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Submitted to Delivering a smart and secure electricity system: implementation
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About you

What is your name?

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Respondent type: please check the box that best describes you as a respondent from a list of options below.

Individual

If you answered 'Other' please describe :

What is your organisation?

Organisation:

Are you happy for your response to be published?

Yes

Would you like to be contacted when the consultation response is published?

Yes

Energy Smart Appliances consultation

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

Please enter your answer here.:

Tight but not impossible.

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?

Yes

Please expand on your response:

3 Do you have a view on when the smart mandate for heating appliances should be implemented?

Please enter your answer here.:

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?

Don't know

Please expand on your response:

I disagree that all ESAs should (a) measure and (b) report upstream their behaviour from both a technical/cost and privacy point of view. I believe there are reasonable open-loop use cases where a consumer can be rewarded for the outcomes, eg shifting load from peak times on a TOUT, without it being necessary or appropriate to know exactly how that was achieved. A smart meter is in that case sufficient witness.

Where ESAs do measure, and where the appliance energy is significant in kW or kWh/d for example, then supply-meter-equivalent accuracy is useful to minimise reconciliation issues and provide some redundancy, eg in case of meter or equipment failure or drift.

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.

Not Answered

Please expand on your answer.:

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.

Yes

Please expand on your answer.:

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.

Yes

Please expand on your answer.:

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.

Please give your answer here.:

A think avoiding "herding" and gaming may be important, and (for example) randomising some operations wrt HH timing boundaries might have to be considered to protect grid integrity. I brought up related concerns at Elexon workgroup 109 with potential perverse incentives to game netting periods rather than reduce actual grid flows, which is what the physics requires.

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.

Please give your answer here.:

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.

Please give your answer here.:

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?

Yes

Please expand on your response.:

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?

No

Please expand on your response.:

See Q4 answer. This has significant privacy and security implications without being necessary in many cases. It may be better to insist that participating in some programmes requires that, such as being paid in effect for capacity/availability rather than energy/shifting.

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?

Yes

Please expand on your response.:

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 DRSRPs?

Yes

Please expand on your response.:

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?

Yes

Please expand on your response.:

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?

Yes

Please expand on your response.:

Recent history is replete with local GB experience where failure of network connectivity or supplier systems has left users temporarily unable to control their own systems even when physically in front of them (eg a very large energy retailer), or where a tech provider has walked away from a product (eg turned off back-end support) and effectively permanently disabled the user's system.

It must be possible to work in at least a "limp-home" mode in the absence of external comms for comfort/safety/privacy reasons, given in particular that consumer Internet connectivity essentially has no SLA.

It would/should still be possible to respond to locally-measurable values such as mains frequency and RMS voltage (eg looking for sags).

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?

Yes

Please expand on your response.:

For now. This may however be worth revisiting at finer grain of products/services/devices and areas of behaviour.

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

No

Please expand on your response.:

Given my own recent research (DOI:10.3390/su16114710) and how critical the control strategy may be to (a) overall energy/footprint savings and (b) how different system components interact, I think that appropriate strategies should be very strongly encouraged unless good reason can be given not to follow them. The MCS 'requirements' are IMHO not strong and clean enough and are difficult to find (their PDFs are not even searchable!) and many installers and others seem unaware of them or at least of their potential importance.

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?

Yes

Please expand on your response.:

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

Yes

Please expand on your response.:

21 Do you agree with 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?

No

Please expand on your answer:

See Q4 and Q12 answers. Complexity, comms requirement and privacy/security impact, not required in many useful cases.

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

Yes

Please expand on your response.:

See Q4 and Q12 answers. Complexity, comms requirement and privacy/security impact, not required in many useful cases.

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

Yes

Please expand on your response.:

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?

No

Please expand on your response.:

Many users will not understand what they are being asked to do. (DECC SoS had to intervene on behalf of a family near me who, as I understand it, were left to manage a complex heat-pump system with no help or explanation and ended up with monumental bills.)

I do agree that sensible peak-avoiding defaults should be built in, but with slightly narrower hours so people can, for example, be warm when they go to bed which is often *by* 10pm. That may also imply tapered rather than binary behaviour around peaks.

