HM Government

INDUSTRIAL STRATEGY

Electric Vehicle Smart Charging

July 2019

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Foreword

Electric Vehicles (EVs) offer new opportunities for consumers as part of a smarter and more flexible system. Smart charging, during off-peak periods when electricity demand is low, means consumers can benefit from cheaper electricity and avoids triggering unnecessary network reinforcement. Charging of EVs can also be shifted to periods where there is plentiful clean, renewable electricity generation.

Historically, the electricity system in Great Britain (GB) has been powered by a small number of large fossil fuel power stations, with the power then being transported to people's homes and businesses. This is changing. There are now increasing levels of low carbon and renewable generation, often connected at the local distribution network or at the home or business itself (i.e. behind the meter). To enable this transformation and minimise the need for conventional network reinforcement, the system is adapting to become more flexible and smarter in order to better manage the new flows in power. A study for the Government estimates the benefits of a smarter and more flexible electricity system could be £17-40bn to 2050.[1]

The Government is already taking action to drive this transition. In July 2017, it published Upgrading Our Energy System: A Smart Systems & Flexibility Plan (the Plan), setting out 29 actions that Government and Ofgem are taking, alongside industry, to deliver a smarter, more flexible energy system.[2] In October 2018, Government published an update on progress against the actions in the Plan since its publication, and identified nine new actions.[3]

The Automated and Electric Vehicles Act 2018 gives Government the powers, through secondary legislation, to ensure that all chargepoints sold or installed in the UK will have smart functionality.[4] As set out in the Road to Zero, Government is planning to take forward these powers to help ensure these vital building blocks of a smart system are in place from an early stage.[5] Before doing so, Government wants to consult people and businesses on the best way of implementing these requirements, with particular consideration of important issues for consumers like cyber security and interoperability.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/568982/An_analysis_of_electricity_flexibility_for_Great_Britain.pdf
[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633442/upgrading-our-energy-system-july-2017.pdf
[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/748125/ssfp-progress-update.pdf
[4] http://www.legislation.gov.uk/ukpga/2018/18/section/15/enacted
[5] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739460/road-to-zero.pdf

Executive summary

Our mission is for all new cars and vans to be effectively zero emission by 2040. For this to happen, our electricity system needs to be able to meet the extra demand created by electric vehicles (EVs). Smart charging - shifting the time of day when an EV charges or modulating the rate of charge - will help to reduce and manage the impact of EVs on the electricity system, whilst simultaneously creating benefits for consumers and maximising the use of clean, renewable electricity. Recognising the benefits of smart charging, Government took powers under the Automated and Electric Vehicles (AEV) Act 2018 to require new chargepoints to be smart.

The aim of this consultation is to outline the Government's approach and objectives for smart charging of EVs (Chapter 1); seek views on the regulations we propose to create under the AEV Act in 2020 (Chapter 2); gather evidence on a long-term solution, which we believe will be required by 2025 (Chapter 3); and gather evidence on how best to use the AEV Act power on the transmission of chargepoint data (Chapter 4).

In **Chapter 1**, we set out that the Government's **overall aim for smart charging is to maximise the use of smart charging technologies to benefit both consumers and the electricity system, whilst supporting the transition to EVs**. To meet this aim we believe we need to encourage **consumer uptake** and **innovation**, which is why we propose that these are two key government objectives. However, without coordination and regulation, then the smart charging market could evolve in a direction that has negative consequences for electricity **grid protection** and **consumer protection** – our other proposed objectives.

Smart chargepoints are connected devices which can control large amounts of electricity load. A worst-case scenario, where a large number of smart chargepoints are manipulated simultaneously as a result of cyber-attack, could constitute a risk to the electricity system. Additionally, it is a key facet of ensuring a competitive electricity market that when a consumer purchases a smart device, they are not ‘locked-in’ to their smart services provider and have the freedom to switch if they choose. A smart chargepoint which allows this switching is considered ‘interoperable’.

Without government intervention, it is unlikely that smart charging will be taken up at the rate required to achieve the full benefits for consumers and the electricity system during the mass transition to EVs, and there is a risk of variable standards and inadequate protection for the grid and consumers. This is why the Government proposes to intervene now - to introduce regulations under the AEV Act to increase uptake and set minimum standards. Our approach for these regulations is to focus on the desired outcomes, without prescribing a specific technological solution given that we do not want to hinder innovation in this early and rapidly evolving market. This is Phase One of the Government's approach, which is discussed in detail in Chapter 2.

As the scale of deployment of smart charging increases, so too do the risks for the electricity grid and consumers. The regulations in Phase One will set requirements on the chargepoint; however, to adequately provide grid and consumer protection, Government believes there will be a need to go beyond these device-level requirements and set requirements on the operators of the chargepoints. This will be Phase Two. As the smart charging market is at a very early stage and evidence of smart charging in operation is mostly limited to trials, we believe that there is currently insufficient evidence to decide on a course of action for Phase Two. This consultation will gather evidence on a Phase Two solution and this is discussed in detail in Chapter 3.

Chapter 2 describes the approach for Phase One in detail. We propose to use the powers under section 15 of the AEV Act to mandate that new non-public chargepoints will be required to have smart functionality, and that they will have to meet device-level requirements, including on cyber security and smart interoperability.[6] To deliver consistent minimum standards, we propose that the regulations will ordinarily require compliance with British Standards Institution (BSI) standards for smart chargepoints, which are currently under development.

In addition, this chapter includes proposals on:

- the scope of the regulations – definition and type of chargepoint;
- cyber security and data privacy;
- interoperability;
- other technical requirements (such as randomised delay function, minimum charging current and default off-peak charging mode);
- safety;
- monitoring and recording of EV electricity consumption;
- enforcement authority, penalties, and time for compliance.

A draft version of the regulations is included at Annex E. This is an indicative draft only and the regulations may be subject to amendment after consultation.

Chapter 3 is a call for evidence on Phase Two that seeks views on what the long-term approach for operational requirements should be and provides potential options. It proposes that a decision, about what these requirements should be, is made between 2020 and 2022. This is to allow time to gather evidence whilst also leaving enough time for an approach to be implemented by 2025. We intend to use the proposed objectives set out in Chapter 1 as criteria to determine the best solution for Phase Two.

The first option discussed in Chapter 3 is using the smart meter system for EV charging, which is capable of sending load control signals to smart chargepoints. The smart meter system is discussed in the context of the four Government objectives. As an interoperable and cyber secure system, the GB smart meter system goes a long way to meeting the proposed objectives on grid protection and consumer protection. However, there are challenges in using this system and changes would need to be made for the smart meter system to meet all objectives in a comprehensive way.

We would also like to collect evidence on what alternative solutions there are to the smart meter system, which could offer similar outcomes on interoperability and cyber

[6] In this consultation, interoperability or smart interoperability refers to a consumer being able to switch chargepoint operator without the chargepoint losing its smart charging functions and without a visit to the premises to restore it.

security. In the section on alternative options, we describe existing regulations and initiatives that could, with certain amendments and potentially alongside new regulation, form the basis of a solution. Such an approach could be technology neutral and potentially provide increased scope for innovation.

The smart meter system already exists and we are confident in the interoperability and cyber security protection of this system. This is in contrast to any alternative options, which are not yet mature enough to demonstrate that they could adequately mitigate concerns on the same topics. Therefore, the consultation proposes that, based on existing evidence, the current lead option for Phase Two is to use the smart meter system. Other options will continue to be considered until a decision is made in the early 2020s, and we wish to use this consultation to gather evidence on the use of the smart meter system for this purpose and possible alternatives.

Chapter 4 is a call for evidence on whether Government should introduce regulations under section 14 of the AEV Act, which relates to the transmission of data relating to chargepoints.

It is our view that sharing of data will enable better planning for the additional demand created by EVs and maintenance of the electricity networks. We describe what regulation in this area could cover; ask for views on the benefits and disadvantages of this; and for views on what factors should be used to determine when, or if, regulations should be introduced.

If regulations were introduced under section 14 of the AEV Act, there would be a separate consultation about the content of those regulations.

How to respond

The easiest way to respond is to use the online response form. This form also allows you to:

- save your progress so you don't need to complete it all at once
- save or print a copy of your response for your records once you have submitted it

The consultation period began on 15 July 2019 and will run until 7 October 2019. Please ensure that your response reaches us before the closing date. If you would like further copies of this consultation document, it can be found at https://www.gov.uk/dft#consultations or you can contact smartcharging@dft.gov.uk if you need alternative formats (Braille, audio CD, etc.).

Please send consultation responses to:

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Territorial extent

United Kingdom

When responding, please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of a larger organisation, please make it clear who the organisation represents and, where applicable, how the views of members were assembled.

If you have any suggestions of others who may wish to be involved in this process please contact us.

Privacy Information Notice: Confidentiality and data protection

The Department for Transport is carrying out this consultation on proposals to introduce new regulations for chargepoints under the Automated and Electric

Vehicles Act. It is being carried out in the public interest to inform the development of policy.

As part of this consultation we are asking for your name and email address. This is in case we need to ask you follow-up questions about any of your responses. You do not have to give us this personal information. If you do provide it, we will use it only for the purpose of asking follow-up questions. DfT is the controller for this information and we will not share it with any other organisation.

The Department for Transport's privacy policy has more information about your rights in relation to your personal data, how to complain and how to contact the Data Protection Officer. You can view it at https://www.gov.uk/government/organisations/department-fortransport/about/personal-information-charter.

To receive this information by telephone or post, contact us on 0300 330 3000 or write to Data Protection Officer, Department for Transport, Ashdown House, Sedlescombe Road North, St Leonards-on-Sea, TN37 7GA.

Your information will be kept securely and destroyed within 12 months after the consultation has been completed.

Freedom of Information

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the Freedom of Information Act 2000 (FOIA) or the Environmental Information Regulations 2004.

If you want information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information, we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

1. Introduction and objectives

Aim and scope of this consultation

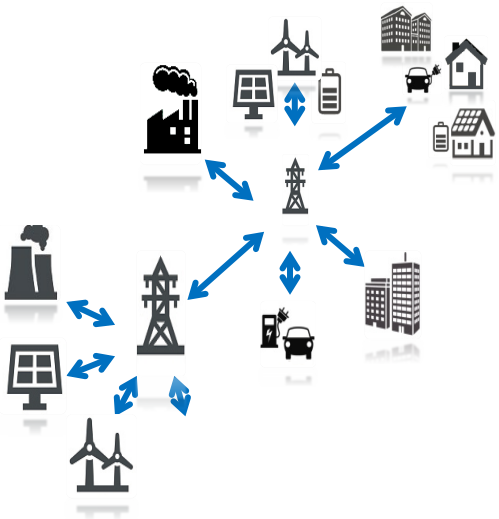
1.1 In the Road to Zero Strategy, Government set out that all new cars and vans should be effectively zero emission by 2040. Making sure the electricity system is ready to meet the future demand created by electric vehicles (EVs) will be vital if we are to achieve this. That is why Government took powers under the Automated and Electric Vehicles (AEV) Act 2018 to enable Government to act and manage the impact of EVs on the electricity system.

1.2 This consultation outlines the approach to enabling 'smart charging' of EVs and the intention to use powers under section 15 of the AEV Act (powers to require chargepoints to be smart) to drive this.[7] **For the purposes of this consultation, smart charging is defined as shifting the time of day when an EV charges, or modulating the rate of charge at different times, in response to signals (e.g. electricity tariff information).**

1.3 This document also includes a call for evidence on the long-term approach to smart charging as well as the use of the powers provided by section 14 of the AEV Act (transmission of data relating to EV chargepoints).

Benefits to the electricity system

1.4 The time at which EV charging (or discharging) occurs, and its power level, could have significant implications for the electricity system. We expect charging at home to continue to be central to the charging ecosystem and are taking steps to facilitate this by separately consulting on introducing requirements in Building Regulations for every new home with a car parking space to have a chargepoint. Without smart charging, EV charging is likely to happen during existing electricity system peak times (such as between 5pm and 7pm) when many people arrive home from work. This would require significant levels of additional investment in both the networks that transport the electricity and in electrical generation capacity to meet demand, with the costs borne ultimately by consumers.



