

PAS for ESA classification: specification

Scoping workshop - Chiswick 2 May
2019



Welcome

Housekeeping

Introductions

Agenda for the day

Agenda

10:00 Arrival, Tea and Coffee

10:30 **Welcome, context and objectives – BSI**

10:45 **Policy introduction – BEIS**

11:00 **DSR PAS – Agreeing the key Scope features – Group session**

12:30 Lunch

13:00 **ESA Classification / Security & Privacy – Breakout session 1 (2 Groups)**

13:45 **ESA Classification / Security & Privacy – Plenary**

14:15 Break

14:30 **DSR Integration / Certification – Breakout session 2 (2 Groups)**

15:15 **DSR Integration / Certification – Plenary**

16:00 **The way forward**

16:30 Close

Objectives of the scoping workshop

- ✓ Provide context for the development of two BSI PAS documents to support the uptake of energy smart appliances (ESA)
- ✓ Explain the development of a BSI PAS and activities after this workshop
- ✓ Review the draft scope of the Demand Side Response PAS project as a first step to developing the PAS



The Energy Smart Appliance

"...an appliance which is communications-enabled and able to respond automatically to price and/or other signals by modulating their electricity consumption"



What does this mean in 'standards terms' so the consumer knows what to expect?



Standards Research Scope

BEIS and OLEV asked BSI to carry out a review and analysis of the existing standards landscape for ***energy smart appliances & electric vehicle chargepoints***. The work comprised:

- A gap analysis of the standards landscape

- Recommendations for the revision or refinement of existing standards, the development of new standards, dissemination and awareness raising activities and standardization activities, or tools and navigation aids for the UK market

- Suggestions for standards, or gaps where these are identified, which an appliance should meet in order to be called a 'smart appliance'

- Timed options to fill in obvious standards gaps, and carry out related or supporting standardization activities.



Recommendation Implementation

1 – DSM Framework

- Develop a framework standard for DSR definition, operation and management

2 - Classification

- Develop a standards classification for smart appliances in a DSR context (framework & appliance specific)

3 – Smart EV: Smart Appliance Convergence

- Research opportunities for convergence of EV charge points and smart appliances in standards

4 – Test and Certification

- Establish a testing and certification regime

5 – Coordination and Oversight

- Ensure an ongoing coordination of smart appliance standardization

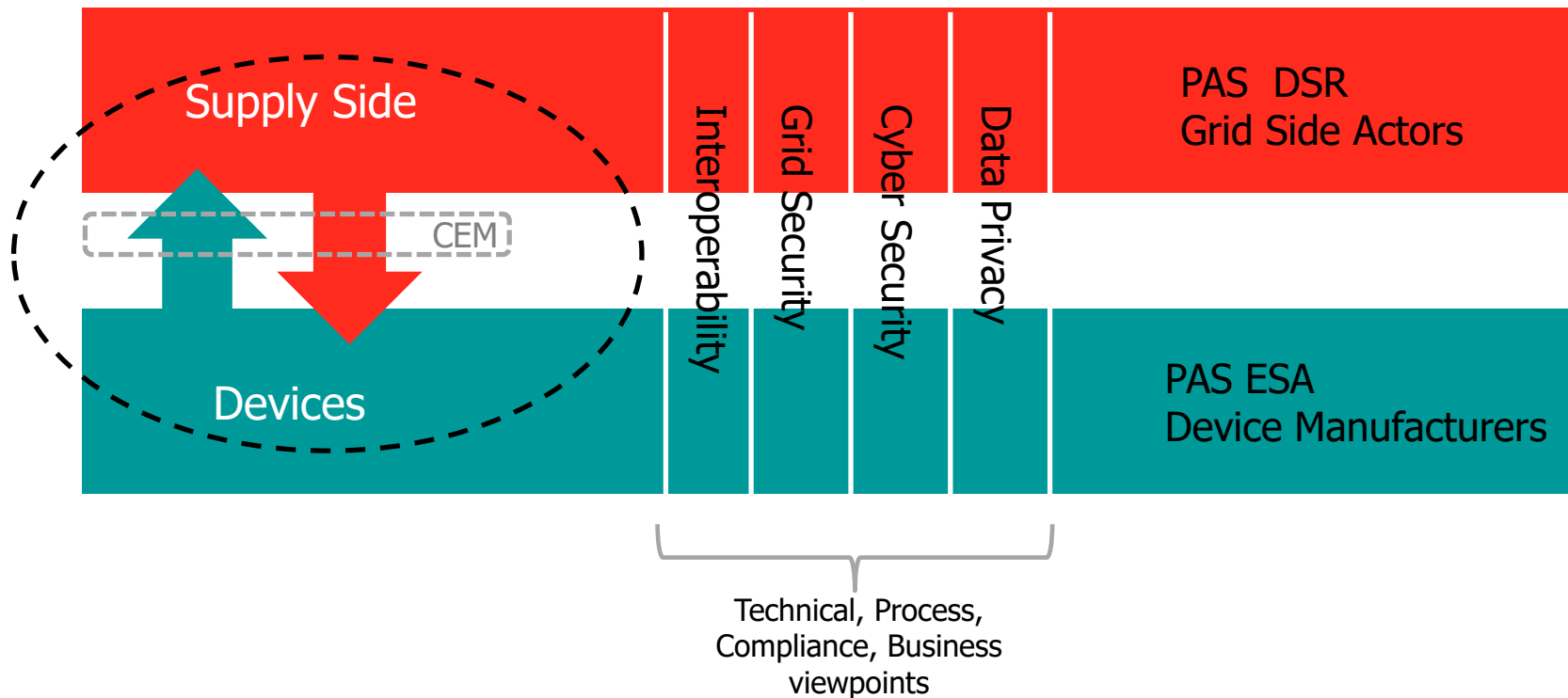


Recommendation Implementation

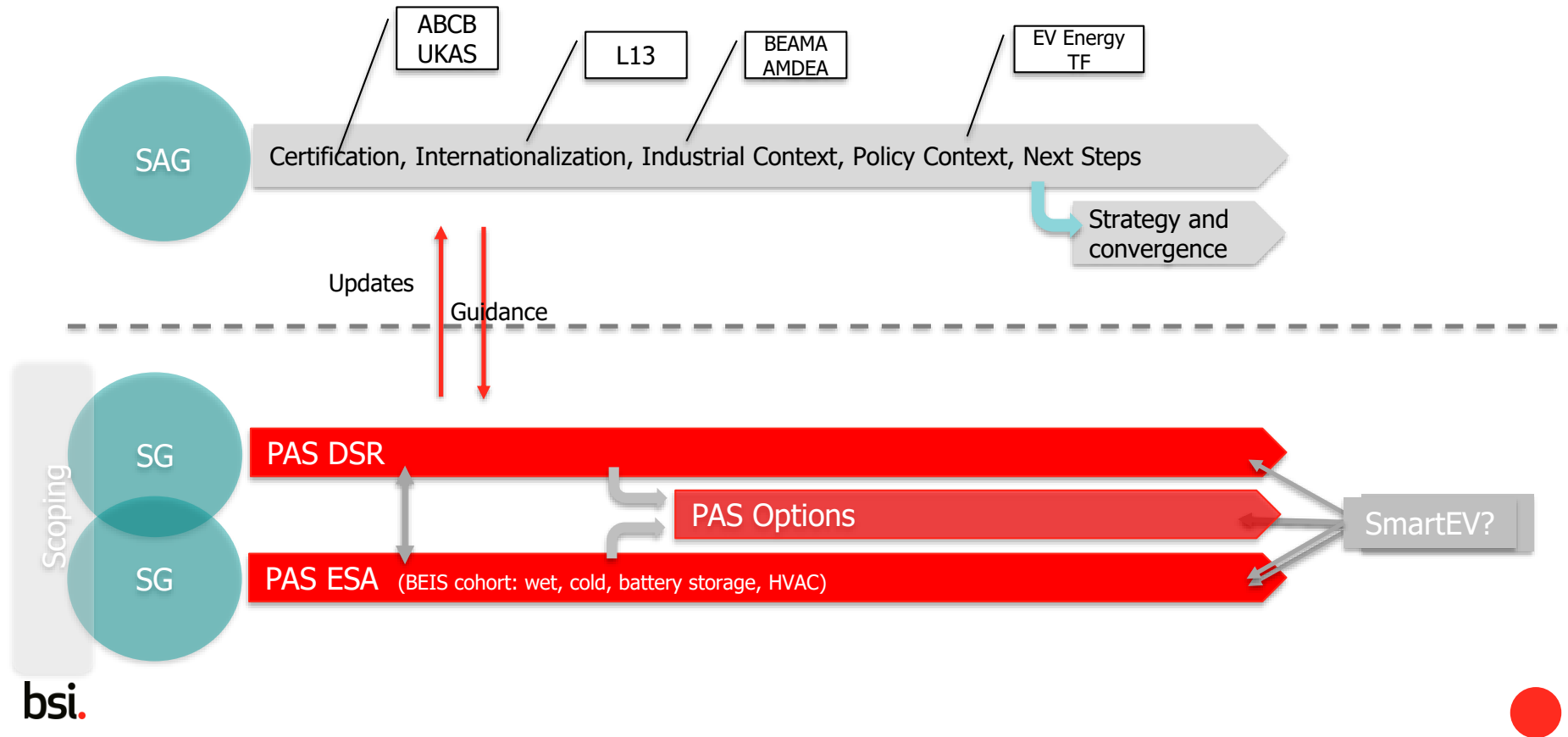
Recommendation	Scope Description	Implementation
1 – DSR framework	<ul style="list-style-type: none">Develop a framework standard for DSR definition, operation and management	PAS
2 – ESA classification	<ul style="list-style-type: none">Develop a standards classification for smart appliances in a DSR context (framework & appliance specific)	PAS
3 – Smart EV: smart appliance convergence	<ul style="list-style-type: none">Research opportunities for convergence of EV charge points and smart appliances in standards	PAS and/or research support to L/13
4 – Testing and certification	<ul style="list-style-type: none">Establish a testing and certification regime	Incentivise market
5 – Coordination and oversight	<ul style="list-style-type: none">Ensure an ongoing coordination of smart appliance standardization	Establish governance



ESA in a DSR Context



Recommendations Implementation



What is a BSI PAS?

- Fast-track standard than can be developed in 9-12 months
- Developed in response to a particular need
- Developed by a dedicated project team
- Has international application
- Compliments and compliant with formal ISO/EN process



Types of standards

Specification

standard that sets out detailed **requirements**, to be satisfied by a product, material, process, service or system, and the procedures for checking conformity to these requirements

