and many alternative solutions that may be more appealing to the consumer and more suited to deliver the desired benefits with clearly understood value for money.

(A65.7) Innovation is a key element at the time of change equal to the industrial revolution. But we would strongly recommend taking a more cross-sectorial view and enable the market to scale and generate societal and environmental benefits as well as economic growth and prosperity. This needs to be done in a credible and transparent way.

Q66: Please provide reasons for your answer, including a consideration of additional key criteria we should consider in determining the timing of the decision point.

(A66.1) As outlined in answer Q64 and Q65 there is no tangible need driving the suggested timing of the decision point.

(A66.2) We would suggest encouraging innovation and productization of added value products and services in the EV energy flexibility context by means of incentives that can be easily adjusted as the market develops. We would comment that legislation is too inflexible and too slow to keep up with the pace of innovation and new products and services at the level of intervention suggested in this consultation.

(A66.3) We think there needs to be stronger assessment criteria around creating growth opportunities for the market as a whole, scalability and global reach, value for money, viable path of transition from fossil fuel to electricity, driving global consensus, consumer engagement and acceptance and timely implementation of government policies in terms of uptake of electric vehicles, air quality improvements and achieving climate change obligations.

(A66.4) There should be clarity about whole system benefits that can be unlocked scaling up electricity from renewables, as well as the transport sector with reference to Connected Autonomous Vehicles (CAV) and a more connected multi modal approach.

Q67: Do you agree that smart metering system offers a viable solution for the smart charging of EVs, with appropriate system changes in terms of access and functionality?

(A67.1) We would certainly support that smart metering should be assessed in-depth with regards to the added benefit that can be derived from this investment. At this point in time based on the reason already given in particular with reference to the difficulties of the current roll out of smart metering, the very slow uptake of electric vehicles, duplication of capabilities and smart control features across industry sectors and the lack of a joint up approach in the deployment of the charging infrastructure portfolio and technology choices nationally and globally – it would be premature to conclude that smart metering would solely deliver the best possible outcome for the UK in this context.

(A67.2) The proposal is overly simplistic, restrictive and not inclusive to the market participants as a whole and does not leverage the breath of technical solutions available today and even more so UK's capabilities to drive innovation.

Q68: Please provide the reasons why you agree or disagree.

(A68.1) As stated previously, this consultation omits that there is no essential need in the first place and as such there is no justification to proceed with this proposal now. The proposal does not

leverage UK R&D and industry capabilities to the full thereby limiting economic growth across all sectors. Certainly, smart metering potential should be assessed in-depth, but we also feel that this should be done in a more generic device neutral way.

(A68.2) We would suggest that the proposal needs to consider that EVs is a global trend, with a global supply chain and scalable solutions need to satisfy this context.

Q69: In relation to smart charging, how would the smart meter system need to be improved in order to meet reasonable customer expectations of the use of their vehicle? What would be required to do this?

(A69.1) Smart metering would need to be accepted by customers close to 100% and the infrastructure provision would need to reflect this. The SMET 1 metering assets may need to be replaced or upgraded.

(A69.2) A generic monitoring and control functionality would need to be provisioned that works with all connected devices – not specific to EVs. Suitable requirements would need to be developed for this, agreed as part of standardisation and subsequently implemented in the supply chain. However, there is a risk of overlap with other solutions that have a better route to market and scale globally.

(A69.3) There is an argument to be made that metering should just be metering and that the digital integration of connected devices can be achieved in many other ways that would scale globally. In this context it is important from a whole system perspective to understand where smart metering is best leveraged providing investment returns as part of solutions maximising economic growth and technology advancement for the UK.

Q70: What would you think would be the implication of the UK not following developing international standards in this area and requiring the GB based smart meter rollout for the control and operation of smart EV chargers?

(A70.1) It will not help the UK to be recognised and enabled to be a lead player in global markets. Consequently, this is likely to inhibit economic growth and drive up cost for the consumers.

(A70.2) We would urge to consider smart grid solutions and connected devices as a whole and not silo this to be an EV smart charging solution.