Benefits to consumers

1.5 The ability to delay or modulate charging could result in better balancing of the electricity system (electricity supply and demand need to be balanced in real time) and reduce the need for costly network upgrades. This value can be passed through to consumers via cheaper electricity tariffs or other offerings such as rewards for

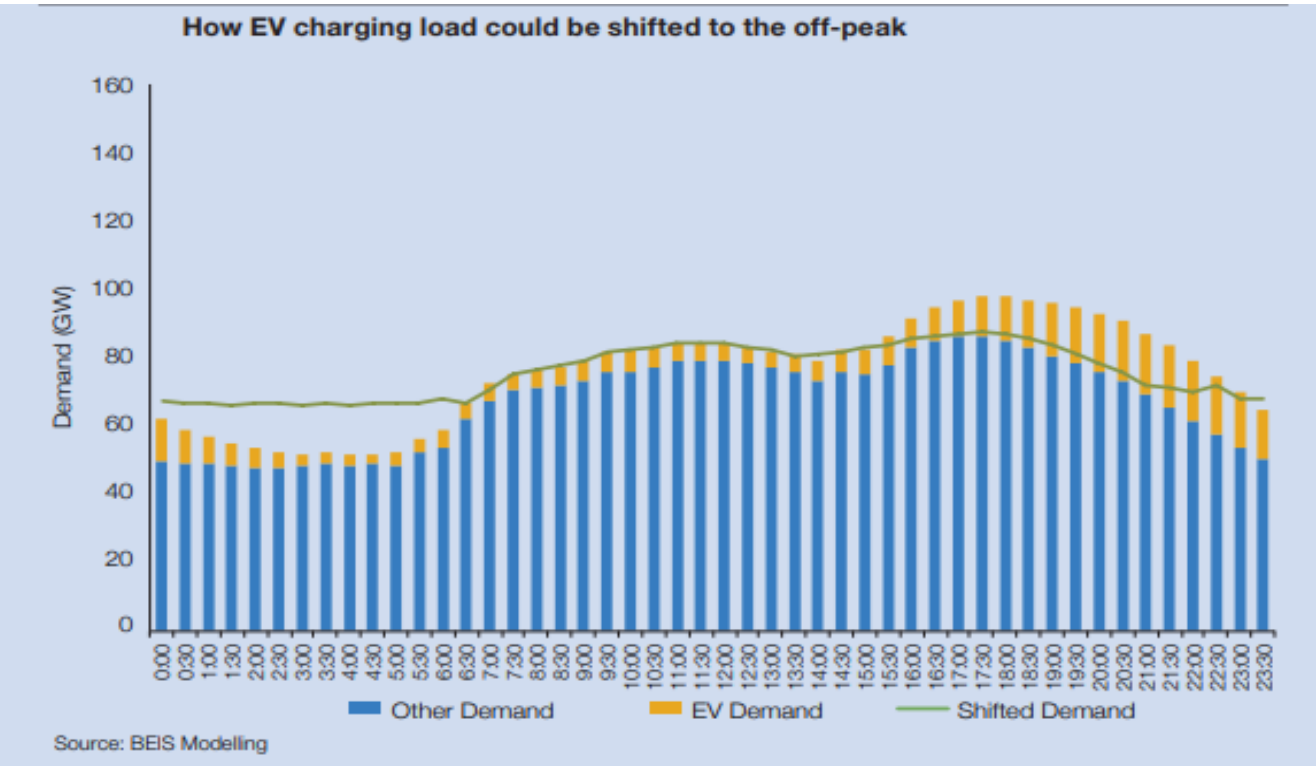
[7] http://www.legislation.gov.uk/ukpga/2018/18/contents/enacted

smart charging, making an EV less costly to run, and allowing consumers to take action on reducing their costs. Smart charging can also be far more convenient - consumers can set charging preferences remotely and through applications without having to manually connect and disconnect their car as often or at inconvenient times.

1.6 There is also the additional benefit of consumers being able to maximise the use of low-carbon emitting renewable electricity (which is generated intermittently), as EV charging can be shifted to times when there is plentiful renewable generation that otherwise may be wasted.

Smart charging

A key feature of a smarter energy system is the ability to minimise peak demand and network congestion, allowing the use of cheaper, low carbon generation to be maximised. The current electricity system has been designed to meet a peak in demand between 17:00 and 20:30. For the rest of the day there can be large amounts of underused generation and network capacity. Generation during these off-peak periods is usually cleaner and cheaper. EVs can support the transition to a smarter energy system by, for example, charging overnight (during the off-peak) reducing the need for investment in infrastructure, but also provide power back to the grid. This makes it cheaper for people to charge and integrates EVs into the electricity system in an affordable way.



Smart charging current market, technologies and horizon

1.7 The number of EV chargepoints is increasing, but it is still an early market, with around 150,000 chargepoints (public and non-public) installed in the UK today. Smart chargepoints are at a particularly early stage of development and deployment, and the majority of UK chargepoints are currently not smart. However, this is changing, with industry bringing more smart chargepoints to market. This has been further bolstered by changes to the Government's Electric Vehicle Homecharge Scheme (EVHS), which, from 1 July 2019, requires that for a chargepoint to be eligible for support it must be smart (as defined within the scheme criteria).[8] However, the technology and business models for smart charging are still in their infancy - in the UK and internationally - and there are a variety of different, evolving methods to deliver it, meaning the real-world evidence of the optimum design and best ways to use this technology remains limited.

Smart charging methods and other technologies

1.8 In order to access the full range of smart benefits, smart chargepoints need to be able to receive and send information so that they can adjust the rate of charging dynamically (these communications are known as 'load control signals'). There are various communication channels that can be used to carry this information, such as through the internet via the chargepoint, potentially controlled via an app. Alternatively, GB smart meters could receive and send the load control signals to chargepoints, instead of the chargepoint carrying out this function independently.

1.9 Government is seeking to demonstrate how the existing load control functionality of the smart meter system would work in practice for loads such as EVs. The Department for Business, Energy and Industrial Strategy (BEIS) made £3 million of funding available for demonstration projects that are due to conclude in Spring 2021.[9] Smart meters could also help smart charging by providing electricity tariff information to the chargepoint operator or to the chargepoint itself.

1.10 Another method for smart charging could be to control the smart functionality via the vehicle rather than a chargepoint. Like a chargepoint, this could be done remotely, for example, via a mobile phone app. There are limited examples of this currently, and it is not clear if all vehicle manufacturers will eventually offer this functionality, but initial demonstrations imply this is possible without the chargepoint itself being smart.

1.11 Much of the smart functionality related to smart chargepoints can happen automatically within the device, but there is often also a 'chargepoint operator' that is responsible for remotely operating smart chargepoints. Typically, a chargepoint operator would monitor a network of smart chargepoints and send load control signals. The chargepoint operator could, for example, be an energy supplier, a distribution network operator, an electricity aggregator or a chargepoint company. Load control signals may be triggered automatically by price signals or by carbon grid intensities, for example, shifting when the EV charges to the cheapest time of day in line with system and network capacity pressures, or to times when the grid is operating with maximum renewables therefore minimising the carbon impact of the vehicle.

1.12 Consumers will also have the choice as to whether and how they use this smart charging functionality. For example, it may not be convenient to charge overnight

[8] From 1st July 2019, all chargepoints installed through the Electric Vehicle Homecharge Scheme (EVHS) must be smart. This fulfils a commitment made in the Road to Zero https://www.gov.uk/government/publications/reducing-emissions-from-road-transport-road-to-zero-strategy

[9] https://www.contractsfinder.service.gov.uk/Notice/8fc7b811-2a6f-4258-850a-463bbc705e66

when the EV is required for travel at night, such as for those working night shifts or in emergency cases. A consumer should ideally be able to choose when they use the smart functionality and have the option of charging the vehicle as soon as they plug it into the chargepoint.

1.13 The very nature of EV charging continues to evolve, with technologies emerging that are likely to have a significant impact on smart chargepoints, and the future of smart charging more generally. For example, Government awarded £30 million for Vehicle to Grid (V2G) innovation last year – where vehicles can provide power back to the grid or directly to homes, businesses and other appliances.[10] These include demonstration projects involving over 2,700 V2G-ready vehicles. Some V2G chargepoints have already been installed as part of these projects, which are due to conclude in 2021. There are also Government-funded innovation trials looking into wireless charging.[11]

Government's aims and objectives for smart charging

1.14 As set out above, smart charging of EVs will reduce the demand on the electricity system at peak times. This means consumers can benefit from cheaper charging of their EVs, as costly electricity network and generation upgrades to increase electrical capacity at peak times can be avoided and the use of clean, renewable electricity increased. **The Government's aim therefore is to maximise the use of smart charging technologies, to benefit both consumers and the electricity system, whilst supporting the transition to EVs.**

1.15 To meet this aim we believe we need to encourage **consumer uptake** and **innovation**, which is why we propose that these two factors are key government objectives. However, without coordination and regulation, the smart charging market could evolve in a direction that has negative consequences for electricity **grid protection** and **consumer protection** - therefore these are our other proposed objectives. The proposed objectives are described below, with risks discussed first.

Grid Protection: Cyber security and grid stability

1.16 EV smart charging can help ensure supply and demand of electricity is better balanced, as it is designed to shift electricity consumption away from existing peaks. Conversely, if large numbers of EVs start or stop charging simultaneously, this has the potential to create sudden spikes or drops in electricity demand that could cause issues with balancing. There are different ways to deal with this, for example staggering signals for EV smart charging, or randomisation of response to signals for smart charging.

1.17 Cyber-attacks, such as the hacking of individual devices, their control systems, or the communications between them, could threaten the electricity system if, for example, large numbers of connected EVs were manipulated simultaneously. Robust cyber security measures are therefore necessary to mitigate the risk that EV smart charging presents to the stability of the grid, in addition to protecting individual consumers. As EV uptake and smart charging increases, the risks will evolve. It will be vital that these are appropriately mitigated in a proportionate way as the smart charging landscape changes and grows.

[10] https://www.gov.uk/government/news/30-million-investment-in-revolutionary-v2g-technologies
[11] https://www.gov.uk/government/news/solar-high-speed-and-wifi-charging-set-to-revolutionise-electric-transport

Consumer Protection: Smart interoperability, safety and data privacy

1.18 Government committed within the Road to Zero Strategy to putting consumers at the heart of everything it does, and it is vital that consumers are sufficiently protected when using smart chargepoints. This will include ensuring chargepoints are safe, secure and interoperable.

1.19 In this consultation, interoperability (or smart interoperability) refers to a consumer being able to switch chargepoint operator without the chargepoint losing its smart charging functions and without a visit to the premises to restore it.[12] Without interoperability, these smart charging functions on the smart device will only be able to be operated by the original company, or a limited set of companies. For example, non-interoperability could arise if a chargepoint exclusively uses proprietary messaging protocols that other companies cannot interact with.

1.20 The Government views interoperability as essential for a competitive electricity market[13] - a smart chargepoint should not unfairly disadvantage those consumers switching between energy suppliers or chargepoint operators. In addition, a consumer should be able to change chargepoint operator and/or energy supplier (noting that these could be the same company) without having to purchase and install a new chargepoint. There are several reasons why consumers may want to change operators: switching to a better smart charging tariff, changing to a company offering a better customer experience, or in case their current operator ceases trading. A non-interoperable chargepoint would mean the consumer is effectively "locked in" to the smart services of a chargepoint operator for the lifetime of the chargepoint, if the consumer wishes to keep the smart functionality.

1.21 There is an existing safety and data privacy framework that would apply to smart charging, such as regulations for electrical installations and requirements under the General Data Protection Regulation (GDPR) Data Protection Act 2018.[14] However, Government will also seek to ensure that appropriate measures are taken for potential issues that could arise specifically from smart charging. For example, there are additional safety aspects to consider because smart charging includes adjusting the charging rate remotely, when the consumer may not be present.

1.22 Cyber security, set out under the grid protection objective above, also provides protection for consumers regarding data privacy and will be considered in both contexts.

Encouraging Consumer Uptake

1.23 Consumer uptake of smart charging is vital to achieving the Government's aim of maximising the benefits of smart charging (as set out in paragraphs 1.4-1.6), alongside, and to support, the Government's wider objectives around uptake of ultra low emission vehicles as set out in the Road to Zero. We want consumers to engage with and use smart charging functionality so that they can exploit the benefits of this technology, and so that, in turn, the benefits to the electricity system can be realised.

1.24 If smart charging is too complicated, too inconvenient, or doesn't offer sufficient benefits to consumers, then consumers will not engage. Smart charging solutions must therefore be affordable; good value; simple to engage with; and convenient.

[12] In this consultation, this is different from 'interoperability' in the context of all EVs .having a universal charging socket..
[13] See also 'Proposals regarding smart appliances: government response'. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/748115/smart-appliances-consultation-government-response.pdf
[14] https://www.gov.uk/government/publications/guide-to-the-general-data-protection-regulation

Innovation

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. 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.

1.26 This will help maximise benefits to consumers and will also mean that the UK can stay at the forefront of the developments in smart charging.

Questions

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

Q02 Do you agree with the proposed Grid Protection objective?

Q03 Do you agree with the proposed Consumer Protection objective?

Q04 Do you agree with the proposed Consumer Uptake objective?

Q05 Do you agree with the proposed Innovation objective?

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.

The Government's proposed approach

Why do we need to intervene now?

1.27 The Government's proposed aims and objectives (the "Objectives") for smart charging are not currently being met and are unlikely to be without government intervention. Many chargepoints on the market are not smart and it's unlikely, in the absence of intervention, that the uptake of smart charging will happen at the rate required. Smart charging will be key to enabling the rapid uptake of EVs that is needed to meet the Government's targets, whilst managing the impacts on the electricity system.

1.28 The diversity in business models and practices of this early market, whilst important for innovation, also risks a proliferation of smart chargepoint systems developing with varying standards and functionality. Without clear requirements and standards set for the industry, it's unlikely that the market will deliver smart chargepoints that provide sufficient grid and consumer protection, at least in the short term.

1.29 The Government needs to act now to meet its aim of increasing the number of consumers using smart charging and to deliver the consistency and common standards required to ensure appropriate cyber security protection and interoperability.

1.30 Additionally, intervention in an early market will avoid a more costly and potentially more disruptive intervention at a later date. In particular, Government is keen to avoid a scenario where excess retrospective action is required, where existing infrastructure in a developed market would need to be brought in line with new

requirements. Additionally, it will allow the UK to influence international approaches to help increase alignment.

1.31 Implementing smart charging as the norm now will also help consumers, including:

- Allowing them to gain the benefits of smart charging at the earliest stage;
- Encouraging the market to develop more smart tariffs sooner, providing additional choice and affordability; and
- Introducing the wider public to smart devices in general.

A phased approach

1.32 We believe the case for acting now is clear. For this consultation, Government proposes **that most new chargepoints should be smart; and that these smart chargepoints should meet device-level requirements, including for cyber security and interoperability**. See Chapter 2 for more details.

1.33 At this stage, the Government will not prescribe a specific technology to enable smart charging. In the context of rapidly changing technologies, business models, and overall shape of the market, it is important that Government's intervention is proportionate and fosters innovation. In line with the Government's White Paper on Regulation for the Fourth Industrial Revolution, we propose to avoid unnecessarily prescriptive legislation that, whilst providing clarity for industry in the short-term, could lock in outdated approaches and hinder innovation.[15] Instead, we propose a technology neutral approach that focuses on desired outcomes and minimum standards; this increases flexibility for industry, who can decide how best to meet the outcomes, and encourages innovation since industry has greater freedom to try out new ideas, technologies and business models.

1.34 As the scale of deployment of smart charging increases, so too do risks related to the electricity grid and consumer protection. Government treats cyber security as a key priority and will ensure that appropriate measures are in place well before smart charging could constitute a significant risk to the electricity system and consumers.

1.35 The Government is therefore also considering what additional requirements, beyond the powers of the AEV Act, may need to be placed on the operators of the chargepoints and the associated device communications, in addition to the device. A device-level requirements approach means that although the products will meet certain standards, the companies that operate the smart functionality will not be subject to holistic regulation on their wider governance and operations. Some codes and requirements on these elements do exist,[16] but there is no mandatory regulation ensuring interoperability and cyber security for smart charging at the organisational and operational level.

1.36 Furthermore, though a single device may be secure, the communications between connected devices and supporting platforms may contain vulnerabilities, opening the whole system up to the risk of cyber-attack. The National Cyber Security Centre (NCSC)[17] supports a holistic, system level approach to cyber security to mitigate these risks.

1.37 For consumer protection, requirements on the chargepoint operator are also likely to be necessary to ensure that chargepoint operators act in the best interests of consumers for smart charging. One example is that although the chargepoint could

[15] https://www.gov.uk/government/publications/regulation-for-the-fourth-industrial-revolution
[16] For example, Network and Information Systems (NIS) Regulations
[17] https://www.ncsc.gov.uk/

be interoperable, without requirements on the chargepoint operator, these operators might not relinquish control of the smart functionality when the consumer requests a change of operator, or simply be unhelpful or slow to respond to such requests.

1.38 **We propose that, in the longer term, it will be necessary to set requirements for chargepoint operators beyond the device itself, to ensure that interoperability and security objectives are delivered. As a long-term principle, for both cyber security and interoperability, we propose to ensure similar consumer and grid protection outcomes to the GB smart meter system** (See Smart meters as the current lead option for a long-term solution). Such requirements would go beyond the powers of the AEV Act and therefore new legislation is likely to be needed.

1.39 However, as set out above, the smart charging market is at a very early stage in terms of technology, business models, deployment and usage. There are a variety of approaches to smart charging with various advantages and disadvantages, and the pace of innovation is so rapid that the smart charging landscape is evolving quickly. Evidence of smart charging in operation is mostly limited to trials. **In this context, based on current evidence and noting the risk of stifling innovation, the Government currently considers that more evidence is needed before specific operational requirements are mandated.**

1.40 **Therefore, Government proposes to take a phased approach to smart charging regulation**: acting now to increase the uptake of smart charging and ensuring minimum standards and protections for consumers and the grid - Phase One; whilst allowing the time required to further develop options and make an evidence-based decision on a longer term solution - Phase Two. The second phase should build on and complement the first phase, which should act as a stepping stone, making it easier for industry to adjust.

1.41 The Government intends that the decision for Phase Two is taken early enough to ensure a smooth transition from the Phase One proposal and that unnecessary investment is avoided where possible. We are seeking to set a balance between providing clarity for industry on the future direction of travel whilst allowing enough flexibility to adapt to changing technologies and markets.

1.42 **Government proposes that a long-term solution should be in place, with compliant products available and relevant processes in place, by 2025, in order to make sure cyber security and interoperability risks are sufficiently guarded against before large numbers of chargepoints are in use.** In order to have implemented the chosen solution(s) by 2025, a decision on what the long-term approach is will likely be needed between 2020-2022.

1.43 More detail on the long-term approach, timing for a decision, and the possible options can be found in Chapter 3. This includes call for evidence questions, where we will welcome your views.

Questions

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

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

Phase One

1.44 This consultation proposes to:

- **Require new chargepoints to be smart; and**
- **Require that smart chargepoints meet device-level requirements, including on cyber security and interoperability.**

1.45 The Government will create regulations under section 15 of the AEV Act to achieve this. We propose that the regulations will apply only to chargepoints and chargepoint cables that have smart functionality. We also propose that these regulations should apply only to private chargepoints, rather than public chargepoints.

1.46 It is proposed that smart chargepoints will ordinarily be required to comply with British Standards Institution (BSI) standards, which are currently under development for smart chargepoints and smart appliances (see BSI Standards), before they can be installed. Chargepoints will need to undergo an independent testing and assurance regime that refers to the BSI standards and we propose to appoint the Office for Product Safety and Standards as the enforcement body.

1.47 A detailed explanation of Phase One and the requirements the Government intends to introduce can be found in Chapter 2, including the consultation questions where we welcome your views.

Phase Two

1.48 To decide on a long-term solution, the Government will assess the options for Phase Two against the Government's proposed objectives. However, at this stage, there is not enough evidence to make an assessment and this consultation will help build the evidence base for this.

1.49 As we do not propose to decide on a long-term solution now, it is important to define when a decision needs to be made by. The Government considers that a long-term solution needs to be in place, with compliant products available, by 2025 to ensure that adequate regulations and protections are in place, for both the grid and consumers, before large numbers of smart chargepoints are installed. Therefore, a decision on the long-term approach should be made between 2020 and 2022, to allow for implementation by 2025.

1.50 The GB Smart Meter system is currently capable of sending load control signals to smart chargepoints. The system also delivers full interoperability for consumers and strong levels of cyber security, which are key elements of two of Government's four proposed objectives. As an existing system that can deliver on core requirements, **the Government's current lead option for a long-term solution for EV smart charging is to use the smart meter system.**

1.51 Alternative approaches to a smart meter system, that could also offer similar outcomes for the protection of the grid and consumers, are possible. This could build on the Phase One approach and introduce additional requirements for the chargepoint operators, potentially adapting existing regulations to a smart charging context or developing new regulations. Both the chargepoint and the chargepoint operator, or other relevant organisations, would need to comply with the relevant regulations and would be subject to enforcement.

1.52 Chapter 3 is a call for evidence about timelines, evidence for a decision, and the options for a long-term solution.

Transmission of chargepoint data

1.53 Chapter 4 of this consultation is a call for evidence regarding the transmission of chargepoint data, including data about energy consumption and geographical location, another power of the AEV Act.[18] This is about transmitting data to relevant specified parties, who could include the Electricity System Operator, Transmission Owners or Distribution Network Operators (DNOs), to enable a smart and flexible energy system at lowest cost to consumer. The data may also be useful for forecasting chargepoint usage and locations to inform strategic chargepoint infrastructure rollout.

1.54 Government is considering what data should be shared between relevant parties, and under what agreements this should take place. We would like to obtain views on whether regulations should be introduced to facilitate this data sharing, what data they should include and when Government should decide to intervene.

Timelines

1.55 The consultation period began on 15th July 2019 and will run until 7th October 2019. We will then review the responses before producing the Government response. We will also produce a detailed impact assessment before laying the Statutory Instrument in Parliament on the smart chargepoint regulations.

1.56 If Parliament approves the smart chargepoint regulations then they are expected to come into force in 2020, subject to this consultation.

How to answer this consultation

1.57 Some of the responses from this consultation may be used to assist with a detailed impact assessment of the proposed regulations. Therefore, please indicate anticipated costs to your organisation of the proposed regulations in your answers where relevant and where you are in a position to do so.

Other powers for electric vehicle charging

1.58 In addition to the smart provisions, the AEV Act also provides Government with powers to:

- mandate a common minimum method of payment between different types of EVs and chargepoints (section 10);
- define minimum standards for physical connection to public chargepoints in secondary legislation, enabling connection interoperability[19] so all users can access them (section 10);
- set reliability and maintenance standards to ensure chargepoints are available for use (section 10);

[18] http://www.legislation.gov.uk/ukpga/2018/18/section/14/enacted

[19] Interoperability in this context means all EVs being able to access all chargepoints. This is different to smart interoperability, which is the subject of this consultation and is about a chargepoint retaining its smart functionality when a consumer switches chargepoint operator.

- ensure data on where chargepoints are located, whether they are available for use and whether they are in working order is made freely available in an open source format, building on the Government's National Chargepoint Registry (section 13); and
- increase the provision of public infrastructure for EVs, by requiring large fuel retailers and motorway services areas to provide such facilities for their customers (sections 11 and 12).

1.59 The Government took these powers to set a direction for the EV infrastructure market. We do not want to intervene unnecessarily as regulatory interventions at such an early stage of market development can risk stifling innovation, hampering competition and have unintended consequences.

1.60 The Government continues to monitor market developments on improving the charging experience closely. If the market fails to deliver further improvements across the entire network or takes too long, the Government is prepared to intervene using the powers provided in the Act to ensure a good deal for consumers. **Taking forward regulations using these powers is beyond the scope of this consultation.**

2. Phase One: Using the AEV Act powers to develop device-level requirements

2.1 Chapter 1 set out the case for intervening now. This consultation proposes that:

- To increase the use of smart charging, new non-public chargepoints will be required to have smart functionality; and
- To ensure appropriate protection for consumers and the grid, smart chargepoints will have to meet device-level requirements, including on cyber security and interoperability.

2.2 The Government proposes to achieve this by using powers under section 15 of the AEV Act, set out below, to create regulations. It is proposed that these regulations will apply only to chargepoints and some chargepoint cables, not to other mechanisms or devices that are capable of smart charging, such as the vehicle (not in scope of AEV Act). Wider regulation of chargepoint operators (described in paragraphs 1.34 - 1.38) delivering smart services is also not in scope of the AEV Act. The regulations would relate to device-level requirements only. As with all government legislation, these regulations will remain under review and will be updated or amended as appropriate.

2.3 **Consumers would have the choice as to whether and how they use this smart charging functionality.** If a consumer decides to take advantage of smart charging, there still might be occasions when they choose not to do so. For example, it may not be convenient to charge overnight when the EV is required for travel at night, such as for those working night shifts or in emergency cases. A consumer should ideally be able to choose when to use the smart functionality and have the option of charging the vehicle as soon as they plug it into the chargepoint. The intention of setting regulations now is to ensure that all chargepoints have the functionality for smart charging, so that consumers become more familiar with the concept and have the option to take advantage of it if they wish.

2.4 Typically, the benefits of smart charging are realised through shifting charging away from peak times to times when the electricity system is less constrained, such as overnight or other times of excess low-carbon generation, for relatively long periods. This scenario fits well with home charging, but not necessarily as well with other charging types, such as public charging where consumers generally need to charge quickly. The powers in the AEV Act relate to *all* chargepoints sold or installed in the UK; this consultation considers whether requirements should differ depending on the use case of the chargepoint.

2.5 In this chapter, we describe how we define a smart chargepoint; what types of chargepoints are in scope of the regulations; how we propose to develop device-level requirements for smart chargepoints; and specific device-level requirements.

Powers under Section 15 of the AEV Act

15 Smart charge points

(1) Regulations may provide that a person must not sell or install a charge point unless it complies with prescribed requirements.

(2) The requirements that may be imposed under subsection (1) include requirements relating to the technical specifications for a charge point, including for example the ability of a charge point—

(a) to receive and process information provided by a prescribed person,

(b) to react to information of a kind mentioned in paragraph (a) (for example, by adjusting the rate of charging or discharging),

(c) to transmit information (including geographical information) to a prescribed person,

(d) to monitor and record energy consumption,

(e) to comply with requirements relating to security,

(f) to achieve energy efficiency, and

(g) to be accessed remotely.

(3) Regulations under subsection (1) may also prescribe requirements to be met in relation to the sale or installation of a charge point.

(4) In this section—

(a) "sell" includes let on hire, lend or give;

(b) references to a prescribed person include references to—

(i) a person of a prescribed description, and

(ii) a device operated by one or more prescribed persons.

Definition of chargepoint

2.6 The AEV Act defines a chargepoint (or "charge point", which is how it is set out in the Act) as **a device intended for charging a vehicle that is capable of being propelled by electrical power derived from a storage battery (or for discharging electricity stored in such a vehicle)**. In many cases this will mean the device that a consumer plugs the EV into, in order to charge the EV. Often these devices are static points, installed on a wall or as a standalone unit. However, we have seen examples of charging cables entering the market which include a built-in device that enables smart charging. For the purpose of these regulations, **we propose that the smart regulations should also apply to charging cables which contain a smart charging-enabling device.**

Consultation questions

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

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

Types of chargepoints

2.7 Charging of an EV can take place in a variety of locations, such as at home when there is off-street parking, in the workplace or at public locations. Smart charging is likely to provide the greatest benefits when EVs can be plugged in for long periods of

time, for example at home and at work, rather than at public chargepoints where users generally need to start charging immediately. We therefore do not consider that intervention is currently necessary to require public chargepoints to be smart.

2.8 **We propose that these regulations require all chargepoints except for public chargepoints to be smart**. A public chargepoint is defined in the AEV Act 2018 as a chargepoint "provided for use by members of the general public".[20] Our proposal would effectively mean that all private chargepoints would be within scope of the regulations. 'Private' is likely to encompass home chargepoints (in off-street and some on-street parking locations) and the majority of workplace chargepoints.

2.9 We recognise that there may be additional benefits for public chargepoints to be smart, and there may be scenarios where considering a chargepoint as 'private' or 'public' is not necessarily clear cut (for example, chargepoints at hotels or airports). However, we propose the enforcement body (see paragraph 2.49) use the test of whether the chargepoint is intended to be used by the general public in their enforcement activity.

2.10 We will keep the extent of these regulations under review. We will also consider evidence of whether any exemptions are necessary - for example for non-public chargepoints for specific vehicle manufacturers.

2.11 However, the regulations would also cover other important requirements for smart chargepoints, such as cyber security. We therefore also propose that, although we do not *require* public chargepoints to be smart, **if a public chargepoint does have smart functionality then it must comply with the rest of the proposed regulations.**

Consultation questions

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?

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.

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

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

Definition of smart chargepoint

2.12 The regulations would define the term 'smart chargepoint' to reduce the risk of ambiguity in identifying the devices that will be in scope. In order to carry out smart charging we consider that as a core requirement a chargepoint must be communications enabled (able to send and receive messages) and able to respond automatically to a remote signal by adjusting the electricity consumption flowing

[20] http://www.legislation.gov.uk/ukpga/2018/18/section/9/enacted

through the chargepoint. This is in line with how the government also defines a smart appliance.[21]

Consultation questions

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?

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

BSI Standards

2.13 The regulations we are proposing will ordinarily require compliance with British Standards Institution (BSI) standards for smart chargepoints, which are currently under development. Smart chargepoints will need to be certified with reference to the BSI Standards before they can be sold or installed. We are proposing that compliance with the standards would be mandatory, except where organisations can prove that their chargepoints comply with suitable equivalent standards that meet the same outcomes.

2.14 In 2018 the BSI published a study reviewing the current landscape of technical standards relating to energy smart appliances (ESAs), including EV chargepoints, at the request of the Government.[22] Following the review's recommendations to address current standardisation gaps, the Government commissioned BSI to develop appropriate technical standards for ESAs through an industry-led process which considers the European and International standardisation context.[23]

2.15 The process aims to develop and enable a set of standards as Publicly Available Specifications (PAS) that will underpin the secure and interoperable uptake of ESAs in the marketplace while helping to remove barriers to the deployment of ESAs for actively managing demand on the electricity network in an integrated whole-systems approach. The standards will also be compatible with GB smart meters being used for the load control of ESAs.

2.16 These standards will include an ESA classification PAS, which will describe device requirements relating to the smart device, and a Demand Side Response (DSR) framework PAS, which will describe the smart services. The aim of these is to address the Government's policy principles relating to effective smart operation of ESAs: grid stability, cyber security, interoperability and data privacy.[24] They will also provide the basis for certification in accordance with these principles.

2.17 The publication of these BSI standards is expected to be in early 2020, after a public consultation period from BSI. We do not intend to introduce the regulations until these standards are published. However, the outcomes that chargepoints would be regulated against are set out in this consultation.

2.18 There are many common aspects between the principles underpinning the BSI standards development and the proposed objectives described in Chapter 1 of this consultation. There are a number of specific device-level requirements and outcomes

[21] As per the government consultation on smart appliances: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/690805/Consultation_on_Proposals_regarding_Smart_Appliances-.pdf

[22] https://www.bsigroup.com/en-GB/smart-appliances-flexible-energy/

[23] See reference 22.

[24] See reference 22.

that Government proposes would help to meet both the principles underpinning the BSI standards and the objectives proposed in this consultation.

2.19 We describe the device-level requirements below. It is not yet confirmed which elements will form part of the BSI standards, and which will be specified in the Regulations. We ask respondents to consider whether the requirements should form part of the Regulations.

Cyber security and data privacy

2.20 Cyber security and data privacy are key elements of our Grid Protection and Consumer Protection objectives for smart charging (paragraph 1.14). In keeping with the phased approach described in Chapter 1, we propose to implement the below device-level requirements as soon as possible (after publication of the BSI standards), to provide mitigation of cyber security risks at a proportionate level for the market today, and to provide a platform upon which a holistic, system-based approach to cyber security can be built.

2.21 We propose a combination of outcome-based security requirements, an independent security testing and assurance scheme, as well as mandatory security characteristics.

Outcome-based security requirements

2.22 We propose the following as outcomes to be included in the Regulations:

a. Protect the integrity of chargepoints through physical protections[25]
b. Protect operational interfaces of chargepoints and prevent use of non-operational interfaces
c. Protect communications and messages sent from and received by chargepoints
d. Protect firmware on chargepoints, and enable secure updates of firmware
e. Protect electric charging, metering, payment charging and other functions of chargepoints (where applicable)
f. Protect data held by chargepoints
g. Ensure that messages sent to chargepoints are sent from a certified and trusted source

Mandatory cyber security characteristics

2.23 The BSI standards for ESAs will include cyber security requirements for ESAs, including smart EV chargepoints. We propose that the Regulations under the Act will reference the BSI standards specifically. As set out above, we propose that these requirements would be mandatory, except where proven equivalent or higher security standards exist. That is, a smart chargepoint which meets a different set of standards that contain all the requirements in the BSI standards would meet the outcomes as defined in the Regulations.

[25] For example, ensuring a tamper-protection boundary surrounding the smart chargepoint to deter access to key components

2.24 The cyber security characteristics in the BSI standards will take into account existing standards at the UK and international level.[26,27,28]

Independent testing and assurance scheme

2.25 To demonstrate compliance we propose that chargepoints are checked for the mandatory security characteristics through an independent testing and assurance scheme before the point of sale and installation. For example, this scheme could be similar to Commercial Product Assurance.[29] Having a security testing assurance process will provide confidence that the outcome-based requirements have been met, and the benefits of smart charging don't turn into a vulnerability for the electricity system. This independent testing for cyber security characteristics could also be combined with testing for other smart chargepoint requirements, so that a manufacturer only has to go through one testing and assurance process (paragraph 2.30).

2.26 The cyber security standards will also address the protection of any data held by the devices as well as the ingress and egress of that data. The Regulations will apply to several types of chargepoints which use different data in different ways. Data fully outside of the device would not be in scope of these regulations but chargepoint operators will still need to comply with relevant data legislation such as the Data Protection Act and GDPR.

Consultation questions

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?

Q18 Please give reasons for your answer.

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

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

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

Q22: Please give reasons for your answer.

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

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

Interoperability

2.27 Interoperability, including why Government views it as important, has been explained previously (paragraph 1.18). Government proposes that interoperability can only be

[26] For example, the EU Cybersecurity Act establishes an EU framework for cybersecurity certification, boosting the cybersecurity of online services and consumer devices.
[27] For example, Commercial Product Assurance (CPA) build standards, HAN-Connected Auxiliary Load Control Switches security characteristics, European Network for Cyber Security smart requirements
[28] https://www.ncsc.gov.uk/content/files/protected_files/document_files/SMLT-SC-0005_HCALCS_v1_2.pdf
[29] https://www.ncsc.gov.uk/scheme/commercial-product-assurance-cpa

delivered with a common set of functional device requirements and a common means of communication that can be used by any potential operators of the device.

2.28 For these regulations, we propose to require that the chargepoint is capable of retaining smart functionality if the chargepoint operator is changed without the need for a visit to the premises.

2.29 It is proposed that requirements around interoperability will form part of the BSI technical standard for chargepoints. It is also proposed that compliance with an equivalent standard could be accepted if it can be proved that it achieves the same outcomes.

2.30 In order to ensure that the interoperability outcome and compliance with the BSI standard has been met, we propose to establish a certification and assurance regime. This would provide an independent assessment that the chargepoints are functionally interoperable and would allow for enforcement of this requirement.

Consultation questions

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?

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

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

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

Grid stability: Randomised delay function

2.31 If large numbers of chargepoints turn on or off at exactly the same time, this can cause stability issues for the electricity system. This could happen if, for example, numerous chargepoints responded at the same time to a price signal. To address this issue, we propose including a requirement that all chargepoints have a function that randomly delays how quickly it responds to a signal over a period of time.

2.32 This functionality is already standard in smart meters, where SMETS2 (smart metering equipment technical specification version 2) allows for a configurable randomised offset of between 0 and 30 minutes for any change in price or switch state. Additional regulations on energy suppliers require that a randomised offset of up to 10 minutes is configured by suppliers on meters.

2.33 We propose that the randomised delay function should have a maximum delay of 10 minutes. This could be overridden if, and only if, the chargepoint is responding to particular services that need very fast responses, such as frequency response services, in order to assist the electricity system with stability issues. There could also be exemptions for any public chargepoints that are smart.

2.34 This type of randomised delay function would accord with industry current practice (for example, smart meters) and reduces the costs of system and network operation and risks of power outages.

Consultation questions

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

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

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

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?

Minimum charging current or power

2.35 There are reported problems in some vehicles that if the chargepoint switches off completely, before the vehicle has finished charging, this could mean the vehicle doesn't then restart charging. In order to avoid this problem, we propose introducing a requirement that chargepoints should not reduce the rate of charge below a minimum amount of current or power when connected to the vehicle. This requirement wouldn't apply when the vehicle is in 'Vehicle to Grid' mode where the vehicle is discharging electricity back through the chargepoint.

Consultation questions

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

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

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

Default off-peak charging mode

2.36 Some consumers may not understand or be interested in the benefits of smart charging and the Government does not currently intend to mandate that consumers use the smart functionality of chargepoints. However, requiring a default installation mode where the charging is delayed until a specified off-peak time (such as from approximately midnight to 6am, similar to when many storage heaters turn on) could help consumers engage with smart charging from the moment of installation. It would also mean that if consumers didn't want to engage with changing default settings, then they would at least be charging in a smarter way.

2.37 We propose that domestic (home) chargepoints should, by default, be installed in this way. We also propose that there would be a manual override of this default function. It would not apply to non-domestic chargepoints because standard off-peak times, such as overnight, would be less accessible to such users. For the avoidance of doubt, this function would need to work in conjunction with the randomised delay function.

2.38 Another alternative would be similar - but, rather than delaying charging to off-peak, it would instead reduce charging during peak by default, so the EV would still charge but at a slower rate during peak times.

Consultation questions

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

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

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

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

Safety

2.39 There are existing safety laws and guidance that provide a framework which extends to covering chargepoint installations and products. Some examples are as follows:

a) Electricity Safety, Quality and Continuity Regulations

b) IET Wiring Regulations (BS 7671)

c) IET Code of Practice for Electric Vehicle Charging Equipment Installations

d) Electric Vehicle Conductive Charging System standard (BS EN 61851)

e) Highways and Electrical Registration Scheme (for installations on a public highway)

f) The Low Voltage Directive and Electrical Equipment (Safety) Regulations

g) The Electromagnetic Compatibility Regulations

h) The Health and Safety at Work Act

i) Building Regulations

2.40 Compliance with points (a) – (g) is already required for relevant chargepoint installations under the Government's Electric Vehicle Homecharge Scheme (EVHS).[30]

2.41 There are various safety considerations around EV charging that chargepoint companies consider, such as what warnings and instructions consumers need, what controls are in place in the event of an accident, what waterproofing is required and how current overload can be prevented.

2.42 Smart charging can introduce new safety considerations because it involves a high-energy device being adjusted remotely when owners may not be present or when they may not be observing these adjustments. We therefore propose that, under these Regulations, chargepoints and their installation should be required to be safe. To meet this outcome, chargepoint sellers and installers should have due regard to the above safety framework where relevant.

Consultation questions

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

Q41: Please give reasons for your answer.

[30] https://www.gov.uk/government/publications/electric-vehicle-homecharge-scheme-minimum-technical-specification

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

Q43: Please give reasons for your answer.

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

Vehicle to Grid (V2G)

2.43 V2G is at an early stage of development. Whilst the technology itself is generally accepted as being workable, the viability of V2G business models and impacts of V2G operation on charging equipment, vehicles and the wider system are yet to be confirmed.

