

Office for Low Emission Vehicles
Department for Transport
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07 October 2019

Dear Sir/Madam,

Electric Vehicle Smart Charging – consultation response

We welcome the opportunity to respond to your consultation on Electric Vehicle Smart Charging.

As you are aware, ELEXON is the Code Manager for the Balancing and Settlement Code (BSC). We are responsible for managing and delivering the end-to-end services set out in the BSC and accompanying systems that support the BSC. This includes responsibility for the operation and delivery of balancing and imbalance settlement and the provision of assurance services to the BSC Panel and BSC Parties. We manage not just the assessment, but also the identification, specification, development, implementation and operation of changes to central systems and industry processes. This end-to-end model provides expertise in one place for both administration (especially, Change) and systems design and implementation. In addition, such expertise is then available to support industry, government and regulator in considering future changes and innovation against the existing industry rules, for the benefit of the consumer. Having this breadth of business also allows us to attract, develop and retain talent, providing opportunities for staff to develop in-depth expertise to assist the industry and the BSC Panel.

In addition, through our subsidiary, EMR Settlement Ltd, we are the Electricity Market Reform (EMR) settlement services provider, acting as settlement agent to the Low Carbon Contracts Company (LCCC), for the Contract for Difference (CfD) and Capacity Market (CM). EMR services are provided to the LCCC through a contract and on a non-for-profit basis.

We are keen to ensure that the Settlement arrangements are appropriate, promote smart charging and enable the uptake of Electric Vehicles (EVs). As you are aware, ELEXON has been testing lamppost charging infrastructure on behalf of the industry. We have also had numerous discussions with parties looking to provide EV offerings, including Demand Side Response, Vehicle to Grid and other flexibility and balancing services. We are a member of the EV Energy Taskforce under the Energy Systems Catapult (ESC) and Low Carbon Vehicle Partnership (LowCVP).

We would welcome OLEV explaining in more detail its rationale for a Phase 2 decision in 2023 date and whether this decision gate is tied to particular outcomes. That is, whilst we appreciate that there is a need to make progress, making a decision in 2023 may not give time to learn from EV demonstration projects which OLEV has suggested might not conclude until into 2021, including other related projects, e.g. smart Meter rollout and Market-wide Half-hourly Settlement (MHHS), and Future Retail Market Arrangements.

We also consider OLEV's public versus private split might be too simplistic. For example, there are private and public use cases that share common characteristics and might benefit from common solutions or related requirements/obligations. For example, users' actual use of public and private infrastructure may be broadly the same (i.e. in terms of time of use); or where an aggregator may offer the combined capability of many EVs connected to public charge-points (e.g. at a public car

park) in the same that they may provide the combined capability of EVs connected to private (Vehicle to Grid) infrastructure.

Furthermore, we believe it would be useful for a single repository of EV issues and proposals to be provided such that crossover issues can be highlighted. There have been numerous consultations from government, distribution business and ESC all looking at similar issues relating to EV charging. This may help with resource constraints in responding to multiple consultations, if responses to similar questions have already been answered elsewhere.

We have chosen to respond to a number of the questions in your consultation where we feel our comments can add further value. The views expressed in this response are those of ELEXON alone, and do not seek to represent those of the BSC Panel or BSC Parties. If you would like to discuss any aspects of our response, please do not hesitate to contact me at kevin.spencer@elexon.co.uk, or on 0207 380 4115.

Yours sincerely,

Kevin Spencer

Design Authority

Q01oQ01: Do you agree with the Government's proposed aim (to maximise the use of smart charging technologies)?

We agree with the Government's proposed aim. We believe the aim should be to maximise opportunities for consumers to participate in and support the effective and efficient operation of electricity networks and markets. We also believe that markets and therefore access to markets is an effective means of managing supply and demand, network constraints and rewarding flexibility. Consequently, we believe there are numerous 'use cases' that need to be considered when developing smart Charging regulations that maximise access to markets.

We believe proposed public versus private split might be too simplistic. For example, there are use cases that apply in both public and private scenarios, which may require equal or at least similar treatment. For example, public on street and private) off street parking and charging, where the user might have regular or specific use of on-street public facilities that is comparable with another users using off-street facilities; or aggregated private flexibility/V2G and aggregated public Flexibility/V2G.

There are also competing/ overlapping roles in the wholesale and retail market. Distribution businesses may require control for network management and flexibility aggregators may wish to provide balancing services. This may cause issues of conflicting signals. Hence, some coordination and interoperability is needed for 'smart' functionality, in order to comprehend many sources of information and prices.

Whilst we cannot comment on the cost-benefit case for V2G services, we are aware of stakeholders considering how V2G services may be offered and used. Consequently, we believe more attention should be given upfront to how smart charge point requirements enable or at least can accommodate V2G services. This is because if the functionality required to support V2G is not considered at this early point there is a risk that a growing number of 'phase 1' non-V2G charge points will need to be retrofitted or replaced, which could be costly and may inhibit the future use of EVs for V2G.

There are synergies for regulation required for residential, on-street, car park offerings, fleet charging and V2G. Alignment of common regulations for different use cases should be considered.

For residential we believe the relationship between the smart charge point and the customers boundary Meter needs careful consideration. It may be that operator back-end systems will have the 'intelligence' to control and potentially collect information from the charge point without the functionality being built into the charge point itself or piggy backing on smart Meter functionality.

We also believe that interoperability might not be achievable, where bespoke infrastructure is being provided by charge point manufacturers/operators to manager specific circumstances. This appear to be true in examples seen for lamp post charging or smart cables.

ELEXON has also been developing requirements to allow [multiple suppliers for a single premises \(BSC Modification P379\)](#). Under these arrangements charge point operators may be required to notify EV data to Settlement on behalf of the customer.

This interaction will also require careful consideration when setting regulations relating to smart charge points. ELEXON has also been looking at '[behind the meter](#)' metering requirements (BSC Modification P375) that may require new 'measurement and control devices' that are not likely to be smart Meters. The EV users and/or charge point operators may provide flexibility services, e.g. through aggregators, and so secondary metering may be necessary to demonstrate the provision of these services.

Q02: Do you agree with the proposed Grid Protection objective?

It is suggested that the Grid Protection objective is less about markets and flexibility and more about ensuring that use of EVs and Charge points doesn't cause the network to fall over or become hi-jacked.

However, we believe there are wider considerations.

The consultation refers to 'supply and demand of electricity is better balanced', which is only one element of managing networks - e.g. in addition to managing overall balance of energy, The Electricity System Operator (ESO) and Distribution System Operators (DSOs) manage frequency, voltage, reactive power. Furthermore, DSO services not so focused on energy balancing. System Operation is split into constraint management and energy balancing. Where balancing is simply making sure there is enough electricity to meet demand and constraint management accepts that the networks are imperfect and need careful coordination to ensure it doesn't break and to maintain power quality.

We also envisage a future where the needs of DSOs, the SO and other market participants (e.g. suppliers) may conflict. Again, consideration should be given to who can access the smart charging functionality and for what purpose. We note that currently only the Supplier can provide load switching directly via the smart Meter and that EVs are not listed as trusted devices that can be controlled.

Q05: Do you agree with the proposed Innovation objective?

Not in its entirety, see below for rationale.

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.

We agree with the intention of the innovation objective. ELEXON are experiencing first-hand the pace and range of change to the industry and therefore agree that it is important that regulation is designed to accommodate change. Consumers will benefit from innovations that improve their use of EVs and charge points through cost savings or opportunities to provide and be rewarded for flexibility.

It is difficult to future proof the solutions if the solution is linked to specific architecture/technologies. We believe regulations should set minimum requirements and be revisited and improved over time as more is known of potential offerings. We believe the need to specify regulations for Smart Charging (which are technology neutral) not for Smart Charge points. Outcome based regulations could allow a variety of combinations of tech and services – e.g. dumb charge point + smart cloud service or 'all-singing-dancing' charge point or smart charge point with communication with SMETS Meters.

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

In general we support the idea of a phased approach – i.e. to establish a baseline that provides early direction and certainty, which is developed over time and so takes account of developments in the sector and wider energy industry, and lessons from trials and demonstrations.

Our understanding is that your proposal to make a decision on Phase 2 in 2023 is driven by your expectations about when the mass uptake of EVs will occur. We also understand that it may be driven by the network companies' price control reviews (e.g. RII0 ED2 is due to be set in 2023), the rollout of smart meters and availability of HH tariffs.

On the one hand, we understand the need to put in place measures, sooner than later, which will help to drive the achievement of your Road to Zero targets. We also recognise that as network companies price controls are set every 5-7 years. Therefore, it is important to have established arrangements on which they can prepare business plans for investing in and supporting EV infrastructure.

On the other hand, we note that National Grid's Future Energy Scenarios rely on statistics prepared for the European Commission¹ that suggest that the most ambitious uptake of EVs put EU market share at ~2% in 2025 and 15% in 2035. The UK targets 5% in 2020. Is 5-10% market share in 2025 really 'mass uptake'?

We believe sufficient time should be allowed between phases to understand the learnings from the preceding phase, industry trials and demonstration projects (some of which are expected to conclude in 2021) and to align with related industry initiatives (e.g. the rollout of smart meters, for which the deadline has been extended to 2024).

We therefore feel the 2023 date for phase 2 may not give time to learn from EV demonstration projects, which you (OLEV) has suggested might not conclude until into 2021, including or other related projects, e.g. smart Meter rollout and Market-wide Half-hourly Settlement (MHHS), and Future Retail Market Arrangements.

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

We agree that the smart charging market is at a very early stage in terms of technology, business models, deployment and usage and that innovation should not be stifled. We also agree that it will be necessary to set requirements for charge point operators beyond the device itself, to ensure that interoperability and security objectives are delivered. Notwithstanding our previous point made in Q01, that interoperability might not be achievable where bespoke circumstantial infrastructure is being provided by charge point manufacturers/ operators. There are currently different charging protocols (CHAdeMO and CCS) used by Japanese and European car manufactures respectively. It certainly makes sense, in the immediate future, to agree on a standard for car charging hardware.

¹ Ecodesign (2018), *Preparatory Study on Smart Appliances (Lot 33) – Final report*. Available at: <https://eco-smartappliances.eu/en>

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

Yes, but we believe they should be tailored and appropriate to each 'use case'. For example, charging cable metering still need a bespoke charge point in order to function.

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

Some smart regulations may only be appropriate for certain use cases. Residential charging requirements are likely to be very different to those required 'on the go'. Different Regulations may be required for fast charging as opposed to trickle charging. Some charge points may be able to provide 'export' to the distribution network while others will not (e.g. lamppost charge points because they are unmetered, the electrical wiring may not support export and because it may make management of the distribution network less predictable).

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

No, we do not agree regulations for public charge points should be considered separately.

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

As identified in Q01 we believe proposed public versus private split might be too simplistic. That is, there are use cases that apply in both public and private scenarios. For example, such as (public) on street and (private) off street parking and charging, where users' charging routines might be similar irrespective of whether using on-street public or off-street private facilities; or aggregated private flexibility/V2G and aggregated public Flexibility/V2G. There are also competing/ overlapping roles in the wholesale and retail market. Distribution businesses may require control for network management and flexibility aggregators may wish to provide balancing services. This may cause issues of conflicting signals. Hence, some coordination and interoperability may be needed for 'smart' function to comprehend many sources of information and prices.

Public car parks might be a good source of flexibility - i.e. parked cars plugged in for extended period of time, which might require smart 'type' regulation. However, 'Fleet charging' is likely to require alternative requirements to ensure Fleet EVs can balance availability with time of charging (such that their charging time are managed differently to residential). Likewise, off-street private charging and on-street public charging might be used similarly.

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

Yes, but we believe they should be tailored and appropriate to each 'use case'.

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

We consider that the requirements 'to monitor and **record energy consumption**' may not be required at the device for public or private charging. In addition, the regulations should say both consumption and '**export**' to future enable for V2G or other flexibility services. The regulation suggests that charge point's measurement function was really intended to give the consumer visibility, i.e. not for wider access/use. We believe that charge point should provide data for the wider arrangements. For example, the charge point may not automatically push details of charging events to the operator, so presumably the device would need to record details of each event, for the operator to collect later. Alternatively, the charge point may need to store all events for maintenance/diagnostic purposes?

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

Yes, but we refer to points made in Q01 about being clear where competing/ overlapping roles in the wholesale and retail market who is responsible for signalling the charge point. Consideration should be given to clarifying what controls the load. The BEIS smart meter model appears to envisage the Auxiliary Load Controls (ALCs) and Hann Connected ALCs (HCLALCs) for load control sitting outside the charge point. If charge point must include communications, load control then describing/defining device level regulations could be incompatible with BEIS' smart meter vision.

This highlights a more general point which is what constitutes a charge point – is it a single device or a combination of (any) devices that perform defined functions. We believe it should be defining the function and not the device(s).

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

We believe that there is a balance to be struck between protecting Charge Point data and not constraining the availability of data for regulated purposes (such as Settlement) or impacting the ability to use such data for flexibility, DSO or other innovative purposes.

The current data access requirements for smart meter data could constrain the ability to access the data specified under the regulations where customers have opted-out of providing the data.

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

Yes, in principle. However, we believe some bespoke offerings may mean that charge points cease to function (and become stranded assets) where the operator and/or manufacturer cease trading.

The charge point might require a default dumb mode to ensure basic functionality is retained when operators cannot control the device or the customer chooses to operate in non-smart mode (e.g. to protect privacy).

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

Yes, such standards, certification and assurance would help with interoperability issues. We would not want a situation similar to that with SMETS1 Meters. Again though interoperability between 'which' parties needs consideration.

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

Yes, it is vital to ensure concurrent load is not being switched (for example, on half-hour boundaries). This is especially true on parts of the network that are servicing a high concentration of EVs.

However, there may be certain flexibility services where large numbers of charge points do need to be managed in precise unison, e.g. frequency response or voltage control. Devices need to be flexible, in some scenarios load control is staggered/randomised and in other cases, control can be coordinated to take effect at the same time.

In terms of charging at cheap times, one would want the charge timing directly linked to the electricity meter's register timings (which are randomised on smart meters). However, for operational network management purposes you might want the charger to respond instantly to prevent network overload.

We suggest that smart charge point infrastructure should be able to regulate load according to cater for different modes of use/response – i.e. they should cater for randomised response but should also cater for precise response in unison with other devices.

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

We do not have a view if 10 minutes is sufficient. Similar delays are currently defined for the Radio Tele-switching arrangements and for switching load via smart Meters.

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

As well as randomised offsets the [Tele-switching](#) arrangement define 'operating windows' for different 'Groups' of systems. This approach can be used to ensure that groups of systems switch at different or 'offset' times. A similar approach could be used for EVs if they could be assigned to 'Groups'.

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

We believe it will be hard to define a default 'off peak' period. The actual peak varies by distribution region and the concurrent peak is not likely to be useful for setting the default. Furthermore, other charge point operators may have their own peak and off-peak periods – e.g. wholesale market peak periods, TSO peak periods.

There is a risk that relying on pre-programmed off-peak means that as actual 'peak' moves (e.g. because EVs and other loads have been nudged away from traditional peak periods), supplier and network tariffs 'peak' rates overlap with pre-programmed off-peak.

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

We refer you to our answer to Q36. You could potentially set something by time of year. Concurrent cooking and lighting peaks occur in winter. In summer, these peaks are separated. So one size fits all requirement may not be appropriate.

Building in predetermined time of use charging rules may inhibit or contradict the work of Ofgem and industry to create new charging arrangements and tailored tariffs.

Charging rates could be price dependent. However, would the response be formulated by the charge point or another device, e.g. Smart meter?

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?

There is a risk that if charge points aren't required to have V2G then cost of retrofit may be prohibitive. It may be appropriate to define minimum V2G for certain use cases - e.g. workplaces, depots, car parks.

If space is not made for flexibility now it may inhibit innovation, lead to potential retrofit costs and undermine the customer's experience. For example, the SMETS approach to access and to In-Home-Displays (IHDs) was initially too narrow. Also, customer experience of SMETS1 versus SMETS2 smart meter has harmed perception for smart meters in general.

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?

Yes, see below

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.

We believe the export should be monitored and recorded, such that it can be accurately accounted for. The Smart Export Guarantee (SEG) is already looking to ensure the lack of visibility of export spill onto distribution networks is addressed. Visibility will also help other services develop as it aids identification of availability.

Ofgem's benefits case in Smart Systems and Flexibility Plan set out the work industry needs support to take advantage of flexibility.

Therefore, the EV regulations need to cater for specific functionality, like export measurement and more sophisticated load control, and multi user access/control (e.g. suppliers, network companies, aggregators) and possibly the ability to optimise import/export based on different price inputs.

The point about optimisation is becoming more and more of a concern in industry, i.e. in terms of balancing a wider range of targeted network, retail/wholesale and flexibility costs/revenues.

Furthermore, the solution provided under SECMP0046 (SEC Code modification - Allow DNOs to control Electric Vehicle chargers connected to Smart Meter infrastructure) could mean a charger is switched off (by the DNO) via load control switch. This would conflict with any charge rate variations etc. made at the charge point itself.

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?

Yes, we refer you to our response to Q14. However, 'recording' does not have to be a function of the charge point if held in a back-end system. It could be a smartphone app rather than a function of the charge point.

The charge point needs to respond to signal Energy flows could be monitored by meter/measuring device or maybe by the car itself. There is also a case for monitoring load (kW) as well as volumes (kWh).

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

We believe consideration should be given on how EV specific consumption and export data is separated from other consumer consumption especially if smart Meter are to be deemed a viable solution.

Visibility of imports and exports and differentiation between different types of activity will be necessary for wider electricity services, e.g. multiple suppliers, provision of flexibility services, targeted network charging etc. Therefore, the relationship and configuration of charge points and smart metering need to be better defined.

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.

We are not sure at this time when the decision on the long-term approach should be taken. EV infrastructure is still in its infancy and any lesson from early adopters will need consideration before deciding the long-term approach.

We believe that the earliest MHHS will be implemented is 2023. The smart roll out is not due to complete until 2024. In general, the 2020-23 decision feels ambitious taking into account there are many other interrelated initiatives and dependencies. Consideration needs to be given to how EV approach fit into and rely on those other industry-wide initiatives and changes.

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?

Partially, we refer you to our answers to Q01, Q48 and Q49.

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

Changes to access, control and how data is recorded would need to be made to make smart metering a viable solution and then only some use cases. Such changes are significant and would require upgrades to both metering and network infrastructure.

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?

See response to Q68. We do not have a view on customer's expectations but are focussing on interoperability, access to data for regulatory purposes, network security and for flexibility offerings.

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

No, see rationale below.

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

Please see our response to Q67, Q69 and Q70.

Future of Energy Retail Market work on wider access to BM (Balancing Mechanism) and the BSC multiple suppliers modification (P379), may both require the charge point to be subject to some form of additional metering or allocation process - in the former instance the Smart Meter may be insufficient. Of course, a second asset meter could be installed at the charge point, rather than integrated. We are looking at this under our work stream on metering behind the boundary point ([BSC Modification P375](#)).

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

In general - Consistency and certainty.

Specifically for BSC - access to import/export data may be required for Settlement if charge points are subject of Aggregation or multiple supplier offerings.

Also, beyond providing data to help with longer term network planning (para 4.7), access to 'live' data and subsequent central publication (e.g. through our BMRS - Balancing Mechanism Reporting Service) would benefit the wider industry. This is in terms of understanding state of market when trading on day ahead, spot market and in BM. This feeds into general and longstanding interest in greater visibility of embedded flexibility.

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

We agree noting that the ability to share data is vital to the efficiency and agree with the Energy Data taskforce recommendation that to ensure that energy system data is shared between all participants openly and adheres to common minimum standards. We suggest that the minimum requirements are regularly reviewed as arrangements develop.

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

The access to data requirements set out by Ofgem for Market-wide Half-Hourly Settlement allows customers to opt-out of provision of their Half-Hourly consumption data. The granularity required to achieve the benefits of smart charging should consider if there are caveats needed where customers opt to provide certain services.

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

Suppliers, Distribution businesses, the ESO, Flexibility Aggregators and Settlement agents are all likely to require data for certain use cases. Also new 'non-traditional business model' service providers, e.g. charge point operators and optimisers. Ideally, data should be collected once and shared with those who have the appropriate permissions to access the data from a common source.