Code of practice

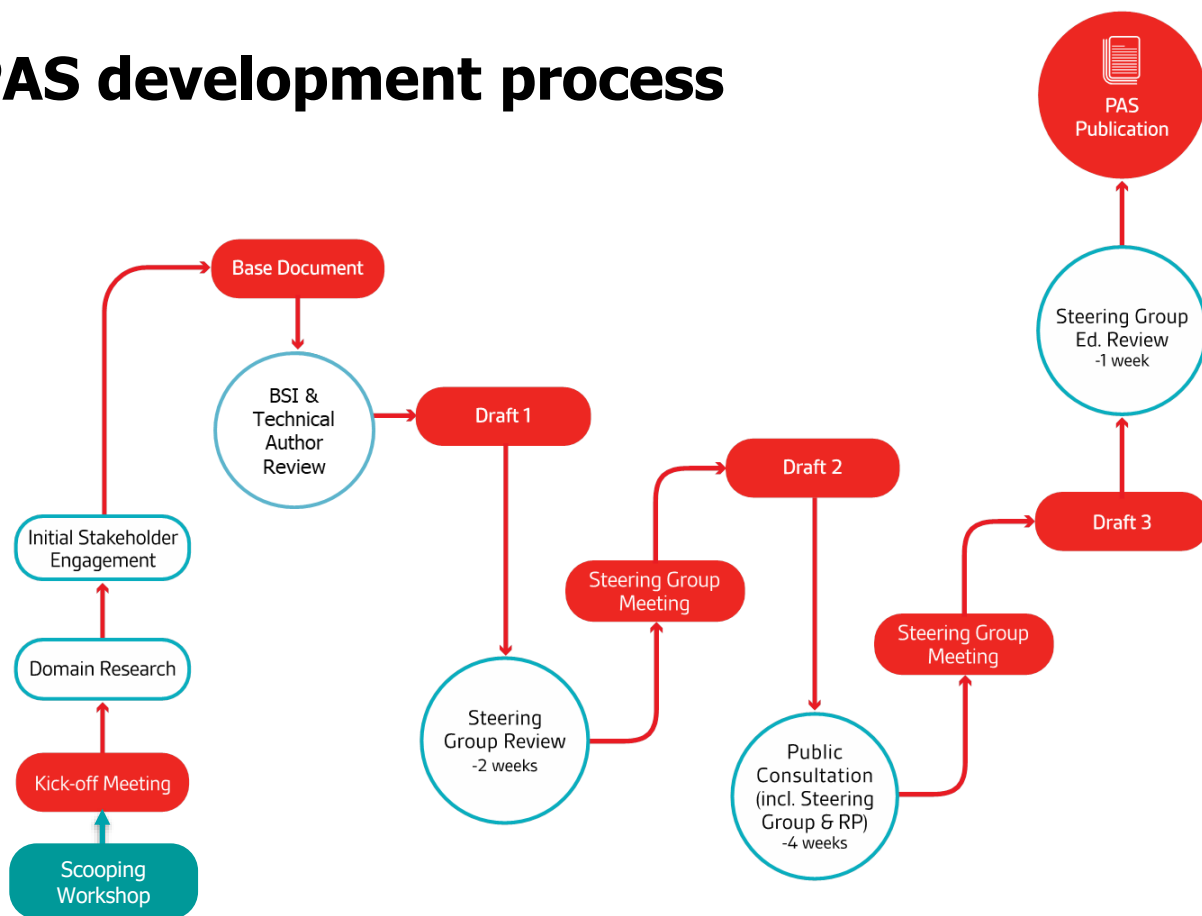
gives **recommendations** for accepted good practice as followed by competent and conscientious practitioners, and which brings together the results of practical experience and acquired knowledge for ease of access and use of the information

Guide

gives broad and general **information** about a subject, with background information where appropriate



PAS development process



Who's involved

Technical Author

Provision of technical input & expertise necessary for the development of a base document

Steering Group

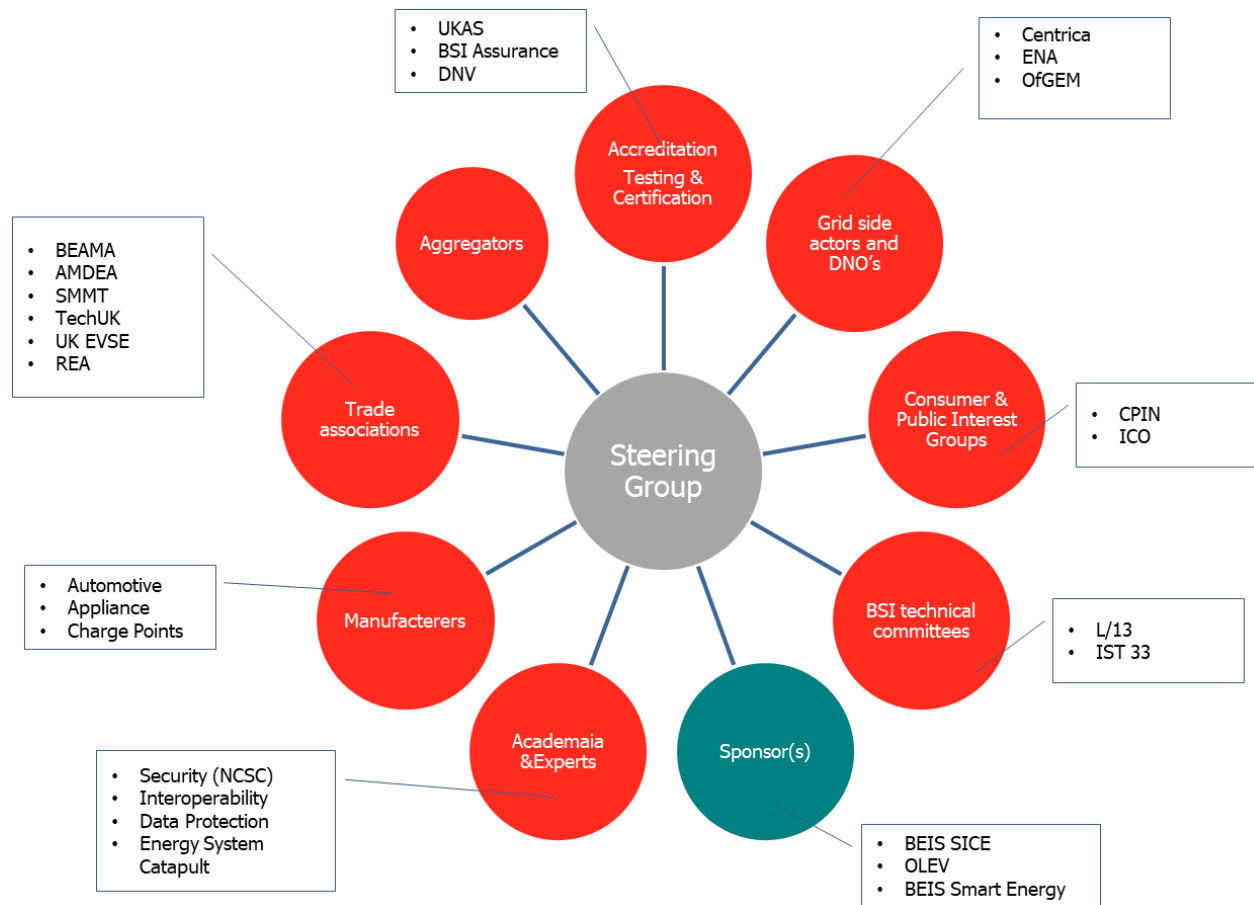
10 -15 key experts in the subject area

Review Panel

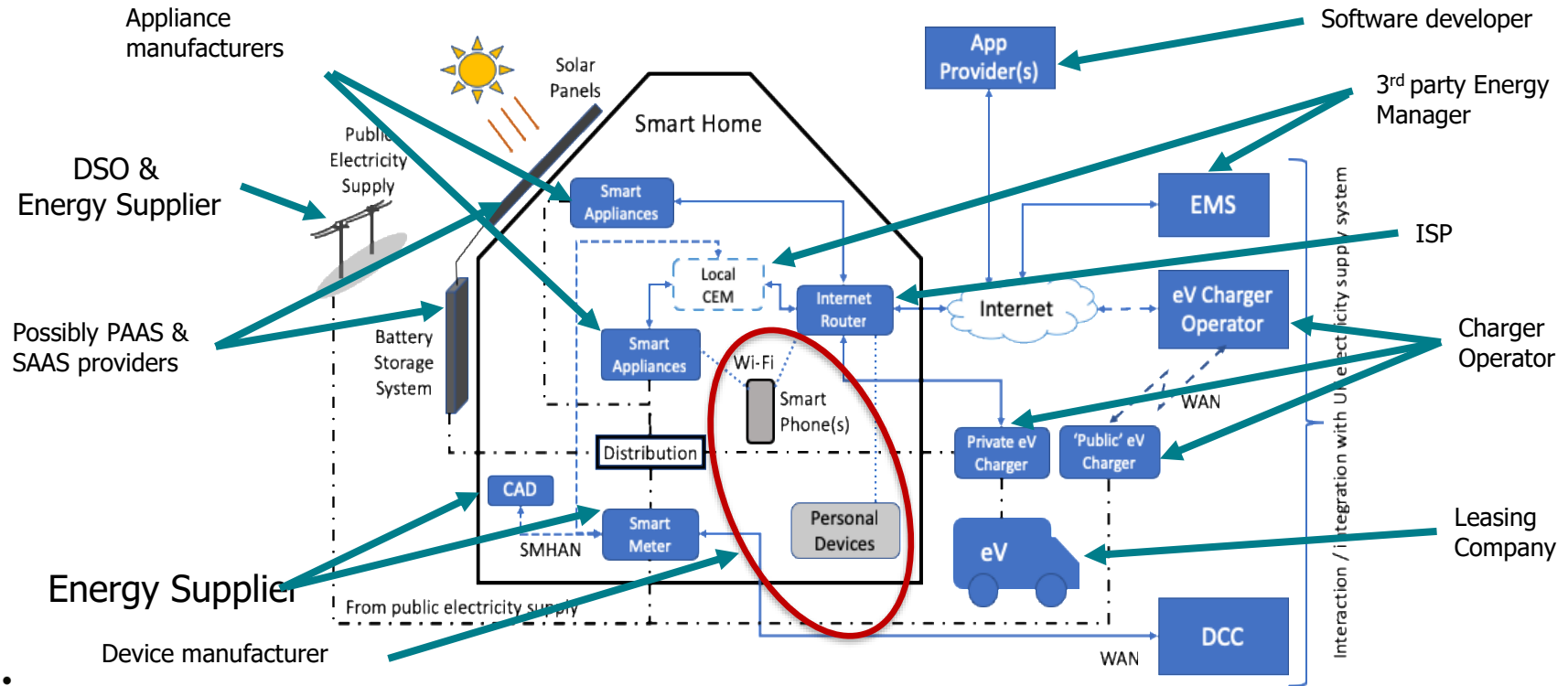
Industry, government, trade associations, formal standards committees, independent experts, and consumer groups



Indicative Stakeholders



DSR Ecosystem – many players



Scenario: properties on single phase from substation

PV

Private eV
Charger

Public eV
Chargers

1
2
3

Competing DSR
service providers



Government Policy Context

ESA Programme

Dr Nina Klein

Energy Engineer

Science and Innovation for Climate and Energy



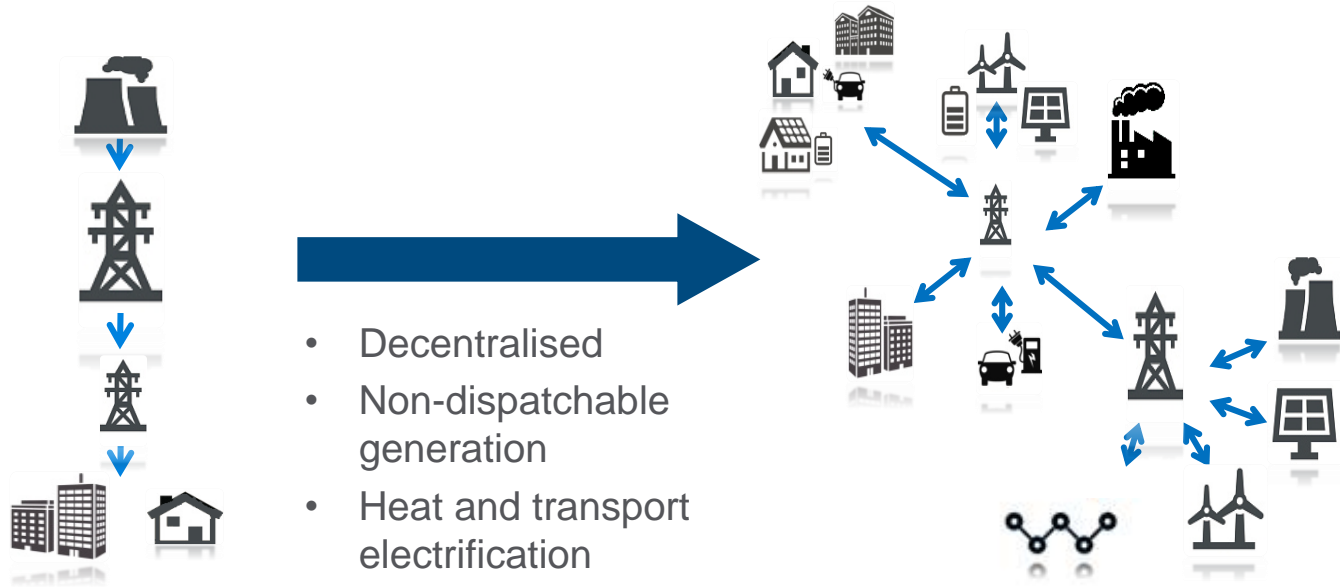
HM Government

May 2019



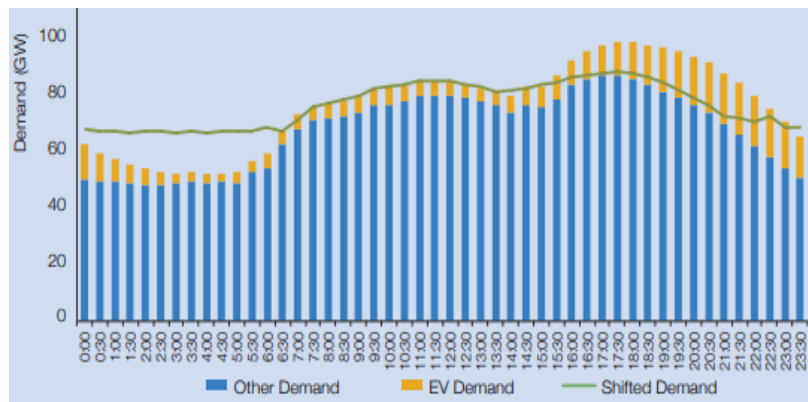
Department for
Business, Energy
& Industrial Strategy

Energy System Transition



Demand Side Response (DSR)

- A smart, flexible energy system could save £17-40bn to 2050
- Domestic ESAs can provide DSR services
- Smart time-of-use tariffs to reduce energy bills
- Whole-system benefits for consumers, networks and generators



Energy Smart Appliances

Connected devices that can modulate or shift their electricity consumption in response to signals.



Energy Smart Appliances (ESAs)



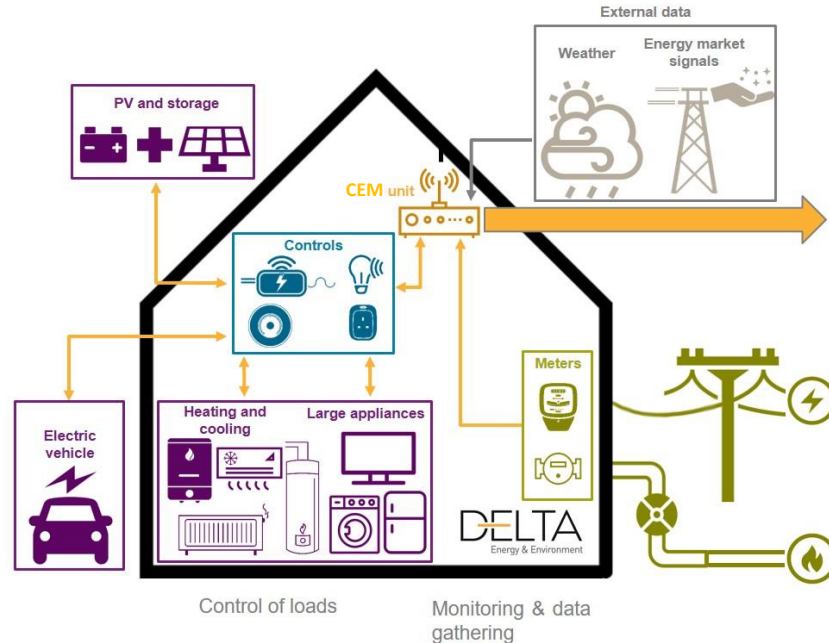
Smart System Opportunities

Benefits

- Cost reductions
- Carbon intensity
- Security of supply
- New businesses

Risks

- Cyber-security
- Data privacy



Government Strategy

The Industrial Strategy

- skills, industry, infrastructure

The Clean Growth Strategy

- cross-sector decarbonisation

BEIS - energy

- Smart Systems and Flexibility Plan

OLEV - transport

- Road To Zero Strategy



BEIS: Smart Systems and Flexibility Plan

- Government and Ofgem publication
- Enabling a smart, flexible energy system
- 29 actions across 3 themes

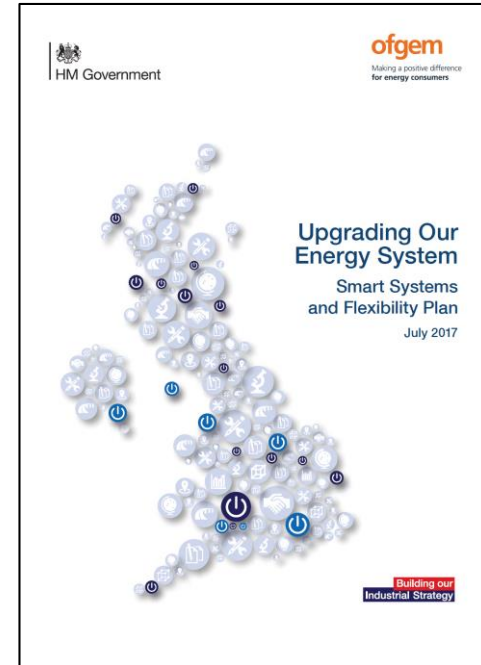
Smart
homes and
businesses



Removing
barriers to
smart
technologies



Markets that
work for
flexibility



Department for
Business, Energy
& Industrial Strategy

BEIS: Smart Systems and Flexibility Plan

Smart Homes and Businesses

Policy principles from stakeholder consultation:

Interoperability	the ability of an ESA to work seamlessly across any DSR service operated by any system player.
Data privacy	the secure storing of data on the device or with any controlling party.
Grid-security	the prevention of outages on the grid caused by erroneous operation of an ESA.
Cyber-security	the prevention of unauthorized access to an ESA by third-parties.



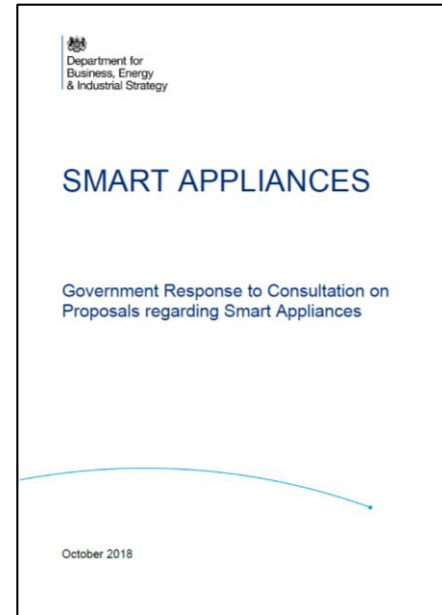
BEIS: Smart Appliances Consultation Response

Government intends:

- to take powers to set regulatory requirements for smart appliances
- to base requirements on the four policy principles
- to consult again on further details of regulation

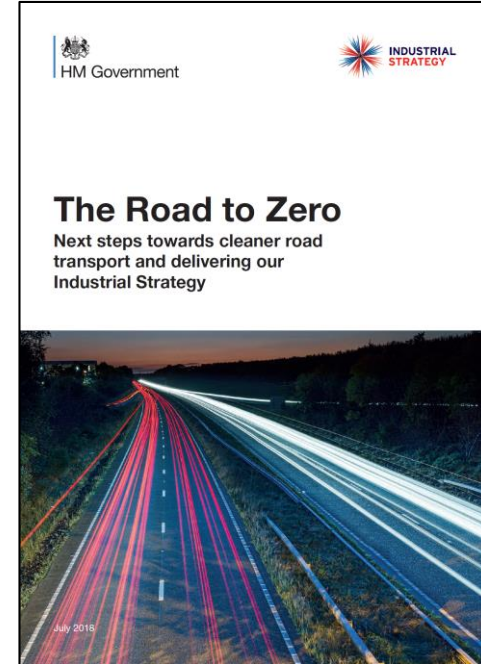
Aims:

- to encourage uptake and protect against risks



OLEV: The Road to Zero

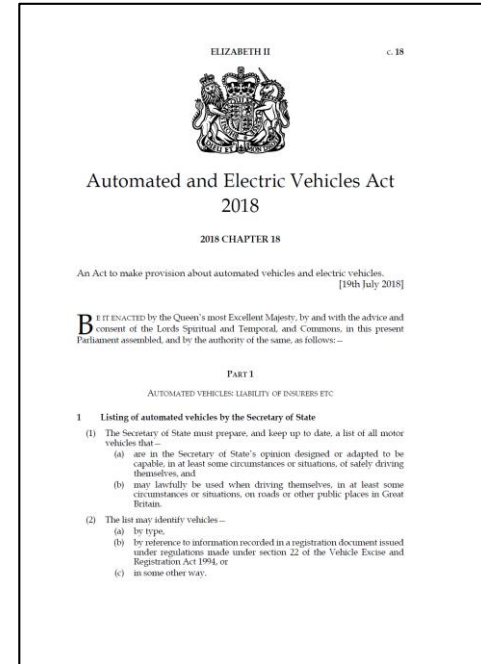
- Be at the forefront of design and manufacturing of zero emission vehicles
- One of the best EV infrastructure networks in the world



OLEV: The Road to Zero

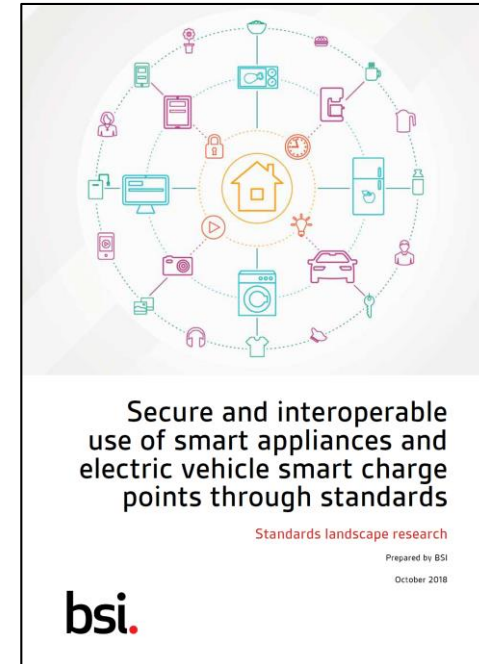
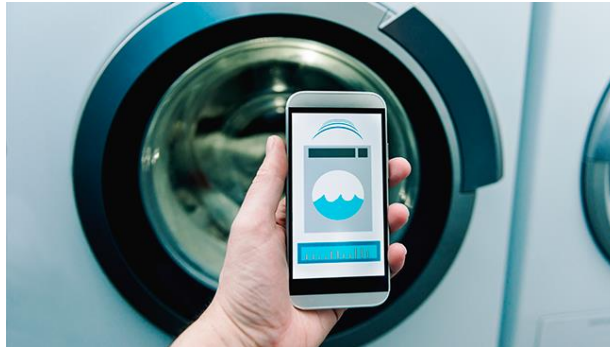
Automated and Electric Vehicles Act 2018

- Powers to ensure any chargepoint sold or installed in the UK is smart
- OLEV intends to consult on using these powers
- Regulation could mandate smart EV chargepoints meet technical standards



ESA Programme - Motivations

- Accelerate deployment of smart products and services
- Deliver recommendations from Standards Landscape Report
- Provide mechanisms to demonstrate regulatory compliance



ESA Programme - Aims

- An industry-led standards development process
- UK leadership through international promotion
- Compatible with UK smart meter network



ESA Programme - Impacts

- Promote the safe, secure and interoperable uptake of smart products and services
- Enable the transition to a smart, flexible, low-carbon energy system at the lowest cost to consumers
- Demonstrate UK leadership on the international stage



Thank you

Dr Nina Klein

Energy Engineer

Science and Innovation for Climate and Energy



Department for
Business, Energy
& Industrial Strategy

DSR PAS Scoping

2nd May 2019



By Royal Charter

DSR PAS - Scope synopsis

"This PAS provides a **code of practice** for the operation of energy smart appliances (ESA) in a demand side response (DSR) context. It sets out the functional and non-functional aspects of a DSR framework, including the responsibilities of actors and associated policies and procedures. This sets the context/reference into which an energy smart appliance can function and operate

This PAS will be used by organizations with responsibilities for operating a DSR environment. It could be useful for manufactures of ESAs to understand the context of device supply to the market."

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Why? Is a standard necessary and will it bring benefits...

What? The content and format of the standard...

Who? Target audience of the standard...

Where? The locality of the standard (national, regional, global)...

When? The best timing for launch...

How? What stakeholders need to be involved to ensure credibility...

DSR PAS - Items in Scope #1

1. Definition of terms, objects and actors in a DSR environment.
2. Logical configuration of a DSR environment. Specification of what the relevant objects in a DSR environment are and the required interface to a ESA. This include key actors and their roles in the DSR environment.
3. Functional configuration of a DSR environment. Specification of what each component in the DSR framework is expected to do (and not expected to do). Key here are the rules for communication between DSR entities such as the CEM, ESA, domestic router, etc.
4. Deployment configuration of a DSR environment. This is the engineering viewpoint of the DSR entities. It considers the physical realization of the entities and the estate on which they may be located. This should consider potential blockers to deployment (e.g. Smart EV located in garage separate to domestic dwelling).
5. Energy smart appliances and smart metering. Although different technologies, it may be beneficial to consider any dependencies and relationships between the two – if only for clarity.

DSR PAS - Items in Scope #2

1. DSR rules. Consideration as to how the DSR supply side responds to a request or option to reduced supply. Essentially this is defining how DSR is implemented to maximize grid stability. This PAS may give guidance on how it should be done, but details left to national and possible regional guidance. For example, if there is an option to reduce supply, should this be done even if there is no need from a grid capacity perspective?
2. Consumer/demand base segmentation to allow for effective grid management. This is related to the above point on DSR rules. This PAS may give guidance on how it should be done, but implementation details should be left to national guidance.
3. Cyber security frameworks in which DSR operates, including security model compatibility between DSR supply side with ESAs. There is also a need to consider roles and responsibilities of actors in this context.
4. Data privacy frameworks in which DSR operates (i.e. GDPR in a DSR context).
5. Lifecycle. When a person moves house or the home profile changes.
6. Grid stability. Mechanisms to prevent gaming of supply.

DSR PAS - Items out of Scope

1. Financial models for DSR operation and associated contracting.
2. Ethics of DSR operation and social inclusivity.
3. Payment services.
4. Functioning and operation of ESA's. CEM may also be out of scope here, but this is to be determined. The CEM could be described in the ESA classification PAS.
5. Safety of appliances, although consideration may need to be given to any generic DSR-related issues.

DSR PAS: Afternoon



DSR PAS: Breakout Session 1

Interoperability (Group A)

To maintain grid security and stability there will be a need for energy suppliers to cooperate and collaborate so as to avoid conflicting actions that undermine the electricity supply system. Allied to the grid security issue is the issue of interoperability, i.e. the avoidance of stove-piped or closed systems.

1. DSR could operate at three levels:
 - a. National – reflecting constraints in generation/supply capacity affecting the ESO's operation and stability of the Grid;
 - b. Regional – with a DSO's area to manage demand from Grid offtake or regional generator or supplier; and
 - c. Local – at sub-station level to manage demand within sub-station to premises infrastructure, e.g. prevent overloading or respond to local constraints.

How will the interactions at these three levels be managed, and who will manage them?

2. Could a home/small business/premises be subject to DSR services from multiple service providers or aggregators? If so how would competing 'signals' be managed, e.g. reduce demand from domestic heating increase demand from eVs or storage systems?
3. What social rules do we need for DSR operation? What do we mean by social rules? Does this include segmentation and profiling of customers?



DSR PAS: Breakout Session 1

Data Privacy (Group B)

From a data privacy perspective, the framework is required to set out appropriate and proportionate controls for the management and handling of consumer/customer data and premises-related information throughout the DSR supply chain.

1. From a data privacy perspective what information shall a DSR service provider have in order to deliver a service and why is this information necessary?
2. What use and/or transfer of customer data and/or information to third parties is necessary? Is this required for purposes other than supply of electricity to the premises?
3. What treatment of data privacy issues are important for inclusion in this PAS beyond a statement to comply with data protection legislation?



DSR PAS: Breakout Session 1

Grid Security (Group A)

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DSR Session 1

Plenary

DSR PAS: Breakout Session 2

Cyber Security (Group A)

The operation of DSR services is potentially vulnerable to cyber security incidents, that affect safety and security of premises and their occupants.

1. What safety and security principles should apply to the design and operation of DSR services? How should this be evidenced?
2. How would the DSR system/service respond to reduced Internet service, e.g. slow service due to traffic volumes or malware activity?
3. How will the DSR monitor whether DSR 'signals' have been responded to by a consumer's appliance(s)?
4. What measures or obligations should the framework contain regarding a DSR service provider's behaviour and actions in the event that the provider is subject to a security breach?



DSR PAS: Breakout Session 2

Interoperability (Group B)

There is an inter-dependency between the operation of the DSR framework and the Energy smart appliance. From a DSR perspective, what information should be included in the PAS for the specification the ESA.

1. Should all ESAs be treated as equal, or do particular classes or combination of ESA warrant particular attention to ensure correct functioning of the DSR system?
2. Is the expectation that all DSR messaging is executed via a CEM? Should the CEM be considered as part of the DSR Framework PAS or the ESA PAS?
3. To address interoperability of smart appliances and DSR services we need a common messaging language, what are our options?
4. What rules, messaging and functionalities do we expect a smart appliance to support?



DSR PAS: Breakout Session 2

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DSR Session 1

Plenary

Wrap up and Next steps





...making excellence a habit.™

ESA PAS Scoping

3rd May 2019



By Royal Charter

ESA PAS - Scope synopsis

“This PAS **specifies** the requirements and criteria that a device needs to meet in order to perform and be classified as an energy smart appliance (ESA). It defines the attributes, the functionalities and performance criteria for a ESA, and specifies how compliance with these can be verified. The characteristics of an ESA are symbiotic with those of the DSR framework in the sense that ESA is able to perform in a DSR environment and enable DSR-based activities.

This PAS is intended to be used by manufacturers and maintainers of ESAs.

ESA PAS - Scope synopsis

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Where? The locality of the standard (national, regional, global)...

When? The best timing for launch...

How? What stakeholders need to be involved to ensure credibility...

ESA PAS - Items in Scope #1

1. Definition of terms.
2. Segmentation of energy smart appliance types.
3. Generic attributes of a ESA.

For example: being capable of both smart and non-smart operation; defining smart modes of operation (on/off, delay, ramp etc.); recovery after a power loss.

4. Data Privacy.

For example, "Privacy by design" considerations.

5. Cyber Security. There are a number of factors here that need to be considered in the specification.

Link to established approaches such as BSI kitemark for IoT Devices, European Network for Cyber Security EV charging security requirements¹ and initiatives like IoT Security Foundation guidelines and Secure by Design principles (DCMS guidance currently submitted to ETSI)

6. Device communication capability

For example is this only with the CEM for DSR? The more 'locked down' a device is the more secure it will be.

7. Peer to peer and third party connections (ESA to Smart Phone?) – this increases vulnerability.

ESA PAS - Items in Scope #2

8. Grid Security

The specification could state that that only secure devices shall be connected to the grid. This could be verified by a check on the software version and any patches installed

Does CEM provide 'second line of defence' e.g. it can intervene if alarm conditions for power use are exceed at a dwelling level.

9. Interoperability:

Device to CEM communications.

Message and communications protocol. There are maturing standards for developing the instruction set that can be referred to. There is a need to check if these standards specify conformance tests for interoperability, or if one needs to be developed.

10. Lifecycle. Considerations include:

Software updates and second-hand market for the ESA.

Do software updates require connection to third party device or are they over the air updates.

Does the CEM play a role in updates as trusted gateway?

Role of the manufacturer in software updates (link to DSR framework

ESA PAS - Items out of Scope

1. Safety – but any DSR must have a failsafe (i.e. ESA cannot be instructed to perform an unsafe operation).
2. Functionality of the device itself, e.g. ability to wash clothes.

ESA PAS: Afternoon



ESA PAS: Breakout Session 1

ESA Classification (Group A)

For the purposes of DSR, the assumption is that ESAs will need to be segmented into classes. This could be done on functionality/type of the device (e.g. EV Chargepoints, HVAC etc.) but potentially could also be done on “smart capability”. Segmentation may also need to consider public v domestic appliance. Likewise it may be important to distinguish between devices that have an inbuilt CEM and those that communicate via an external CEM.

1. What segmentation of ESA types is necessary to perform DSR?
2. Are multiple segmentations required to support compliance with the policy principles of grid stability, cyber security, data privacy and interoperability?
3. Do EV chargepoints need separate attention in this standard? If so, what particular distinctions from other ESAs should be addressed?



ESA PAS: Breakout Session 1

Cyber Security and Data Privacy (Group B)

From a data privacy and cyber security perspective, an ESA needs to ensure it is designed with security and privacy in mind.

1. Does any personal data need to be stored on an ESA? If not, should this be specified? Is the management of data privacy an issue that exists only at the CEM level?
2. What are the obligations on the owner of the ESA / CEM to ensure their devices are safe and secure? What happens when they cease to be the owner?
3. The software on the ESA and/or CEM will need to be kept up to date to ensure it is both safe and secure. What should be specified in the ESA PAS to enable this?
 1. Does the CEM play a role in software updates to an ESA?
 2. What role shall manufacturer play in performing software updates?



ESA PAS: Breakout Session 1

ESA Classification (Group A)

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ESA Session 1

Plenary

ESA PAS: Breakout Session 2

Certification (Group A)

Verification of compliance to the ESA PAS may be required. Different approaches could be envisaged for the ESA and the CEM and this could be an opportunity to make verification via a certification scheme more manageable. If the ESA has no direct communication to the supply side and is simply transmitting messages to/from the CEM with no associated personal data then compliance with the policy principles for the ESA is more straightforward. However, the burden of a more complex compliance is then at the level of the CEM.

1. Should the ESA and the CEM be treated separately from the perspective of any future certification scheme? Does this separation present barriers or opportunities to the manufacturers of either an ESA or CEM?
2. What considerations or clauses should be included in the ESA PAS to support any future certification scheme?



ESA PAS: Breakout Session 2

DSR Dependencies (Group B)

There is an inter-dependency between the operation of the DSR framework and the Energy Smart Appliance. From a ESA perspective, what information should be included in the PAS for the specification the DSR?

1. Is the expectation that all DSR messaging is executed via a CEM? Should the CEM be considered as part of the DSR Framework PAS or the ESA PAS?
2. To address interoperability of smart appliances and DSR services we need a common messaging language, what are our options?
3. How will the DSR monitor whether DSR "signals" have been responded to by a consumer's appliance(s) and vice versa? How should the ESA/CEM react to a lack of DSR?



ESA PAS: Breakout Session 2

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ESA Session 2

Plenary

Wrap up and Next steps





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