2.44 It is clear that V2G solutions could provide significant benefits for the electricity system, as well as potential revenue streams for consumers and/or service providers, in a world where EVs are widespread. Making smart charging the norm for EVs can help to facilitate the notion of V2G as a consumer option, but equally, a prescriptive approach could hamper its development. We are keen to ensure that any smart charging regulations provide adequate space for V2G solutions to continue to develop. For example, we propose to ensure that requirements do not prevent discharging of EVs.

2.45 Similarly, we do not want to restrict other types of advanced smart charging, such as flexibility and balancing services, which could offer additional benefits to consumers.

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?

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?

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.

Monitor and record EV electricity consumption

2.46 Monitoring electricity consumption can help engage consumers with their energy bills and usage. This requirement would ensure that the chargepoint must monitor and record the electricity consumed and/or exported, the time the charging event lasts, and provide a method for the consumer to view this information.

2.47 There is already a similar requirement for public chargepoints under the Alternative Fuels Infrastructure Regulations 2017.[31] These regulations state that "an infrastructure operator must ensure that all recharging points for which that operator is responsible incorporate intelligent metering systems". An 'intelligent metering system' means "an electronic system that can measure energy consumption, providing more information than a conventional meter and can transmit and receive data using a form of electronic communication".

[31] http://www.legislation.gov.uk/uksi/2017/897/contents/made

2.48 The information could be provided to users in various ways, for example through an application, and could be provided on a period basis or in real time. Users could also provide consent for this data to be shared with third parties, such as energy price comparison websites, so that they are able to easily compare smart charging deals.

Consultation questions

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?

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

Enforcement authority and penalties

2.49 We propose to appoint the Office for Product Safety and Standards as the enforcement body because of their national scale and because the Regulations are directly about the sale and installation of products. We propose that the civil penalty for non-compliance is a fine for each non-compliant chargepoint sold or installed, which we consider will provide an effective deterrence.

Consultation questions

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

Q51: Please give reasons for your answer.

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

Q53: Please give reasons for your answer.

Time for compliance

2.50 It is anticipated that chargepoint sellers or installers will need time to adapt their stock of chargepoints to comply with these requirements. We are minded to bring the regulations into force 12 months after they are laid in Parliament.

Consultation questions

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

Q55: Please give reasons for your answer.

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

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?

Other considerations

2.51 We are also interested in your views on the following questions because it might inform the contents of the regulations.

Consultation questions

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?[32] Please explain any issues and any potential solutions.

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

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

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.

[32] The protected characteristics are: age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex; sexual orientation (https://www.legislation.gov.uk/ukpga/2010/15/section/4)

3. Phase Two: Smart charging long-term approach - Call for evidence

3.1 As set out in Chapter 1, as the number of smart chargepoints increases, Government will consider what long-term options may be required to strengthen the levels of protection against cyber security and interoperability risks (paragraphs 1.16 - 1.22). Government takes cyber security extremely seriously and will ensure that appropriate measures are in place well before smart charging could constitute a significant risk to the electricity system and consumers.

3.2 **A long-term solution needs to go beyond device-level requirements for chargepoints, to considering operational requirements on chargepoint operators, or other relevant companies involved in smart charging**. This will ensure that the chargepoint operators are subject to a form of regulation on their wider operations, such as the systems being used to control load, and the organisation's wider resilience to cyber-attack. These operational requirements go beyond the scope of the AEV Act.

3.3 In this chapter we describe the timeline for a decision on the long-term approach, how the decision will be made, and the options under consideration. One option for a long-term approach to EV smart charging is to use the smart meters system to send load control signals to the chargepoints; this is currently the Government's lead option. An alternative option would be to use a combination of regulations and standards (some that already exist that will need amendment and some that will need to be created) to achieve similar outcomes.

3.4 All questions relating to Phase Two are listed at the end of this chapter. Please note that these questions constitute a call for evidence, as opposed to the consultation questions listed in the first two chapters.

Decision on a long-term approach

3.5 The Government proposes to use the proposed objectives set out in paragraphs 1.14-1.15 (Grid Protection, Consumer Protection, Consumer Uptake, Innovation) as criteria to determine the best solution for a long-term approach. As set out in paragraph 1.39, the smart charging market is at a very early stage and evidence of smart charging in operation is limited mostly to trials. There is not yet enough evidence to decide on the long-term approach, and therefore a risk that we stifle innovation in this early market, which is rapidly changing and evolving. The responses to this call for evidence will help to build the evidence base for the decision, alongside ongoing industry fora,[33] innovation projects and other related Government projects and workstreams.

[33] Including the Electric Vehicle Energy Taskforce, whose proposals for smart charging are expected to be available in autumn 2019

3.6 Before determining what the appropriate long-term solution will be, it is important that we determine when the decision on the long-term solution must be made. We consider that a long-term solution needs to be in place by 2025 in order to ensure that adequate regulations and protections are in place, for both the grid and consumers, before large numbers of smart chargepoints are installed. A decision on a long-term solution is therefore likely needed between 2020 and 2022, to allow sufficient time to implement the chosen solution(s) by 2025. After a decision has been made, potential next steps could include consulting on the specifics of the of the decision in 2023 and having fully developed systems and available products in 2024.

Example of indicative timeline leading to long-term solution in place by 2025

2019	2020	2021	2022	2023	2024	2025
Smart charging consultation response	Decision on long term solution, consultation and potential primary legislation			Consulting and regulating on specifics of a decision	Systems fully developed and available products	Long term solution delivered

3.7 We want to provide some indication of when a decision will be taken to provide industry with as much clarity as possible. However, given the limited evidence in this space; ongoing developments that will impact on the smart charging market; and uncertainty over exactly how long it will take to implement a chosen solution(s); it is not possible to provide an exact date for the decision now. Government will consider how to confirm the exact decision point within the proposed interval of 2020-2022 using the responses to this consultation and other sources of evidence. We will consider several factors, including the following:

a. The impact of the decision point in meeting Government's aim and proposed objectives (see Chapter 1) on grid protection, consumer protection, consumer uptake and innovation;

b. The impact of the decision point on the subsequent implementation date i.e. when would a decision point be needed to deliver implementation by 2025;

c. The impact of a decision point on industry development and innovation i.e. an earlier decision may provide clarity for industry sooner (including developing systems, for example advanced functionality for smart meters) but may also hamper further innovation;

d. The impact of a later decision potentially leading to unnecessary investment or to holding back required investment; and

e. The strength of the evidence base at the time of a decision point, bearing in mind this is a dynamic and changing market.

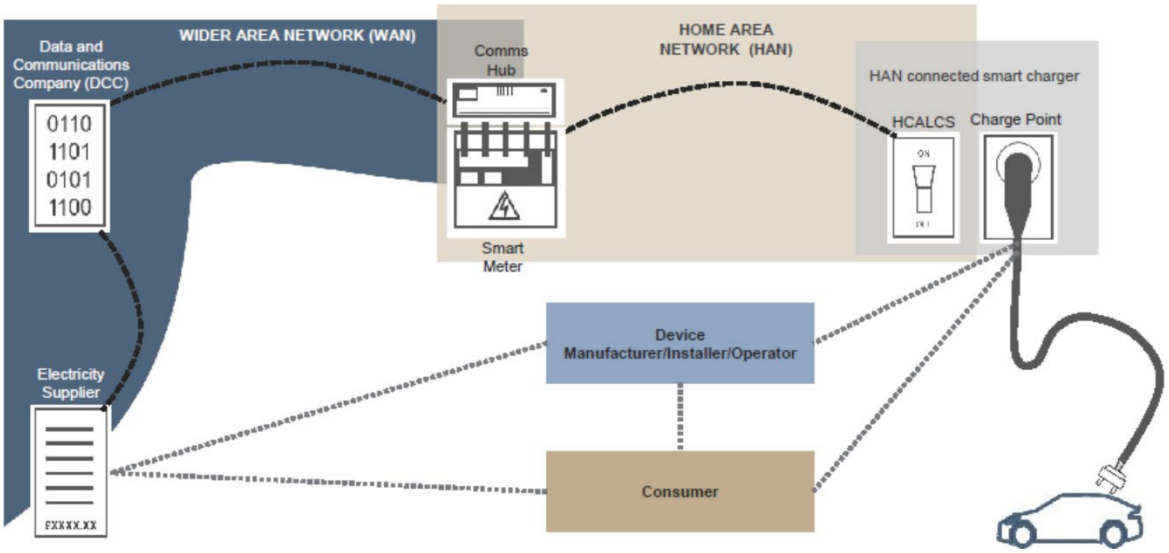
3.8 As the smart charging landscape is still uncertain, we propose to keep the date of a decision point under review.

Using smart meters for EV smart charging

3.9 Smart meters being deployed in GB are capable of sending load control signals to smart chargepoints, instead of the chargepoint carrying out this function independently. BEIS is funding two demonstration projects which will build and trial devices in the context of EV load management, to demonstrate the existing

functionality. Projects are expected to conclude in Spring 2021.[34] Further work will be required to develop further functionality to exploit the full range of smart charging benefits, such as V2G. An early decision to use smart meters for EV smart charging would help this advanced functionality to be developed sooner.

3.10 The smart metering system could deliver a solution for EV smart charging which achieves full interoperability for consumers and end-to-end cyber security - achieving the objectives on Consumer Protection and Grid Protection. As an existing system that is already capable of meeting two of the four proposed objectives, we can see advantages in selecting the smart metering system as the long-term solution for EV smart charging. The smart meters system also already has a governance framework and communications network in place. An assessment of using the smart meters system against the objectives is set out further below.



Grid Protection

3.11 From the perspective of cyber security, the smart metering system delivers a strong offering. The systems-based approach, independent assurance regime and governance structure means that the risk of a cyber-attack impacting the system is low. The smart metering system also includes a randomised delay function, reducing the risk of multiple load control signals being sent simultaneously, and providing additional grid protection as a result.

3.12 It is worth highlighting that, if smart charging load control signals were sent through the vehicle rather than the chargepoint, such signals, and the users who send them, would bypass the chargepoint requirements. It is likely that alternative solutions beyond smart chargepoint regulation are needed to ensure cyber security and wider operational requirements for situations where smart charging is controlled by methods other than via the chargepoint.

Consumer protection

3.13 The smart metering system provides a fully interoperable solution between the users of the central communications system (known as the DCC[35]), which is a key element of the consumer protection objective. This is achieved through the specification of minimum functional requirements of devices, a common device language and a

[34] Detailed information relating to how the smart metering infrastructure could provide a solution to EV charging is in Annex D
[35] https://www.smartdcc.co.uk/

single national data and communications network and common interface for users. This is all open source.

3.14 At present, the users who can access the load control elements of the system are licenced energy suppliers. Today, there are several smart EV charging networks in use, many of which are not managed by traditional 'energy suppliers', but instead by 'chargepoint operators' or 'electricity aggregators'. There would therefore need to be Government decisions, as well as changes to the DCC, to allow these entities to access the system to deliver interoperability in the context of smart EV charging.

3.15 As stated in Chapter 1, there are existing laws and measures for safety and data privacy that would apply to smart charging and the smart meter system also has additional protections in place for consumer privacy, data access and other protections. The smart metering arrangements also include a data access and privacy framework ensuring appropriate requirements are in place to safeguard consumer privacy.

Consumer uptake

3.16 As explained previously, it is important that any solution for smart charging does not have an adverse effect on consumers or businesses looking to purchase electric vehicles and chargepoints.

3.17 To be part of the smart meter system, smart meter manufacturers and energy suppliers must ensure that their products and processes meet physical, operational and regulatory requirements. Assurance is provided through several different testing regimes - for example, smart meter products must undergo independent Commercial Product Assurance (CPA)[36] testing to confirm they meet cyber security requirements. The same products must be tested by energy suppliers, to ensure interoperability and interchangeability. There are requirements on energy suppliers with regards to becoming a DCC User laid out in the Smart Energy Code and these are independently assessed by a Competent Independent Organisation.[37] Energy suppliers are required by their licence to ensure that the smart meters they install in homes, and the way in which they communicate with the smart meters, meet all the necessary requirements. There is potential to open the smart metering system to parties other than suppliers who want to perform load control. However, as with smart meters, or any alternative system, there are likely to be requirements placed on these actors which deliver similar outcomes on cyber security and consumer protection.

3.18 At the moment, the current generation of smart meter ("SMETS2") is required to be present for a smart chargepoint to work through it. The smart meter rollout is progressing[38] and the national smart metering communications network provides coverage to 99.25% of properties in GB. Smart meters are available on request by a consumer.

3.19 Regarding use of smart meters for public charging, work places and businesses, there is no technical barrier to deploying a smart meter solution. However, this issue would require further consideration and consultation before commitment of smart meters in these areas (where they are currently not commonplace). Further consideration would also need to apply to use cases that don't contain ordinary meters, such as lamppost charging.