I would like to see a standard uniform mandated simple core UI/UX across devices and manufacturers (by device class) that is simple enough for all users to understand and that can have legions trained to advise on because it is uniform. Manufacturers can add optional differentiators but must support that core simple interface. It may have to be able to guide users as to the costs of NOT avoiding peaks for example. (I proposed this to a heat-pump manufacturer.) It may form part of my research plan over the next few years.

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

Please enter your answer here.:

The standard uniform mandated simple core UI/UX across all manufacturers of a given device class, per answer to Q24.

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

Yes

Please expand on your response.:

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?

Yes

Please expand on your response.:

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

No

Please expand on your response.:

I think there should be a competent persons scheme or similar, since failing to install, commission or explain such a system has serious financial and health implications for the recipient, and indeed the climate.

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?

Please enter your answer here.:

I wish I had that answer. Industry influencers such as Nathan Gambling and Adam Chapman may have some answers.

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

Yes

Please expand on your response:

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

Please enter your answer here.:

(a) it is hard to get such standards right anyway in my experience (b) malice and FUD from vested interests, submarine patents, etc.

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?

Not Answered

Please expand on your response.:

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

Please enter your answer here.:

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?

Not Answered

Please expand on your response.:

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?

Please enter your answer here.:

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?

Please enter your answer here.:

a) Adjusting the random distribution (not simply uniform) and seeding with good entropy and/or DNO-supplied network topology (eg to spread the loading changes by address on local transformers and phases).

b) Locally measurable quantities such as mains frequency and RMS voltage.

c) A built-in fallback time-based calendar of likely key synchronisation risk times, updated over time.

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?

Please enter your answer here.:

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?

Yes

Please expand on your response.:

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?

Please enter your answer here.:

In my experiences of inventing and bringing to market multiple novel services and technologies, with varying degrees of support/resistance, I found fintech and comms much easier than energy to make progress in. The default in most such endeavours is accidentally (and sometimes maliciously by incumbents and regulators and their advisors) to squash novel solutions as they do not fit existing frameworks which almost by necessity lag technology. We need to move with greater speed than I feel confident that current regulators move with.

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?

Please enter your answer here.:

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?

Yes

Please expand on your response.:

Existing tech that could have been deployed many years ago has not been because it has been seen as a nuisance or a threat by existing participants, or simply unlikely to have a direct obvious significant monetary benefit to any one key party, even though there are measurable objective diffuse benefits available if an appropriate framework is provided by government fiat. Standardisation of implicit DSR may help.

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

Please enter your answer here.:

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?

Please enter your answer here.:

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?

Please enter your answer here.:

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).

Not Answered

Please expand on your response.:

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?

Please enter your answer here.:

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?

Please enter your answer here.:

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?

Please enter your answer here.:

IMHO...

Ideally anything mandated by a government regulation in this area should be truly open (and one should not have to pay to read the standard if smaller innovators are to get a look in), so for example freely published under CC0 or BSD or Apache or CC BY permissive licences, ie (1) is best. (2) is tolerable if properly policed and with clawback in the face of non-RAND behaviour by the licensor. (3) is not tolerable.

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?

Yes

Please expand on your response.:

We have to move fast. CO2 accumulates while we dither and delay.

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.

Please enter your answer here.:

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?

Yes

Please expand on your response.:

Yes and no.

Often subsystems can be designed with a high degree of independence without explicit interop and to continue to behave well even if one or more of them fails or is degraded.

For example in my home there are independent subsystems for off-grid PV (with storage), grid-tied PV in multiple rounds, grid-tied storage, and PV diversion with a heat battery. There is a small amount of coupling with Raspberry Pi scripting, but each system is fairly independent of the others and if one stops others will continue to operate well. This approach loses a little nominal efficiency but is relatively robust, which I think is important in large-scale deployment to the general public.

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?

Please enter your answer here.:

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

Please enter your answer here.:

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?

Not Answered

Please expand on your response.:

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

Please enter your answer here.:

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?

Not Answered

Please expand on your response.:

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.

Not Answered

Please expand on your response.:

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

Not Answered

Please expand on your response.: