DEPARTMENT OF ENERGY & CLIMATE CHANGE

Smart Metering Implementation Programme

Consultation on the second version of the Smart Metering Equipment Technical Specifications

[URN 12D/258 13th August 2012]

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The consultation can be found on DECC's website:
http://www.decc.gov.uk/en/content/cms/consultations/SMETS 2cons/SMETS 2cons.aspx

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Contents

General information

Purpose of this consultation

This consultation seeks views on the second iteration of technical specifications of smart metering equipment and related matters.

Issued: 13th August 2012

Respond by: 8th October 2012

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Consultation reference: URN 12D/258

Territorial extent:
This consultation applies to the gas and electricity markets in Great Britain. Responsibility for energy markets in Northern Ireland lies with the Northern Ireland Executive's Department of Enterprise, Trade and Investment.

How to respond:
Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome. Responses to this consultation should be sent to smartmetering@decc.gsi.gov.uk. The consultation closes on 8th October 2012.

Responses should be clearly marked Smart Metering Implementation Programme: Consultation on the second version of the Smart Metering Equipment Technical Specifications (URN 12D/258). Responses and any enquiries related to the consultation, should be addressed to:

Smart Metering Implementation Programme
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Additional copies:
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Other versions of the document in Braille, large print or audio-cassette are available on request. This includes a Welsh version. Please contact us under the above details to request alternative versions.

Confidentiality and data protection:
Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information legislation (primarily the Freedom of Information Act 2000, the Data Protection Act 1998 and the Environmental Information Regulations 2004).

If you want information that you provide to be treated as confidential please say so clearly in writing when you send your response to the consultation. It would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded by us as a confidentiality request.

We will summarise all responses and place this summary on our website at www.decc.gov.uk/en/content/cms/consultations/. This summary will include a list of names or organisations that responded but not people's personal names, addresses or other contact details.

Quality assurance:
This consultation has been carried out in accordance with the Government's Code of Practice on consultation, which can be found here:
http://www.bis.gov.uk/files/file47158.pdf

If you have any complaints about the consultation process (as opposed to comments about the issues which are the subject of the consultation) please address them to:

DECC Consultation Co-ordinator
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Email: consultation.coordinator@decc.gsi.gov.uk

1. Executive Summary

1. The Government's vision is for every home and smaller business in Great Britain to have smart electricity and gas meters. In addition, energy suppliers will be required to offer domestic customers an In-Home Display (IHD) which will present real-time information on energy usage.

2. Smart meters will be rolled-out over two implementation phases, the Foundation stage and Mass Roll-out stage. The Mass Roll-out stage will result in smart electricity and gas metering systems being installed in all properties.

3. The Response to Roll-out Consultation (April 2012[1]) presented Government's initial decisions in relation to the technical specifications for smart metering equipment, publishing the first version of SMETS alongside these decisions. The Response also identified areas in which further work was being undertaken and signalled that the technical specifications would be further developed in certain areas. This consultation seeks views on proposals for adding to the technical specifications and on a series of related matters.

Smart Metering Equipment Technical Specifications (SMETS)

4. The objective of the initial version of the SMETS (SMETS 1) published in April 2012[2] was to establish a specification that would ensure that smart meters installed during the Foundation stage could perform a minimum set of functions in a consistent manner. These functions are designed to deliver the benefits from smart metering, as defined in the Impact Assessment, and are summarised in the 'A-H List', as set out in the March 2011 Prospectus Response[3]. SMETS 1 aimed to reduce the risk that smart meters will need to be replaced when a customer changes their supplier and provide confidence to suppliers to begin their roll-out programmes.

5. In parallel with SMETS 1 drafting, a number of further issues were still under development. Some of these functions might have delayed the introduction of SMETS 1 and so the availability of compliant smart meters for Foundation. The Programme was also in the process of managing a wireless Home Area Network (HAN) trial.

Smart Metering Equipment Technical Specifications – Version 2 (SMETS 2)

6. This consultation seeks views on the additional functions and features that Government proposes to introduce through an updated version of the SMETS (SMETS 2) and the wider regulatory framework, notably on the preferred HAN solution, plus issues

[1] http://www.decc.gov.uk/assets/decc/11/consultation/smart-metering-imp-prog/4965-gov-resp-cons-tech-spec-smart-meters.pdf

[2] http://www.decc.gov.uk/en/content/cms/consultations/cons_smip/cons_smip.aspx

[3] http://www.decc.gov.uk/en/content/cms/consultations/smart_mtr_imp/smart_mtr_imp.aspx

concerning the governance, assurance and operations of this equipment. The consultation seeks evidence and views on the costs and benefits associated with the proposals and also calls for evidence that will assist the Programme to plan for the introduction of SMETS 2 meters, such as the time required to have products available to support testing and trialling.

Communications between devices

7. A key objective of the smart metering solution is that equipment in consumer premises is fully interoperable. This means that products – primarily smart meters and IHDs – procured by different energy suppliers from different manufacturers can 'talk' to each other without the need for pre-configuration or multiple visits to premises. This will support situations where a consumer has separate gas and electricity suppliers and where equipment has to be replaced or added to over time. It will also facilitate connection to the smart metering system of devices purchased by the consumer, for example home automation systems or smart appliances.

8. It is proposed that interoperability will be supported by mandating the use of a defined, 'open' HAN standard for smart metering. Following a field trial of wireless propagation and an analysis of 'open' protocols, amongst other evidence, Government is proposing that the ZigBee SEP / DLMS applications layer standard is mandated for GB smart metering. The choice of radio frequency is also discussed in this document with a proposal that both 2.4 GHz and 868 MHz based solutions are permitted. It is expected that 2.4 GHz solutions would be used initially and that 868 MHz solutions would be brought forward and added as soon as practicable. Options for delivering both of these standards through regulations are explored. In addition it is recognised that a wired HAN will be required for certain types of property (e.g. high-rise flats). A trial of wired HAN solutions is planned.

9. In the Response to Roll-out Consultation, Government announced that a separate communications hub would not be required for SMETS 1 metering systems but will be required for SMETS 2. The communications hub will manage communications between devices within the premises, allowing devices to be added or replaced over time, and will act as the 'bridge' between devices in the premises and the Wide Area Network (WAN). The WAN will provide communications to and from the Data and Communications Company (DCC).

10. The Government proposes that communications hubs are procured and owned by the DCC's Communication Service Providers (CSPs). Under this approach, a requirement to provide energy suppliers with communications hubs that comply with the Communications Hub Technical Specification (CHTS) would be added to the DCC licence. The initial version of the CHTS would be prepared by Government and transferred to the Smart Energy Code (SEC). This arrangement will place responsibility for integration of the HAN and the WAN with the parties which are considered best placed to manage this task. Energy suppliers will be responsible for installing a communications hub at the time that they install smart meters and, other than in exceptional circumstances, it is proposed that energy suppliers will also be responsible for field service activities to maintain communications hubs. The alternative solution whereby energy suppliers procure, own, install and maintain communications hubs is also discussed. Views are welcome from all parties on the relative merits of the alternative approaches.

SMETS 2 – Additional Capabilities

11. The Government is proposing to include a small number of additional functions to those included in SMETS 1. These relate mainly to additional requirements which can help to 'future proof' the smart metering system for the development of smart grids, helping to provide the basis for electricity Distribution Network Operators (DNOs) to effect smart grid management. These are discussed in Chapter 4.

12. An area deferred from SMETS 1 was that of electricity meter variants: for example variants that include auxiliary load control switches or multiple measurement elements. It is proposed that these optional requirements are defined in SMETS 2 and, where appropriate, the CHTS.

13. In addition, this consultation makes proposals and seeks evidence on requirements that were committed to previously, including:

- Support for consumer access devices and, in particular, a secure and consumer friendly method of linking such devices to the consumer's smart meters via the HAN
- A Prepayment Interface Device to assist energy suppliers to meet the "safe and reasonably practical" obligations associated with prepayment operations
- Further proposals for Microgeneration Meters to facilitate smart metering of the output from solar panels and other small-scale generation plant
- Capabilities to support installation and maintenance activities

Governance and Assurance of Security and Interoperability

14. The importance of security has been emphasised by the Government at all stages in the Programme's development of policy and technical proposals. This consultation seeks views on the arrangements that Government proposes to establish for the ongoing governance of security matters and for the assurance of security controls in the end-to-end solution.

15. Each party involved in the end-to-end solution will be reliant on equipment, systems and services provided by others. Given that equipment will be installed in consumers' homes and businesses, it would be disruptive to customers and expensive to energy suppliers if equipment issues arise at change of supplier or when equipment is replaced or added to.

16. The Government proposes that compliance with SMETS and the CHTS can be evidenced by certificates showing conformance with HAN protocol standards and the security requirements. These proposals are discussed in Chapter 5.

Operational Licence Conditions

17. The Government stated in its Response to the Roll-out Consultation that it was minded to introduce an operational licence condition to require energy suppliers to utilise a specified set of functions that are included as 'capabilities' in SMETS: for example, to utilise the capability to record up to 13 months of half-hourly consumption data. The Government

expects that energy suppliers will utilise a wide range of functions specified in SMETS. Nevertheless, in due course, operational licence conditions will provide certainty that consumers and network operators will be able to access data, which is important to the delivery of smart metering benefits. Chapter 6 sets out the Government's detailed proposals on the drafting and timing for introducing operational licence conditions and draft conditions are at Annex A.

Availability of SMETS 2 Equipment

18. The Government has undertaken initial analysis of the activities required to: complete SMETS 2 (including GB Companion Specifications for the HAN); submit notifications to the EU; prepare and bring in certification regimes; develop, test and manufacture new products; and prepare for industry testing and trials. Time durations and inter-dependencies and risks have been discussed with relevant parties.

19. Plans indicate certified SMETS 2 metering equipment being available at scale by early 2014. The availability of CSP-provided communications hubs is dependent on the time required for CSPs to specify, procure and test suitable products following contract award (currently planned for Spring 2013).

20. The Government is particularly keen to capture views in response to this consultation on the completeness of the activities required to allow SMETS 2 compliant meters to be deployed, on the time reasonably required to complete each activity, on interdependencies and on the most appropriate approach to introducing SMETS 2 into the regulatory arrangements.

21. Finally this consultation addresses the issue of when the governance of SMETS should be transferred from the Programme to the SEC Panel.

2. Catalogue of consultation questions

Chapter 4 – SMETS 2 Development	
1.	Do you have any comments on the criteria used in the evaluation of the application layer standards?
2.	Do you agree with the proposal to adopt ZigBee SEP / DLMS as the HAN application layer standards for GB?
3.	Do you agree that equipment should be required to comply with SMETS and a GB Companion specification for ZigBee SEP / DLMS?
4.	Do you agree with the overall approach proposed in relation to the HAN physical layer? If not, please provide a rationale and evidence for your position.
5.	Do you have any comments on the criteria used in the evaluation of the physical layer of the HAN?
6.	What are your views on the compatibility of the reserved spectrum 870-876MHz with 868 MHz and the value of considering the use of this band?
7.	Do you consider that additional measures should be taken to encourage the development of an 868 MHz solution?
8.	Do you agree with the approach to allow the market to determine the balance between 2.4 GHz and 868 MHz? If not, please provide rationale and evidence.
9.	What are your views on the costs and benefits of the three options identified for deploying wireless solutions (i.e. 2.4 GHz as the default; dual-band communications hubs; or market led)?
10.	Do you agree with the proposal for a 'fit for purpose' installation obligation on suppliers?
11.	Do you have any views on the proposed approach to developing a wired HAN solution?
12.	Do you agree with the proposed scope of functional requirements for a communications hub? Are there any other functions that should be included and what would be your rationale for including those functions (including estimated costs and benefits)?
13.	Do you have views on the specification for an 'intimate' interface between electricity meters and communications hubs?

14.	**Do you agree with the Government's marginal preference for the CSP-led model for communications hub responsibilities, or do you prefer the supplier-led model? Please provide clear rationale for the advantages and risks associated with your preferred option.**
15.	**Do you agree with the proposal that a CHTS-compliant communications hub should not be mandated for opted out non-domestic sites and that suppliers should be free to use whatever type of communications equipment best supports their processes and WAN service?**
16.	**Do you agree that the gaining supplier should bear the costs of installing an appropriate communications hub if they decide to switch between opted in and opted out?**
17.	**Do you agree that the design and implementation of outage reporting functionality should be assigned to CSPs, documented in the communications hub technical specification?**
18.	**Do you agree that it would be inappropriate to require meters operated outside DCC to be required to implement outage reporting? Please provide rationale to support your views**
19.	**Do you agree that maximum demand registers should be included in SMETS? Please provide evidence to support your position and provide evidence on the cost implications of delivering this functionality via back office systems or via the meter.**
20.	**Do you agree with the proposal not to include the capability to generate additional voltage alerts based on counter thresholds in SMETS 2? Do you have any evidence that could justify including this functionality in SMETS 2?**
21.	**If DNOs were permitted to access remote disablement functions, should control logic be built into DCC systems or meters? If the logic should be built into meters, should the logic be specified in SMETS 2? Please provide rationale to support your position including estimates of the cost of delivering this functionality under the different options being considered and any evidence relating to safety issues associated with each option.**
22.	**Do you agree that variant smart electricity meters should be specified in SMETS 2 and that the cost uplift for variant smart meters is similar to that for variant traditional meters? Please provide evidence of costs to support your views on cost uplifts.**
23.	**Do you agree that randomisation offset capability should be included for auxiliary load control switches and registers as described above? Do you have views on the proposed range of the randomisation offset (i.e. 0 – 1799 seconds)? Please provide evidence on the cost of introducing this functionality.**

24.	**Do you support Option 1 or Option 2 for 'pairing' a CAD to the HAN? Please present the rationale for your choice and your views on the implications that these options have for the technical design of the solution.**
25.	**If Option 2 were adopted, do you agree that obligations should be placed on energy suppliers to support this process by submitting 'pairing requests' to the DCC on request from their consumers?**
26.	**Do you consider that other CAD installation options should be pursued? If yes, please explain the approach you favour and your reasons.**
27.	**Do you agree with the proposal to include in SMETS 2 a specification for a PPMID, connected via the HAN, as described above?**
28.	**Would including the capability to enable gas and electricity supply through a PPMID connected via (a) a wireless HAN or (b) a wired HAN meet GB safety requirements? What impact would including this capability have on the cost of smart metering equipment? Please provide evidence to support your answers.**
29.	**Do you agree with the proposal that the communications hub should be specified such that it can support multiple smart electricity meters? How many smart electricity meters should be supported by each communications hub?**
30.	**Do you agree that a specification for a HHT interface to the HAN should be defined? If yes, please identify the functions that this interface would need to support and the scenarios in which such functionality could be required.**

Chapter 5 - Governance and Assurance of Security and Interoperability	
31.	**Do you agree with the proposed approach to the governance of security requirements? If you propose alternative arrangements please provide evidence to support your views.**
32.	**Do you agree with the proposal to establish independent assurance procedures for DCC and DCC users? Please explain your views and provide evidence, including cost estimates where applicable, to support your position. Comments would also be welcome in relation to the impacts and benefits of the proposed approach with regard to small suppliers.**
33.	**Do you agree with the proposal that re-testing should occur at least at set intervals and more frequently when significant changes to systems or security requirements are introduced? Please explain your views.**
34.	**Do you agree with the proposal to establish an independent security certification scheme for smart metering equipment? Do you have any views on the proposed approach to establishing a certification scheme or evidence of the costs or timelines for setting up such a scheme or submitting products for certification?**

35.	**Do you agree that sanctions for non-compliance with security requirements should be included in the SEC? Do you have views on the nature of the sanctions that might be imposed?**
36.	**Do you agree with the proposal to, in effect, extend the arrangements already proposed for SMETS installations prior to DCC operation, to all installations being operated outside DCC? Please provide evidence of the costs that might be incurred and the impact of this approach on small suppliers.**
37.	**Do you agree that interoperability is central to the development of a successful smart metering solution and that activities related to the assurance of SMETS equipment should be governed by SEC? Please provide views on the governance arrangements that would be appropriate for assuring interoperability of smart metering equipment.**
38.	**Do you agree with the creation of an 'approved products' list and the requirement on suppliers and CSPs to obtain, retain and provide evidence of appropriate certification should apply regardless of whether they intend to enrol the equipment in DCC?**
39.	**Do you agree that protocol certification (against a GB Companion Specification) should provide adequate assurance that a product will meet interoperability requirements? Please explain your views and identify any additional assurance testing that you consider to be necessary and the rationale for including such testing.**

Chapter 6 - Operational licence conditions	
40.	**Do you agree with the Government's proposals to require energy suppliers to operate specific aspects of smart metering equipment functionality for domestic consumers? Please provide rationale to support your position.**
41.	**What are your views on the Government's proposals to require energy suppliers to operate specific aspects of smart meter equipment functionality for micro-business, but not other non-domestic, customers?**
42.	**Do you agree that the licence conditions as drafted effectively underpin the Government's policy intentions for consumer operational requirements?**
43.	**What are your views on the Government's proposals for obligations to be included in the SEC for information to be made available to Network Operators and ESCOs via the DCC?**
44.	**Do you agree with the Government's proposals for the timing of the introduction of operational requirements? Please explain your reasoning.**

Chapter 7 – Next Steps	
45.	Do you agree with the proposed changes to the smart metering regulatory framework to reflect the CSP-led model for communications hub responsibilities? Are any other changes necessary?
46.	Do you agree that the equipment development and availability timelines are realistic? Please give evidence.
47.	Do you agree that SMETS 2 should only be designated when the Government has confidence that equipment to satisfy the new requirements is available at scale? Should a further period of notice be applied to ensure suppliers can manage their transition from SMETS 1 to SMETS 2 meters?
48.	What are your views on when responsibility for the SMETS modifications process should transfer from the Government to the SEC?
49.	Which of the options (standing sub-committee or non-standing sub-committee) would you prefer in relation to modifications to the SMETS?
50.	Are there any particular areas of expertise that the sub-committee will need to fulfil its role, in terms of membership composition?