3.20 Additionally, the GB smart metering system is specific to Great Britain and has been developed and tailored as such, whereas chargepoint manufacture and operation is a

[36] https://www.ncsc.gov.uk/information/commercial-product-assurance-cpa
[37] https://www.smartdcc.co.uk/customer-hub/becoming-a-dcc-user/
[38] The DCC reported that the one millionth SMETS2 meter connected to their system on 22 May 2019.

worldwide market. There is a risk that a set of smart requirements specific to GB could discourage foreign chargepoint manufacturers from entering the GB market. However, this risk didn't materialise in the Smart Meter market where there has been significant investment and global participation, with the market keen to act given a framework within which to innovate. Additionally, as with any electrical/electronic product, there is always a degree of localisation depending on the geography it is deployed in. Manufacturers are adept at making platform products that can be easily localised.

3.21 A decision on the smart meter roll-out in Northern Ireland has not yet been taken. Depending on when this decision happens and what the result is, an alternative solution for smart charging could be required to ensure similar outcomes in Northern Ireland.

Innovation

3.22 As described in Chapter 1, smart charging and EV chargepoints are developing in a nascent and dynamic market, with various approaches and technologies emerging. The smart metering system imposes a wide suite of requirements on users and manufacturers in the space. This approach is proven to be effective in delivering a secure and interoperable system, and provides a framework within which industry can innovate, albeit within a chosen method of communications. To meet objectives on security and interoperability effectively, a single method of communication could be required. However, we also need to avoid hampering innovation.

3.23 To be able to confirm smart metering, or any alternative solution, as an enduring long-term option for smart charging, Government would need confidence that the system would not preclude innovative approaches to smart charging and emerging technologies. In a world where hundreds of thousands of electric vehicles will be charged each day in the UK, further functionality would need to be developed to deliver dynamic demand side response technologies, in particular vehicle-to-grid. It is also possible that functionality would need to be developed for reporting back EV chargepoint power consumption separately from the total house consumption. Where any of these changes require changes to the DCC, system implementation is expected within 12 months from the point at which the requirements (once developed by industry using the existing change governance process) have been approved. Such DCC changes are likely to need a phase 2 decision to using smart meters for smart charging before they are likely to be developed. As and when further developments in the smart charging market result in new desired functionality, the DCC could undergo a similar process of adaptation.

Conclusion

3.24 The smart metering infrastructure is in a strong position to achieve two of Government's key objectives for smart EV charging. It would be an interoperable solution, which is a key element of our Consumer Protection objective. It would provide a high level, end-to-end cyber security, a key element of our Grid Protection objective. There is a good argument for building an enduring solution from the basis of the smart metering system.

3.25 There are, however, challenges to overcome for this solution to meet all of our objectives in a comprehensive way. In the short-term, one example is the introduction of functionality for proportional load control that is beneficial for the smart control of all loads (including EVs). There are changes that would need to be in place and to meet all objectives in a comprehensive way. New functionality can be developed once confirmed as Government's enduring approach, including potentially permitting

load control to non-energy suppliers. Whilst there will undoubtedly be challenges with using the smart metering system, at present government considers these are likely to be lower than in any alternative solution, given stated objectives on interoperability and security.

Alternative options

3.26 We have described how the smart metering system is an option to deliver smart charging for the long-term. We want to collect evidence on what other options could also be viable, with the aim of meeting the proposed objectives set out in paragraph 1.15.

3.27 For an alternative solution, it is clear that wider governance for smart operations, including requirements for cyber security and interoperability are key to meeting Government objectives in the longer-term. **These are important considerations for a solution that could persist beyond smart operation of EV chargepoints;** smart appliances, and effective demand side response in general (including smart charging through the vehicle), could all be impacted by long-term approaches in this area. Alternative solutions and options could either require specific technology or could be technology neutral, if they are still able to meet our proposed objectives.

3.28 Alternative options would involve using a different communications system or systems, such as via the chargepoint, rather than the smart meter system. In this section, we describe existing initiatives and regulations related to cyber security and consumer protection in the context of electricity. We consider that an alternative solution could arise from upcoming changes to these regulations, and that a combination of these regulations potentially alongside new regulations, building on the device-level requirements described for Phase One and with an appropriate enforcement regime, could achieve a solution that delivers similar outcomes to a smart meter system.

3.29 The alternative approach hasn't been judged against the four objectives, as this approach is not mature enough for a fair assessment. This contrasts with the smart meter system, which already exists and where there is a clearer understanding of how this option would work and how it would deliver against the objectives. In the absence of a clear alternative solution that can deliver on the proposed objectives, and how long this would take to develop, the smart meter system is currently the Government's lead long-term option.

BSI Standards

3.30 As explained in Chapter 2, Government has commissioned BSI to produce standards for smart appliances, including smart EV chargepoints, in an industry led process. Alongside the classification standard for device-level requirements, this includes a framework standard for operators of smart charging services. The standards seek to address the principles of grid stability, cyber security, interoperability and data privacy of smart appliances and operators of smart (demand side response) services in general.

3.31 Government could use these BSI standards as part of a basis for a long-term approach to smart charging and demand side response in general. These could work in combination with other regulations and codes, which are described below.

NIS Regulations

3.32 For cyber security, a regulatory regime aimed at the security and resilience of essential services has been created through the Security of Network and Information Systems (the "NIS Directive"). The NIS Regulations, which came into force in May 2018, provide legal measures to enhance the overall level of security (both cyber and physical resilience) of network and information systems that are critical for the provision of digital services and essential services, including services in the energy sector. The NIS Regulations establish multiple competent authorities, which are responsible for oversight and enforcement of the Regulations in each relevant sector. BEIS and Ofgem are joint competent authorities for England, Scotland and Wales in this regime, and in Northern Ireland the Department of Finance (NI) perform this role.

3.33 Operators of Essential Services (OESs) are defined as falling within scope of the Regulations, and for the electricity subsector, these currently include National Grid, suppliers, Distribution Network Operators (DNOs), interconnectors and large generators.[39] OESs are required to take appropriate and proportionate technical and organisational measures to manage the risks posed to the security of the network and information systems which they use in their operations. The smart metering system has been determined by the competent authorities in England, Scotland and Wales to meet the requirements in the NIS.[40] OESs are also required to notify significant incidents. Where organisations fail to comply, they can be subject to a maximum fine of £17 million in the UK.

3.34 The National Cyber Security Centre (NCSC) developed the Cyber Assessment Framework (CAF), a tool to assist with the assessment of the security measures that an organisation has in place. The CAF is based on structured sets of Indicators of Good Practice (IGPs), based on 14 security principles that cover four areas: managing security risk, defending systems against cyber-attack, detecting cyber security events and minimising the impact of cyber incidents.

3.35 In the electricity subsector, the NIS Regulations currently apply to the entities mentioned previously, but not necessarily to chargepoint operators, and not to any service operated beyond the meter. Assessing the scope of the NIS Regulations will form part of an upcoming review, to be undertaken by the Department for Digital, Culture, Media and Sport (DCMS).

[39] Customer and gigawatt thresholds are defined in the NIS Regulations 2018.
[40] The competent authority for Northern Ireland has not reached this determination.

NIS Regulations Review

The Network and Information Systems Regulations (NIS Regulations 2018) aim to strengthen the resilience of essential services in the energy, transport, water, health and digital infrastructure sectors, and key digital service providers. Companies that meet the thresholds in the NIS Regulations are deemed Operators of Essential Service (OES) and are required to put appropriate security measures in place and report significant incidents that occur.

BEIS and Ofgem are joint competent authority for the electricity sector for England, Scotland and Wales. BEIS has published a NIS policy document which sets out high level principles for compliance and the thresholds and process for reporting incidents. Ofgem followed with more detailed guidance to support OES with their cyber security provisions under the regulations.

DCMS will carry out a post implementation review of the NIS Regulations by May 2020. The purpose of this review is to assess whether the NIS Regulations are effective in ensuring the protection of networks and information systems that are critical to the provision of essential services and relevant digital services. In the Government response to the public consultation that was carried out before the drafting of the NIS Regulations, the Government made a commitment to use the 2020 review to consider extending the scope of the NIS Regulations to additional sectors.

ADE Code of Conduct

3.36 Voluntary measures for cyber security of demand side response services also exist today. The Association for Decentralised Energy (ADE) are the leading trade association for decentralised energy, representing more than 140 parties from across the industrial, commercial and public sectors, including aggregators. The ADE launched a voluntary demand side response Code of Conduct for aggregators last year, and in May 2019 launched the compliance regime behind the code, called Flex Assure.

3.37 The code aims to set common standards for electricity aggregators, to provide assurance to those using their services. One area in which the code tried to achieve this is technical due diligence, which includes operational elements relating to cyber security.

3.38 Initially, Flex Assure will apply to commercial, industrial and public sector energy users. The intention is to extend Flex Assure into the domestic DSR market as it develops in the near future.

Future Energy Retail Market

3.39 In relation to consumer protection considerations, BEIS and Ofgem are currently reviewing the energy retail market (see below). The review could have implications on products included as part of 'bundles' from energy suppliers, which can include EV chargepoints.

Future Energy Retail Market Review

As part of the Secretary of State for BEIS's Energy White Paper, the Government wants to see an energy system which fully harnesses the power of competition, drives continual innovation, is fair, safeguards the most vulnerable and delivers clean affordable energy consistent with its climate goals. In November 2018, the Secretary of State for BEIS launched a joint review with Ofgem to investigate what policy, legal and regulatory changes might be needed to deliver these goals in the energy retail market. The review is looking to ensure that the energy retail market is fit for the future and will enable consumers to take advantage of the increased flexibility and lower costs of the smart, low-carbon energy system, whilst appropriately safeguarding all consumers.

How the energy retail market operates will determine the products and services that individual customers and businesses can buy. We need services that maximise opportunities to speed up and reduce the cost of energy transition, which deliver value and choice. We also must ensure proportionate protection for all customers. It is about putting consumers at the centre of a smart, low-carbon energy system. The review will join up with Government and Ofgem's existing work programme, the review of energy industry codes and codes governance, and Government's Energy Data Taskforce.

BEIS and Ofgem plan to publish a consultation document this summer. The document will mark the mid-point of the review and set out the emerging thinking on challenges, available options, and how they might fit together. Stakeholders' views and evidence to the questions will help inform the next consultation on more developed reforms later in 2019.

3.40 As outlined in paragraph 1.20, one of the key concerns for Government is where a consumer could find it difficult to switch energy supplier due to a lack of interoperability of their smart chargepoint or other smart charging method. For example, this could occur if an energy supplier offered a smart chargepoint bundled with an energy tariff, where a customer could be disincentivised to switch supplier - perhaps because they would lose smart functionality if doing so.

3.41 Ofgem do not currently have any rules specific to bundled products as part of energy supply licenses, however there is a requirement present in the licence conditions that the costs of non-optional bundled products are included in the estimated annual costs for customers, so that energy consumers understand their annual consumption and costs.

3.42 Ofgem and Government consider a consumer's right to switch to be fundamental, and the energy component of a bundled product remains subject to all the same conditions and regulatory requirements as a non-bundled product. As Ofgem moves towards more principles-based regulation, it is expected that companies need to ensure product-bundling does not lead to poor customer outcomes with regards to their choice of tariffs. In specific cases, suppliers may ask for a derogation of a licence requirement in relation to a bundled product, but this would be assessed on a case by case basis and would not be granted unless a supplier could demonstrate there would not be any adverse consumer outcomes.

Smart meters as the current lead option for a long-term solution

3.43 The smart meter system could provide an enduring solution for the smart charging of EVs, and Government is confident that this system would be highly secure and interoperable. The system already exists, and smart charging demonstration projects will conclude shortly.

3.44 The alternative options and approaches discussed above are not yet mature enough to demonstrate they could adequately mitigate concerns regarding cyber security and interoperability. An alternative approach could avoid some of the current drawbacks of the smart meter approach, such as alternatives being technology neutral and potentially providing increased scope for innovation. However, there are challenges around developing a new approach:

a. As a framework connecting the above elements does not exist, it remains uncertain how difficult, time consuming and costly it would be to use an alternative approach compared to making the required changes to the existing smart meter system;

b. It is not clear if this approach could provide equal or better outcomes across the smart charging objectives compared to a smart meter approach;

c. It is not clear if this approach could meet the smart charging objectives by 2025.

3.45 **Therefore, this consultation proposes that, based on current evidence, use of the smart meter system for smart charging is the Government's current lead option for the longer term (by 2025).** Other options will continue to be considered until a decision is made, potentially between 2020 and 2022. The Government, however, would need to be confident that other options could deliver similar outcomes to smart meters on cyber security and interoperability, as well as achieving all smart charging objectives.

Call for evidence questions

Decision on a long term approach

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.

Q63: What is your preferred year for a decision?

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

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

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.

Using smart meters for EV smart charging

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?

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

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?

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?

Alternative options

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?

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?

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.

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

Smart meters as the current lead option for a long-term solution

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

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

4. AEV Act Powers - Transmission of data relating to chargepoints - Call for evidence

Background

4.1 This section is about transmitting chargepoint location and energy data to relevant specified parties, who could include the Electricity System Operator, Transmission Owners or Distribution Network Operators (DNOs), in order to forecast chargepoint usage and locations.

4.2 To be able to effectively manage a smart and flexible energy system it is critical that the relevant parties have sight of what is connected to the network, where it is connected, and the impact the use of the appliance will have on the network. EVs are a new, increasing demand on the energy system. Without the above, network operators are unable to prepare and ensure their network can cope with the increased additional demand. If network operators know when and where EV chargepoints are connected to their network they will be able to strategically target any required reinforcement works, rather than having to respond to critical constraints; ultimately saving consumers money.

4.3 It is Government's view that sharing of data that enables network operators to plan and maintain their networks efficiently should be done in a way that provides maximum benefits at least cost to the consumer. The Government is still exploring what minimum data should be shared between relevant parties to achieve this. Government is considering what this data may include, and currently views the following as potentially useful: chargepoint location, chargepoint installation date, chargepoint power rating, chargepoint live consumption data. This consultation notes the outputs from the Energy Data Taskforce,[41] which has recommended actions for the energy sector (government, regulator and industry) to ensure that energy system data is shared between all participants openly and adheres to common minimum standards.

4.4 This section is a call for evidence with questions such as what the perceived benefits and disadvantages are of introducing these regulations and what factors should be used to determine when, and if, regulations (under AEV Act) are introduced. It will also ask what other arrangements could be used to achieve similar benefits.

4.5 For reference, the provisions under section 14 of the Act read as follows:

[41] Energy Data Taskforce - https://es.catapult.org.uk/news/energy-data-taskforce-report/

14 Transmission of data relating to charge points

(1) Regulations may make provision for the purpose of ensuring the ongoing transmission of charge point data to a prescribed person or to persons of a prescribed description.

(2) "Charge point data" means prescribed information relating to a charge point (which may include information about energy consumption and geographical information).

(3) Regulations under subsection (1) may impose requirements—

(a) on operators of charge points that are provided for use by members of the general public, and

(b) in relation to charge points that are not provided as mentioned in paragraph (a), on prescribed persons or persons of a prescribed description (subject to subsection (4)).

(4) Regulations under subsection (1) may not impose requirements on owners or occupiers of domestic premises.

(5) Regulations under subsection (1) may make provision about when, how and in what form charge point data is to be transmitted.

4.6 The regulations can set out, for example:

- What chargepoint data should be transmitted. This can include energy consumption data and geographical information.
- When, how and in what form the data is transmitted. For example, to help ensure data privacy, the regulations could require that the information be anonymised.
- Who the data should be transmitted to. This could be, for example, the relevant organisations that manage the electricity grid and networks, such as the Electricity System Operator, Transmission Owners or Distribution Network Operators (DNOs).
- Who the requirements are imposed upon. This could be relevant organisations that have control of the data and could include an energy company or chargepoint operator. There is no intention to place the obligation on a domestic consumer, as this is prohibited in the AEV Act.

4.7 Having access to accurate chargepoint data, such as geographical and live consumption data, could help ensure better electricity network planning; resulting in a fairer deal for energy consumers. This information, combined with information on network capacity availability, could help to plan strategic chargepoint infrastructure deployment to encourage uptake of EVs. The benefit of these regulations would be ensuring the relevant parties have access to the information required to achieve this.

4.8 Obligating those that can provide the data (e.g. chargepoint operators) to share it with prescribed parties is likely to place additional administrative burdens in comparison to ad-hoc market arrangements, but may be required in the future to ensure sufficient data provision.

4.9 As more smart chargepoints are installed, the Government expects to see the market provide this data to third parties, including those who manage the electricity network. We are monitoring how the market develops in this area.

4.10 We would like to collect more evidence on when intervention should take place, if required. For example, the My Electric Avenue[42] project found that across Britain

[42] My Electric Avenue Project - http://myelectricavenue.info/

32% of local electricity networks will require intervention when 40%-70% of customers have EVs.

Call for evidence questions

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

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

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

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

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.

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

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

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

What will happen next

A summary of responses, including the next steps, will be published within three months of the consultation closing. Paper copies will be available on request.

If you have questions about this consultation please contact:

Office for Low Emission Vehicles

Department for Transport

Great Minster House

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London

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Annex A: Impact assessment

A.1 A final-stage detailed impact assessment will be published before regulations are introduced. To access the impact assessment that was developed prior to the introduction of the AEV Act, please use the following link: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/590714/ulev-modern-tranport-bill-consultation-impact-assessment.pdf

A.2 When responding to the consultation, please comment on the analysis of costs and benefits, giving supporting evidence wherever possible.

A.3 Please also suggest any alternative methods for reaching the objective and highlight any possible unintended consequences of the policy, and practical enforcement or implementation issues.

Annex B: Full list of consultation questions and call for evidence questions

Chapter 1 - Introduction and objectives

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

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

Q03: Do you agree with the proposed Consumer Protection objective?

Q04: Do you agree with the proposed Consumer Uptake objective?

Q05: Do you agree with the proposed Innovation objective?

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.

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

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

Chapter 2 - Phase One: Using the AEV Act powers to develop device-level requirements

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

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

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?

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.

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

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

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?

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

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?

Q18: Please give reasons for your answer.

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

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

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

Q22: Please give reasons for your answer.

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

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

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?

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

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

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

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

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

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

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?

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

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

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

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

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

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

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

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

Q41: Please give reasons for your answer.

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

Q43: Please give reasons for your answer.

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

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?

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?

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.

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?

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

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

Q51: Please give reasons for your answer.

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

Q53: Please give reasons for your answer.

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

Q55: Please give reasons for your answer.

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

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?

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?43 Please explain any issues and any potential solutions.

[43] The protected characteristics are: age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex; sexual orientation (https://www.legislation.gov.uk/ukpga/2010/15/section/4)

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

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

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.

Chapter 3 - Phase Two: Smart charging long-term approach - Call for evidence

Decision on a long term approach

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.

Q63: What is your preferred year for a decision?

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

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

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.

Using smart meters for EV smart charging

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?

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

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?

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?

Alternative options

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?

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?

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.

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

Smart meters as the current lead option for a long-term solution

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

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

Chapter 4 - AEV Act Powers - Transmission of data relating to chargepoints - Call for evidence

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

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

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

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

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.

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

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

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

Annex C: Detailed explanation of a smart meters approach for EV load control

Information about smart meters for EV load control

C.1 This section sets out how the smart metering system achieves interoperability and a high-level of cyber security, as well as planned changes that could help for EV smart charging.

The Smart Metering System is fully interoperable

C.2 Interoperability is achieved in three ways:

- **Functional:** devices all contain the same minimum functions (e.g. number of registers, prepayment, half hourly recording of consumption data etc) and this is achieved through the requirements set out in the smart metering equipment technical specifications (SMETS).
- **Technical:** devices communicate with each other using the same communications protocols and underlying data model. This is set out in the Great Britain Companion Specification (GBCS), compliance with which is a SMETS requirement.
- **Interface:** energy suppliers (and other system users) communicate via a central communications system, provided by the Data and Communications Company (DCC) using the same interface specification (i.e. a common set of messages, all of the same format, regardless of supplier). This is achieved through the DCC User Interface Specification (DUIS).

C.3 Interoperability provides several benefits including:

- Retention of smart services for consumers when they switch energy supplier
- Reduced device stranding risk
- Greater assurance of delivering security outcomes than would be the case with a non-interoperable solution
- Efficiencies from rationalisation of smart metering interfaces and processes within meter operator and energy supplier businesses i.e. a single user interface rather than the multiple interfaces which would need to be maintained to communicate with different inherited devices each with their own systems.

The Smart Metering System delivers high level, end-to-end security.

C.4 Government considered cyber security as fundamental to the successful development and the wide adoption of Smart Metering System devices. The deployment of large numbers of devices with the ability to switch loads presents a risk to the devices and networks they connect to as well as to the entire electricity

system. To mitigate these risks, the Smart Metering model established physical, regulatory and operational security controls backed by independent security assurance (some of which are listed below) to ensure no single compromise could have a systemic or significant impact:

C.5 Physical

- A system that only authorised parties, such as energy suppliers and network companies can access.
- Appropriate access control to ensure parties are only given access to those parts and functions of the system they require.
- The use of digital signatures and encryption of sensitive data to provide authenticity, integrity and non-repudiation;
- Two-party authorisation of important messages to devices to prevent any potential for an intermediary to intercept and change the message;
- A restriction on the location of operations that send supply-affecting commands to devices;
- Anomaly detection to detect and block unusual patterns or above average volumes of the different types of message;
- Randomisation of load switching, a control to protect against frequency spikes impacting national grid.

C.6 Regulatory

- Creation of the Smart Energy Code and appropriate license conditions relating to security to ensure an appropriate regulatory framework is in place to mitigate the risks.
- Creation of the Smart Energy Code Panel and various Sub-Committees, independent of Government and composed of experts from industry to oversee all aspects relating to security.
- All organisations connecting to the Smart Metering system must undergo a security assessment (prior to connecting and during their operation). The scope and frequency of the assessment is determined by the nature of the organisation's role. Those that can perform load control (currently only energy suppliers), have licence conditions requiring additional security controls appropriate to the risk.
- Key devices within the system, such as those that can control electricity load are required to undergo a device specific assurance process under the Commercial Product Assurance scheme run by NCSC. Devices are assessed against a set of Security Characteristics and also a Build Standard to assure the engineering principles and practices product developers have followed to create a secure product.
- If a product is certified, an ongoing Assurance Maintenance process is implemented to ensure that any change made to the product or Build Standard process during its certification period, which has a material impact on security, undergoes re-evaluation by an independent, accredited body.

C.7 Operational

- Development and maintenance of an overarching security risk assessment to ensure emerging and future security threats are appropriately addressed. This is in turn informed by an annual threat assessment provided by National Cyber Security Centre. Smart metering regulations require that a review of the security risk assessment is undertaken at least annually by the SEC Panel Security Sub Committee.
- Development and maintenance of an end-to-end security architecture. Smart metering regulations require that a review of the end-to-end security architecture is undertaken at least annually by the SEC Panel Security Sub Committee.
- Each organisation must carry out an assessment of their processes for the identification and management of risk at least annually.
- Each organisation, both prior to and regularly thereafter, adhere to specific, defined security requirements set out in regulations and are independently assessed against them; This includes the implementation of international standards and common industry good practices such as 27001;

C.8 An analogous set of risks exists for smart EV charging, which could be mitigated by managing vehicle charging via the Smart Metering System or learning from the experience to ensure that equivalent security outcomes are obtained. This will be done in cooperation with leading experts in industry and Government including the National Cyber Security Centre (part of GCHQ).

Existing Smart Meter functionality provides for load control

C.9 Smart meters already provide for any load, such as electric heating or an electric vehicle, to be connected and controlled independently from a consumer's main supply. This is done through an auxiliary load control switch (which is standard capability within SMETS2 smart meters) or could be part of an independent device connected to the meter via the home area network (HAN connected ALCS or HCALCS). These switches currently provide for two levels of control, which could be set at either "on" and "off" or for example 80% and 100% of full charge rates, as determined by the energy supplier or procurer of the device. Where a SMETS2 meter is installed, ALCS and HCALCS functionality is ready and available for industry to use. HCALCS switches could also be layered within a single device to provide more than two levels (i.e. more granular) control.

C.10 Smart meter load control functionality is already being used for electric heating. To show how a secure, interoperable system for load control could work in practice for smart EV charging, BEIS is funding two demonstration projects which will build and trial ALCS devices in the context of electric vehicle load management. As well as demonstrating existing functionality, these projects are expected to develop learning on the limitations to current ALCS functionality in the context of smart charging and should build understanding of the requirement for additional functionality. Projects are expected to complete and share learnings in Spring 2021. BEIS expects this demonstration will also inform industry's position as to whether a readymade system is more cost effective in delivering security and Interoperability objectives compared to developing alternative, commensurate systems to deliver the same objectives.

Smart Meter systems compatibility with delivery of frequency of response

C.11 Frequency Response (FR) functionality is not detailed in the smart metering equipment technical specifications (SMETS), and some in industry have taken this to mean that a device interfacing with or being operated via the smart meter system could not perform FR. BEIS does not believe this to be the case. Where frequency response functionality is required, it can be built into the load or device controlling that load (e.g. the smart EV charger). This would mean there is capability within the device to monitor and respond to changes of frequency within pre-set thresholds. As such, and at its simplest, an ALCS/ HCALCS could be used to turn the FR function on and off. If any additional FR functionality is required (e.g. configuring frequency thresholds, additional more granular data recording requirements) then SMETS and DCC system changes would be required, though BEIS does not see an immediate need or justification for this at present. Regarding verification of provision of frequency response services, BEIS understands there are various options to provide this, but one option is to us existing consumption data (available at 10 second intervals) provided by the smart meter accessible over the home area network.

BEIS intends to introduce enhanced proportional load control functionality into the smart metering system, which is expected to be in place by summer 2020.

C.12 BEIS proposes to add devices to the smart metering technical specifications, which will provide for more proportional load control functionality. These new devices will build upon existing ALCS and HAN-connected ALCS devices, by extending their binary control to more granular proportional control capability. Engagement with industry suggests there is a clear requirement for proportional control functionality and that this functionality is relatively easy to define.

C.13 Pending finalisation of definition of the requirement with industry, and assessment of costs of DCC system changes, BEIS expects to publish the revised SMETS in summer 2019, meaning industry would be able to begin designing and manufacturing relevant devices from this point. Publication of revised SMETS will also initiate the DCC system changes and testing, which are expected to be in place ready for use by summer 2020.

Smart metering has a governance structure in place which facilitates enduring change whilst maintaining interoperability

C.14 The smart metering system is open source and governed by a multi-party contract (the Smart Energy Code) and associated governance (a code Panel and various sub-committees including on security, technical and operations). This has been developed over a number of years and avoids the need for industry parties to develop many bilateral contracts with each other and provides a consistent framework for operation and development of the system.

C.15 The Smart Energy Code contains a change process and governance (a change sub-committee) that enables all Parties to propose and manage change to core functionality of devices, systems and processes while being consistent with maintaining interoperability and security requirements. Without such a common, open source system, future development that preserves interoperability would not be possible.

Timelines for delivering further change

C.16 With regards to the implementation of any further minimum, common functionality for smart EV charging not already provided by the smart metering system (e.g. common vehicle to grid arrangements or provision of load control access to non-energy suppliers), then where these require changes to the DCC system implementation is expected within 12 months from the point at which the requirements (once developed by industry) have been approved.

Annex D: Consultation principles

The consultation is being conducted in line with the Government's key consultation principles which are listed in the following link:
https://www.gov.uk/government/publications/consultation-principles-guidance

If you have any comments about the consultation process please contact:

Consultation Co-ordinator
Department for Transport
Zone 1/29 Great Minster House
London SW1P 4DR
Email consultation@dft.gsi.gov.uk

Annex E: Draft regulations

DRAFT STATUTORY INSTRUMENT

2020 No.

ROAD TRAFFIC

The Electric Vehicles (Smart Charge Points) Regulations 2020

Approved by Parliament

Made - - - - ***

Laid before Parliament ***

Coming into force in accordance with Regulation 1

The Secretary of State, in exercise of the powers conferred by sections 15, 16, 17 and 18 of the Automated and Electric Vehicles Act 2018 (**a**) ("the 2018 Act"), makes the following Regulations.

In accordance with section 18(4) of the 2018 Act, a draft of this instrument has been laid before Parliament and approved by a resolution of each House of Parliament.

The Secretary of State has consulted such persons as the Secretary of State considered appropriate in accordance with section 18(3) of the 2018 Act before making these Regulations.

PART 1

Introduction and application

1.These Regulations may be cited as the Electric Vehicles (Smart Charge Points) Regulations 2020 and come into force on [date].

Interpretation

2.In these Regulations—

"enforcement authority" means the Secretary of State or any person authorised by the Secretary of State in accordance with regulation 14;

"certification body" means a person authorised by the Secretary of State to carry out the functions referred to in regulations 8 and 12 or, if no such person has been authorised, the Secretary of State;

"cyber attack" means exploitation of a charge point's smart functionality or of systems or networks connected to it to cause harm or disruption;

"domestic charge point" means a private charge point in a residential building;

"off-peak hours" means [to be confirmed];

(**a**) 2018 c. 18.

"private charge point" means a charge point which is not a public charge point;

"public charge point" means a charge point which is provided for use by members of the general public;

"remote access" means access to a charge point using its smart functionality;

"smart functionality" means the ability of a charge point to—

(a) send and receive information and;

(b) respond to messages by adjusting the rate of electricity flowing through the charge point; and

"usage data" means information of the kind referred to in regulation 13(1).

Application

3.—(1) These Regulations apply to private charge points.

(2) These Regulations, other than Regulations 5, 9 and 11, apply to public charge points which have smart functionality.

(3) These Regulations do not apply to electrical cables unless—

(a) the cables are capable of charging a vehicle that is capable of being propelled by electrical power derived from a storage battery; and

(b) the cables have smart functionality.

(4) These Regulations do not apply to—

(a) the sale of a charge point before [date]; or

(b) the installation of a charge point before [date].

(5) These Regulations do not apply to the sale of charge point which is to be exported outside of the United Kingdom and which is not intended for use within the United Kingdom at any time.

PART 2

Requirements in relation to charge points

Sale and installation of charge points

4.—(1) A person must not sell a charge point that they know, or ought to have known, does not comply with the requirements set out in these Regulations(**a**).

(2) A person must not install a charge point that they know, or ought to have known, does not comply with the requirements set out in these Regulations.

Requirement for charge point to be smart

5. A private charge point must have smart functionality.

Security and standards

6. A charge point must comply with the security requirements in the Schedule.

(**a**) The meaning of "sell" is set out in the Automated and Electrical Vehicles Act 2018 c.18, section 15.

7.—(1) A charge point must comply with [BSI standard](**a**).

(2) Any requirement in these Regulations for a charge point to comply with [BSI standard] can also be satisfied by compliance with an equivalent standard or code of practice of a national standards or equivalent body.

8.—(1) A charge point must not be sold or installed unless it has been certified by the certification body as being in compliance with—

(a) the security requirements in the Schedule; and

(b) such of the provisions of [BSI standard] as relate to security.

Operational requirements

9.—(1) A private charge point must be configured in a way which—

(a) ensures that when it responds to information received by it by adjusting the rate of electricity flowing through it, it operates with a random delay of up to [x] minutes; and

(b) permits the user of the charge point to override the random delay.

10.—(1) A charge point must be configured in a way which ensures that when a charge point is charging a vehicle, it operates with a minimum charging current of [details to be added].

11.—(1) A domestic charge point must be configured in a way which—

(a) ensures that, as a default, it charges a vehicle during off-peak hours regardless of what time the vehicle is first connected to the charge point; and

(b) allows the user of the charge point to override the default mode of charging during off-peak hours.

12.—(1) A charge point must be configured in a way which enables operation of the charge point to be switched between charge point operators by remote access and without the need for a visit to the location of the charge point.

(2) A charge point must not be sold or installed unless it has been certified by the certification body as being in compliance with the requirements of paragraph (1).

13.—(1) A charge point must incorporate a metering system by which, on each occasion the charge point is used, it monitors and records—

(a) the electricity it has consumed or exported (as the case may be); and

(b) the amount of time for which the charge point is consuming or exporting electricity.

(2) A charge point must be configured in a way which enables the user of the charge point to view the information referred to in paragraph 1 at the point of using the charge point.

PART 3

Enforcement

Enforcement Authority

14.—(1) These Regulations must be enforced by the Secretary of State.

(2) The Secretary of State may authorise in writing any person who appears suitable to act on the Secretary of State's behalf to—

(a) carry out any function under these Regulations, other than those in Regulation 24; and

(b) exercise any of the powers provided by these Regulations.

(**a**) [reference to BSI standard].

Power of enforcement authority

15.—(1) An officer of the enforcement authority may enter premises to which the public has access in order to observe the carrying on of a business on those premises.

(2) The power in sub-paragraph (1) may be exercised at any reasonable time (whether or not the public has access at that time).

(3) The power of entry in sub-paragraph (1) may be exercised without first giving notice or obtaining a warrant.

16.—(1) An officer of the enforcement authority may—

(a) make a purchase of a charge point; or

(b) enter into an agreement to secure the provision of a charge point.

(2) For the purposes of exercising the power in sub-paragraph (1), an officer may—

(a) at any reasonable time, enter the premises to which the public has access (whether or not the public has access at that time), and

(b) inspect any charge point on the premises which the public may inspect.

(3) The power of entry in sub-paragraph (2) may be exercised without first giving notice or obtaining a warrant.

17.—(1) An officer of the enforcement authority may test any charge point which the officer has purchased pursuant to regulation 16(1) to determine whether that charge point complies with these regulations.

Civil penalty notice-content

18.—(1) A party who fails to comply with Regulation 4(1) or 4(2) is liable to pay a civil penalty.

(2) Where the enforcement authority decides to impose a civil penalty, the enforcement authority must service a civil penalty notice on the person in breach.

(3) A civil penalty notice must —

(a) be in writing;

(b) be dated;

(c) include the amount of the penalty, which will not exceed the maximum;

(d) specify how to pay the penalty;

(e) specify the deadline for paying the penalty, which will be [twenty eight days from the date the civil penalty notice is issued];

(f) include details of the breach; and

(g) specify how to object to the civil penalty.

Amount of civil penalty

19.—(1) The maximum amount of a civil penalty is—

(a) £XX for each charge point sold in breach of Regulation 4(1);

(b) £XX for each charge point installed in breach of Regulation 4(2).

Objection to a civil penalty

20.—(1) A person who receives a civil penalty notice may, within twenty eight days beginning from the date of the civil penalty notice, serve on the enforcement authority a notice of objection ("notice").

(2) The enforcement authority must consider an objection served in accordance with Regulation 20(1) and notify the party of that consideration.

(3) Following that consideration the enforcement authority may—

(a) cancel the penalty;

(b) reduce the penalty;

(c) increase the penalty; or

(d) determine not to alter the penalty.

Appeals against civil penalties

21.—(1) An appeal may be brought by a person ("appellate") against a decision to require the appellate to pay a penalty under these Regulations.

(2) An appeal may be brought only if the appellate has given notice of objection and the enforcement authority has—

(a) reduced the penalty under regulation 20;

(b) increased the penalty under regulation 20; or

(c) determined not to alter the penalty under regulation 20.

(3) An appeal must be brought within 28 days of being notified of the enforcement authority's decision on the notice of objection under regulation 20.

(4) On appeal, the Court may—

(a) allow the appeal and cancel the penalty;

(b) allow the appeal and reduce the penalty; or

(c) refuse the appeal and confirm the penalty.

(5) An appeal is to be—

(a) a re-hearing of the enforcement authority's decision to impose a penalty; and

(b) may be determined having regard to matters of which the enforcement authority was unaware.

(6) Paragraph (5)(a) has effect despite any provision of rules of court.

(7) In this regulation "the Court" means—

(a) the County Court in England and Wales, and Northern Ireland; and

(b) the Sheriff in Scotland.

(8) However—

(a) the County Court in England and Wales or Northern Ireland may transfer proceedings under these Regulations to the High Court; and

(b) the Sheriff in Scotland may transfer proceedings under these Regulation to the Court of Session.

Enforcement of penalty decision

22.—(1) This regulation applies where a sum is payable to the enforcement authority as a penalty under these Regulations.

(2) In England and Wales, the penalty is recoverable as if it were payable by an order of the County Court in England and Wales.

(3) In Northern Ireland, the penalty is recoverable as if it were an order of the County Court in Northern Ireland.

(4) In Scotland, the penalty may be enforced in the same manner as an extract registered decree arbitral bearing a warrant for execution issued by the Sheriff Court or any sheriffdom in Scotland.

Service

23.—(1) Any document served under these Regulations must be in writing and will be validly served on a party if it is sent to that party's last known business address by—

(a) first class post;

(b) recorded delivery; or

(c) prepaid registered post.

(2) Any document required by these Regulations to be served on the enforcement authority will be validly served by—

(a) first class post;

(b) recorded delivery;

(c) prepaid registered post; or

(d) electronic communication.

(3) In the case of notifications given under Regulation 20(1), service shall be deemed to have been given on the second day after the day on which is it sent.

Review

24.—(1) The Secretary of State must from time to time—

(a) carry out a review of the regulatory provision contained in these Regulations; and

(b) publish a report setting out the conclusions of the review.

(2) The first report must be published before the end of the period of five years beginning with the date on which these Regulations come into force for any purpose.

(3) Subsequent reports must be published at intervals not exceeding 5 years.

Signatory text

Name
Address — Parliamentary Under Secretary of State
Date — Department

SCHEDULE 1

Regulation [6]

Security requirements

Cyber security

1.—(1) A charge point must have appropriate security measures to ensure that its functions, including those referred to in sub-paragraph (2), are resilient to cyber attack.

(2) The functions referred to in sub-paragraph (1) are—

(a) charging vehicles;

(b) enabling vehicles to export electricity;

(c) taking payment for the charging of vehicles; and

(d) monitoring and recording, and enabling the user of the charge point to view, usage data.

(3) A charge point must have appropriate security measures to—

(a) protect the integrity of its firmware;

(b) enable secure updates of the firmware; and

(c) protect the integrity and confidentiality of data stored on it.

(4) A charge point must be configured so that—

(a) communications from the charge point are sent in a secure manner with an appropriate level of encryption to prevent interception by an unauthorised third party;

(b) communications which are stored on the charge point are stored in a secure manner with an appropriate level of encryption to prevent access by an authorised third party;

(c) the charge point is capable of determining that a communication to the charge point (including any update to its software or firmware) is from a certified source; and

(d) the charge point only accepts communications (including any update to its software or firmware) from a certified source.

(5) For the purposes of sub-paragraph (4), a communication is from a certified source if [details to be added].

(6) The charge point must contain a warranty from the manufacturer that includes regular updates to the charge point's security system.

Physical security

2.—(1) A charge point must be designed and manufactured to provide an adequate level of protection against physical damage to the charge point.

(2) In particular, a charge point must incorporate a tamper-protection boundary to protect the internal components of the charge point.

(3) A charge point must be designed and manufactured to provide an adequate level of protection—

(a) for its operational interfaces; and

(b) against use or attempted use of the charge point other than through the operational interfaces.

(4) For the purposes of sub-paragraph (3), operational interfaces means [details to be added].