Q71: Do you think that an alternative approach, as outlined above, could deliver the Government's objectives on smart charging by 2025, with similar outcomes to the smart meter system on cyber security and interoperability?

(A71.1) We would emphasise that it is early days, and we do not know yet what charging infrastructure solutions will carry what proportion of the travel demand. For instance, if EV charging would be embedded strategically into the road network, wireless charging in combination with battery swap and pantograph for heavy duty vehicles the context of this consultation would have very little substance.

(A71.2) In the smart home context, there are many possibilities how smart charging could be digitally integrated, smart metering would be a component to consider.

(A71.3) We would advise against rushing into this, we feel the proposed time scale is misguided and for the reason previously outlined any decision now would lack evidence and unlikely to deliver desirable outcome.

Q72: Are there other alternative approaches that could deliver the Government's objectives on smart charging by 2025, with similar outcomes to the smart meter system on cyber security and interoperability?

(A72.1) Simply to illustrate alternative solution not casting any judgement:

- (1) One could implement smart charging today by downloading energy tariff data to the vehicle charge controller / infotainment system.
- (2) Similarly, onsite generation data, grid export and import data could be provided to the vehicle. There is no need for any device integration, this is purely data sharing / integration.
- (3) The vehicle charge controller would then optimise the charging based on minimising grid import while satisfying the travel demand and battery utilisation.
- (4) In many cases the vehicle could be connected using WiFi at the destination charge location or in combination with the smart phone.
- (5) As previously highlighted from a cross-sectorial view there are other ways to achieve the desired outcome without any dependencies on smart metering that would work at a global scale. Having said this one should always consider extracting more benefits from the smart metering investment.
- (6) The suggested solution would be largely agnostic to a particular type of charging infrastructure and hence could optimise across the whole portfolio of service provisions.
- (7) This would be a generic approach that could be adopted more widely in the transport sector.

Q73: Please provide reasons for your answer, including what technologies and approaches to regulation could be used and information and evidence on how any alternative options would deliver similar outcomes to the smart meter system on cyber security and interoperability. Please say how much time you think developing the approach would take and what costs may be incurred.

(A73.1) As outlined in (A72) there are different conceptual approaches that would draw on existing technologies and would operate in a distributed, resilient and highly automated fashion. We would suggest that the barriers are primarily disconnected policy making and not having the marketplace prepared to launch these solutions to market.

(A73.2) We would suggest that with the right mind set and cross-sector collaboration, exciting, convenient, value for money offerings could easily make their way into market for the consumer to choose and enjoy.

(A73.3) This approach would be much more aligned with the Connected Autonomous Vehicle narrative and the service integration that can be achieved cross sector provided by wide range of market participants.

(A73.4) We would iterate our view that in order to deliver economic growth and a viable path of transition to the market, the market as a whole with as many market participants possible needs to be engaged – this of course includes smart metering.

(A73.5) In this context, pace of innovation and desirable products and services to market the customer would be willing to pay for would be much more viable and progressive at times of high level of continuous change.

Q74: What are your views on smart charging via the vehicle rather than chargepoint? How do you think government should approach regulating this area?

(A74.1) As previously outlined, we would suggest taking time and step back to take stock as to what is already available in the market and how digital integrated service offerings can be created in a cost effective and elegant way that scales globally and is applicable to billions of consumers willing to pay for it because they have choice to satisfy their ambitions, desires and needs as they want to.

(A74.2) In this context the proposal of this consultation is very much limited by constraint management embedded in the infrastructure (a very narrow view of the world) rather than the opportunities that can be derived from the charge control already embedded in the vehicle and the emerging technology roadmap as we move towards connected and autonomous vehicles

(A74.3) We believe one of the barriers is the difference between a highly regulated energy market and a much more free flowing added product and services market. EVs and CAVs have legs in both types of markets. It will take some thought to reconcile this paradox to achieve best outcome.

Q75: Do you agree that requiring the use of smart meters for smart charging should be the lead option for Phase Two?

(A75.1) No, as previously outlined, smart metering is about metering and is not well positioned to provide smart living control functionality in a generic, mobile and location independent context that scales nationally and globally. In this context it is unlikely to qualify as a lead option. However, this doesn't mean that smart metering can't be leveraged on a component level where it is available. It is important to think on a global level while taking advantage of local opportunities.

(A75.2) Smart metering has a role to play within the overall system at a component level where it is available as an option and **not** as a mandated must have.

(A75.3) Considering all the possibilities and opportunities already available today without smart metering we would suggest focusing the stakeholders' efforts on a more generic digital integration agenda in the national and global context.

Q76: Please provide the reasons why you agree or disagree.

(A76.1) As previously stated, smart metering is at the component level of a smart system, primarily for metering and that other mechanism and control components are better placed to develop

products and services that deliver optimised control for EVs and many other connected devices on a global scale.

Q77: What do you consider the benefits of introducing regulations under this section could be?

(A77.1) We would recommend caution with regards to introducing legislation and propose that initially guidelines should be developed that describe the rational in the context of use cases who owns that data, who needs the data and what is the overriding societal benefit to share the data.

(A77.2) It should be considered how to incentivise sharing of data in a secure and safe way that would benefit the wider market. Legislation may be required if a particular stakeholder group becomes a barrier to unlock whole system benefits for the benefit of everyone and if a national delivery mechanism is required independent from the commercial stakeholders. For example, the concept of a data trust may be relevant here.

Q78: What do you consider the disadvantages of introducing regulations under this section could be?

(A78.1) Data is highly valuable and often commercially sensitive. This needs to be considered when legislating for the greater benefit. Data and data services is the “new oil”.

Q79: Do you agree with the views on the minimum data to be made available? If not, what should or should not be included?

(A79.1) Considering that the large-scale uptake of EVs will introduce vast energy storage capacity to the electricity system and transport of this energy, it is worthwhile to cautiously pursue this avenue. However, it needs to be bound by real use cases that would be beneficial to everyone.

(A79.2) There are also some architectural consideration. What data should be held centrally, what can be localised and what are the centralised and decentralised processing requirements.

Q80: What criteria do you think should be used to determine when these regulations should be introduced?

(A80.1) We would suggest that this needs to be use case driven with clear benefit of outcome in the national interest.

(A80.2) The digital integration aspect is subject to a lot of innovative change and we would recommend not to rush into this.

(A80.3) As different use cases in the market mature with their associated products and services, a more informed decision can be made as to what legislation would be helpful and when it might be needed.

Q81: Please give details of any approaches to implementing these regulations that would be either helpful or unhelpful. For example, preferences for when, how and in what form the data is transferred.

(A81.1) We would suggest that the underlying principles products and services will be based upon as part of a digital integration framework would need to be established and clarified which may involve standardisation work.

(A81.2) There are many applications / use cases that could become relevant, for example, data that is collected by the vehicle could be made available to the National Transport Survey to subsequently inform investment priorities. SoC and charging power could be shared with the infra-structure for capacity planning which could be contracted as part of the consumer – CPO service offer and be managed as a data trust.

(A81.3) We would suggest this requires further investigation as to the stakeholders involved and the opportunities arising from the deployed technologies.

Q82: What data privacy considerations do you think would be relevant and how do you think they could be resolved? For example, consumer preference.

(A82.1) We would suggest that use cases need to be established first to get a handle on the data requirements in relation to products and services offered to market, the potential interactions that may occur between different use cases and the risks that may arise.

Q83: Who should have access to this data? What processes should be in place to access the data to ensure safeguarding?

(A83.1) In principle anyone could have access to this data if privacy is guaranteed. For example, collection of real-life performance of EV range could be useful to avoid issues such as Dieselpgate. Understanding the level of SoC of the vehicle parc by geographical locations could be helpful where to invest into public infra-structure in relation to network assets. Legislation could be fairly high level to the effect as to what data is put into a data trust and who has access based on use cases.

Q84: Please give details of any alternative arrangements that could be used to achieve similar benefits to those outlined above.

(A84.1) We would suggest that this would need to be assessed in the context of a data reference architecture.