3. Introduction

The Government Approach to SMETS

22. The Government published the first version of the SMETS in April 2012.It was noted in the Response to Roll-out Consultation, which was also published in April, that the SMETS was likely to evolve over time. Several issues were identified for further consideration by Government, before a decision would be taken on their inclusion in a future version of the SMETS. This consultation covers these outstanding issues and related topics, presenting a proposed way forward on each.

23. The first version of the SMETS was designed to deliver functional interoperability[4] in smart metering equipment to be installed during the Foundation Stage. This will enable suppliers to install and operate meters in the Foundation stage, and so facilitate early learning and benefit realisation. Where these smart meters do not achieve full technical[5] and commercial interoperability[6], interventions may be required at change of supplier.

24. The Government's aim for the second version of SMETS (SMETS 2) and the CHTS is that they will describe smart metering equipment that will be fully interoperable. The most significant proposals are the HAN solution , the communications hub requirements and responsibilities proposals in Chapter 4, and the assurance requirements in Chapter 5.

25. The Government will continue to work with the SMETS Stakeholder Advisory Group (SSAG) – the expert advisory panel it established including representation from consumer bodies, manufacturers, energy suppliers, network operators and other interested parties – as it develops the SMETS and CHTS. The responses received to this consultation will also be carefully considered as the specifications are developed. Chapter 7 discusses the development and regulatory timetable (including any notification to the European Commission[7]), that the Government plans to follow.

[4] **functional interoperability** – functional requirements are required to be delivered in a consistent, defined way, such that any supplier will be capable of operating any meter with a clear understanding of the processing the equipment will undertake and the outputs they, and their customers, will receive

[5] **technical interoperability** – a supplier's smart metering equipment is interchangeable and inter-connectable with that of any other supplier's in any particular premises

[6] **commercial interoperability** – suppliers are capable of operating smart metering equipment installed by another supplier without the need to replace any equipment in the premises.

[7] The Technical Standards and Regulations Directive requires Member States to notify new technical regulations that impose restrictions on the characteristics of products.

4. SMETS 2 Development

26. Since publication of the Response to Roll-out Consultation, a wireless HAN trial has been completed. Analysis has also been undertaken of other issues which were outside the scope of SMETS 1.

27. This chapter seeks views on a range of topics related to the development of the next generation of smart metering equipment, including the functional requirements of the communications hub, ownership of the communications hub and additional functions and features that the Government proposes to introduce through SMETS 2 and the wider regulatory framework.

Home Area Network Solution

Overview

28. The HAN will be at the heart of the smart metering system. The HAN is the communications link between smart metering equipment (gas and electricity meters, communications hub and the IHD) in consumer premises. It is also a key enabler for consumers to access their data by allowing consumer devices to securely join the network. These devices may, in turn, enable smart appliances and smart grid technology.

29. Given the HAN's central role to the smart metering system, a standardised HAN is an important feature in delivering equipment interoperability, enabling a 'second' supplier to easily inter-connect and communicate its equipment to a HAN installed by a 'first' supplier. It allows industry to coalesce around a technology, providing certainty to manufacturers and investors, and reducing complexity and installation costs for suppliers (and consumers). It also supports an active smart appliances market, allowing providers to focus their product and service development, helping to simplify consumer offers. It can therefore help GB achieve the full benefits of a smart meter roll out.

30. For this reason, the Government said in April that its preference is to mandate a HAN standard – based on internationally recognised 'open' standards, subject to compatibility with GB requirements and the availability of products. The Government did not however specify what that standard should be, concluding for the first iteration of the SMETS that there was insufficient evidence available to inform the selection of the most appropriate standard. The Government concluded that for SMETS compliance, all HAN communications (including in Foundation) should be based on 'open' standards (as defined by EU interoperability framework/ ICT strategy[8]) and that it would review the case for specifying a HAN standard in future iterations of SMETS.

31. This consultation looks at the criteria, evidence and options for defining a HAN standard(s) under SMETS 2. The HAN evaluation has taken into account a number of

[8] The EU definition was used in SMETS as the GB ICT strategy definition is being consulted on. The consultation closed recently and a response will be provided in due course.

factors including the ability to deliver the expected benefits in the Impact Assessment, the extent of wireless propagation in GB properties, the availability and deployment of the technology, the availability of certification schemes and the suitability for gas meters / power consumption. Evidence underpinning the analysis and options has been gathered from a number of workstreams, including a HAN wireless trial to investigate coverage at different radio frequencies, feedback from roll-out during the Foundation stage and advice from industry experts.

32. The Programme has developed a number of evaluation criteria and, through this consultation, the Government welcomes views on the evidence, relevant considerations and options.

33. HAN standards are generally specified by reference to a set of 'layers' in line with the Open Source Interconnection (OSI) seven layer model[9]. This allows each layer to be decoupled from the others whilst enabling them to inter-operate to create a reliable and secure conduit for the transmission of data (and therefore information) between endpoints. In the case of the smart metering systems, these endpoints comprise an IHD, meters and the communications hub. For the purposes of presentation, the Programme has distilled the OSI model into two groups of layers:

- The application (language and intermediary) layers – which define the content of messages and the way in which they are presented
- The physical layers – which define the communications medium (e.g. radio frequency selection for wireless) and the methods by which data packets are transmitted and validated

34. The HAN evaluation set out below is therefore split into two parts – the 'application' and 'physical' layers. These layers can be considered separately as the physical layers under consideration support all the application layers under consideration - albeit with bandwidth and development timescale implications. These implications are drawn out as part of the analysis. The aim of the evaluation was to assess whether there is now sufficient evidence to specify a HAN solution; whether a single HAN solution can be identified; and if it should be mandated.

35. As previously recognised, due to the diversity of property types, building materials and other physical characteristics there is a need to provide both wired and wireless HAN solutions. This chapter focuses on wireless solutions and proposes a way ahead for gathering the evidence needed to specify a wired HAN solution.

[9] These layers are:- Physical, Data Link, Network, Transport, Session, Presentation, Application. Further information available at www.iso.org (ref. ISO/IEC 7498-1:1994- section 6)

HAN Application Layer

Summary of issue under consideration:

Interconnection of equipment in the home is supported by the use of HAN standards. A defined application layer(s) is required for interoperability - without this, equipment would need to translate from one language to another, which increases complexity and cost. Following consultation with industry experts, a number of application layers were identified and evaluated for use.

Potential solutions and analysis

36. Each device connecting to the HAN must be equipped with communication technology that enables the messages passed between devices to be 'understood'. Application layer protocols are used to provide this standardised 'understanding'.

37. A set of application layer standards was identified by a working group of industry experts as having the potential to support smart metering. As identified previously, all solutions must meet the requirements of being an 'open' standard as defined by the EU interoperability framework. The list of candidate solutions was peer reviewed with Intellect (which represents the UK technology industry) and the HAN Advisory Group. Some of the candidate solutions are already recognised by the EU and other international recognised standards bodies (KNX, MBUS and DLMS) and a fourth is seeking approval (ZigBee Smart Energy Profile). The different solutions offer different characteristics and capabilities and have been evaluated using the following criteria:

- GB functionality - supports the functions set out in the Prospectus Response in 2011[10] enabling delivery of the benefits assumed in the Impact Assessment
- Assurance – provides an appropriate equipment assurance regime (including interoperability test specifications, test equipment, training and a governance structure)
- Maturity - has the capacity to be delivered at scale and will be available in volume to deliver equipment for Mass Roll-out

38. Analysis of KNX (a standardized protocol for intelligent buildings) indicated that there is very limited if any practical evidence on which to form a view of its viability. It is not currently used in metering solutions, so it is unclear if it could be adapted. Whilst based on open standards, it requires installations to be undertaken by KNX certified installers, potentially limiting roll out.

[10] Response to the Prospectus Consultation available at:
www.decc.gov.uk/en/content/cms/consultations/smart_mtr_imp/smart_mtr_imp.aspx

Response to Prospectus Consultation: Functional Requirements Document available at:
www.decc.gov.uk/en/content/cms/consultations/smart_mtr_imp/smart_mtr_imp.aspx

39. Analysis suggests that MBUS (a European standard for the remote reading of gas or electricity meters) does not provide sufficient functionality to deliver all the SMETS requirements (e.g. functionality not currently supported includes pre-payment, complex tariffs, 13 month data storage). The development of MBUS to meet GB requirements, together with an appropriate testing regime (necessary for ensuring interoperability), can be expected to take time – and possibly delay roll out.

40. Both ZigBee Smart Energy Profile (SEP - a low power application layer standard, administered by the ZigBee Alliance) and Device Language Message Specification (DLMS - a suite of standards developed and maintained by the DLMS User Association for data exchange for meter reading, tariff and load control) compare well against the criteria.

41. DLMS is a European standard whilst SEP is in the process of becoming a European standard (expected to be agreed this winter), though both meet the requirements of 'open' standards. Both SEP and DLMS are considered capable of delivering the 'A-H list' of requirements and have established GB based test specifications, infrastructure and processes. Equally both are underpinned by significant investment by established supply chains and demonstrate volume manufacturing (SEP deployments mostly in US whilst DLMS is mainly in EU).

42. Both DLMS and SEP have shortcomings. DLMS is oriented towards electricity metering and "smart grid" functions but is not well-suited for gas meters which need frugal use of battery power. As a result few gas meters use DLMS. SEP is focussed on provision of consumer data either to an IHD or over an interface to a consumer device but does not provide as extensive functionality as DLMS for electricity.

43. ZigBee SEP is available in two forms: SEP v1 is a mature standard developed on the ZigBee networking standard, a low power wireless protocol. SEP v2 is being developed to provide internet protocol (IP) addressing but its immaturity and the lack of available products have led to the conclusion that SEP v1 should be adopted. References to SEP in this document relate to SEP v1 unless otherwise stated.

Proposed approach

44. The Government considers that there is sufficient evidence to mandate a standard and proposes that a combination of ZigBee SEP and DLMS is prescribed as the application layer for GB smart metering equipment (with SEP for the gas meter and the In Home Display and DLMS for the electricity meter). The two standards are complementary in that ZigBee SEP allows "tunnelling" of other protocols, including DLMS. In this way they create a single HAN "intermediary" layer which can transport both SEP and DLMS commands and data between smart metering devices, and maximise the functionality benefits and reach of both.

45. It is proposed that a GB Companion Specification would be included under SMETS to define how each of the standards would be used. This would substantively remove the potential interoperability risk created by the use of two application layers. Further work is required to develop the GB Companion Specifications. Given the importance of

interoperability to the smart meter roll-out and to delivering the benefits associated with this, in combination with the third package requirements[11] to achieve interoperability, a strong case for this level of prescription can be made. Further discussion on this topic is included in the Assurance of Equipment section in Chapter 5.

Government Position
The proposed application ("language") layers to be specified in SMETS 2 for the HAN are ZigBee SEP (for gas & IHD) and DLMS (for electricity). Suppliers will be required to demonstrate compliance against SMETS and a GB Companion Specification.

Consultation Questions	
1.	**Do you have any comments on the criteria used in the evaluation of the application layer standards?**
2.	**Do you agree with the proposal to adopt ZigBee SEP / DLMS as the HAN application layer standards for GB?**
3.	**Do you agree that equipment should be required to comply with SMETS and a GB Companion specification for ZigBee SEP / DLMS?**

HAN Physical Layer

Summary of issue under consideration:

Wireless HAN standards can be implemented on a variety of radio frequencies and limiting the number of frequencies would simplify the specification, procurement and logistics of the supply chain. In practice there are constraints on the ability of a single frequency to operate in all GB properties and the Government has therefore considered options that achieve the required level of coverage (ability to work in GB properties) and bandwidth (ability to deliver SMETS functionality). The requirement for a wired option is also addressed.

[11] Electricity http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0055:0093:EN:PDF

Gas http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0094:0136:en:PDF

Potential solutions and analysis

46. A number of radio frequencies were identified as representative of potential wireless HAN frequencies for use in Great Britain (these are all defined by EU directives as licence exempt bands[12]:

- 169 MHz (0.0075 MHz available bandwidth)
- 433 MHz (1.75 MHz available bandwidth)
- 868 MHz (2 MHz available bandwidth)
- 2.4 GHz (83.5 MHz available bandwidth)

47. The rationale for focusing analysis on these frequencies is that they define the boundaries of what is likely to be required to deliver the GB smart metering roll-out requirements in terms of development time, bandwidth and coverage.

48. These options have been assessed against the following criteria :

- Sufficient bandwidth capacity – the bandwidth available at that frequency to deliver SMETS requirements, including in areas of high property density. The Government estimates that approximately 2 MHz of bandwidth may be necessary in areas of high property density (to allow real time data to the IHD, 13 month consumption data to the communications hub, firmware upgrades to the smart gas meter). This estimate builds in spare capacity for smart grids functionality
- Coverage/Propagation potential – a solution that achieves coverage in the maximum number of GB properties without requiring additional equipment and incurring cost
- Interference risks - there is the potential for some 'in-band' interference from other applications that use the chosen spectrum and 'out of band' interference from applications in neighbouring areas of the spectrum. The risk of interference increases with the number of devices using the spectrum. The manifestation of in-band interference would most likely be delays in sending / receiving data. There would also be a risk of smart metering interfering with other devices operating in the chosen band
- Development time, in terms of the timescale for developing the preferred application layer on the physical layer at scale, so that there is a deployable solution.

49. The Programme has collected evidence from a number of sources, including a wide range of industry experts[13] – through and outside of the range of advisory panels established as part of the Programme's routine evidence gathering, feedback from GB and international deployments and a radio frequency propagation trial undertaken by RED-M on DECC's behalf.

50. The trial conducted by RED-M evaluated the four potential 'physical layer' radio frequencies at multiple locations in 120 GB properties (targeting a similar ratio to GB housing types defined in the English Housing Survey). At each property measurements

[12] The UK Licence exempt bands are defined at http://stakeholders.ofcom.org.uk/nimaries/spectrum/spectrum-policy-area/spectrum-management/research-guidelines-tech-info/interface-requirements/IR_2030.pdf

[13] Includes but not limited to energy suppliers, meter manufacturers, energy networks, OFCOM, consumer groups, ESTA, technology providers (e.g. chip suppliers) and independent experts (radio frequency and protocols)

were taken of the 'signal loss' for a standard signal transmitted between the most common locations in each given property type for electricity meters to gas meters and IHDs. The RED-M report of the trial results is published alongside this consultation[14] document.

51. Analysis of the evidence available suggests the following headline findings:

- There is evidence to indicate that 2.4 GHz signals will not propagate effectively in all property types (predicted by the HAN RF propagation trial, and supported by industry and technical experts, to achieve circa 70% coverage without utilisation of additional equipment)[15]
- 868 MHz, 169 MHz and 433 MHZ are all likely to achieve over 95% satisfactory propagation. However 169 MHz and 433 MHz are considered unlikely to have sufficient bandwidth to meet GB needs (the range of functions, and frequency of messaging) which critically undermines their applicability to the smart meter programme
- Both 868 MHz and 2.4 GHz are considered to have sufficient bandwidth to meet GB requirements but smart metering equipment is only currently available and being deployed at 2.4 GHz
- There is likely to be a significant lead-in time to transport the ZigBee SEP / DLMS application layers to an 868 MHz solution. It could therefore take several years to develop an interoperable and tested 868 MHz solution available at volume
- No material evidence was found to quantify the interference risk of using these frequencies, whilst there have been no reports of issues from other geographies
- 868 MHz is adjacent to a licensable part of the spectrum (870-876 MHz). This spectrum could be licensed and so reserved for a specific activity. Government would welcome views on the compatibility of this spectrum with 868 MHz and whether there is value in considering this further, especially against the background that discussions at a European level could result in part or all of this band being allocated to licence exempt devices.

52. It should also be noted that smart meters are covered by UK and EU product safety legislation, which requires manufacturers to ensure that any product placed on the market is safe. The Government recognises that some consumers remain concerned that their health may be affected by radio waves and draws attention to the work of Health Protection Agency showing that the evidence to date suggests exposures to the radio waves produced by smart meters do not pose a risk to health[16]. The Agency has committed to keeping the evidence under review.

[14] http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/smart-meters/6071-smart-meters-rf-surveys-final-report.pdf

[15] The coverage figures quoted are assumed to correlate between electricity meter and gas meter, and electricity meter and the IHD. This assumption is subject to ongoing analysis.

[16] Further information on the Health Protection Agency's advice can be found at:

http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/SmartMeters/#exposuressmartmeters

Proposed approach

53. On the basis of the analysis set out above, there would be merit in permitting solutions based on 2.4 GHz technology and solutions based on 868 MHz technology to be deployed. The Programme understands that 2.4 GHz-based solutions are currently available and that such technology is supported by many manufacturers of consumer equipment, including CEDIG[17] members. However, limiting wireless frequency to technology based on 2.4 GHZ is likely to increase costs unnecessarily, as additional equipment or a wired solution would have to be deployed in a significant proportion of properties. It is estimated that this could increase overall costs by £700-800 million on the net present value basis used in the Impact Assessment[18]. The estimate assumes that additional equipment will be required to improve propagation and/or that wired solutions are employed in premises where 2.4 GHz does not provide adequate propagation[19]. Given the expected propagation performance and cost, there is therefore a case for also allowing 868 MHz-based solutions, even though the technology is not yet available.

54. Within an overall approach which allows deployment of two wireless solutions, there is a range of options in terms of the extent to which the regulatory framework influences the balance between the two. Views are invited on this issue, and specifically on the approaches described on the following page[20].

[17] the Consumer Energy Display Industry Group represents the majority of UK manufacturers of In-home Displays (IHDs) and Consumer Access Devices (CADs).

[18] http://www.decc.gov.uk/en/content/cms/consultations/cons_smip/cons_smip.aspx#impact

[19] This compares to the April 2012 Impact Assessment where we assumed a single wireless solution was available from the start of SMETS meter deployment and that it achieved near complete coverage. This analysis assumes that an 868 MHz solution does not emerge/is not deployed.

[20] Until an 868 MHz-based solution is available (to provide a connection to the gas meter), the Programme has estimated that there would be the same additional costs to all approaches presented (i.e. where 2.4 GHz could not provide a complete solution within a property). These would stem from aborted visits (£45 per visit) and the replacement of dumb for dumb meters (£27-£148 per unit depending on meter type

OPTIONS

Option 1: 2.4 GHz is the default / dominant standard

This would result in deployment of communication hubs using 2.4 GHz technology to most premises. CEDIG[21] has proposed an approach along similar lines on the basis that it would be more attractive from the perspective of the smart appliances market. However, given the evidence on propagation performance of a 2.4 GHz-based solution, this approach would not be effective in all premises – alternative wireless solutions and/or additional equipment would be necessary to enable coverage in all premises[22].

Option 2: Dual-band communication hubs are mandated

Under this approach the aim would be for a dual band communications hub (supporting both 2.4 GHz and 868 MHz frequencies) to be deployed in all premises once 868 MHz technology was available for mass deployment. Metering equipment could utilise either 2.4 GHz or 868 MHz-based technology. This approach would maximise the interoperability of the smart metering equipment deployed, facilitating simplicity for investors, suppliers and consumers – including the smart appliances market. It would help simplify equipment variants and installation logistics. However, this option would require every communications hub to include dual band technology once an 868 MHz solution is available. An additional HAN module in each communication hub is expected to cost £2.50 per unit.

Option *3:* Market led

Under this approach, it would be up to the installing supplier to decide which HAN solution to deploy in any given property (2.4 GHz or 868 MHz) with all metering equipment using either 2.4 GHz or 868 MHz as the sole HAN standard in that premise. This would provide industry with flexibility to coalesce around either solution. Other options are available to constrain the market choices and reduce these costs (e.g. regulating behaviour in single-fuel installations), and to encourage an 868 MHz solution to be available sooner. Without this regulatory intervention, this approach could increase operational complexity (e.g. installers encountering a higher combination of equipment variables at installation) and consumer complexity (a consumer would need to know which HAN frequency was used in their home, or pay a premium for a device with dual capability).

55. The Government is not at this stage persuaded of the case for mandating either 2.4 GHz as the default solution or moving towards mandating a dual band communications hub.

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[21] CEDIG: the Consumer Energy Display Industry Group

[22] Under this approach, if the CSP is not contracted to provide a communication hub which includes an 868 MHz solution, it is assumed that suppliers would need to look to deploy a second communication hub (assumed to cost £25 per unit) to provide the gas meter connection. Additional equipment would be needed to reach the IHD (e.g. repeaters, £10 unit cost). Other more cost effective solutions might appear and views on this would be welcome. Under this option an increase in the cost of the 868 MHz model is conceivable due to a lower volume of deployed units.

56. The Government does however consider it important that solutions based on 868 MHz technology are developed expeditiously and is therefore considering whether to take steps to encourage an 868 MHz solution to be developed as soon as practicable. While the market can be expected to produce a solution (as 2.4 GHz will not provide wireless coverage in all properties), it may not come forward early enough to maximise overall efficiency. In any case, Government will need to determine the commercial arrangements with the CSPs, assuming that they are responsible for the procurement of the communications hub.

57. To help bring such a solution forward, energy suppliers could be required to make use of an 868 MHz-based solution. Whilst this might provide more confidence that a secondary wireless solution is available and deployed, suppliers have natural (cost) incentives to encourage the development of an early 868 MHz solution and so it is not clear whether such an obligation is necessary.

58. In order to encourage an efficient solution and to optimise the consumer experience, the Government considers that there is a case for a 'fit-for-purpose installation' obligation on suppliers. This would act to require suppliers to ensure that the solution they install at any property was capable of serving all the smart metering equipment in that property (some stakeholders suggest that this could include 868 MHz 'ready' kit[23]). This would be particularly important where a supplier only supplies one fuel in a premises.

Government Position
It is proposed that solutions based on 2.4 GHz technology and solutions based on 868 MHz technology should be permitted. The Government is not at this stage persuaded of the case for mandating either 2.4 GHz as the only solution or moving towards mandating a dual band communications hub. The Government is therefore seeking views on whether a market led approach, with steps to incentivise the development of an alternative wireless solution, will deliver the optimal solution.

Consultation Questions	
4.	**Do you agree with the overall approach proposed in relation to the HAN physical layer? If not, please provide a rationale and evidence for your position.**
5.	**Do you have any comments on the criteria used in the evaluation of the physical layer of the HAN?**
6.	**What are your views on the compatibility of the reserved spectrum 870-876 MHz with 868 MHz and the value of considering the use of this band?**

[23] This could mean equipping a communications hubs with an extra HAN transceiver

7.	**Do you consider that additional measures should be taken to encourage the development of an 868 MHz solution?**
8.	**Do you agree with the approach to allow the market to determine the balance between 2.4 GHz and 868 MHz? If not, please provide rationale and evidence.**
9.	**What are your views on the costs and benefits of the three options identified for deploying wireless solutions (i.e. 2.4 GHz as the default; dual-band communications hubs; or market led)?**
10.	**Do you agree with the proposal for a 'fit for purpose' installation obligation on suppliers?**

Wired HAN

59. A wired HAN solution is needed where wireless solutions will not achieve satisfactory propagation. A small percentage of GB properties (c. 350,000) are high-rise flats where wireless HAN solutions are unlikely to work without the use of extra equipment and/or shared infrastructure. The Programme is in discussion with energy suppliers and technology providers as to how they might undertake a short, wired HAN technology trial to test various solutions that have been proposed. As it stands there is insufficient evidence on which to base a decision. The Programme will therefore work with industry to urgently undertake this wired HAN solution trial with the intention of consulting on options, including the regulatory approach, in 2013.

Consultation Question	
11.	**Do you have any views on the proposed approach to developing a wired HAN solution?**

Communications Hub - Introduction

60. A communications hub will be installed in each consumer's premises to provide the interface between the DCC's WAN and the HAN. This section considers the functionality required in the communications hub, the allocation of responsibilities for these devices and the communications requirements for opted out non-domestic sites.

Communications Hub - Requirements

Summary of issue under consideration:

The Response to the Roll-out Consultation stated that the Government would define a communications hub and that it could be physically separate or detachable from the electricity meter. This section discusses the functionality of the communications hub.

61. The Response to Roll-out Consultation outlined the Government's decision that the first iteration of SMETS (SMETS1) would not require a separate communications hub. SMETS 1 identified a set of WAN-related capabilities that SMETS 1 smart metering systems will be required to support. The Government also concluded that a communications hub would be defined and included in a future iteration of the SMETS and that it should be physically separate or detachable from the electricity meter.

62. A separate communications hub will therefore be required for the next generation of smart metering systems to be installed in domestic premises. The Programme has started to extract the WAN-related functions from the SMETS 1 documentation and to assemble a CHTS. This detailed work will be progressed in conjunction with the SMETS SSAG. The Government would welcome views from all parties on the functions to be performed by the communications hub as described in this chapter.

63. Work to date has identified the logical components of the communications hub and the functions they should perform. The Government proposes that the communications hub should consist of:

- WAN module – the WAN module maintains the communications hub's connection to the CSP's WAN and manages the transfer of messages to/from the WAN, including authentication, integrity checking and message error handling. The WAN module will need to be designed to match the WAN communications technology (i.e. core and infill WAN technologies used in each CSP region) and may need to include translation and/or formatting of messages for the WAN
- HAN module – the HAN module maintains the communications hub's connection to the HAN, it provides the 'network coordinator'[24] function for HAN operations and manages the transfer of messages across the HAN
- Processing functions - this component performs a range of message handling, data storage and processing functions, for example:
  - Gas meter 'mirror': this will allow the communications hub to perform various functions as a proxy for the gas meter thus reducing the amount of power consumed by the battery in the gas meter. This allows the gas meter and the communications hub to be synchronised at 30 minute intervals rather than having to respond directly to ad hoc requests
  - Issuing alerts on detection of a power outage and the restoration of supply
  - Support to firmware upgrades to the communications hub and, possibly, to other HAN devices.

64. The Government proposes that the communications hub should support two classes of HAN device, namely smart metering devices (essentially meters and the IHD) supplied and installed by an energy supplier, and consumer access devices (CADs). CADs will only be able to access a defined set of data items from smart metering devices on a read-only basis. They will not be permitted to update meter configuration parameters or to execute meter functions, and will not have access to the WAN. Further discussion of CADs is presented later in this chapter.

[24] The "network coordinator" manages the joining of devices to a HAN and the flow of information between them.

65. The communications hub will require a power source taken from the unmetered mains electricity supply. It is expected that a standard power connector will need to be specified as a requirement for SMETS 2 electricity meters.

66. As signalled in the Response to Roll-out Consultation, the communications hub may be stand-alone or fitted directly to the electricity meter using a standard 'intimate' interface[25]. Through SSAG, the Government has invited industry to propose standard specifications for an 'intimate' interface. Stakeholders have indicated that 'intimate' interfaces would facilitate the installation and replacement of communications hubs and – possibly - offer a data link between the electricity meter and the communications hub, in addition to the wireless HAN link.

67. When SMETS 2 is published it is proposed that a CHTS is published alongside it. The CHTS would contain detailed requirements for the HAN module and the processing functions of the communications hub, but only high-level requirements for the WAN module. The detailed specifications for the WAN module would be added by CSPs.

Consultation Questions	
12.	**Do you agree with the proposed scope of functional requirements for a communications hub? Are there any other functions that should be included and what would be your rationale for including those functions (including estimated costs and benefits)?**
13.	**Do you have views on the specification for an 'intimate' interface between electricity meters and communications hubs?**

Communications Hub - Responsibilities

Summary of issue under consideration:

The communications hub forms the interface between the WAN which will be the responsibility of the Communication Service Provider (CSPs) and HAN devices which will be the responsibility of energy suppliers. The communications hub is therefore vital to the delivery of both industry and consumer benefits.

This section discusses options for allocating responsibility to the communications hub.

68. Provision of the WAN service and maintaining a serviceable WAN connection at each electricity meter point is a responsibility of the DCC through its CSPs. The physical

[25] An 'intimate' interface would allow the communications hub to be attached to the electricity meter using a defined form factor (e.g. dimensions, method of attachment) and connections (e.g. for power source).

component in the consumer premises that maintains the WAN connection is the WAN module, which will be a component of the communications hub.

69. Installation and provision of smart metering devices is the responsibility of energy suppliers. Energy suppliers have the commercial relationship with the consumer and are the only party with statutory rights of access to consumers' premises. Links between smart metering devices are enabled by a HAN which is managed by the HAN module that will be a component of the communications hub.

70. Thus the communications hub straddles the DCC and energy supplier domains as it combines the WAN module and the HAN module in a single device. Responsibilities for the communication hub could therefore be led by the DCC (through the CSPs) or by energy suppliers.

71. Responsibility for communications hubs spans a number of functions which need to be allocated between energy suppliers and the CSP, namely:

- Design
- Ownership and procurement
- Certification and testing
- Installation
- Replacement

72. The Government has analysed in detail the merits of two main alternate approaches as well as a number of variants. In doing so the Government recognises the significant scale of the financing and logistic challenges on all parties concerned, the overriding desire to avoid costly and disruptive repeat visits to premises, and the need to protect investments at the end of CSP contracts.

73. The first of the two approaches, termed the CSP-led model, would see the CSPs being responsible for the majority of these functions. The second, termed the supplier-led model, would place more responsibility with energy suppliers.

74. In both models the Programme would be responsible for the initial high level design of the communications hub by specifying its functionality and standards to be supported. These will be specified in the CHTS which would be governed by arrangements set out in the SEC. Additionally, in both models, the DCC would be responsible for remote fault detection of the communications hub.

75. Under the CSP–led model the DCC licence would include an obligation to procure devices which comply with the CHTS and the DCC would discharge this obligation through its contracts with CSPs. CSPs would own the communications hubs and would be responsible for their procurement, certification and testing. Devices would be passed to energy suppliers to install alongside meters and to install replacements in the event of faults.

76. Under the supplier-led model the CHTS would be included in SMETS and suppliers would be obliged to install SMETS-compliant smart metering equipment, including a communications hub. CSPs would provide a specification for their WAN module which energy suppliers would use to procure communications hubs. Energy suppliers would

own, test, install and replace communications hubs, in line with their responsibility for meters and IHDS.

77. Potential merits of the CSP-led model include;

- It places responsibility for all parts of the WAN with one party so the CSP can be held responsible for providing access to the HAN
- CSPs should have a better developed capability than energy suppliers to source communications equipment efficiently and economically, noting that arrangements would need to ensure that any benefits from falling component prices are not retained by the CSP
- There will be fewer CSPs than energy suppliers affording potential aggregation economies when buying from original equipment manufacturers
- By placing responsibility with a third party it avoids dependencies between competing energy suppliers for non-dual fuel premises where, for example, the gas supplier would otherwise employ a communications hub belonging to a different electricity supplier.

78. Potential merits of the supplier-led model include;

- It places responsibility for delivering an effective HAN with one party
- Responsibility for all in-home equipment would reside with energy suppliers, in line with their responsibility to consumers
- It avoids the risks of one organisation installing another's assets and potentially complex recharging arrangements between energy suppliers and the DCC.

79. Having considered the views of energy suppliers and CSP bidders, the Government considers that there are arguments in favour of each model with both approaches being feasible but neither being risk free.

80. The Government currently views the balance of advantage lying narrowly with the CSP-led model on the basis that the greater technical risk in this area is that of securing a reliable WAN connection and the CSP should, in principle, be better placed to specify and procure communications equipment economically and efficiently. This option is the basis for the current discussions with CSP bidders.

81. However the Government recognises that this introduces a number of complexities including access to finance, responsibility for CSP assets by energy suppliers, and split responsibility for the HAN. In particular, it would be necessary under this approach to operate the principle that 'costs lie where they fall' in respect to installation and maintenance, to avoid complex recharging arrangements.

Government Position
The Government considers that on the basis that the costs for installation and maintenance would lie where they fall the balance of advantage lies marginally in favour of the CSP-led model. The Government seeks views on this position, in particular from energy suppliers as to why they would not be better positioned to fund, own and operate the communications hub against a specification provided by the CSPs.

Consultation Question	
14.	**Do you agree with the Government's marginal preference for the CSP-led model for communications hub responsibilities, or do you prefer the supplier-led model? Please provide clear rationale for the advantages and risks associated with your preferred option.**

Communications Hub – Opted out non-domestic consumers

Summary of issue under consideration:

Energy suppliers have the option of operating smart meters at smaller non-domestic sites either through DCC or through an alternative operator (e.g. their own solution or that of an outsourced service provider). This section discusses whether smart metering installations at non-domestic sites that are opted out of DCC should be required to install a CHTS-compliant communications hub.

82. The roll-out licence conditions (published on 05 April 2012[26]) require suppliers to take all reasonable steps to ensure SMETS compliant smart metering systems are installed in domestic and smaller non-domestic premises by 31 December 2019.

83. This obligation covers both domestic and smaller non-domestic sites[27] although in the case of non-domestic consumers, the roll-out licence conditions include exemptions allowing the continued installation of advanced metering until April 2014 and, in limited circumstances, thereafter. Furthermore there is no requirement for suppliers to offer an IHD to non-domestic consumers.

84. Additionally, for non-domestic sites, suppliers or other metering service providers can choose to operate some or all of their smart meters either through DCC (opted in) or through their own systems or those of an outsourced service provider (opted out).

[26] http://www.decc.gov.uk/assets/decc/11/consultation/smart-metering-imp-prog/4965-gov-resp-cons-tech-spec-smart-meters.pdf

[27] In the context of smart metering, smaller non-domestic sites are defined as those in profile classes 3-4 for electricity and as having consumption of less than 732 MWh per annum for gas.

85. If the Government's preferred approach to communications hub ownership is adopted (i.e. the CSP-led model), all opted in sites would use a communications hub supplied by the CSP. These communications hubs would be CHTS-compliant with a WAN module specified by the CSP. In the case of opted out sites, CSP-provided communications hubs might not be operable (e.g. they might use a WAN module which is specific to the CSP's WAN technology or service) and suppliers (or agents) would have freedom to select the WAN technologies and service providers to be used. The WAN modules used by opted out suppliers will need to be compatible with the WAN services they procure.

86. Different suppliers have expressed markedly different views on whether the communications hub at opted out non-domestic sites (excluding the WAN module) should be CHTS-compliant.

87. Some suppliers, especially those offering only a single fuel, have argued that while a site is opted out, the supplier should be free to determine whether the communications hub should be CHTS-compliant (e.g. they argue that an electricity-only supplier should not be required to install gas mirror functionality). They point out that if and when a site is opted in to DCC (e.g. at change of supplier) a site visit would be required to install a CSP-provided communications hub.

88. Others have suggested that the threat of having to undertake a site visit to install a CSP-provided communications hub could make opted out sites unattractive to other suppliers, which could undermine competition. They propose that this should be addressed by making the opted out supplier pay for installation of a CSP-provided communications hub at change of supplier. As an alternative, they propose that the opted out supplier should provide a CHTS-compliant communications hub and permit the WAN service contract to be adopted by DCC if a gaining supplier wishes to opt in.

89. A further issue of not having a CHTS-compliant communications hub is that the consumer may be unable to procure a consumer access device to retrieve data from their smart meter(s). Suppliers arguing against the need for a CHTS-compliant communications hub, suggest that this is not a relevant issue as suppliers and energy service companies already compete on the basis of providing detailed data and services to this market, and the customer will have chosen a contract under which access to data is generally obtained via a website, rather than at the premises.

90. The Government proposes that CHTS-compliant communications hubs should not be mandated for opted out non-domestic consumers and welcomes stakeholders views on this proposition. This is a competitive market and customers are already negotiating supply and service agreements with a range of energy suppliers and service providers.

91. The Government would also welcome views on the proposal that at opt in and opt out the then registered supplier (likely to be the gaining supplier) should bear the cost of installing a new communications hub[28], if required. Under the roll-out licence conditions published in April 2012 suppliers are responsible for ensuring that their customers' smart meters

[28] At opt in the new communications hub would be provided by the CSP; at opt out the communications hub would be provided by the registered supplier.

remain compliant with the version of the SMETS extant at the time of installation, and also for ensuring that any retroactive updates to SMETS have been applied (e.g. to implement a security patch to the firmware).

Government Position
The Government proposes that in the case of opted out non-domestic customers, the energy supplier should not be required to install a CHTS-compliant communications hub. **The Government also proposes that at opt in and opt out the then registered supplier (likely to be the gaining supplier) should bear the cost of installing a new communications hub.**

Consultation Questions	
15.	**Do you agree with the proposal that a CHTS-compliant communications hub should not be mandated for opted out non-domestic sites and that suppliers should be free to use whatever type of communications equipment best supports their processes and WAN service?**
16.	**Do you agree that the gaining supplier should bear the costs of installing an appropriate communications hub if they decide to switch between opted in and opted out?**

SMETS Additional Capabilities

92. During the development of SMETS 1, a number of technical issues were deferred to a future iteration of the SMETS. These issues have been progressed since publication of SMETS 1 through work led by the Programme, working closely with industry through the SMETS SSAG.

93. This section provides further information on each of the additional capabilities proposed for SMETS 2 and, where appropriate, the wider regulatory framework. The additional capabilities are divided between those that will provide additional functionality for electricity DNO's and those that will enable an additional set of devices to be linked to smart metering equipment via the HAN.

Additional DNO Functions

94. The Response to Roll-out Consultation identified a set of electricity DNO requirements that would be included in the next iteration of SMETS. These DNO requirements are designed to further enable the smart metering system to support smart grids and comprise:

- Outage management
- Maximum demand recording
- Additional voltage alerts

95. Since April a further issue has emerged relating to access to remote disablement and load limiting functionality by multiple parties. This is also discussed in this section.

Outage Management

Summary of issue under consideration:

The detection and reporting of power outages has been identified as a significant benefit arising from the roll-out of smart meters. The Response to Roll-out Consultation concluded that outage detection (and detection of supply restoration) should be performed by the smart metering solution but that the method of delivering this functionality should be subject to further discussion, especially with CSPs.

96. Outage detection and reporting functionality covers the capability to detect that a power outage has occurred in consumer premises, to log that occurrence (within the electricity meter) and, if the supply is not restored within a specified period (set at 3 minutes), to send an alert to the DCC via the WAN. DCC would forward alerts to the relevant DNO. When supply is restored another alert would be issued.

97. The Response to the Roll-out Consultation identified that outage alerts could be triggered by the smart electricity meter, the communications hub or in components of the CSP's network. Placing this capability in the meter would require both the meter and communications hub to store sufficient power to send an alert message after the mains supply had been lost, making this a more costly option.

98. If the proposed CSP-led model for communications hub responsibilities is confirmed, responsibility for outage reporting will fall within the scope of the CSPs' activities. Accordingly, the Government proposes that responsibility for outage reporting should be included in the scope of the CSP procurement: CSPs may elect to implement the functionality in any of the components of their smart meter WAN infrastructure, including, but not limited to, the communications hub. For convenience, the outage reporting functionality would be specified in the CHTS.

99. It is not proposed that smart metering systems operated outside DCC (e.g. in Foundation or opted out non-domestic sites) would be required to implement outage reporting. This would require DNOs to establish communication links with all suppliers operating meters outside DCC. Furthermore, until the completion of Mass Roll-out stage, smart meters will not be present at all sites, so outage reporting would be incomplete, although with increasing coverage over time.

Government Position
If the proposed option for communications hub responsibilities (i.e. CSP-led) is confirmed, the Government proposes that the design and implementation of outage reporting should be assigned to CSPs (through DCC licence conditions) who may choose to implement it either in the communications hub or in other components of their solution. The ability to log the time of outages and the restoration of supply was included in the smart electricity metering system in SMETS 1 and will be carried forward to SMETS 2. **If the supplier-led model is adopted, the CHTS would be included in SMETS and suppliers would be responsible for procuring SMETS compliant equipment, including the functionality to perform outage reporting.**

Consultation Questions	
17.	**Do you agree that the design and implementation of outage reporting functionality should be assigned to CSPs, documented in the communications hub technical specification?**
18.	**Do you agree that it would be inappropriate to require meters operated outside DCC to be required to implement outage reporting? Please provide rationale to support your views.**

Maximum Demand Recording

Summary of issue under consideration:

In the Response to Roll-out Consultation, the Government indicated that the capability to record maximum demand would be considered in the next version of SMETS subject to stakeholder discussions. Maximum demand capability has been requested by DNOs.

100. Maximum demand recording requires the electricity meter to identify and record the highest demand value in a given period of time. This data has been requested by DNOs to assist with network planning and the operation of their networks. This data will be of particular value as distribution networks come under increasing pressures arising from renewable generation, microgeneration, electric vehicles and the electrification of heat.

101. Two options have been identified for analysing and recording maximum demand: in the meter or in 'back office' systems.

OPTIONS

Option 1: In the meter
Under this option additional registers would be provided in the meter to record maximum demand values. Discussion with stakeholders has indicated that DNO requirements could be satisfied through the provision of three registers, two for import and one for export. One of the import registers and the export register would measure the maximum demand/export in any half hour period since the register was last reset. The second import register would measure the maximum demand in a half-hour period within a user-configurable period (e.g. the highest half-hour demand on any day between 16:00-20:00). The registers could be reset independently of other registers although it has been suggested that there may be merit in all meters adopting a time period set nationally by a body such as the Energy Networks Association.

Option 2: In 'back office' systems
Under this option no additional registers would be provided in the meter. Instead DNOs would retrieve half-hourly profile data (import and/or export) and use their back office systems to analyse the data and identify maximum demand values. This option would allow DNOs to analyse maximum demands in whatever time periods they choose, for a set of properties (e.g. in a specified geographical area or to sites attached to a specified segment of the network).

102. DNO's have indicated that their strong preference is option 1, including the capability in the meter. They have confirmed that three registers would provide sufficient granularity for their analyses. Meter manufacturers have indicated that, whilst inclusion of the functionality would require additional development and testing, the impact would be low when compared to the cost of metering equipment. DNOs have presented evidence that the cost of retrieving data and processing it in their back office systems would be significant. Accordingly the Government proposes to include maximum demand registers in SMETS 2.

Government Position
The Government proposes to include maximum demand registers in SMETS 2. Two registers would record maximum import demand and a third would record maximum export level.

Consultation Question	
19.	**Do you agree that maximum demand registers should be included in SMETS? Please provide evidence to support your position and provide evidence on the cost implications of delivering this functionality via back office systems or via the meter.**

Additional Voltage Alerts

Summary of issue under consideration:

In the Response to Roll-out Consultation, the Government indicated that additional voltage alert counters would be considered in the next version of SMETS subject to stakeholder discussions. The potential requirement for voltage alert counters was proposed by DNOs.

103. SMETS 1 specifies the requirement to generate alerts when voltage exceeds a predefined threshold and to count these 'excursions' on a related counter. DNO's proposed that the capability to generate an alert when this counter reaches a configurable threshold should be included in SMETS 2. This would allow DNOs to identify serious events without having to monitor alerts triggered by individual voltage excursions.

104. Meter manufacturers have stated that implementation and configuration of counters, counter thresholds and the sending of alerts when thresholds are exceeded has the potential to introduce significant additional complexity into meters and to the systems required to manage and configure these parameters via the DCC. DNO's have estimated the costs that might be incurred if every voltage excursion generated an alert which was carried over the WAN. This analysis indicates that on the basis of current estimates, the potential savings from building functionality into the meters would be minimal.

105. Given the cost and complexity of adding additional voltage alerts in SMETS 2, DNO's have proposed that monitoring of voltage alerts should be performed in their 'back office' systems, using alerts generated by smart meters each time a voltage excursion is detected. Accordingly the Government proposes that this capability should not be included in SMETS 2.

Government Position
The Government proposes not to include the capability to set configurable voltage alert counter thresholds, in SMETS 2.

Consultation Question	
20.	**Do you agree with the proposal not to include the capability to generate additional voltage alerts based on counter thresholds in SMETS 2? Do you have any evidence that could justify including this functionality in SMETS 2?**

Access to remote disablement by multiple parties

Summary of issue under consideration:

DNOs have raised the possibility that under smart grid operations they might need to remotely disable and enable smart electricity meters. This raises an issue that if a supplier wished to access this functionality at the same time as the DNO, rules may be required to determine how supply is enabled. Similar considerations apply to the load limiting capability in smart electricity meters.

106. Capabilities to remotely disable, re-arm, enable and load limit smart electricity meters are included in SMETS 1. Generically these commands are referred to in this section as disablement functions.

107. During Foundation, when smart meters are controlled by energy suppliers, the energy supplier will be the only party able to issue disablement commands. In the medium to longer-term, the development of smart grids may generate a demand for DNOs to also initiate remote disablement commands (e.g. to manage supply shortfalls). However such smart grid operations would be ineffective until a substantial proportion of meters are smart (i.e. well into the Mass Roll-out stage).

108. In any event, disablement of individual meters by DNOs is only permitted in a narrow range of specified circumstances (e.g. tampering with the supply). In general, energy suppliers are the only parties with the authority to disconnect a supply at the meter (e.g. for non-payment) and then only after rigorous procedures have been concluded. When DNOs need to disable supply (e.g. to perform work on their network) they isolate a network feeder at the sub-station.

109. However, as SMETS 2 meters installed in the next few years will be in place for up to 15 years, it is possible that before they are replaced, arrangements could be introduced which permit DNOs to perform disablement functions.

110. The possibility of both suppliers and DNOs using the disablement functions creates the potential for conflict on enablement. For example, an energy supplier that had disabled a meter due to non-payment would not wish the meter to be enabled by a DNO that had disabled a group of meters for smart grid reasons.

111. To cope with these complexities, logic would need to be specified to record the sequence of disable commands and determine which request takes priority when supply is to be restored.

112. Two approaches have been identified for managing the disablement functions. Firstly, the enablement logic could be built into DCC's systems or, secondly, logic could be built into meters.

113. Under the first approach where logic is built into the DCC's systems, some concerns have been expressed that safety could be compromised if the WAN became unavailable during a disablement period (i.e. could DCC be confident that it had received all the acknowledgement messages that had been issued by meters and that it knew the current state of every meter?). However the DCC approach offers the significant benefit that

functionality can be introduced later without the need for logic to be built into meters. The second approach of building the enablement logic into meters would require the logic to be specified in SMETS 2.

114. The Government would welcome views from stakeholders on whether – in the event that industry arrangements were changed to allow DNOs to execute remote disablement commands as part of their smart grid operations - control logic should be built into DCC systems or meters. If it should be built into meters, the further issue is whether the logic should be specified in SMETS 2 as a future-proofing measure.

Government Position
The Government seeks views on whether logic to control disablement functions by multiple parties should be specified in SMETS 2. This might provide future-proofing in the event that DNOs are at some future date permitted to execute such functions as part of their smart grid activities.

Consultation Questions	
21.	**If DNOs were permitted to access remote disablement functions, should control logic be built into DCC systems or meters? If the logic should be built into meters, should the logic be specified in SMETS 2? Please provide rationale to support your position including estimates of the cost of delivering this functionality under the different options being considered and any evidence relating to safety issues associated with each option.**

Electricity Meter Variants

115. Nearly five million premises have non-standard arrangements for electricity metering mainly associated with radio teleswitch[29] and polyphase installations. The Response to Roll-out Consultation proposed that 'variants' should be specified in SMETS 2 to support these metering arrangements.

116. The Programme has analysed the requirements of electricity meter variants in conjunction with SSAG and proposes that the following variants are specified in SMETS:

- auxiliary load control switches for controlling individual loads. This includes internal switches in variant meters and external switches connected via the HAN
- boost buttons to over-ride any auxiliary load switching

[29] Radio Teleswitch (RTS) is a system that supports scheduled and ad hoc switching of specific circuits within the premise. Typically these circuits support storage and water heating operated on tariffs such as Economy 7.

- multiple measuring elements (to allow concurrent tariffs on separate load circuits)

117. The installation of variant meters will be left to supplier choice and suppliers have indicated that they will generally install variant smart meters to ensure continuity of tariff arrangements and to minimise any disruption which might result from rewiring within the property.

118. To ensure that DCC users can recognise and operate variant meters, the Programme will specify a set of data items which will identify the measuring capability of the meter (i.e. polyphase or multiple metering elements); the number, type and rating of auxiliary load control switches that are fitted; and whether a boost button is fitted. These data items will be specified in SMETS 2 and will be accessible via DCC.

119. The Government's working assumption is that the cost uplift of variant smart meters will be similar to the cost uplift of variant traditional meters. Government would be interested in evidence in relation to this assumption.

Government Position
The Government proposes to include variant smart electricity meters in SMETS 2 to address requirements for auxiliary load control switches, boost buttons, multiple measuring element meters and polyphase supplies.

Consultation Question	
22.	**Do you agree that variant smart electricity meters should be specified in SMETS 2 and that the cost uplift for variant smart meters is similar to that for variant traditional meters? Please provide evidence of costs to support your views on cost uplifts.**

Randomisation of auxiliary load control switches

Summary of issue under consideration:

When many loads come on at the same time, power surges can occur that put the electricity supply system under stress. This section discusses whether randomisation of switching times should be specified in SMETS 2 such that load switching can be spread over a defined period.

120. Industry stakeholders have highlighted that if large numbers of individual loads (e.g. storage heaters) are switched simultaneously, components of the energy supply system (i.e. generation, transmission and distribution) may become over stressed. This risk was

identified when the original RTS system was installed and randomisation of switching times was introduced as a mitigation measure.

121. The Programme has identified two sets of circumstances where randomisation might need to be used under smart metering:

- Auxiliary load control switches activated via a schedule held in the metering system (e.g. to control space or water heating). This scenario is comparable to the original RTS requirement
- Switching by consumer programmed devices (e.g. tumble driers) in response to a price change (e.g. at the start of an off-peak price period)

122. Stakeholders have proposed that a randomisation capability should be included in SMETS 2 to allow a supplier to:

- apply a random offset to programmed or ad hoc switching times[30]
- apply a random offset to the tariff switching table

123. It has also been proposed that suppliers should be able to synchronise the switching of auxiliary loads with the switching times between tariff registers by applying the same offset to both. This is consistent with current RTS arrangements and should avoid customer confusion. For example, if the notional 01:00 start time for a storage heating circuit were offset by 7 minutes to 01:07 the start of the off-peak period of the tariff would also shift by 7 minutes to 01:07.

124. On the advice of SSAG, the Government proposes that the randomised offset range should be between 0 and up to 1799 seconds (i.e. actual switching would occur up to 30 minutes after the notional switching time). Switching times and offsets would be accessible to devices over the HAN.

125. Meter manufacturers have indicated that randomisation offset functional capability to variant smart meters will not add significant cost to the metering equipment.

Government Position

For smart electricity meters with internal or external auxiliary load control switches, the Government proposes that the following capabilities are included in SMETS 2:

- **randomisation of on/off switching of auxiliary load control switches**
- **randomisation of switching between registers (i.e. of price changes)**
- **ability to align the switching of auxiliary loads with the switching between registers.**

[30] In a situation where load shedding was required quickly the random offset for an ad hoc command could be set to zero.

Consultation Question	
23.	**Do you agree that randomisation offset capability should be included for auxiliary load control switches and registers as described above? Do you have views on the proposed range of the randomisation offset (i.e. 0 – 1799 seconds)? Please provide evidence on the cost of introducing this functionality.**

Interface Requirements

126. Defining a HAN standard in SMETS 2 and the CHTS will provide the opportunity for suppliers and consumers to link devices to the smart metering equipment in the premises. Linking devices to the HAN will be accomplished by 'pairing' them to the relevant communications hub. The communications hub will be required to support the linking of supplier-provided smart metering devices and of consumer access devices: these requirements will be defined in the CHTS.

127. To ensure interoperability of equipment, SMETS 2 will need to include specifications for additional devices or for the interfaces to/from them. The additional devices that may be included in SMETS 2 are:

- Consumer Access Devices
- Prepayment Interface Devices
- Microgeneration Meters
- Handheld Terminals

Consumer Access Devices

Summary of issue under consideration:

An increasing range of devices is becoming available to assist consumers manage their energy use, including enhanced energy displays, smart appliances and home automation controllers. As the deployment of smart metering proceeds and consumers recognise the benefits these devices bring, this market in Consumer Access Devices (CADs) may evolve rapidly. The path of this evolution will be set by product designers and the developers of innovative commercial models. The design issue addressed in this section is the process for connecting CADs to the HAN.

Context

128. The smart metering programme aims to facilitate improvements in energy efficiency and to assist consumers in managing their energy consumption. These aims can be promoted by providing energy use information to consumers. All domestic consumers will be offered an IHD which will display data relating to energy consumption and price. Where customers are on a prepayment tariff, the IHD will also provide information such

as the credit balance and the availability of emergency credit. Data will be transmitted to the IHD over the HAN.

129. The consumption and tariff data held by smart metering devices may also be made available to devices purchased by consumers. Devices which might utilise such energy data include:

- A computer interface: for example, a 'dongle' plugged into the USB socket of a PC which might collect smart metering data and make it available to an application or software package which the consumer can use, for example, to analyse their energy use
- An enhanced IHD: an IHD offering additional capabilities (e.g. more intelligent ambient displays) or a higher specification screen than the SMETS-compliant IHD that energy suppliers will be obliged to offer
- A smart appliance: for example, a smart washing machine which the consumer could programme to switch on only when off-peak prices are in force
- A home automation controller: a device to collect energy consumption and pricing information from the smart metering system, analyse it in conjunction data from other sources and act on this information: for example to control a central heating system by combining energy data with input from temperature and motion sensors.

130. In addition to their connection to the smart metering HAN, these devices may also be connected to the internet to allow the consumer to monitor consumption and to control home appliances through internet-connected devices such as smart phones. Such connectivity would also enable consumers – or agents acting for them – to upload smart metering data for access or analysis by a service provider they have authorised.

131. Devices connected locally to the HAN to allow consumers to access their smart metering data are referred to generically as CADs. CADs are expected to be available for purchase through retail stores or as part of a service: for example installing a central heating system, re-fitting a kitchen or as part of an energy supply contract.

132. SMETS 1 specified that the smart metering system should include the capability to link consumer access devices to the HAN. However as SMETS 1 did not mandate a HAN standard it was not appropriate to define how the connection between the CAD and the HAN should be established.

133. If the proposal to adopt ZigBee SEP / DLMS is adopted for the HAN, CAD devices will need to conform to these standards and follow the mechanisms they provide for connection to a HAN. This may impose constraints on the range of viable connection options.

134. CADs will only be permitted 'read-only' access to data held in smart metering equipment. For security reasons, software in the communications hub (the HAN coordinator) will prevent CADs from updating any data in smart metering equipment or from executing any functional capabilities of a smart meter (e.g. load limiting). Software in the

communications hub and smart meters will also prevent CADs from accessing data which pertained to a previous tenant[31].

Objectives and criteria

135. CAD manufacturers and consumer groups have advised that ease of connection will be a key factor in determining how the CAD market develops. Equally it is important that the methods of allowing CADs to access the HAN do not permit a breach of privacy or security. In devising a method for the connection of a CAD, the term 'secure and consumer friendly connection' has been used to summarise these aims.

136. In relation to privacy, a particular challenge is that around 50% of meters are located in shared spaces (e.g. stairwells in blocks of flats) or on external walls which can be accessed by others.

137. Points raised in discussion with stakeholders in relation to the 'consumer friendly' criterion focus on the need for a consumer to be able to install a CAD without the need for technical knowledge. A further consideration is the ability of a consumer to access support in the event that they experience problems during the installation process.

138. Other factors to be taken into account include the costs of providing functionality to enable the installation of CADs, the distribution of costs (i.e. the extent to which costs will be imposed on all smart metering equipment or focused on CAD users) and the time that could be required to develop any new functionality that is required.

139. Finally it will be necessary to consider commercial and market factors, for example the extent to which options require the involvement of DCC or energy suppliers.

Options

140. The process of connecting a CAD to the consumer's HAN is termed 'pairing': it involves the HAN coordinator in the communications hub recognising the presence of a CAD and permitting it to communicate with other devices in the HAN.

141. The Government would welcome views on the ways in which a CAD may be paired to a HAN, in particular in relation to the two options presented on the next page. For each option the italicised text illustrates the 'customer journey'.

[31] This capability is already included in SMETS 1 and will be carried forward to SMETS 2.

OPTIONS

Option 1: Passkey entry on CAD

A passkey (e.g. ten digit number) would be assigned to each communications hub and recorded by the DCC. This passkey would be made available to the supplier who would pass it to the consumer. When a CAD is installed the passkey would be entered into the CAD to activate the pairing process.

- *The consumer is issued with a passkey by their energy supplier when their smart meters are installed or when they move into the property. The consumer purchases a CAD and installs it. To pair the CAD to the HAN the consumer presses a 'pairing key' on the communication hub and then enters their passkey into the CAD (or a PC connected to it). Successful pairing would be confirmed by a message or indicator on the CAD.*

Option 2: Remote pairing

This would follow the approach used by energy suppliers to install smart meters and would require a SEC party to download details of the CAD to a specified communications hub via DCC.

- *A consumer purchases a CAD from a retailer / service provider. The consumer installs the CAD and then contacts a nominated SEC party who authenticates the consumer and sends a pairing request message to the communications hub via DCC. Receipt of the request message triggers the communications hub to complete the pairing process with the CAD. Successful pairing would be confirmed by a message or indicator on the CAD*.

Analysis of options

142. Option 1 – passkey entry on CAD – provides an approach that allows the consumer to complete the installation locally. It requires that consumers are issued with a passkey when their smart metering system is installed and there is a clear risk that the consumer may lose this and need to contact their supplier to retrieve it. Government welcomes views on whether suppliers should be required to provide passkey information on demand and on the checks that suppliers should make to authenticate the consumer when they request a passkey reminder.

143. This option requires additional functionality in the smart metering equipment that may impact development timescales or cost. A 'pairing button' will be required on the communications hub which will set the hub to 'listen' for a CAD with a valid passkey. A further requirement will be for a keypad to be available on the CAD or a device linked to the CAD (e.g. a PC in the case of a 'dongle' or the user interface of a smart appliance in the case of a home automation controller).

144. Option 2 – remote pairing – is similar to the approach that has been employed in other jurisdictions, notably in Texas and in Australia. It offers the highest level of privacy as it requires authentication of the consumer by a SEC party. This could be achieved using methods already deployed by energy suppliers or by an ESCO using the Customer Information Number (CIN) process, which involves sending a random number to the consumer's meter or IHD and requiring the consumer to repeat the CIN back to the ESCO as confirmation of their location. Under this option security credentials would be lodged with the SEC party by the CAD manufacturer and these would be transmitted to the relevant communications hub to enable pairing to occur. The process would be relatively straightforward for the consumer as they would only make a phone call or complete a simple internet transaction to complete the pairing. As this is the same process as would be used for meter installation by suppliers, this option should have minimal impact on development time or the cost of standard equipment.

145. An implication of Option 2 is the need for a SEC party to be involved as they are the only organisations to which DCC will provide services. Two sub-options arise from this. The first would be to require the consumer's energy supplier to provide the pairing service on request and the second sub-option would be to allow other SEC parties to provide this service. The supplier-only option can be implemented through the regulatory arrangements, thus ensuring that the service is available, whereas the second option would rely on others acceding to the SEC and providing 'pairing' as a commercial offering. The latter option also introduces uncertainty into the procurement of DCC services as the number of potential parties to be supported is unpredictable.

146. In addition to the two options presented here, the Programme has also explored options involving a physical interface on the communications hub and pairing using an already trusted device (i.e. a meter or IHD). Both of these options present issues in terms of privacy (especially where meters are in shared areas) or require the presence of an IHD, which may have been abandoned by the consumer.

Government Position

Work to date indicates that the two options presented above are potentially viable means of connecting a CAD to the HAN although they display different advantages and disadvantages in relation to the objective of achieving 'secure and consumer-friendly' connection. Both options require further detailed analysis but views are invited on these options and on any alternative proposals.

Consultation Questions	
24.	**Do you support Option 1 or Option 2 for 'pairing' a CAD to the HAN? Please present the rationale for your choice and your views on the implications that these options have for the technical design of the solution.**
25.	**If Option 2 were adopted, do you agree that obligations should be placed on energy suppliers to support this process by submitting 'pairing requests' to the DCC on request from their consumers?**
26.	**Do you consider that other CAD installation options should be pursued? If yes, please explain the approach you favour and your reasons.**

Prepayment Interface Device

Summary of issue under consideration:

A Prepayment Interface Device would provide functionality to facilitate the use of prepayment services by consumers whose meters are in locations which are difficult to access. This could allow suppliers to operate meters in prepayment mode where otherwise they would be unable to satisfy their obligation to offer this service only where it is safe and reasonably practical to do so.

147. In line with the commitment made in the Response to Roll-out Consultation, the Programme has undertaken further work, in collaboration with industry, to define a Prepayment Interface Device (PPMID). The aim has been to define a PPMID which would replicate the functionality of the user interface (i.e. the display and input buttons) of smart gas and electricity meters. The PPMID would be connected via the HAN. This would allow consumers with difficult-to-access meters, to input data and commands through the PPMID which would otherwise need to be input through the user interface on the meter.

148. User interface commands related to prepayment (PPM) functions in SMETS are:

- Activate emergency credit
- Add credit (i.e. input a UTRN[32] manually); and
- Enable supply after a supplier has remotely disabled it and subsequently re-armed the meter (this meets the requirement that after an individual meter has been disabled a person must be present when supply is enabled to ensure that all appliances are switched off).

[32] The UTRN (Unique Transaction Reference Numbers) is a one-time code that can be applied directly onto the relevant meter in order to add prepayment credit. A UTRN would be acquired from a designated vending agent and would be required only when the WAN is unavailable: in normal circumstances credit would be added remotely

149. Ideally a PPMID would provide the capability to support these commands and display all the prepayment-related data items that would otherwise be displayed on the meter. However, during engagement with industry a safety concern has been raised in relation to the sending of commands over a wireless HAN to enable the gas or electricity supply. Whilst one supplier already provides equipment with a wireless connection to enable supply, other suppliers have expressed concerns about the safety of this solution. Some meter manufacturers have suggested that if this capability is to be provided over a wireless HAN, the radio equipment would have to be of a higher specification than would otherwise be required. This would have an impact on the cost of all smart meters and communications hubs.

150. The Government would welcome views on whether it is safe and cost-effective to include the enable supply command via a PPMID.

151. Provision of a PPMID will not be a universal solution for prepayment customers and the installation of a PPMID will not guarantee that suppliers have met the requirements of the 'safe and reasonably practical' obligation. However a PPMID could provide an option where otherwise the supplier might need to move the meter, provide a wired solution or not offer a prepayment service.

Government Position
The Government proposes that the specification of a PPMID is included in SMETS 2. The PPMID will replicate functionality of the user interface of smart gas and electricity meters using a HAN communications link. **Stakeholders are invited to provide information on the safety and cost implications of including the enable supply command in the PPMID specification.**

Consultation Questions	
27.	**Do you agree with the proposal to include in SMETS 2 a specification for a PPMID, connected via the HAN, as described above?**
28.	**Would including the capability to enable gas and electricity supply through a PPMID connected via (a) a wireless HAN or (b) a wired HAN meet GB safety requirements? What impact would including this capability have on the cost of smart metering equipment? Please provide evidence to support your answers.**

Microgeneration meters

Summary of issue under consideration:

The 'A-H list' of requirements for smart metering included the capability to store and transmit readings from a microgeneration meter. The Response to Roll-out Consultation indicated that SMETS 2 specifications, which will unbundle meter and communications functions that were combined in SMETS 1, should continue to enable microgeneration metering. This section discusses the requirements for microgeneration meters in SMETS 2 and the CHTS, and for the DCC functionality needed to access such meters.

152. A microgeneration meter is an electricity meter used to measure energy generated by small-scale renewable technologies such as photovoltaic cells (solar panels). 'Standard' traditional electricity meters are currently used as microgeneration meters to measure the energy flow from the microgeneration equipment into the premise. Typically, consumers read their own microgeneration meter and send readings to their Feed-In Tariff (FIT) supplier. The FIT supplier pays for the energy generated according to a set tariff. Net export from the property (often a deemed amount for domestic premises) is eligible for an export tariff.

153. SMETS 1 includes a requirement for the electricity smart metering system to be capable of establishing a HAN link with a microgeneration meter and of sending / receiving information to / from that meter.

154. In the future, FIT suppliers may wish to install smart meters to measure microgeneration output and a SMETS-compliant electricity meter will have the functionality needed for this purpose. When the communications hub is specified as a separate device to the electricity smart meter, a microgeneration meter (i.e. a standard SMETS 2-compliant electricity meter installed to measure output from microgeneration equipment) could be operated remotely in the same manner as other smart electricity meters. Microgeneration data could also be retrieved via a CAD connected to the HAN. This would require communications hubs to be able to manage multiple smart electricity meters on the same HAN.

155. The roll-out obligations for smart metering do not cover microgeneration and, accordingly, support for microgeneration meters is not included in DCC's core services. Such a service could be introduced later as an elective service. However, one issue to be addressed in developing this service will be the availability of data to allow DCC to perform access control in respect of FIT metering points. For import / export meters DCC will use data from the existing meter point registration services: these are robust, automated systems managed by DNOs to support the change of supplier process. Currently there is no comparable system supporting the registration of FIT meters.

156. Therefore a pre-requisite for introducing DCC support for microgeneration meters as an elective service will be the availability of a robust registration system for FIT metering points. One option would be to incorporate FIT metering points into a consolidated industry registration system when the standard gas and electricity registration functions are transferred to DCC (targeted for 2-3 years following DCC go live). However, this is

outside the Programme's scope and will need to be the subject of further analysis by industry.

157. For now, the Government proposes to include a requirement that CHTS-compliant communications hubs should support multiple SMETS-compliant electricity meters. This will provide the capability to link microgeneration meters into the HAN as and when DCC develops elective services to support microgeneration meters.

Government Position
A SMETS-2 compliant electricity meter could in future be used as a microgeneration meter and Government proposes that CHTS-compliant communications hubs should be specified such that they will support multiple SMETS-compliant smart electricity meters. In future elective services may be developed by DCC to provide access to microgeneration meters at FIT metering points, thus providing the same support for microgeneration meters as will be provided to import/export meters.

Consultation Question	
29.	**Do you agree with the proposal that the communications hub should be specified such that it can support multiple smart electricity meters? How many smart electricity meters should be supported by each communications hub?**

Handheld Terminals

Summary of issue under consideration:

As a HAN standard was not specified in SMETS 1 it was not appropriate to specify ways in which various installation and maintenance activities would be performed. Suppliers would decide for themselves whether a handheld terminal should be used.

To achieve interoperability, energy suppliers have suggested that a standard HAN interface should be provided for handheld terminals. Handheld terminals may be used to support the installation process or to configure meters where there is no WAN connection (e.g. temporary loss of WAN service).

158. Suppliers have identified a variety of situations where they consider that use of handheld terminals (HHTs) may be required to support their installation and maintenance activities, for example:

- Initial pairing of a meter to a communications hub
- Input of a meter point reference (MPAN or MPRN) as part of the installation process

- Input of an identifier for an auxiliary load control switch
- Configuration of meters in the event that the WAN is unavailable (either because connectivity has been lost or because the WAN service is not yet available at that site).

159. Given that meters will be switched between suppliers at change of supplier and that suppliers may change their meter manufacturers and meter operators (MOPs) to reflect commercial factors, there is a high level of agreement among stakeholders that a standard specification should be developed to allow a HHT to interface with smart metering devices via the HAN.

160. Any specification of the HHT interface to the HAN is dependent on the end-to-end security architecture and on clarifying how the preferred HAN standard (i.e. ZigBee SEP / DLMS) could support a HHT. This work will be carried forward by the Programme in conjunction with stakeholders. The Government would welcome views on the role that HHTs might play in support of installation and maintenance activities.

