

Energy UK response to DESNZ Smart Secure Electricity Systems Programme: Section 1: Energy Smart Appliances

21.06.2024

Executive Summary

Energy UK is the trade association for the energy industry with over 100 members - from established FTSE 100 companies right through to new, growing suppliers, generators and service providers across energy, transport, heat and technology.

Our members deliver nearly 80% of the UK's power generation and over 95% of the energy supply for 28 million UK homes as well as businesses.

The sector invests £13bn annually and delivers nearly £30bn in gross value - on top of the nearly £100bn in economic activity through its supply chain and interaction with other sectors. The energy industry is key to delivering growth and plans to invest £100bn over the course of this decade in new energy sources.

The energy sector supports 700,000 jobs in every corner of the country. Energy UK plays a key role in ensuring we attract and retain a diverse workforce. In addition to our Young Energy Professionals Forum, which has over 2,000 members representing over 350 organisations, we are a founding member of TIDE, an industry-wide taskforce to tackle Inclusion and Diversity across energy.

Energy UK would note the following key positions across the core focus areas of this consultation document.

Smart Mandate

- Energy UK supports the implementation of the regulations by the suggested timeframe, although greater guidance on what can be expected in a grace period would be welcome.
- Greater detail on the inclusion and role of BESS would be welcome.
- Low-income and vulnerable customers may lack sufficient digital literacy to change default settings on heat devices, so industry proposes that installers should be required to explain the settings on their devices
- Proposal that devices should not be required to take the form of a physical interface on the device itself, but would welcome the requirement for an app or digital control.
- This response has been drafted under the assumption that a heating appliance with an add-on is classed as the same as a heating appliance.
- Energy UK suggests gradually extending the Smart Mandate to cover all ESA devices equally, beginning with the large load controllers as suggested first.
- Existing regulations (such as the UK's smart charging regulations) should be aligned to the Smart Mandate so that smart charging services are defined for all types of ESAs. For example, as EV charging regulations do not require MIR compliance, this would need to be considered in any new Smart Mandate approach.

Cyber Security & Grid Stability

- There remains a need for further engagement with random offset function to mitigate the risk of large-scale synchronised changes in load.

Technical Frameworks: PAS 1878 & 79

- Energy UK welcomes the PAS revision in parallel to SSES as a way to open alternatives routes to compliancy, to compliment the suggested PAS standards. However, industry work that has been progressed to further develop the standards since 2021, with BSI, has not been referenced. The PAS revision might therefore not cover successful best practices for interoperability. There is still a need to maintain an outcomes-led approach for cyber and grid stability in line whilst with ETSI.
- If 2% nominal accuracy metering accuracy requirement is introduced, PAS 1878 would also require an update as it currently stands at 10%.

Energy UK members have submitted responses with additional detail relevant to their specific business models and technical approach

If you have any questions about this response or wish to engage with Energy UK and its members, we would welcome further engagement.

Kind regards,

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Consultation Questions

First Phase Regulations: Overview

1. Do you have a view on the lead time industry will require to implement the first phase regulations as proposed in this document?

Market-wide Half-Hourly Settlement will start from December 2025, and Government targets to ramp up heat pump installation to 600,000 per year in 2028. The consultation focuses on low carbon technologies (LCTs) with the intent to ensure the proposed new LCTs are an enabler not a blocker.

Whilst the suggested timelines may be difficult for some product manufacturers, they would provide future customers with a potential new revenue stream to offset the capital cost of their product. Therefore, and in the context of existing carbon budgets, system transformation, continued high international energy costs, and Net Zero 2050, Energy UK supports the implementation of the regulations by the suggested timeframe. Some of the challenges to this timeframe are noted throughout the consultation.

Given the need to balance regulatory hindrance with providing certainty for businesses, clarification on what the proposed grace period would look like would be welcome, as this will deliver some flexibility for manufacturers who may need additional time to implement the changes, while enabling the whole industry to invest with confidence. Additionally, as it is product manufacturers who require the detailed guidance, not just the legislation, in order to ensure that they are compliant with the policy, it may be helpful to provide a grace period specifically for manufacturers to implement the phase 1 regulations, as members have raised concerns that the timeframes are tight. A minimum of two years is required from the publication of technical standards.

It is important to note the broader policy activities which remain ongoing, such as EPC reform, data and digitalisation, asset registration, GBIS and ECO. Alignment and identification of where SSES overlaps with these milestones is key for a successful delivery, with Ofgem's consumer consent platform workstream as a key area of crossover. This is also particularly pertinent with broader alignment with EU policy regulations.

Energy UK suggests that Government consider that the range of suggested ESAs will all be at different stages of readiness against the proposed requirements. For example, many heat pump manufacturers already comply with the Smart Grid Ready initiative in Europe although this does not feature power modulation or the measuring requirements within the SSES consultation.

Energy UK proposes that Government does not try to reinvent the wheel with UK specific regulations as this works against the principles of common market approaches and adds cost burdens to sectors that are still nascent in market development terms.

Additional clarity on the timeframe of when a response to the consultation could be expected would be welcome, particularly with the coming change of government.

First phase regulations

1. Mandating ETSI EN 303 645 to establishing minimum cyber security

Energy UK strongly supports the use of ETSI EN 303 for cyber requirements as a tool to ensure cyber requirements, in a way which aligns with broader global standards, is not overly prescriptive, and provides a minimum level of cyber security standards.

The Cyber Assessment Framework (CAF) outlined in Section 2 should be clearly cross referenced with the introduction of ETSI EN 303 645, given the overlap in cyber security focus. Alignment of principles will help to simplify the process for cyber teams, without hindering cyber security outcomes.

2. Establishing minimum requirements for grid stability: Mandating randomised delay and other options

Mandating randomised delay across all technologies at this stage may result in curtailment of the innovation seen in demand side response and energy smart appliances to date. As long as clear principle-based requirements are established, there may be other ways that ESAs operating in their most basic setting can continue to deliver the required outcomes in grid stability. More detail is provided on these alternate pathways in the response to question 36.

Whilst randomised delay is intended as a backstop to herding behaviour, even as a backstop it presents a risk that may limit the access of ESAs to key markets. The Balancing Market especially requires guarantees of minimum response time and randomised delay could put those guarantees in question. There are other options for ensuring grid stability, such as having frequency response at the device level or using advanced controls for the ramp rates of devices, solutions the market is already beginning to implement by itself.

As above, whilst recognising the ambition of the timeline to meet Net Zero, the 12-18 months lead time will likely not be feasible for implementation given the required software and hardware changes which will be required. Whilst multiple routes, led by outcome-led regulation, would be preferable to mandating randomised delay, should this approach be mandated, a lead time of 24 months would be appropriate.

3. Introducing a ‘Smart Mandate’

Energy UK supports the Smart Mandate, with the following considerations:

- The Smart Mandate should be gradually extended to cover all ESAs.
- The defined minimal requirements in phase 2 based on revision of PAS 1878 do not contradict with regulated requirements and industry decisions for implementations made in phase 1, as worked upon during BSI’s PAS Technical Working Group. Both of the phases 1 and 2 should be harmonised, so any additions to the PAS requirement are complementary and don’t cause disruptions to device rollout.
- Alignment with commonly accepted data exchange protocols in other regions is important to the success of the approach, for example in basing the PAS 1878 outlook on commonly accepted standards such as IEEE 2030.5 (UK & US) and OpenADR (UK, AUS and US). Energy UK strongly recommends continued assessment with other relevant alternatives in European landscape throughout the process.

2. Do you agree with our plan to proceed on the basis of phasing ESA device regulations as set out above whilst committing to keep this approach under review?

Energy UK agrees with the proposed approach. Aligning requirements with the pace of electric vehicle (EV) and home charging uptake will ensure that the majority of consumers benefit from DSR services. This will ease the burden for manufacturers who will be deploying the devices.

- Allowing flexible timelines will encourage the rollout of emerging technologies without regulatory hindrance.
- Industry working groups would be a useful way of ensuring collaboration when reviewing the regulations.

Measuring Instruments Regulations 2016 (MIR)

It is important to note that the success of any proposed regulatory implementation depends upon DESNZ resolving the interaction with Measuring Instruments Regulations 2016 (MIR) legislation (owned by the Department for business and Trade). The requirement for compliance is not financially viable or warranted and agreement on an appropriate metering accuracy requirement from ESO or others need to be resolved in time for the supply chain to respond to the regulation to avoid previous challenges which arose.

It is important to note that the European Commission is making amendments to the Measuring Instruments Directive to better align with EV charging requirements. Any proposed changes to the UK's standard should be closely aligned with the EU standards to minimise costs for businesses and customers.

3. Do you have a view on when the smart mandate for heating appliances should be implemented? Please provide evidence to support your answer.

Energy UK supports the implementation timelines proposed by DESNZ, and welcomes DESNZ's consideration of the identified factors. This ensures that all electric heating systems such as heat pumps and heat batteries have the potential to be smart and flexible.

Energy efficiency and heat policy are currently undergoing a substantial amount of scrutiny and subject to significant changes in light of potential changes to Government policy, market movements, and technological advances.

The Smart Mandate should be implemented as soon as possible for heating devices to enable the most efficient use of heating appliances, thereby reducing the carbon intensity of home heating and increasing the scope for demand flexibility.

However, the exact implementation time of the Smart Mandate must align with updates to energy efficiency and social schemes such as the Energy Company Obligation (ECO) scheme and Great British Insulation Scheme (GBIS) to ensure that delivery of these schemes is not impacted due to complexity arising from scoring metrics being amended in the middle of the scheme period.

The Smart Mandate must also align with the Home Energy Model product database to simplify the deployment of smart heating technologies. Noting the expected increase in heat pumps and heat batteries over the next 3 years, including because of the implementation of the Future Homes Standard, industry would welcome clarification from the Government on

whether there will be any interoperability obligations placed on heat pumps and heat batteries installed between 2026 and 2028. It is harder to comment on the phase 2 requirements of the Smart Mandate as there is less detail on these in the consultations.

Regarding PAS 1878 itself, the standard was principally designed to support EV charging, which foremost represents larger blocks of predictable load, and therefore at present is not best aligned to equal operation of other ESAs such as heat pumps. Without cross-ESA understanding reflected in the design of the standards, these will deliver sub-optimal value to consumers. ESA consumption forecasts are assumed to be discrete and the approach does not enable a combined ESA forecast, i.e. EV and heat pump profile to be offered as one resource. The standard also does not directly address, and is therefore unclear on, how a Customer Energy Manager (CEM) may enable cross asset optimisation, whilst the main focus of the standards is on assuming most of the intelligence resides at device level.

4. Would you support the introduction of a metering accuracy requirement to the effect that all ESAs should have a means to measure their import/export consumption to up to or better than 2% nominal accuracy?

Energy UK supports the introduction of a metering accuracy requirement.

Without this requirement, smart technology will be rolled out without consumers being able to access flexibility revenues, and without delivering the intended system benefits of flexible demand.

The PAS 1878 specification states: “*An ESA shall be capable of measuring or calculating its power consumption/production values with an accuracy upper limit of 10% standard deviation error on reported power values*”. Therefore, this introduction would also require an update to the PAS 1878 specification, which currently states that accuracy should be 10%.

The requirement would also require an update to the Electric Vehicle (Smart Charge Points) Regulations 2021, as this also requires 10% accuracy.

Members would also request clarification on how this requirement would be certified.

5. If you are a manufacturer, would requiring a nominal 2% accuracy requirement impact your business or products? If yes, please outline the impacts and the costs and benefits with as much detail as possible.

Following a Power Responsive trial in which a limited volume of aggregated electric vehicle load was accepted into the Balancing Mechanism with a relaxed metering requirement of 1% accuracy, the ESO now allows aggregated small assets into the BM, allowing up [to 300MW of flexible assets to be aggregated and utilised in the Balancing Mechanism](#).

It is not clear what level of metering accuracy that will be adopted by network operators or if there is scope for further relaxation to facilitate access to more assets. Energy UK understands that ESO has commissioned an independent review into the appropriate metering standard, and Government should refer to this in their decision. MIR compliance is important for consumers to get compensated for their actions.

First Phase Regulations: Smart Mandate

6. Do you agree that the scope of the smart mandate should be extended to include hot water storage and generation (indirect electric hot water storage cylinders, standalone direct electric hot water cylinders, and hot water heat pumps)? If not, please provide supporting evidence.

Energy UK supports this proposal.

As above, the Smart Mandate should gradually be extended to be applicable for all ESAs. This would allow ESAs the ability to participate in grid balancing and DSR services, with the same regulations as outlined in the consultation.

Energy UK suggests that the controls should be smart, although they may not need to be integrated. For example, in the case of BESS and heating controls in the case of hot water storage, what needs to be smart is the inverter which may or may not be built into the heating device itself.

These technologies are important in minimising an increased peak load as heating is electrified, although it is worth noting the additional costs to generation and network infrastructure that this would require.

7. Do you agree that the scope of the smart mandate should be extended to include the whole hybrid heat pump system (rather than just the heat pump within a hybrid), with requirements placed on the common controller? If not, please provide supporting evidence.

Energy UK supports this proposal.

Energy UK agrees with extending the Smart Mandate to include the whole hybrid heat pump system. The exclusion of certain appliances such as hybrid heat pumps would add costs to heat pumps and compel the market to shift to the cheapest possible solution – which in turn may not align with lowest carbon option.

To safeguard consumer experience of hybrid systems, it would be welcome to devise a specific standard relating to this system in line with the advice from the Climate Change Committee whereby hybrid heat pumps would be required to operate in heat pump mode up to 80% of the time.

Additional consideration is needed for how the standard will apply to this system, given the rest of the standards apply only at the device level.

8. Do you have a view on whether standalone domestic battery energy storage systems (BESS) should be included in future legislation in order to be subject to the smart mandate requirements associated with the first phase regulations? Please provide evidence to support your answer.

Energy UK supports the inclusion of BESS, and would refer to the response to Q6 regarding the need for the inverter to be smart.

The Smart Mandate should be intended to be gradually extended to include all ESA types. By including all ESA types into the mandate, it will help to futureproof the technology rollout so they are able to participate in DSR markets in the future, particularly for technologies

which have not been included in the proposal, such as air conditioners. This would ensure their smart functions will be recognised and mandated as part of prequalification process(es) for the value they bring to electricity- and particularly flexibility markets.

Additional clarity is required on the phase 1 and phase 2 interoperability enforcements in the Smart Mandate implementation period.

9. Do you have any data on what proportion of installed domestic battery energy storage systems (BESS) have smart functionality? Smart functionality is defined as being communications-enabled and able to respond to price and/or other signals by shifting and/or modulating their electricity consumption.

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10. Do you have evidence on the extent to which domestic battery energy storage systems (BESS) with smart functionality already meet the minimum requirements set out in Table 1? Please provide evidence to support your answer.

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11. Do you agree with government's proposal that electric heating appliances must be able to modulate output and/or change the time at which electricity is consumed in response to signals, including price and other signals that facilitate DSR?

Energy UK supports this proposal. Without this regulation, there is a risk that electrifying heating could impact upon local grid stability if areas see a sudden and significant increase in installations and DNOs are unable to invest ahead of need.

Equally, if all appliances within a property can be treated as smart, this makes product use and DSR easier for customers as they do not need to programme two or more devices to a given smart tariff. This regulation thus presents an opportunity to make the system more efficient.

It is important that:

- The Smart Mandate aligns with the product database in the Home Energy Model to simplify deployment, noting they both may need to accommodate an ability to adapt to future market and design changes to avoid hampering innovation.
- The Government's proposal aligns with the design of energy efficiency and social schemes such as ECO to ensure that low income and vulnerable households continue to benefit from advances in technology and updates to Government policy.

Energy UK also would request that Government provides clarification on what the minimum period of modulation is, as this is not outlined in the proposal. Such regulatory decisions are crucial for manufacturers as this informs both product design and UK market business plans.

Energy UK also needs clarification on whether turning the appliance on/off and using building fabric store heat for shift electrical consumption would be acceptable.

12. Do you agree with the proposal that electric heating appliances within the scope of the mandate must provide two-way communication in order to receive and act upon direct control signals, and to send signals on the device status?

Energy UK broadly supports this proposal, under the assumption that the boundary of “electrical heating appliance” includes an add-on controller.

Energy UK recommends that:

- This is also a requirement for batteries and EV chargers, as well as electric heating appliances.
- If this change is implemented, ECO and the Home Energy Model be updated to reflect this policy change.
- This is done in tandem with energy suppliers or chosen aggregator in a cyber secure fashion.

13. Do you agree with the proposal that electric heating appliances within the scope of the mandate must be designed to be interoperable so that devices do not cease to have smart functionality if the owner changes electricity supplier?

Energy UK supports this proposal, and as above, it is under the assumption that the boundary of “electrical heating appliance” includes an add-on controller.

Energy UK recommends that this is also a requirement for batteries and EV chargers, as well as electric heating appliances. There is no rationale for lower interoperability standards for batteries or EV chargers than for heating appliances.

14. Do you agree with the proposal that, as part of the first phase ESA regulations, electric heating appliances within the scope of the mandate must be designed to utilise open standard communication protocols for the application interface to remove a barrier to interoperability with DSRPs?

Energy UK supports this proposal.

Industry would stress the importance of ensuring that the open standard communication protocols align with other European markets. Imposing additional or substantially different functionality requirements compared to those in other European markets may act as a barrier to investment in the UK.

As above, Energy UK supports this proposal under the assumption that the boundary of “electrical heating appliance” includes an add-on controller.

15. Do you agree with the proposal that the mandate should require electric heating appliances to prioritise safe operation over responding to information or user input?

Energy UK supports the proposal to ensure that safe operation is prioritised over other functions. Energy UK recommends that this is also a requirement for batteries and EV chargers, as well as electric heating appliances.

This is crucial for customer safety in the first instance and for ensuring societal buy-in of clean heat technologies in the second instance. Sources of grid instability risks are varied and set to evolve as the energy system becomes more responsive to demand, supply and other market signals.

To mitigate unwanted costs to ESA manufacturers or DSRPs that may ultimately be passed to customers, industry would encourage the Government to carefully consider the exact extent and wording of regulation on ESA’s safe operation.

Further mapping and modelling of the potential requirements of regulation on the unit costs of DSR, would be welcome.

Safe operation regulations should also align with European and international markets.

16. Do you agree that the mandate should require electric heating appliances to be able to continue to function to provide heating and/or hot water services when network connection is lost?

Energy UK supports the proposal that a device must be able to continue to function to provide heating and/or hot water as appropriate for the device.

The Government is correct to identify the loss of network connection as a potential challenge for the functionality of smart home heating devices. Home heating (and the devices which enable it) should be treated as an essential service vital for ensuring quality of life and wider safety of customers.

Home Energy Model assumptions could be used to resolve any data inconsistencies arising from a network outage.

17. Do you agree with government's proposal that the mandate should not require a maximum turn/shut down time or minimum speed of response?

Energy UK supports the Government's proposal that there should be no maximum turn/shut down time or minimum speed of response.

18. Do you agree with government's proposal that the mandate should not require specific control strategies to be installed with electric heating appliances?

Energy UK agrees with this proposal.

However, several manufacturers have advised they will face increased costs to meet proposed Smart Mandate requirements – which will affect customer affordability.

It would be helpful if the Government could, in support of this proposal, provide a benefits-based case for using ESAs that demonstrates a clear positive outcome arising from the increased device costs as a result of the Smart Mandate.

19. Do you agree with government's proposal that hybrid heat pumps operated by a common controller must be able to receive and act upon fuel tariff data and be able to utilise the alternative heat source to meet heat demand during a DSR instruction?

Energy UK agrees with the proposal that hybrid heat pumps be required to receive and act upon signals.

Thermal comfort for heat pump users is vital for ensuring living standards are maintained for users and enabling rapid adoption of the technology by new users. Allowing the use of an alternative heat source in the event of a DSR instruction without further specificity could result in many homes having a higher carbon intensity relative to their potential.

Industry would appreciate more detail from the Government on the circumstances in which the use of an alternative heat source will be required.

Energy UK requests that DESNZ develops their definition of a hybrid heat pump to inform how manufacturers develop products for the UK market.

20. Do you agree with government's proposal that all electric heating appliances within scope must provide a user interface?

Energy UK agrees that there must be an interface of some form on electric heating devices for customers to participate in DSR. This should not be required to take the form of a physical interface on the device itself.

Industry is supportive of innovation in the electric heating appliance market, particularly where product functionality is concerned. It is very encouraging to see more manufacturers developing electric heating appliances with connected physical interfaces as this enables greater interaction. However, it should be noted that it remains unclear how all of these options work with the proposal to require that heating appliances operate if internet connectivity is lost.

For instance, if the only way of controlling the heating appliance is via an app on a device, the customer may not be able to operate the appliance when internet connectivity is unavailable.

While it would be preferable if all electric heating appliances had a physical interface, the smart heating mandate should not require this as this would:

- Reduce the number of manufacturers who can supply the UK market.
- Require suppliers to augment their existing product line and/or develop new products solely for the UK market – the resulting costs will likely be passed on to consumers.
- Instead, a virtual interface via web portal or mobile app should be allowed under the mandate.
- As above, Energy UK supports this proposal under the assumption that the boundary of “electrical heating appliance” includes an add-on controller.

21. Do you agree with the government's proposal that electric heating appliances must be able to estimate their power consumption, with the manufacturer free to choose the estimating (calculating or measuring) approach?

Energy UK agrees that assumptions must be made about the power consumption for electric heating appliances to be able to participate in DSR services.

However, Energy UK recommends the following:

- All appliances covered by the smart mandate including electric heating appliances, measure their power consumption.
- Heating appliances collect data on their thermal output.

This device-level measurement allows manufacturers, installers and customers to track the electrical demand, the efficiency and the flexibility of their products. It will also enable other policy areas to provide benefits to Smart Secure Electricity System policy area. For example,

the Boiler Upgrade Scheme and Future Homes Standard do not require a heat meter to be installed alongside heat pumps.

However, SSES requirements to install a heat meter will enable installations via the BUS & FHS to be interoperable with other ESAs.

22. Do you see any difficulty with the position that government is proposing? Please provide evidence to support your answer.

It is concerning that the process for determining a given device's power consumption will be delegated to manufacturers without governance and monitoring of real-world performance. The system as proposed by the Government is vulnerable to manipulation at the expense of the climate as a result of inaccurate energy consumption by appliances and thus increased carbon intensity. As was seen in the automotive industry, test performance is not always reflective of real-world emissions performance. Whilst the requirement on the accuracy of the measuring device should alleviate some concern, the absence of governance ultimately poses a risk of inaccuracy.

All eligible electric heating appliances should be entered into the Home Energy Model's Product Database and the variables from this database should be used to estimate power consumption in a manner bespoke to each home.

If a smart meter is not required for installations, ongoing work to develop safety standards for ESAs and other DSR providers must properly account for the safe operation of a DSR action when real-time consumption compared to device capabilities is less certain than it would be when using a smart meter.

It is also unclear whether the Government's proposals place heat flexibility, for instance from heat pumps and heat batteries, on the same footing as electrical flexibility, for instance from EVs and batteries. Both types of flexibility must be considered equally.

The regulation must also be accurate enough to enable explicit DSR activity and explicit enough to ensure that both types of flexibility are given equal levels of priority.

23. Do you agree with government's proposal that electric heating appliances will not be required to collect data on their thermal output?

Energy UK disagrees with the proposal that electric heating appliances will not be required to collect data on their thermal output.

Energy UK would support mandating that all electric heating appliances, smart or otherwise, collect data on their thermal output. This information will help to inform users about the efficiency and flexibility of their heating system.

24. Do you agree with government's proposal that all electric heating appliances, on set up, should require users to set their heating preferences, that DSR and TOUT operations to be enabled by default, and for functions that can be undertaken outside of peak hours to be pre-set to do so?

Energy UK agrees with the proposal that all electric heating devices should be required to enable DSR and TOUT operations.

It remains unclear what “on set up” means in this context. The Government should clarify whether this means when the product is manufactured or when it is installed. It may be the default would be when manufactured, as with EV chargers. However, if it refers to installation, the Government should clarify how this proposal squares with the proposal to allow installers and users to turn off all DSR and time-of-use tariff operations from point of installation.

While DSR and TOUTs are likely to be suitable for the majority of the population, industry is conscious that the energy use patterns of many low-income and vulnerable customers may be less suited to this level of automation or participation.

Some customers may lack sufficient digital literacy or otherwise be unable to remove or change the default settings on their electric heating appliances.

Being enabled by default also introduces a potential risk to manufacturers and installers in call-backs from customers who are not suitably informed of the impacts and implications of participating in DSR.

To mitigate this risk, Energy UK recommends that:

- Installers be required to explain the default and alternative settings on their devices to facilitate informed choices by consumers.
- Work to establish common terminology and consider other measures for simplification for consumers should continue to develop alongside the SSES work.
- Accessibility be a core consideration in installation of these appliances.
- Regulatory alignment with the European Union is pursued to facilitate manufacturers who supply multi-market products across Europe.

Energy UK also urges the Government to also consider the impact of opt-out method and how this may damage heat pump/DSR service adoption.

25. Are there any other requirements that you believe should be included in the minimum requirements for the smart mandate?

Offline behaviour: EV chargers and heat pumps may not be connected to the internet at the time of installation. Customers may also want to define how the unit behaves offline.

Connected Device Data: CEMs/HEMs capable of reporting on numbers of connected devices each month.

26. Do you agree with government’s proposal to require the appliance manufacturer to provide appliances with integrated or ‘add-on’ ESA functionality?

Energy UK agrees with this proposal, allowing sufficient flexibility to manufacturers while simultaneously ensuring that provision is made for ESA functionality within devices.

This of course assumes that a heating appliance with an add-on is classed as the same as a heating appliance.

27. Do you agree with government’s proposal to require sellers to ensure that an electric heating appliance (or system of appliances) is sold with either integrated or add-on ESA functionality?

Whilst Energy UK supports the Smart Mandate applying to electric heating appliances, this must be applied in a way that delivers the best outcomes for customers and for manufacturers. Energy UK therefore conditionally supports the provision of optional ESA functionality, noting it may be better that this is not mandated immediately but could instead be tied to the receipt of subsidies initially, much like smart requirements were tied to subsidy for electric vehicles.

The proposal to mandate ESA functionality risks adding further costs for those selling heat technologies in the UK compared to other markets. Consideration of how this could impact UK market attractiveness as well as how this could impact consumers in terms of additional costs of the equipment, would be welcome.

Without some form of ESA functionality, costs on the system will increase for all consumers, and as such any cost incurred must be balanced fairly with the benefits to all consumers.

28. Do you agree with government’s proposal not to place any legal obligations on installers of smart heating appliances?

Energy UK agrees with this proposal in principle.

Clarification is required as to whether the default is within the manufacture, as it is with EV chargers. It is otherwise unclear to us how the Government expects smart heating appliances to operate in smart mode if the installer has no obligation to set up the appliance in smart mode or explain how that could be done later.

In absence of strict requirements on installers to register the asset with the DNO, SSES policy should align with the Government-funded innovation project on [Automatic Asset Registration](#). Following the Phase 1 (feasibility study) of the programme in 2022, it is now in Phase 2 (solution development), with Phase 3 (pilot testing) to begin in August 2024 and conclude in February 2025.

29. Do you have a view, and supporting evidence, on how government ensures that installers have the awareness and ability to successfully install smart heating appliances?

Energy UK recognises that incentivising installation of smart heating appliances while ensuring an adequate supply of installers may be challenging to balance. To address concerns around sufficient skills, the Government may wish to explore an approach to providing 100% funding for CPD courses for the installation of smart heating appliances to supplement increased interest seen in heat pump installation training.

Levies on energy bills are currently funded by bill payers to support several environmental and social projects within the energy sector and are primarily recovered through electricity bills. This market distortion clashes with current Government policy to encourage electrification of demand. For the UK to successfully decarbonise, this imbalance must be addressed in coordination with an approach to smart technology that enables low carbon heating to become the cheapest option for consumers.

30. Do you agree that open data standards are required to enable EV charge point interoperability with energy suppliers and DSRSPs?

Energy UK agrees that data standardisation is required to enable interoperability. This standardisation is important to ensure that the energy supply and EV infrastructure are not a closed relationship.

Energy UK notes the following considerations:

Open data standards would allow better data capture to make the EV rollout coordinated, efficient, and informed between energy supplier and charge point management system. It will also allow for better interoperability and prevent contract lock-in as the market matures, as well as providing an element of futureproofing for ESAs.

Whilst open data will be a useful tool in EV rollout, the market remains nascent and as such it may be too early to mandate a single approach. As mentioned earlier, whilst advanced interoperability is desirable, it is not yet technically deliverable.

There remain serious questions about imposing what would likely be a basic CEM interface that would undermine innovation in the ESA space and questions about how TOUT signals and other flexibility signals would be prioritised in the proposed architecture. These questions need urgent addressing to ensure the DSR sector is allowed to develop and innovation is not undermined.

Open standards, which are not mandated, are preferred by industry to best deliver on interoperability, ensuring a seamless data transfer between actors. Energy UK members suggest that EV charge point communication between charge points and operators should be based on existing open protocols (such as OCPP 2.0.1) and between operators of chargepoints and Utilities/System Operators. Open standards and protocols should also be based on open existing data standards (such as OpenADR, IEEE2030.5).

There would also be a need to define what form these open data standards will take, for example if these would be integrated under PAS 1879/78 in the announced revision of PAS since EV and Charging stations are not included.

31. What are the barriers to implementing such open data standards?

Commercial challenges

At present, there is limited or no access to UK tariff information. Cloud-based APIs will be required to open this opportunity and smooth the customer experience.

The benefits of providing reciprocal data sharing to inform strategy and innovation mean that there is clear value to sharing additional data from a wide range of sources. Where the source of the data is a commercial actor that has worked over the years to develop data gathering capabilities through relationships with customers and technical expertise, incentives for sharing this data must be derived fairly so that the value gained by the public and the energy system results in rewards for the organisation and its customers.

Much of this data will be commercially sensitive, and some will be data that, when combined with other sources, could pose a risk to privacy of customers. As such there must be a clear

emphasis on safe and ethical data-sharing infrastructures which protect the consumer and the industry.

Public Engagement & Consumer Challenges

The level of trust and consumer buy-in for smart technology and data sharing remains a challenge for the sector. It is vital to explore and communicate the safety of the approach to gathering, sharing, and utilising customer data with customers and the public to ensure informed consent and safeguards for the protection of this data.

The Government should only consider data privacy requirements that are not already featured in UK GDPR to avoid confusion, duplication, or overlap that could lead to contradictions or complexity. Where additional protection is required beyond UK GDPR, for instance on sensitive data related to consumer consumption habits and preferences which can theoretically be used to identify an individual and their location, there is value in further development.

Lessons learnt from smart meter rollout in public-based messaging around data and permissions must be core to the approach, with carefully managed messaging to avoid consumers being discouraged from sharing energy consumption information. The smart meter rollout has failed to clearly establish the wider system benefits of smart meters for consumers, relying on personal consumption information without setting out the benefits of a smarter system that delivers lower costs to all consumers. Establishing clear societal benefits alongside the individual benefits of data sharing is essential to generating consumer buy-in and delivering the benefits derived by mass adoption.

Open data and data sharing are different tools which serve different purposes, but it would be useful to align this with Ofgem's Data Sharing workstream to align consent and cybersecurity measures across the industry. With increased cybersecurity incidents and increased coverage of these in the media, consumers and industry will need a level of reassurance that their data will be protected.

Obtaining consumer consent should be transparent, ongoing, informed, and scalable. Data standards must be set in the user agreement, with a strategy to address how to engage and protect users without strong digital literacy skills.

32. From your experience does EV-EVSCP interface communication regarding battery state of charge pose a barrier to access to the full range of EV tariffs and DSR services?

Yes.

Knowing the battery state of charge is essential to properly optimise at home charging for drivers. A charging schedule for a nearly full battery is completely different to a nearly empty battery. CPOs can manage charging of a nearly full battery during short, sharp windows when electricity prices are cheapest. For an empty battery, CPOs need to better manage the charging schedule to ensure it is full by morning, meaning it will be charged for longer periods, during which electricity will be both cheaper and more expensive.

Access to the state of charge data is therefore essential for both CPOs and drivers to know when to best charge the car. This information is crucial to help manage peak demand and for consumers to make the most of smart charging financial benefits. Notably, the state of charge belongs to the customer, rather than the vehicle OEM, and sharing this data is

therefore the decision of the owner. The communication of this consent process is essential to ensure that customers clearly understand the benefits they can gain through smart charging, whilst effectively managing peak load control.

33. What other technical and commercial barriers have you experienced to EV drivers accessing a full range of available tariffs and DSR services?

Tariffs

It is difficult for consumers to compare tariffs, given these can offer different services and bundled products. EV tariffs can be separate from household tariffs and EV plans and costings vary by region.

EV tariffs not covered by Ofgem's price cap. Variable EV tariffs offering a dual-rate are covered by the price cap, while fixed deals are not.

Upfront Costs

High upfront EV and EV charging equipment costs can discourage drivers from investing in technologies that could provide savings long-term.

DSR services

Types of property can affect the availability of parking available, for example whether this is off-street parking, or in a rental property parking, will limit if a customer can access DSR services through their vehicle.

Limited awareness & public mistrust of EVs and smart tech in the benefits of DSR services. These will also be linked with consumer concerns over EV battery warranty and longevity if entering in services such as V2G.

Flexibility markets and price signals vary by region impacting the actual outcome of a smart tariff and DSR participation.

DSR services are tied to specific CEMs due to the evolution of commercial business models ahead of any standardisation. To ensure that Customer Energy Management Systems (CEMs) and Home Energy Management Systems (HEMs) can access all Demand-Side Response (DSR) services, it is important to use open interfaces. This is similar to how the Open Charge Point Protocol (OCPP) works for electric vehicle charging stations. By using open protocols like OpenADR or other outcome-driven specifications, seamless communication and interoperability between different systems and services can be enabled.

The Government should play a role in providing a consistent policy and incentives to address driver uncertainty.

First Phase Regulations: Cyber Security and Grid Stability

34. Do you foresee any issues with adoption of ETSI EN 303 645 for Phase 1 requirements for all ESAs? If so, how could these issues be mitigated?

Energy UK strongly supports the mandated ETSI 303 645 at this current stage as a minimum requirement. It will be important that the Government work closely with industry and with consumer representatives to ensure that this standard remains appropriate, taking action only where there is an evidenced need for additional measures. Cybersecurity of ESAs should be covered through Home Energy Management System (HEMS) controls since they will dominate the commands to ESAs.

A table which explains whether cloud services or devices are affected by the ETSI requirements should be set out, as ETSI covers a system and the charge point manufacturer does not always know which OCPP server it will be connected to. Energy UK requests that manufacturers state whether their device is ETSI compliant or not.

Energy UK also notes the difficulty in aligning standards with rapid advancements in technologies, and similarly to previous consultation responses, an outcomes-based approach to cyber security challenges is preferred which fosters innovation whilst ensuring appropriate security measures.

For many energy smart devices connected to the cloud, companies will have stronger protections in place already, with many operators using more advanced standards to provide better cyber security measures for their customers. Members have therefore noted concerns around the cloud security system, with current standards offering little regulation.

SOC 2 is the voluntary security framework which covers how companies should handle customer data stored in the cloud. As this framework is easily audited and is robust in requirements, it allows companies to adhere to greater data privacy measures in a greater way than ETSI 303 645 currently does. It may be worth adhering to some of the principles of this standard to future security iterations to ensure cloud security is considered in the cyber workflow.

Whatever the outcome, an appropriate time period between the publication of the detailed guidance and the introduction of the standard is required. This is because developers and manufacturers require the detailed guidance, not just the legislation, to ensure that they are compliant with the policy. Detailed guidance can create significant costs for ESA providers.

In terms of applying the cyber security requirement, the policy development process must take into consideration not only smart devices but also Home Energy Management Systems (HEMS) and their development on an international market. The policy framework must allow for the development of smart applying to both options.

35. To what extent would requiring cyber security testing of ESAs prior to them being sold or distributed in GB impact ESA supply chains? What other approaches could be used to provide sufficient assurance that cyber security requirements were being met?

All additional requirements placed on ESAs inevitably place an increased cost on the unit, the impact of which needs to be assessed as part of a full cost-benefit analysis. Additional costs will accrue from product testing and supply chain reviews. This has been evidenced from Smart Metering Commercial Product Assurance (CPA). This change requires simplicity,

consistency and flexibility in implementation from Government in order to deliver implementation at lowest possible cost to consumers.

However, cyber security threats are difficult to predict. It is unlikely that regulations and standards can be amended quickly enough to match the pace at which new cyber threats emerge at - whereas cybersecurity testing is more likely to be able to do so. Based on that, a given regulatory standard for ESAs supported by cybersecurity testing seems like the most responsible way of managing this. The cost of compliance is ultimately cheaper than ESAs becoming compromised.

Government should undertake a cost benefit analysis and risk assessment to examine where future protection would best be applied, and whether or not organisations are not meeting these standards already based on international standards.

Guidance as to how testing will be achieved is required, and Energy UK advocates for a principles-based outcome which ensures quality without limiting innovation.

Energy UK members have noted a skills shortage for technically-trained cyber professionals who are able to understand the technical process during audits. With any proposed increased protections, greater guidance from Government would be welcome regarding how the standards will integrate with existing standards and how these will operate independently to allow increased understanding across industry. Dedicated training programmes will also be required to ensure the widespread adoption and adherence of the proposed new standards.

Testing requirements (including cybersecurity) should be part of pre-qualification processes so that Service Providers and their related systems can be sure their products are validated.

36. Do you have any suggested alternative solutions to the random offset function which would mitigate the risk of large-scale synchronised changes in load?

Energy UK recognises the rationale for a randomised delay function to mitigate against short-term risks to grid stability and agrees with mandating this capability in ESAs. However, there are multiple ways to ensuring against the risks to the networks posed by herding behaviour and the Government should explore outcome-led regulation with respect to ensuring grid stability, rather than mandating the means through randomised offset. This is because randomised offset is a relatively crude method of ensuring grid stability, even if it is only meant as a last resort. There are serious concerns that randomised delay, if implemented poorly, could add uncertainty to the market operation of DSRSPs, complicate supply chain and manufacturing arrangements, and undermine their market participation.

If herding behaviour does occur, it is a sign that market signals are working effectively, and the proposed standards must do all they can not to prevent efficient market operation. In the first place, the Government should ensure that local flexibility market arrangements are sufficiently designed to respond to grid stability events. This should be the first priority for preventing grid instability caused by herding behaviour.

In order to mitigate the risk of undermining the development of the DSR market, it is important that the Government allows as many routes to pursuing grid stability as possible for the industry, ensuring there are a range of options available for DSRSPs to choose from that best suit their technologies, operation and the markets they participate in. There are a

range of possible alternatives to randomised offset that can be used by ESAs and DSRSPs. These include:

- Frequency response capabilities at the device level. These could reduce the reliance on direct signals from third-party platforms or providers and could respond more dynamically if there was an issue detected, rather than delivering a delay by default.
- Managing randomised delay at the building level rather than the device level, as is done in Germany.
- Advanced control ramp rates for smart devices when a threat of herding is detected, something already being investigated in the EV charging sector.
- Dynamic Operating Envelopes, as used in Australia, so that the upper and lower safety bounds of capacity allocated to the grid adjusts in real time as devices are connected and disconnected. This ensures that the grid can manage capacity for vehicle charging, heat pump use and other electricity demand based on real-time demand.
- The coordination of TOUT offerings to avoid herding behaviour, in coordination with energy suppliers, ESA manufacturers, DNOs and the ESO. This would be more complex and require more specific understanding of which customers in any given area are on what TOUT offer.

These alternatives, and others identified in the consultation, will be relevant to consumers and assets where randomised delay is more difficult. For instance, EREC G100 stipulates under 5 second response time. This would be concerning in small commercial applications, which may also come into scope. Some Energy UK members have also noted that home-level batteries operating in a peak shaving or an export limiting mode requires a fast response capability that would clearly not be possible if a randomised delay were to be applied.

The Government should ensure a continued focus on broader measures at the system level to ensure grid stability alongside consideration of randomised offset requirements, to ensure DSR providers have a range of measures to ensure grid stability whilst limiting any negative impact on commercial viability that could impact uptake. This should ultimately be achieved through an outcome-led approach to grid stability.

37. Please comment on the assumptions and methodology used in the cost appraisal of the analytical annex. Can you provide estimates of the costs of providing consumer interfaces and monitoring?

Energy UK mostly agrees with the assumptions used to develop the cost appraisal though there are some key things of note:

1. The significant heterogeneity of energy appliances at the building-level means there will likely be a degree of variance in the costs of various measures between differing technologies and companies.
2. From Energy UK member experience during the Smart Chargepoint regulatory implementation, the costs for compliance and familiarisation outlined in the annex are lower than the costs Energy UK members experienced in practice. Energy UK suggests that Government examines these figures again.
3. Though not directly related to the measures described in the annex, some ESAs already have metering capabilities built into them and so fall under the requirements

of the Measuring Instruments Directive (MID) retained from EU law. This directive is proportionate for conventional building smart meters but can present overly stringent conditions on ESAs that can add hundreds of pounds to their unit costs. The Government should investigate this issue with a view to creating exemptions to certain MID requirements for ESA devices with built-in metering.

38. Do you agree with using the Designated Standards approach as the basis for government to design the Approved Standards framework for the SSES programme?

An overview of the alternative routes to compliance, particularly to ensure that other commonly accepted standards (which deliver the same outcomes as PAS in relation to interoperability) can help encourage innovation in the market whilst allowing for the desired outcomes to be delivered.

In relation to PAS 1878, the revisions to the technical framework should be included in the Designated Standards approach. As above, any changes to the standard should be complimentary between phases 1 and 2 to ensure the interoperability can be feasibly implemented.

Regarding PAS 1878, Energy UK members have noted uncertainty over how the standard should be handled.

Given the proposal outlines a 12-month period to review PAS, without considering the ongoing election, it will be unlikely a revision to the standards will be complete in this time. The work needed to make PAS 1878 ready for the UK market will likely take longer than 12-months, despite the working group's attempts to tackle some of the standards. Getting this standard right also risks delaying the rollout of interoperable devices.

As an alternative option, providing alternative routes to compliance alongside PAS would help to mitigate this concern, whilst allowing for innovation in the market without over-prescribing interoperability requirements. However, similarly, this route isn't perfect as it risks over-complication of standards without providing a clear standard on interoperability.

Energy UK members are undecided what the preferred outcome of this problem is, whether alternative routes to compliance should be pursued in line with the PAS revisions. As a first step, it would be useful to review the documents created during the Government PAS working group so industry can view what proposed standards were suggested.

Government should also review the alternative compliancy routes, reviewing how all commonly used standards can be recognised and assessed on an equal basis.

Whatever the outcome decided, it is sensible to assign a certifying body such as BSI, with an appropriate third-party assessment body, such as OPSS. Regulatory requirements will ensure this adoption is of the quantity, quality and consistency necessary.

39. Do you have any comments, suggestions or changes to the initial view described above for how Approved Standards could work; especially for the proposed manner of assessing potential new approved standards?

The Government must ensure there is sufficient engagement with industry to ensure outcomes are established.

Overcomplexity for DSRSPs risking the consumer experience of interoperability. This may also be mitigated through a combination of the right protocols under appropriate governance, and market enforcement. For instance, maintenance of a central register of approved standards in a common format and a thorough approvals process for these standards including controls, reviews and audits ensures standards are accessible, appropriate and fortified.

As mentioned earlier, UK standards should be complimentary with other regions/ initiatives to ensure alignment on the requirements (e.g. UK & US initiatives on IEEE2030.5 open exchanges, and the ongoing work on OpenADR).

40. Are there any areas where you foresee the need for additional standardisation beyond PAS1878? If so, in what areas and over what timeframes would you expect new standards to develop?

As technology advances, it is likely that further standardisation will be needed, but it is uncertain when this will be required and what triggers should be utilised to justify additional standardisation. The approach must be inherently flexible in order to best reflect the pace and scale of change still expected in the sector.

It's also worth highlighting the technical implications of transferring ESAs between providers. Energy UK suggests the inclusion of EVs and bi-directionality in the standards, potentially through a later phase, helping to facilitate flexibility market participation. In developing any future standardisation, there is a need for clarity over the end-to-end process in terms of interoperability requirements, across aggregation, retail, and manufacturing to better clarify how that is considered at all stages of the customer journey. Customer protections will also be important to monitor in order to ensure that any emerging gaps are addressed. Any work in this space should include consultation with Citizens Advice, Energy UK, and the ADE.

The impact of any future changes must be considered in the context of both the international standards approach and the continued innovation in this sector to ensure that the UK does not lose its innovation edge nor become misaligned with the rest of the region / rest of the world.

41. Do you believe that there is a need for standardisation of Implicit (also called Routine) DSR in order to meet the government's interoperability objective? If so, what aspects do you consider would need to be standardised, and are there any existing technical standards that you believe could be used?

Standardisation in this way seems like a good idea in principle, but implementation and regulation may still be too early.

42. How should an approved standards approach be designed to ensure that DSRSP interoperability is maintained?

A framework of the approved standards would be helpful, ensuring that the standards outlined cover the interoperability requirements.

43. How complex would it be for DSRSPs to update their system to have the functionality to interact with an ESA that uses a new approved standard? What would

the likely timeframes be and how could the technical challenges be managed?

The complexity of this change is dependent on a number of factors, and could require notice years ahead of implementation, with advanced guidance.

Open engagement with a wide range of industry stakeholders would be a welcome part of mitigating the impact and timescales of the change.

44. What criteria should be applied to ensure that any proposed standard is fit for purpose, and to avoid an excess of standards adding undesirable complexity?

More clarity is required on the technical governance and security governance approach to be applied, including how industry engagement will continue ahead of further standards being introduced. Collaboration will be critical throughout the process to ensure innovation is enabled, particularly around the mapping and assessment of preferred standards. This process should be transparent and include engagement with a wide range of stakeholders.

Government should apply overarching principles that ensure the standards deliver a positive impact on:

- Innovation
- Competition
- Carbon reductions
- Cost to all consumers
- Cost to specific customers
- Cost to supply chain companies

45. Should DSRSPs be required to ensure that services they offer are interoperable with all ESA types that they offer that service to? (for example, a service for EV drivers should be compatible with any approved standards for EV charge points).

Energy UK agrees with the proposal not to specify that an ESA work with any user interface or third-party operator, and that interoperability does not extend to other devices within the home.

Energy UK agrees with Government's proposed outcomes for a minimum level of interoperability in order to deliver the best outcomes for consumers. The benefits of ensuring interoperability have been shown during the rollout of smart meters, and it is essential that interoperability is a key requirement / principle for ESAs.

The preferred standards should be market-wide, meaning manufacturers, aggregators, and DSRSPs commit to the implementation and compliance with the related product standards. There is potential for the inclusion of these standards under pre-qualification requirements for service provision, and within the approach to allocating public support schemes.

It should also be noted that mandated implementation (over choosing which standards manufacturers/DSRSPs work to) could raise costs for consumers. Consideration of costs should be factored into the decision outcome.

46. How should an approved standards approach be designed to ensure that the SSES cyber security, grid stability and data privacy objectives for devices can be met?

Energy UK agrees that regulatory requirements should be established to promote minimum cyber security, grid stability and cyber security standards. Regulatory requirements will ensure this adoption is of the quantity, quality and consistency necessary for the market to evolve in a safe manner while allowing room for innovation in this nascent market.

Government should consider the approach to establishing clear frameworks that identify alignment with other existing standards, clarifying which standards meet the required minimum requirements in any area. Governance of this and the wider implementation process will be critical to ensuring alignment of existing and emerging standards with the UK technical approach.

The presumption of conformity through approved standards and outcome-based requirements, as described in Option 1, can tackle objectives, for instance on minimum levels of cyber security where companies have different solutions, but with common end results and outcomes. This approach allows for innovation and competition in solutions whilst avoiding unintended consequences of prescriptive regulations in a nascent market.

Approved standards do risk creating stringent conditions but service providers already support a wide raft of standards in their products and services so it is possible to deliver against. In an outcomes-based model, however, the market will naturally gravitate towards particular approved standards that are most feasible, while also allowing for innovation to deliver efficiencies.

Maintaining a central register of approved standards in a common format and a thorough approvals process for these standards, including controls, reviews and audits, will ensure standards are accessible, appropriate and fortified. Indeed, arrangements already exist to provide independent auditing and testing of cybersecurity. For example, in Zigbee SEP, there is an auditing process which uses the ISO 27001 global standard. Market enforcement via a body such as the Office of Products Safety and Standards (OPSS) will ensure requirements are being met.

The Government should consider how to ensure approved standards for grid stability are outcome linked and are not too closely tied to any requirement for delayed response capabilities. This could be essential given delayed response may not be a suitable path for all DSR providers in ensuring cost-effective grid stability whilst remaining commercially viable.

It is important that any approved standards approach considers and aligns with existing and evolving standards commonly accepted across the sector, rather than causing conflict or duplication. Regular assessments of standards would be a welcome approach to ensure that international trends and technical advances are factored into the UK approach.

Data Privacy

The outcomes of GDPR to current ESAs and supporting systems would achieve an appropriate level of data protection for consumers. However, because GDPR applies to organizations, its direct application to ESAs (devices) or systems does not seem possible.

Further joint working to investigate the practicality of applying the principles or outcomes of GDPR to ESAs, perhaps by reviewing scenarios or use cases to identify those in which sufficient protection for consumers would not be achieved.

47. What information of the cyber security, data protection and grid stability criteria would industry need to be able to design a new approved standard?

Given the preference for an Option 1, outcome-led assessment of standards, the information required would concern the expected impact of DSR services on a predetermined set of outcomes.

- With respect to grid stability, existing regulation can provide for these outcomes, namely:
 - DCUSA, Schedule 8 [N1]
 - General Product Safety Regulations 2005
 - Electrical Equipment (Safety) Regulations 2016
 - BS EN 60335-1: Household and similar electrical appliances. Safety – General Safety Requirement
 - IEC 60730-1: Safety standard – Automatic electrical controls • Building Regulations

These standards should provide sufficient guidance for grid stability needs though perhaps more information would be required from DSR providers and ESA manufacturers on the exact reactive and cross-asset coordination capabilities they possess to mitigate grid stability issues. This may include built-in delayed operation, device-level frequency response capabilities or communications capabilities that allow load sharing and smoothing across devices in a household or even several buildings.

Should such measures meet outcomes in existing regulation for grid stability, this should be sufficient.

48. What template of “open” or “fair and equitable” licence should government require before allowing technical specifications that require this intellectual property into the standard?

An open approach is likely to lead to lowest costs for consumers, without hampering innovation too much.

49. Given the additional detail provided in this chapter, do you believe that the proposed 24-month period between when the first and second phase regulations come into force is appropriate?

Depending on what the outcomes of the proposal, more time will be required, and as such flexibility around specific exemptions should be a core part of the approach, while continuing the intention to implement within 24 months given the importance of these regulations.

The outcomes of PAS 1878 revision will be particularly impactful to Energy UK members. If it is decided that stricter requirements will be needed, the full 24 months will be required. The timelines are also difficult to comment on, as for 24 months to be carried out, there needs to be a consistent framework for smart devices, and clarity over interoperability requirements in line with the PAS revision. Additional guidance on the approach to implementation and governance would be welcome to aid the delivery of the changes by the sector.

Clarity and certainty for the industry is critical, so any additional detail on timelines should be shared as soon as is possible.

As above, it may be helpful to provide more clarity on what a grace period would look like for industry, and what criteria will be considered in that approach. Supply chain uncertainty and wider global pressures mean timelines and costs may fluctuate over coming years.

Harmonising phase one with the PAS revision will also be critical to ensuring that phase two of implementation is not impeded by differences in interpretation.

50. Are there any documents (such as specific standards, protocols, guidance, code, specifications) that should be explored for inclusion into the SSES technical framework? Please can you provide within your answer why their inclusion would help meet the SSES policy objectives and why the SSES technical framework is the best delivery mechanism.

Extensive work done within PAS 1878 and 1879 development to collate and document all existing standards should be reflected in the approach.

Further steps in the UK to ensure interoperability should be reflective of commonly accepted exchange standards in the UK and be aligned with standards already used or emerging in other regions to avoid patchworks developing. The summary SSES consultation notes that other routes towards compliance should be considered and investigated in relation to the upcoming planned revision of PAS 1878. If this assessment proves the validity of those routes in delivering the preferred outcomes of the standard, those existing standards could potentially be included in the Technical framework.

The following standards should be included in the assessment of potential routes to compliance:

- IEEE 2030.5, commonly used amongst SOs and DSRSPs on aggregated residential BESS systems.
- OpenADR (IEC 62746)
- IEC standards IEC 62325 and IEC 62746

In the future, it is likely that tighter cloud regulation for internet-based devices will be needed.

51. Do you believe that in the future, homes with multiple devices will have problems (such as sub-optimal energy management, grid stability concerns, etc) if there is not an active management of the devices at a premises level?

Energy UK broadly agrees that active management will play a role in avoiding issues for homes with multiple ESAs.

Active management options exist and can adapt through innovation to meet any unforeseen challenges as the nascent market develops.

New market entrants are developing offerings in this space to manage more complex smart homes, and should be enabled to enter the market and provide a competitive solution.

HEMS (as outlined in the following question) will help to deliver some of these solutions, and mitigate some of the risks.

52. What is your definition of a Home Energy Management System (HEMS) and what, if any, role do you see HEMS having within the SSES technical framework?

HEMS should provide value to the homeowner and the supplier by saving money and energy by providing a mixture of control, scheduling, and gathering user data. They should monitor the energy consumption of the home residents to help them adapt their energy usage behaviour based on the feedback they receive from the system.

HEMS should also support suppliers manage peak demand, by receiving signals from the supplier and create schedules based on the signals and the homeowner's priorities, and be capable of communicating with the various home devices for monitoring and control, and be capable of external communication with the local utility for receiving signals. They should then be able to analyse data such as energy consumption and provide feedback to homeowners. It also should create schedules based on energy consumption behaviour, system goals, users' priorities, and utility DSR signals.

HEMS are also responsible for cyber security and data protection for the consumer and operator, enabling better communication between systems, ESAs, and cloud systems on the operator or aggregator side.

An interoperable, secure, and flexible HEMS is useful outcome for the regulatory outputs of SSES. HEMS could also help to avoid command contradictions on the device level, compared to system controls.

53. Does this list capture all the required functions to maintain the technical frameworks necessary to facilitate load control? Are other functions needed?

Energy UK agrees that this captures the required functions.

54. Do you agree with the overall model of technical governance? Can you suggest any existing governance that would be well suited to take on this function?

Energy UK agrees with the overarching principle of a Technical Governance Group, though Government should consult with industry on the exact form this group takes and its parameters. This included term limits, voting structures, external review, the structure including roles and responsibilities, budget and the exact nature of the terms of reference.

55. Does this list capture all the necessary functions to deliver security governance? Are other functions needed?

The list of functions for security governance is overall comprehensive.

One of the functions should include coordination with the technical governance body to ensure that security governance measures have as limited an impact as possible on consumer experience, convenience, costs and market development.

On the oversight of the common systems, the single PKI architecture must be capable of dealing with multiple parties operating in the market and be flexible to cope with innovation and commercial developments as the market matures so as to not stifle innovation. With regard to a common system for anomaly detection, without a clear definition of what anomaly detection embodies, Energy UK cannot comment on whether the exact wording of this function is appropriate. Nonetheless, some form of anomaly detection systems, using

common systems or otherwise, is essential given the potential impact on a local grid of a catastrophic anomaly from a single large DSR system. Many, if not most, DSR systems already have anomaly detection systems but they will need to be adapted for aggregated domestic loads in the future. This and other considerations must form part of any common system for anomaly detection. Government must consult with industry on this as it develops the security governance framework.

56. Do you agree with the overall model of security governance? Can you suggest any existing governance that would be well suited to take on this function?

A common system implies a significant level of agreement needed when changing or evolving rules of, or changes to the system. Many of Energy UK members have noted that their current view of governance arrangements for smart meters (encompassed within the Smart Energy Code) is that it they are both cumbersome to navigate and are unlikely to accommodate the (speed of) innovation expected in this market.

If common systems are considered, there should be due consideration of the cost and time to implement and integrate them into suppliers' existing systems. In addition, Government should consider the risks of the inevitable centralisation of information that common systems would involve, including the complicated certification required for Public Key Infrastructure.

An alternative and more flexible approach such as a central body acting as a root certificate authority (CA) with multiple entities authorised by the central body to act as sub-CAs warrants review by National Cyber Security Centre (NCSC) and industry. Such alternative approaches create resilience to poor governance at the root level and therefore provide a more innovative and competitive landscape that will ultimately lower costs for the end consumer. An example of such an approach is the Open Connectivity Foundation (OCF) which developed a single PKI with two competitively operated roots licensed/approved by the OCF. The OCF also offers compliance testing and other services to support the Foundation.

57. Do you agree that electricity network licence holders are best placed to meet certain costs of setting up and maintaining technical and security frameworks during the Transition Phase? Please explain your answer.

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58. Do you agree with the proposed approach for recovering the costs of administering a licensing regime? Please explain your answer.

Energy UK agrees that sharing costs for governance and operational activities to maintain and supervise interoperability and cybersecurity would be a sensible approach.