Government Position
The Government acknowledges that HHTs can facilitate installation and maintenance activities and that a standard specification of an HHT interface to the HAN would assist suppliers and MOPs to work interoperably across SMETS 2 / CHTS-compliant devices. It is proposed that further specification work is undertaken before finalising whether an HHT specification is included in SMETS 2.

Consultation Question	
30.	**Do you agree that a specification for a HHT interface to the HAN should be defined? If yes, please identify the functions that this interface would need to support and the scenarios in which such functionality could be required.**

EU Energy Efficiency Directive

161. The European Council and Parliament reached an agreement on the EU Energy Efficiency Directive[33] in June 2012. The Directive is wide ranging and contains new requirements related to demand side and supply side energy efficiency, including smart meters, to enable the EU to get back on track towards meeting its target to reduce primary energy consumption by 20% by 2020.

[33] http://ec.europa.eu/energy/efficiency/eed/eed_en.htm

162. The final text of the Directive is likely to be published in the Autumn, and Member States will then have 18 months to implement the requirements.

Smart meters requirements

163. Almost all of the smart metering requirements in the Directive are in line with those already set out in the 'Third Package' (Directives 2009/72/EC[34] and 2009/73/EC[35]) and with existing GB policies. The Directive does however include a requirement on the provision of easy access to historical daily/weekly/monthly/annual consumption data for at least the previous 24 months via the internet or the meter interface. Please see excerpt below:

164. "Meters installed in accordance with Directives 2009/72/EC and 2009/73/EC shall enable accurate billing information based on actual consumption. Member States shall ensure that final customers have the possibility of easy access to complementary information on historical consumption allowing detailed self-checks. Complementary information on historical consumption shall include cumulative data for at least the three previous years or the period since the start of the supply contract if this is less. The data shall correspond with the intervals for which frequent billing information has been produced. Complementary information on historical consumption shall also include detailed data according to the time of use for any day, week, month and year, and shall be made available to the final customer via Internet or the meter interface for the period of at least 24 previous months or the period since the start of the supply contract if this is less."

165. The Government is currently assessing whether additional steps need to be taken through the Smart Meter Programme to meet this requirement, and potential options. Any proposals relating to such steps will be consulted on in due course.

[34] http://www.energy.eu/directives/Directive_internal_electricity_market.pdf

[35] http://www.energy.eu/directives/Directive_internal_natural_gas_market.pdf

5. Governance and Assurance of Security and Interoperability

Introduction

166. Security and interoperability are system-wide objectives that all parties have an interest in, even though their own responsibilities may be restricted to particular installations or areas of operation. For example, at change of supplier the gaining supplier will inherit devices procured by a competitor and all users of DCC's services will be reliant on its systems and processes.

167. This section considers how security requirements should be governed, and the regimes that will be required to provide appropriate levels of assurance in respect of both security and interoperability.

168. It should be noted that security in the period prior to the commencement of DCC services was the subject of a separate consultation[36], published in May 2012. Responses to this consultation have now been received and are being analysed. Issues related to security during this period are, therefore, not covered in this document.

Governance of Security Requirements

Summary of issue under consideration:

The Government recognises that over time smart metering security requirements will need to be reviewed and modified to reflect changing circumstances. This section considers how these tasks should be governed.

169. The Programme has worked with stakeholders through the Security Technical Experts Group (STEG) to derive security requirements which are designed to mitigate risks facing the smart metering solution. The security requirements provide a complete set of controls from which individual requirements will flow down to individual components of the solution, including smart metering equipment (as documented in SMETS and the CHTS, which will both be part of SEC), DCC's data and communications services (as documented in commercial contracts) and the systems of DCC users (documented as SEC conditions).

170. The process of maintaining the security requirements over time involves two distinct steps: firstly undertaking risk assessments and, secondly, modifying the security requirements in the light of a revised assessment. With regard to risk assessment, each

[36] Smart Metering Implementation Programme: Consultation on a draft licence condition relating to security risk assessments and audits in the period before the DCC provides services to Smart Meters

party will wish to understand the risks faced by their organisation in relation to smart metering. They will need to undertake risk assessments which reflect the particular characteristics of their organisation and market and, from Mass Roll-out stage, will use information collected from operational systems and from assurance activities to inform their assessments. DECC, as the Government Department with responsibilities related to the energy infrastructure, will need to perform risk assessments in relation to the potential impacts of smart metering on that infrastructure.

171. Smart metering security requirements cover all components of the solution and modifications to the requirements should consider inputs from all parties, including Government. Given that many of the security requirements will flow down into documents that are incorporated into the SEC, there would be merit in changes to all security requirements being considered by a technical sub-committee of the SEC Panel, involving both industry and Government experts.

172. Under this arrangement, modified security requirements would be ratified by the SEC Panel and the industry regulator (Ofgem) would be responsible for approving modifications to the security requirements in the same manner as they would approve other SEC modifications.

173. A number of features of this proposal will need specific consideration as the SEC is developed, for example: the composition of the technical sub-committee; its terms of reference; how modifications to security requirements would be approved; and how the security requirements might fit under any SEC disputes and appeals mechanism.

Government Position
It is proposed that the maintenance of smart metering security requirements will be best achieved through a technical sub-committee to the SEC Panel, comprising security specialists from Government, industry and other interested parties. This sub-committee would draw on input from SEC members, especially the risk assessments that they produce: the technical sub-committee is not expected to undertake a separate risk assessment.

Consultation Question	
31.	**Do you agree with the proposed approach to the governance of security requirements? If you propose alternative arrangements please provide evidence to support your views.**

Assurance of Security Requirements

Summary of issue under consideration:

When DCC is operational, security of the end-to-end solution will rely on components supplied by a number of different parties. Assurance procedures could demonstrate that elements of the solution have achieved a known level of compliance with published security requirements. This section discusses the potential scope for security assurance procedures and the manner in which such assurance should be delivered.

174. Components of the end-to-end smart metering solution which may fall within the scope of formal assurance procedures against security requirements, are as follows:

- DCC's systems and services – primarily those provided by the DSP and CSPs but also those systems and procedures operated by the DCC licensee
- DCC users' systems – the systems operated by energy suppliers, network operators and authorised third parties: for example, the systems used to generate user requests submitted to DCC over the user gateway
- Smart metering equipment – equipment installed in consumers' premises

175. In broad terms there is a choice between relying on manufacturers and system operators to perform self-certification against the security requirements or to require that components are subjected to independent certification or accreditation procedures[37].

176. Given the reliance that other parties place on components procured or operated by others, Government proposes that independent certification or accreditation should be employed. Specific benefits of independent assurance are that it:

- Increases the consistency of the compliance testing used to certify / accredit the security characteristics of key elements of the end-to-end smart metering system
- Increases the likelihood that instances of non-compliance with security requirements will be detected and reported
- Reduces the risk of inappropriately skilled personnel being used to perform certification, accreditation/processes

Independent assurance of DCC and DCC Users

177. For DCC it will be necessary to establish a specific accreditation procedure, tailored to its systems and services. The process for assuring CSP systems should be consistent across all CSPs.

178. In the case of DCC users it is appropriate to recognise the different types of user (e.g. energy supplier, network operator, energy services company) and/or the different scale of organisations involved and how this may influence the criteria by which they are certified.

[37] Certification of a component confirms that its security characteristics meet a defined standard. Accreditation assesses whether a complete system complies with published security requirements.

Two options for certifying DCC users have been identified, namely risk-based and role-based certification.

179. Under a risk-based approach, DCC users would be subject to a targeted certification system, based on the level of risk that they pose to the security of the end-to-end smart metering system. Put simply, the greater the level of risk associated with a DCC user, the more security requirements would be included in the scope of their certification.

180. Under a role-based approach, DCC users would be subject to a targeted certification system, based on their powers and obligations under the SEC, as indicated by their 'role codes' (e.g. energy supplier or ESCO). This would allow DCC users with specific powers (for example, the ability to execute a remote disconnect command) to be assigned an appropriate certification tier, bringing more security requirements into or (where appropriate) out of the scope of their certification.

181. The Government proposes that the role-based option should be adopted and that DCC users should be certified using a targeted approach that uses their powers and obligations under the SEC to determine the security requirements that will be in scope for certification. This approach allows for the level of security certification testing (and therefore the associated time and cost) to be commensurate with the rights and capabilities of DCC users under the SEC. It provides for clear differentiation between categories of users (something which may not be easily achieved using a purely risk based approach) and facilitates a more granular approach to setting security requirements than would be feasible by categorising DCC users on a risk basis.

182. Assurance of DCC and DCC users' systems is unlikely to be a one-off procedure. As systems and technologies change so the security characteristics of previously accredited systems will also change. Furthermore, the security requirements will be subject to modification. DCC and DCC user systems could be subjected to re-testing at predefined intervals or when systems / requirements are modified, or a combination of time and events. As a general principle, Government proposes that re-testing should be performed at least at set intervals or more frequently when significant changes to systems or security requirements are introduced.

Government Position

It is proposed that DCC and DCC users' systems should be subjected to independent assurance against the security requirements. In the case of DCC users, certification requirements should be set in relation to the role code of each user. Re-testing of DCC and DCC users' systems should occur at least at set intervals and more frequently when significant changes to systems or to security requirements are introduced.

Consultation Questions	
32.	**Do you agree with the proposal to establish independent assurance procedures for DCC and DCC users? Please explain your views and provide evidence, including cost estimates where applicable, to support your position. Comments would also be welcome in relation to the impacts and benefits of the proposed approach with regard to small suppliers.**
33.	**Do you agree with the proposal that re-testing should occur at least at set intervals and more frequently when significant changes to systems or security requirements are introduced? Please explain your views.**

Independent assurance of smart metering equipment

183. Independent testing of smart metering equipment enrolled into SEC will require the establishment of a certification regime tailored to the smart metering security requirements. A scheme such as CESG's Commercial Product Assurance (CPA) could be leveraged to assess the security requirements that pertain to smart metering equipment. Internationally recognised standards could be referenced in the evaluation criteria.

184. Initial establishment of such a scheme would be managed by the Programme: the governance of subsequent modifications to the scheme would be set out in the SEC. Under a CPA scheme, testing would be performed by independent test houses accredited by CESG.

185. The prime objective of the independent scheme would be to provide assurance to DCC that devices connecting to its services comply with the security requirements. All SMETS 2 equipment will be capable of being enrolled into DCC's services and it is proposed that compliance with SMETS 2 would be conditional on passing the security certification test. Certification would also be required for communications hubs.

186. In principle, certification of a product will be a one-off process. Re-certification would only be required if the product (including firmware) is subject to re-design by the manufacturer or the expiry date of the certificate has been reached.

187. The independent certification scheme could also be used to assess whether SMETS 1 meters meet the security requirements and would therefore be eligible (on security criteria) for enrolment.

188. As the independent certification scheme would be a regulatory requirement it is proposed to notify the certification requirements to the European Commission under the Technical Standards and Regulations Directive.

Government Position
It is proposed that an independent certification scheme is established to validate that smart metering equipment complies with the security requirements. Certification would be a mandatory requirement for SMETS 2 equipment and the CSP-provided communications hub. SMETS 1 equipment may also be certified under this scheme as part of the process of determining eligibility for enrolment in DCC.

Consultation Question	
34.	**Do you agree with the proposal to establish an independent security certification scheme for smart metering equipment? Do you have any views on the proposed approach to establishing a certification scheme or evidence of the costs or timelines for setting up such a scheme or submitting products for certification?**

Non-compliance with security requirements

Summary of issue under consideration:

As failure by one SEC party to comply with security requirements could cause others to incur loss, it is appropriate to consider whether sanctions should be applied to the non-compliant party.

189. In the SEC consultation (April 2012), Government stated that it would separately consider security requirements and assurance processes and that this may include consideration of the liabilities and sanctions that may apply in the event of any failure by the DCC or DCC users to comply with agreed security requirements.

190. The Government considers that clearly defined sanctions are likely to act as an effective incentive for entities to remediate any instances of non-compliance with security requirements. Accordingly Government is considering a range of security specific sanctions as part of its more general considerations on the potential role of sanctions under the SEC (as set out in the SEC consultation). Such sanctions could include withdrawal or limitation of DCC services to a DCC user or restriction of access to a specified set of devices.

Government Position
It is proposed that sanctions for non-compliance with security requirements should be defined in the SEC and might include withdrawal of DCC services to a DCC user or to specific devices.

Consultation Question	
35.	**Do you agree that sanctions for non-compliance with security requirements should be included in the SEC? Do you have views on the nature of the sanctions that might be imposed?**

Security for smart meters not enrolled in the DCC

Summary of issue under consideration:

Even after the commencement of DCC services, smart metering systems will continue to be operated outside DCC, for example: opted out non-domestic sites and SMETS meters awaiting enrolment to DCC. This section considers the requirements that should apply to such meters in relation to security.

191. The Government consulted in May 2012[38] on proposals to place obligations on suppliers in relation to the security of smart metering systems which they install before the commencement of DCC services. The Government is currently analysing responses to that consultation. This section sets out proposals relating to the operation of SMETS-compliant smart metering systems outside DCC in the longer term.

192. The Government considers that an approach is needed which supports a comparable level of security for smart metering systems, whether they are serviced by the DCC or are operated by a supplier (or agent) outside DCC.

193. The responsibility for end-to-end security of smart metering installations operated outside DCC lies with suppliers. The Government proposes to set out security obligations in licence conditions or the SEC which would effectively extend the arrangements already proposed for smart metering installations during the period before DCC provides services. The obligations would require suppliers to carry out a number of recognised industry good practice disciplines for identifying and managing risks to the security of their systems. These would include a requirement to conduct a regular independent audit of the security of systems and the processes for managing risk (i.e. adopt an approach in line with the published draft licence condition relating to security risk assessments and audits in the period before the DCC provides services).

[38] Smart Metering Implementation Programme: Consultation on a draft licence condition relating to security risk assessments and audits in the period before the DCC provides services to Smart Meters

Government Position
It is proposed that suppliers operating SMETS meters outside of the DCC should be obliged to operate a secure end-to-end system and require them to carry out a number of recognised industry good practice disciplines for identifying and managing risks to the security of their systems.

Consultation Question	
36.	**Do you agree with the proposal to, in effect, extend the arrangements already proposed for SMETS installations prior to DCC operation, to all installations being operated outside DCC? Please provide evidence of the costs that might be incurred and the impact of this approach on small suppliers.**

Assurance of Equipment

194. The previous section proposed a security certification regime which will provide DCC with assurance that smart metering equipment procured and installed by energy suppliers and CSPs will meet the security requirements of the SEC. This section considers whether further assurance procedures are required, in particular, to demonstrate that a product introduced by one party will interoperate with products installed by others.

Assurance of Smart Metering Equipment

Summary of issue under consideration:

Many participants including energy suppliers, communications service providers and meter asset providers, will play a role in the procurement and deployment of smart metering equipment. It is in the interests of all parties that equipment from multiple manufacturers interoperates seamlessly within consumers' premises so that equipment does not have to be replaced, adding cost and creating disturbance for customers.

195. The smart metering equipment in consumers' premises will be supplied by multiple parties. If proposals relating to communications hub responsibilities are adopted, the communications hub will be provided by a CSP. The smart electricity meter will be provided by the electricity supplier, the smart gas meter will be provided by the gas supplier, and an IHD is likely to have been provided by the supplier performing the first installation. These four devices may be procured from four different manufacturers but all four need to provide the functionality described in the SMETS and CHTS, and communicate seamlessly over the HAN.

196. Robust and well-established certification and assurance arrangements already exist for verifying certain characteristics of existing traditional meters. They are underpinned by existing legislation, commercial incentives, commercial contracts, and is delivered through

manufacturer self-testing or independent testing by accredited organisations. Statutory requirements include testing under the Measuring Instruments Directive (MID) and European Conformity (CE) marking scheme. Compliance with smart metering security requirements would be tested under a security certification scheme as discussed earlier in this chapter.

197. The technical specifications are designed to deliver interoperability by specifying a HAN standard and a set of minimum capabilities that all smart metering equipment must meet. Licence conditions on energy suppliers and DCC require that they install or provide SMETS and CHTS-compliant equipment respectively and so it should follow that all the equipment they procure and install will be interoperable. However, failures in interoperability often manifest themselves at a very granular level of detail, for example in minor formatting differences in the presentation of individual data fields. It may therefore be necessary to introduce further assurance steps to increase confidence in the interoperability of products.

198. Discussion of this topic with stakeholders has indicated strong support for a business process whereby DCC would refer to a list of 'approved products' before permitting a device to connect to its services. Stakeholders consider that this process would provide confidence that devices can inter-operate as intended. The Government recognises the attractions of this approach and proposes that a list of approved products' should be maintained. Further, as all smart meters installed will be required to comply with SMETS, and so should be interoperable, this list should include equipment that is operated outside of the DCC.

199. The Government proposes that a process should be developed to provide governance over all assurance activities relating to SMETS. This might involve creation of a technical sub-committee of the SEC Panel, focused on SMETS assurance. One output of the assurance process could be the 'approved products' list. The Government proposes that suppliers and CSPs would be required to obtain, retain and provide specified evidence of attaining appropriate certification for the smart metering equipment they have procured.

Additional certification requirements

200. The Government recognises that interoperability of smart metering equipment is a key concern for stakeholders, including suppliers (particularly at change of supplier) and DCC (at enrolment). A key factor in achieving interoperability is the selection of a HAN standard for use by all SMETS 2/CHTS-compliant smart metering devices. ZigBee SEP/DLMS are the application layer standards proposed for the HAN (see chapter 4).

201. Specifications for open standards such as ZigBee SEP and DLMS generally contain both mandatory and optional elements. For example, in the context of smart metering, prepayment functionality will be an option in ZigBee SEP as it is not required in all jurisdictions. However where a device includes prepayment functions, these functions must conform to the ZigBee SEP specification for prepayment.

202. In addition to specifying mandatory and optional functions, protocol bodies often support customised 'profiles' which set out a specified list of options. For example requirements might be set out in a customised profile defining the set of ZigBee SEP options that are specific to GB. This customised profile would be referred to as a GB Companion Specification.

203. Interoperability is a central objective of an open standard and the bodies that manage these protocols (e.g. the ZigBee Alliance) are focused on ensuring that their protocol delivers this outcome. Protocol bodies are incentivised to provide rigorous testing because without guaranteed interoperability customers will switch to other standards.

204. For a product to be certified as being compliant with a standard it must generally be tested by a test house accredited by the protocol body. A compliance certificate entitles the manufacturer to, for example, display the protocol's branding on the casing of the device, its packaging and promotional materials. Compliance testing will be against the generic protocol or against a customised profile such as a GB Companion Specification as described above. In the case of the ZigBee Alliance, the process to adopt a customised profile is only complete once a set of test specifications has been defined for that profile.

205. Potentially there may be requirements for further levels of assurance. One such area relates to the proposal to adopt the DLMS standard for electricity meter commands and ZigBee SEP for all other communications. As these protocols will be tested separately by test houses appointed by the ZigBee Alliance or the DLMS User Association there may be a need for separate tests aimed at verifying that integration of the two protocols meets SMETS / CHTS requirements.

206. The Government considers that HAN protocol testing should provide assurance of interoperability and that smart metering functionality is being delivered. The Government notes that some stakeholders consider that further SMETS functionality and multiple device interoperability testing may be necessary. Government welcomes views from stakeholders as to whether this or any other additional layers of assurance are required, either as one-off activities prior to the Mass Roll-out stage or as ongoing activities.

207. Therefore it is proposed that, as a minimum, two certificates will be required as evidence that a device is SMETS/CHTS-compliant: the first will certify compliance with security requirements and the second will certify compliance with the GB Companion Specification.

Government Position

The Government recognises that interoperability is central to the delivery of the business case for smart metering and proposes that governance of SMETS assurance is established within the SEC. One output of the assurance process could be a list of 'approved products' which are permitted to connect to DCC.

Government proposes that, as a minimum, two certificates will be required as evidence that a device is SMETS/CHTS-compliant: a security certificate and a GB Companion Specification certificate.

Consultation Questions	
37.	**Do you agree that interoperability is central to the development of a successful smart metering solution and that activities related to the assurance of SMETS equipment should be governed by SEC? Please provide views on the governance arrangements that would be appropriate for assuring interoperability of smart metering equipment.**
38.	**Do you agree with the creation of an 'approved products' list and that requirement on suppliers and CSPs to obtain, retain and provide evidence of appropriate certification should apply regardless of whether they intend to enrol the equipment in DCC**
39.	**Do you agree that protocol certification (against a GB Companion Specification) should provide adequate assurance that a product will meet interoperability requirements? Please explain your views and identify any additional assurance testing that you consider to be necessary and the rationale for including such testing.**

Interoperability Licence Condition

208. In the Response to Roll-out Consultation, the Government stated that it was minded to introduce an overarching interoperability licence condition to ensure suppliers take all reasonable steps to deliver interoperability of smart metering equipment. However, it indicated that further consideration would be given to this issue as the assurance regime and the dispute resolution processes were developed.

209. The Government continues to expect suppliers to take necessary actions to deliver interoperable systems. However, the Government considers that the proposals presented in this consultation, including those relating to assurance, HAN standards, responsibilities for the communications hub, and operational requirements, should, if introduced, significantly reduce the risk of interoperability issues emerging. Government also acknowledges that it will generally be in suppliers' interests to address issues which might, if left unresolved, lead to consumer dissatisfaction or operational difficulties (e.g. failure to bill the consumer).

210. In addition, following the SEC consultation, the Government is considering introducing within the SEC objectives a requirement to "facilitate interoperability". This would make clear that one of the key objectives of the Code is to support interoperable smart metering systems. It would also ensure that SEC parties can raise modifications that address interoperability concerns and require that the interoperability impacts are considered during all modifications to the Code or associated documents such as the SMETS.

211. In light of these developments, particularly those relating to equipment assurance and certification, the Government is not proposing to introduce an overarching interoperability licence condition at this stage. However, this position will be kept under review as the regulatory framework is finalised and in the light of practical experience.

Government Position

The Government is not proposing to introduce an overarching interoperability licence condition at this stage, but this position will be kept under review.

6. Operational licence conditions

Summary of issue under consideration:

In the Response to Roll-out Consultation, the Government said that it is was minded to introduce requirements on energy suppliers to give consumers, network operators and other third parties access to functionality that is key to delivering benefits to them and to the wider economy. This section considers the nature of these operational requirements and when they should come into force.

Operational requirements for domestic consumers

212. The SMETS have been designed to support delivery of the Programme's business case. To a large extent, the consumer benefits of smart metering depend on changes in energy use, which will in turn be promoted by the access that smart metering can provide to information about historic and real-time energy use[39]. The Government has made clear that, as a matter of principle, consumers should be able to access their own energy consumption data easily, and share it with third parties, should they choose to do so[40].

213. The Government is therefore seeking a high degree of confidence that consumers will have access to the energy consumption and tariff information that smart meters are capable of providing to them, and that suppliers will use smart metering to provide wholly accurate billing.

214. The Government has already taken steps to ensure that customers will have access to energy consumption and tariff information by defining, as part of SMETS, the required functionality of an IHD. These requirements represent the minimum needed to support the business case for smart metering. Suppliers will be required to offer all domestic customers an IHD[41] free of charge, and the Programme expects the IHD to be a key means by which these consumers will interact with the smart meter and the information it can provide. It is thus central to delivering customer benefits.

215. To provide additional confidence that consumers will have full use of the functionality available on the IHD, the Government now proposes that energy suppliers should be required through licence conditions (draft conditions in Annex A) to ensure that domestic consumers can access, free of charge, the full range of IHD functionality, as set out in SMETS, including the additional functions that the IHD must be capable of performing when the meter is operating in prepayment mode. In line with the requirements for

[39] Smart meter roll-out for the domestic sector (GB): Impact assessment. DECC. Revised April 2012.

[40] Consultation on Data access and Privacy. DECC. April 2012. www.decc.gov.uk/en/content/cms/consultations/cons_smip/cons_smip.aspx#data

[41] Government response to the consultation on draft licence conditions and technical specifications for the roll-out of gas and electricity smart metering equipment. DECC April 2012.

providing and maintaining an IHD, this obligation would apply for 12 months following installation of a SMETS-compliant meter.

216. In the Response to Roll-out Consultation the Government concluded that energy suppliers would not be required to display the account balance on the IHD for credit consumers. However, the capability is included in the SMETS so to keep open the option of providing this information to consumers should evidence establish that that the benefits would outweigh the costs of changes to suppliers' billing systems or if suppliers choose to use it.

217. An IHD is one type of consumer access device: smart meters will also be capable of communicating consumption and tariff information to other consumer access devices, including devices supplied by third parties, via the HAN. Information accessed via the HAN in this way could be directly interrogated by consumers or by third parties (if the consumer wished and permitted them to do so). The Government therefore proposes that suppliers should be required to ensure that all consumption, export and tariff information held on the meter is made available, free of charge, over the HAN. Consumers would be able to access this data through consumer access devices which are suitably configured (i.e. they comply with HAN specification). More information on consumer access devices, including options for secure pairing process, is set out in Chapter 4. Such devices would not necessarily be offered by suppliers, but by retailers and other service providers.

218. The Government has already sought views on whether there should be any specific obligations on suppliers to enable consumers to request and obtain directly from their suppliers their energy consumption data, free of charge and in a common format, and is considering the responses to that consultation.

219. With respect to accurate billing, suppliers are already required by licence to take all reasonable steps to reflect any meter reading that they have taken in the next customer bill[42]. Given the efficiency savings that remote meter reading can deliver for suppliers, the Government expects suppliers to use this smart metering capability. Nevertheless, to provide additional confidence that suppliers will use the capability of smart metering to take remote reads, we propose to require energy suppliers to take all reasonable steps to establish and maintain a connection between the meter and the WAN.[43] This requirement is also an essential prerequisite for the operational requirements for SEC parties, discussed below. Ofgem has indicated that, if necessary, it will consider in due course whether anything further is required to ensure that suppliers are using information from smart meters to provide accurate bills.

220. It is proposed that for domestic consumers the operational requirements should apply to any compliant smart meter installation, including SMETS 1 meters installed from the time the operational licence conditions come into effect. Suppliers that gain customers with a smart meter would have to deliver the requirements once the meter had been enrolled with DCC. For all meters, including any that are not enrolled in DCC, energy suppliers

[42] Electricity Supply Licence, Condition 21B. Gas Supply Licence, Condition 21B.

[43] The 'head-end system' is the software used by DCC (or a supplier in the case of meters operated outside DCC) to manage remote inter-actions with smart metering equipment.

would be expected to deliver all the above functionality by the end of Mass Roll-out stage in December 2019.

Operational requirements for non-domestic consumers

221. The benefits of smart metering for non-domestic consumers are broadly the same as for domestic: wholly accurate billing, and the availability of detailed information about energy consumption that can be used to optimise energy use and maximise energy efficiency of buildings or equipment. Micro-businesses consumers[44] may prefer to access information about their energy consumption in ways that are broadly comparable to domestic customers, through an IHD or a consumer access device. However larger businesses, which may have a portfolio of sites or a relatively high level of energy use at single sites, will often have dedicated energy managers who will seek energy advice services, from their energy supplier or third parties, that are designed to meet their needs. Larger businesses are therefore likely to be less dependent on the guaranteed operation of specific smart meter functionality.

222. To support benefits realisation, the Government therefore intends to seek a high degree of confidence around the operation of meter functionality for micro-businesses customers, but not for larger non-domestic customers. This means extending the operational requirements proposed for the domestic sector to micro-businesses, with some exceptions.

223. Suppliers will not be required to offer an IHD to non-domestic customers, so it would not be appropriate to place operational requirements relating to the IHD on suppliers serving micro-businesses. The Government also plans to exempt from the operational requirements micro-business sites with metering arrangements that are opted out of the DCC. Applying requirements to opted out sites could require the use or deployment of technology that would not otherwise be required (for example, a specific communications hub), creating costs that the Government does not consider would be justified given that the customer would have agreed a contract for service provision with the supplier, and would be free to switch to another supplier if a different type of service were required.

224. The Government has previously sought views on whether there is a need for any specific arrangements to enable non-domestic customers to allow third parties to access their data, and whether any such arrangements should apply only to smart meters enrolled in the DCC or more widely, and is considering the responses to that consultation

225. As micro-business customers may have individual supply contracts, before sharing tariff data made available over the HAN with third parties, they would need to ensure that they were meeting the terms of those contracts, including any confidentiality provisions.

[44] 'Micro-business consumer' has the meaning given to it in Standard Condition 7A of the Standard Conditions for Electricity Supply Licences.

Operational requirements for SEC parties

226. The Government proposes that the SEC should include certain operational requirements for energy suppliers to configure smart metering systems so that DCC can offer services, including access to certain information, to SEC parties including Network Operators and Energy Service Companies (ESCOs). This requirement would be placed in the SEC as it will define the services that the DCC must offer to DCC users.

227. This obligation would apply at the point when the meter was enrolled with DCC. Energy suppliers would ensure that smart metering equipment is configured to enable the DCC to offer services that would provide the following information to SEC parties upon request, subject, where appropriate, to consumer consent and any other relevant legislation:

- Power quality information and related log
- Real-time alerts associated with power quality thresholds
- Real time outage management information (interruption and restoration)
- Active 13 month import/3 month export profile data for electricity (kWh) and 13 month consumption data for gas (m3)
- Reactive 3 month import/export profile data for electricity (kWh)
- 6 minute gas consumption log
- Tariff information (including all tariff information used for billing purposes).

228. The Government is considering the most effective way in which operational requirements would be set out in the SEC. One approach would be to ensure that provision of the information listed above was available as a core service to DCC users. This would be subject to policies on third party access to data (as discussed above) and the exceptions that have been proposed.

229. The obligation would apply to domestic smart metering systems that have not been enrolled with DCC by the end of 2019. The Government is considering, as part of its consultation on data access and privacy, whether non-domestic smart meters opted out of DCC should be required to provide information of the kind listed above to SEC parties.

Government position
The Government proposes to introduce licence conditions to ensure that domestic consumers can access, free of charge, the full range of IHD functionality, as set out in SMETS. For domestic consumers and micro-businesses enrolled in the DCC, it proposes that energy suppliers should ensure that all consumption, export and tariff information held on the meter is made available over the HAN and that suppliers take all reasonable steps to establish and maintain a WAN connection between the meter and the 'head-end system'. Larger non-domestic installations and other non-domestic meters not enrolled in the DCC will not be subject to these operational licence conditions. **The Government proposes that these requirements should apply to the installing supplier from the time the operational licence conditions come into effect. Energy suppliers that gain customers with a smart meter would have to deliver the requirements once the meter had been enrolled with DCC or for domestic consumers not enrolled in the DCC, by the end of December 2019.** **The Government also proposes that energy suppliers should be required through the SEC to configure smart metering systems enrolled in the DCC so that the DCC can offer services to other SEC parties. The obligation would also apply to domestic smart metering systems that have not been enrolled in the DCC by the end of 2019.**

Consultation Questions	
40.	**Do you agree with the Government's proposals to require energy suppliers to operate specific aspects of smart metering equipment functionality for domestic consumers? Please provide rationale to support your position.**
41.	**What are your views on the Government's proposals to require energy suppliers to operate specific aspects of smart meter equipment functionality for micro-business, but not other non-domestic, customers?**
42.	**Do you agree that the licence conditions as drafted effectively underpin the Government's policy intentions for consumer operational requirements?**
43.	**What are your views on the Government's proposals for obligations to be included in the SEC for information to be made available to Network Operators and ESCOs via the DCC?**
44.	**Do you agree with the Government's proposals for the timing of the introduction of operational requirements? Please explain your reasoning.**

7. Next Steps

Summary of issue under consideration:

This section sets out how the Government plans to progress towards the next version of the SMETS and the transfer of responsibility for the SMETS to the SEC.

Regulatory framework

230. This consultation introduces the key additional requirements that are being proposed for inclusion in future versions of the SMETS and the wider smart metering regulatory framework. The Government intends to continue to work with stakeholders during the consultation period and consider the formal responses received to the consultation before presenting its decisions on these issues in a Government response document.

231. The decisions will also need to be reflected in the most appropriate part of the regulatory framework, which in most instances will be in a new version of the SMETS. The Government intends to publish an initial version of SMETS 2 alongside the Government response. However, in some instances the wider regulatory framework will also be affected. In addition, the Government is considering the most appropriate stage in the development process of SMETS 2 that any necessary notifications should be undertaken (as per the requirements of the Technical Standards and Regulations Directive).

232. The following summarises how the Government proposes to introduce its consultation decisions:

- **Wireless HAN requirements (application and physical layers)** – initially, SMETS 2 would state the HAN application and physical layers that the smart metering equipment must be capable of utilising for wireless communications within the premises. Then, once it is available (Q3 2013[45]), the SMETS will further require that smart metering systems are compliant with a wireless HAN GB Companion Specification (initially 2.4 GHz only, the 868 MHz companion specification should be available by late 2014[46]). These GB Companion Specifications will detail the elements of the ZigBee SEP / DLMS protocols to be used to deliver the SMETS 2 functional requirements. Proposals for a wired HAN solution will be consulted on at a later stage, with detailed requirements including the GB Companion Specification for a wired HAN, likely to be available by late 2014[47].

[45] Based on information from stakeholders this is the date when it is expected that a GB Companion Specification would be adopted formally as a 'profile' within ZigBee.

[46] This date is based on estimates provided by stakeholders

[47] This date is based on estimates provided by stakeholders and was caveated as being the earliest date when such a Companion Specification might be available.

- **DNO requirements** – the Government proposes that these requirements, which build on those included in the first version of the SMETS, would be added to electricity smart metering requirements in SMETS 2.

- **Prepayment interface device** (PPMID) – it is proposed that a new section is included in SMETS 2 to describe the functional and other requirements that a PPMID must comply with, although the provision of such a device would remain optional. In addition, requirements would also need to be added to the communications hub specifications to build in the functionality to support a PPMID.

- **Additional interface requirements** – the Government proposes that the additional interface and functional requirements to facilitate the connection and operation of variant electricity meters, CADs and HHTs would be reflected in the CHTS.

- **Communications Hub specification** – if it is decided that the CSPs should be responsible for the procurement of communications hubs, the Government intends to apply these requirements through DCC licence conditions and an associated CHTS. It would then be for the DCC to dispense these requirements through its contracts with the CSPs. The CHTS would take a similar form to the SMETS requirements and would include the minimum physical, functional, interface and data requirements that would need to be provided by the CSP communications hubs (requirements that are in the first version of the SMETS relating to WAN communications and other communications hub functionalities would be removed in SMETS 2) . In addition, the supplier roll-out licence conditions would need to be changed to require that suppliers install a communications hub provided by the relevant CSP as part of their installation of a smart metering system in a consumer's premises (with exemptions for non-domestic suppliers as necessary). This framework may also need to reflect the maintenance requirements on suppliers with regard to the communications hub, but it would be more appropriate for any detailed provisions to be made elsewhere in the SEC. Alternatively is the suppliers-led model for communications hub responsibilities is adopted, the CHTS would be incorporated into SMETS.

- **Equipment assurance and certification** – the first certification technique proposed is the requirement for smart metering equipment to comply with the GB Companion Specification. The arrangements for testing of equipment against the GB Companion Specification should be confirmed as part of the process of it being adopted by ZigBee (expected to be Q3 2013, as above). Secondly the Government proposes that equipment should be subject to independent security certification in order to confirm its compliance with the security requirements defined in SMETS. This overarching requirement would be included in the SMETS. The details of the testing regime - the 'security characteristics' which are capable of verification by an independent testing laboratory – require further development and are expected to be published in early-2013.

233. The Government intends to publish an updated version of the SMETS and the CHTS alongside the Government response and at the same time notify these documents, with the relevant licence conditions, to the European Commission. A further update, and notification to the European Commission, is planned for later in 2013 including the 2.4 GHz GB Companion Specification and the equipment and security assurance and

certification provisions. The timing of this notification will be dependent on adoption of the GB Companion Specification by ZigBee.

234. Successful completion of these notifications should enable the Government to confirm the requirements that will be placed on suppliers, the DCC (including the CSP communications hub requirements) and other appropriate parties regarding the SMETS 2 generation of smart meters. While further development time may be required before all elements of the equipment are available for installation, any gas or electricity metering equipment that is compliant with SMETS 2 would be compatible with a CSP communications hub, even if the initial installation did not include this device.

235. The Government will continue to work in conjunction with industry to further develop the 868 MHz GB Companion Specification and wired HAN solution requirements. Based on input from industry, it is anticipated that these requirements could be reflected in the SMETS and notified to the European Commission by late 2014.

Equipment availability

236. There will be a lead time between when policy decisions are taken, technical specifications prepared (and notifications completed) and when new meters are available for installation. The lead times may vary depending on the scale of development needed and the party that has responsibility for delivering it. The following provides a summary of the Government's understanding of equipment availability timescales, which has been informed by discussions with industry stakeholders.

237. Although the 2.4 GHz GB Companion Specification will not be available until Q3 2013, the nature of the development process is such that the lead time for equipment that is certified as compliant with the specification should not be significant. Similarly, as the DNO, hand-held terminal, PPMID and meter variants requirements could be considered as technologically straightforward, and in many instances are only an extension of SMETS 1 requirements, equipment that delivers these requirements could be available in late 2013. As proposed earlier, equipment will be required to be compliant with the proposed security assurance regime. The design and establishment of this assurance regime should be completed in 2013, enabling the first tranche of product testing to be completed by early 2014.

238. The Government intends that the CSPs will be appointed in Spring 2013. The CHTS should be available by this stage, so the CSPs should be able to begin the development of communications hubs, albeit they may be reliant on adoption of the GB Companion Specification by ZigBee to complete their design. The Government is currently involved in dialogue with potential CSPs, including on the possible development time for communications hubs. It is currently assumed that these communications hubs should be available for testing and trialling in early to mid-2014 and at scale in late 2014, which would coincide with the start of the mass roll out stage.

239. As described above, indications from industry stakeholders suggest that SMETS 2 gas and electricity meters that have been through the security and HAN protocol certification processes should be available in early 2014. It is possible that a somewhat longer lead time may be required for the CSP-supplied communications hubs. At an appropriate time, taking into account equipment availability and lead in time, the Government will introduce the requirement to only install SMETS 2 compliant equipment. This will be

achieved by the Secretary of State designating SMETS 2 as per the requirements in the roll-out licence condition. From this point, or following a period of notice to allow suppliers to manage the transition, only meters that meet SMETS 2 requirements should be installed, but the installed population of SMETS 1 meters would continue to count towards the roll-out obligations.

240. At this stage, the Government considers that SMETS 2 equipment installed ahead of the formal designation of the new requirements will satisfy suppliers' roll-out obligations, as this equipment will also satisfy the SMETS 1 requirements (SMETS 2 adds to rather than fundamentally changes the requirements of SMETS 1).

241. The Government expects that SMETS 2 metering devices, including the CSP-supplied communications hubs, will be available for the testing and trialling of the end-to-end smart metering system. The Government is currently developing its proposals for end-to-end testing and trialling, which it will publish shortly.

Consultation Questions	
45.	**Do you agree with the proposed changes to the smart metering regulatory framework to reflect the CSP-led model for communications hub responsibilities? Are any other changes necessary?**
46.	**Do you agree that the equipment development and availability timelines are realistic? Please give evidence.**
47.	**Do you agree that SMETS 2 should only be designated when the Government has confidence that equipment to satisfy the new requirements is available at scale? Should a further period of notice be applied to ensure suppliers can manage their transition from SMETS 1 to SMETS 2 meters?**

Transfer of SMETS to SEC governance

Ongoing Governance

242. In the Response to Roll-out Consultation, the Government confirmed its intention, that the SMETS should be governed under arrangements to be specified in the SEC and that detailed governance arrangements would be developed and consulted upon.

243. The Government considers that placing the responsibility for the ongoing management of the SMETS under the governance of the SEC would be in line with the approach taken by comparable industry codes. This would provide a more formalised and explicit governance structure involving stakeholders, and an opportunity for the provisions of the SMETS to be contractually enforced. It would also be consistent with the proposed introduction of a SMETS certification, assurance and enforcement framework in the SEC.

Determining when the SMETS will be transferred to the SEC

244. It is proposed that responsibility for the SMETS modifications process should be transferred from the Programme to the SEC as soon as it is practicable to do so. However, the Government proposes that the precise timing of the transfer should be subject to a number of milestones being reached in order to provide sufficient confidence that the Government's objectives for smart metering will be met. These milestones would include:

- A version of SMETS having been completed which reflects the major policy decisions that need to be taken to deliver the Programme's business case
- SEC governance structures having been put in place which are in a sufficiently robust state to manage the process for SMETS modifications efficiently

Governance arrangements for SMETS in the SEC

245. The Government has already consulted upon the general arrangements for modifications under the SEC (for example, who can propose changes and how they will be approved) but noted that special provisions may apply to the SMETS[48]. Given their technical nature, the Government believes proposed modifications to the SMETS should be assessed by a technical sub-committee within the SEC, which would report (in an advisory capacity) to the SEC panel. There are at least two options on the form that this sub-committee could take:

OPTIONS

Option 1: A standing sub-committee with responsibility for both SMETS modification and assurance.
Modifications would be assessed by a standing sub-committee with responsibility for broader SMETS governance issues including assurance and certification. These areas are likely to be inter-related and will call on particular technical knowledge.

Option 2: A non-standing sub-committee convened as necessary when modifications to SMETS are proposed.
The remit of this sub-committee would be limited purely to SMETS modifications. Relevant expertise would be called upon when required, as SMETS modifications would not be expected to be carried out on a frequent basis.

246. SMETS modifications should also be considered by the technical sub-committee responsible for security matters, where appropriate.

[48] Smart Energy Code consultation (April 2012).
http://www.decc.gov.uk/en/content/cms/consultations/cons_smip/cons_smip.aspx#code

247. As with other modifications to the SEC, modifications to the SMETS will be assessed against the relevant SEC Objectives which the Government consulted upon in April 2012 in its consultations on the SEC and DCC licence conditions. The Government is considering the responses to these consultations. In formulating the relevant Objectives for the SEC, the Government will take into account the need to allow for modifications to be raised to the SMETS relating to factors including technological innovation, security issues and the needs of consumers and other users of smart metering services.

Consultation Questions	
48.	**What are your views on when responsibility for the SMETS modifications process should transfer from the Government to the SEC?**
49.	**Which of the options (standing sub-committee or non-standing sub-committee) would you prefer in relation to modifications to the SMETS?**
50.	**Are there any particular areas of expertise that the sub-committee will need to fulfil its role, in terms of membership composition?**

Glossary

Advanced Meter
A meter which, either on its own or with an ancillary device, stores measured electricity or gas consumption data for multiple time periods, and provides remote access to such data by the licensee.

Ambient display/feedback
The representation of information in a form that can be perceived at a glance, for example by colour coding.

Authorised Device
A device that is permitted, under the governance arrangements put in place for smart metering equipment, to be attached to the Home Area Network.

Auxiliary Load Control Switch
A component that can close or open (including on receipt of a Command to that effect) to enable or disable the flow of electricity to/from a specific circuit within the consumer's premises (e.g. a circuit to supply storage heaters)

Communications Hub
A device located at the consumer's premises which will have the capability to communicate and transfer data between smart metering equipment and the smart metering WAN

Communications Service Provider (CSP)
Bodies awarded a contract to be a service provider of the DCC's communications services.

Consumer Access Device
A device which locally retrieves and uses the consumption and tariff information available from the smart metering system to provide energy-related data and services to the consumer.

Credit Mode
A mode of operation whereby consumers are generally billed for their energy use retrospectively.

Data and Communications Company (DCC)
The new entity that will be created and licensed to deliver central data and communications activities.

Device Language Message Specification (DLMS)
An Application Layer protocol.

Distribution Network Operators (DNOs)
Companies that are licensed to take electricity off the high-voltage transmission system and distribute it, over low-voltage networks, to consumers.

End-to-end Smart Metering System
The End-to-end Smart Metering System covers all relevant equipment, communication links and connections from every consumer premises through the DCC to suppliers, DNOs and authorised third-parties.

Energy Service Company (ESCO)
A professional organisation, scheme or trust that delivers energy services and/or other energy efficiency improvement measures in a consumer's facility or premises.

Export
The flow of electricity out of the consumers' premises.

Export Meter
A meter which measures the quantity energy of exported.

Firmware
Software that is embedded in devices for the purpose of controlling that device. It cannot be changed under the normal operation of the device in which it resides.

Foundation stage
The period prior to the start of the Mass Roll-out stage.

HAN Application Layer
The HAN application layer defines the content of messages sent between smart metering devices within a consumer's premises and the way in which they are presented

HAN Physical Layer
The HAN physical layer is the transport layer which defines the physical communications interface and the methods by which data packets are transmitted and validated.

Handheld Terminal
A portable device designed to interact with the smart metering devices during the installation or maintenance of equipment.

Home Area Network (HAN)
The Home Area Network is the means by which communication between Smart Meters, IHDs and other smart metering devices in premises is affected.

In-Home Display (IHD)
An electronic device, linked to smart metering system, which provides information on a consumers energy consumption.

Interoperability
The ability of diverse systems, devices or organisations to work together (interoperate).

Mass Roll-out stage
The period between the date at which the DCC starts providing core communications services and the fulfilment of the roll-out obligation as specified in the roll-out licence conditions.

Microgeneration Meter
An instrument used to measure microgeneration (as such term is defined in Section 82 of the Energy Act 2004), for example from photovoltaic cells, and which is designed to communicate with the electricity smart metering system via its HAN interface.

Network Operators
The companies that are licensed by Ofgem to maintain and manage the electricity and gas networks in Great Britain. (principally Distribution Network Operators and Gas Transporters).

Outage detection
The ability for an electricity supply interruption to be identified and reported to a DNO via the smart metering WAN.

Polyphase Meter
A meter that can measure more than one phase of electrical supply.

Prepayment Interface Device
A device, physically separate to the electricity or gas meter, which provides functionality to facilitate the use of prepayment services by consumers.

Prepayment Mode
The mode of operation whereby customers generally pay for their energy before using it.

Smart Energy Code (SEC)
The Code, spanning gas and electricity, which will be established to provide arrangements for the introduction and ongoing operation of the End-to-end Smart Metering System. Among other things, the Code will detail the relationships between the DCC and the users of its data and communications services. Suppliers, network operators and other users of the DCC's services will need to comply with the Code.

Smart Grid
Building a ‘smarter’ grid is an incremental process of applying information and communications technologies (ICTs) to the electricity system, enabling more dynamic ‘real-time’ flows of information on the network and more interaction between suppliers and consumers.

Smart-type meters
Smart-type meters offer some of the functionalities included in the SMETS, and so deliver some benefits for consumers and the Programme more broadly, but are not fully compliant with the SMETS.

WAN Module
The WAN Module maintains the Communications Hub's connection to the WAN and manages the transfer of messages between them, including authentication, integrity checking and message error handling.

Wide Area Network (WAN)
The network that is used for two way communication between smart metering systems in consumers’ premises and the DCC.

ZigBee
An application layer standard, administered by the ZigBee Alliance

Annex A - Draft licence conditions

Electricity Supply Licence - Condition RR: Smart Metering Systems and In-Home Displays – Operational Requirements

Application

1 This Condition applies in respect of Smart Metering Systems installed at Domestic Premises and at Designated Premises of Micro-Business Consumers (the **relevant premises**).

Smart Metering System – Operational Requirement

2 The licensee must take all reasonable steps to ensure that where there is a Smart Metering System installed at the relevant premises that Smart Metering System is configured to operate in such a manner as to comply with the requirements of paragraphs 3 and 4.

3 The requirement of this paragraph is that there is established a Communications Link:

(a) between the Smart Metering System and the licensee's Head End System, across a WAN Interface; and

(b) between the Smart Metering System and either the IHD or any other Consumer Device at the relevant premises, across a HAN Interface.

4 The requirement of this paragraph is that the Domestic Customer or the Micro-Business Customer (as the case may be) can, at any time and in the case of the Domestic Customer free of charge, access by means of a suitably-configured Consumer Device at the relevant premises any information that:

(a) is capable of being stored in or held by the Smart Metering System (or any part of it);

(b) the Smart Metering System (or any part of it) is capable of sending to the Consumer Device; and

(c) is of a type set out in paragraph 9 (**Customer Information**).

5 The obligation in paragraph 2 is subject to paragraphs 6 and 7.

Commencement of Operational Requirement – Premises of Micro-Business Consumers

6 The obligation in paragraph 2 does not apply in respect of a Smart Metering System at a Designated Premises of a Micro-Business Consumer where that Smart Metering System is not enrolled into the Smart Metering Inventory in accordance with the Enrolment Service provided by the holder of the DCC Licence.

Commencement of Operational Requirement – Domestic Premises

7 Subject to paragraph 8, the obligation in paragraph 2 does not apply in respect of a Smart Metering System at Domestic Premises where that Smart Metering System was not installed or arranged to be installed by the licensee.

8 The exception in paragraph 7 applies only until the earlier of:

(a) the date that the Smart Metering System installed at the relevant premises is enrolled into the Smart Metering Inventory in accordance with the Enrolment Service provided by the holder of the DCC Licence; or

(b) 31 December 2019.

Customer Information

9 Customer Information is any information which provides details of or relates to any one or more of the following:

(a) the quantity of electricity measured by the Electricity Meter as having been supplied by the licensee to the customer at the relevant premises;

(b) where applicable, the quantity of electricity measured by the Export Meter as having been Exported from the relevant premises or an installation at the relevant premises onto a distribution system or transmission system;

(c) the customer's tariff, including the standing charge (where applicable) and the unit rate (expressed where applicable in pence per kWh), used to calculate the Charges for the Supply of Electricity;

(d) where the Electricity Meter forming part of the Smart Metering System is a Prepayment Meter:

(i) the amount of credit (by reference to sums of money) that at any given time remains available for use by the customer;

(ii) the amount of Outstanding Charges, if any and by reference to sums of money, being recovered through calibration of the Prepayment Meter, the level of such Outstanding Charges, and the period within which such Outstanding Charges are to be recovered.

In-Home Display – Operational Requirement

10 The licensee must ensure that any In-Home Display it provides to a Domestic Customer at a Domestic Premises pursuant to its obligations in Condition BB is during the Relevant Period configured to operate in such a manner as to comply with the requirement of paragraph 11.

11 Subject to paragraph 12, the requirement of this paragraph is that the Domestic Customer can, at any time during the Relevant Period and free of charge, access by means of the In-Home Display all information:

(a) which is communicated to it from the Smart Metering System across the HAN Interface; and

(b) which the In-Home Display is required to be capable of displaying in accordance with the requirements of the IHD Technical Specification applicable at the date of its provision.

12 Except where the Electricity Meter forming part of the Smart Metering System is a Prepayment Meter, the In-Home Display need not be configured to operate so as to enable the Domestic Customer to access information which provides details of or relates to:

(a) the amount of credit (by reference to a sum of money) that may be, or is, available to the Domestic Customer; or

(b) Outstanding Charges.

Definitions and Interpretation

13 For the purposes of this Condition:

(a) each of the terms 'Communications Link', 'Consumer Device', 'HAN Interface', 'Head End System' and 'WAN Interface' has the meaning given to that term from time to time in the SME Technical Specification; and

(b) each of the terms 'Enrolment Service' and 'Smart Metering Inventory' has the meaning given to that term from time to time in the DCC Licence.

DCC Licence	means the Licence for the Provision of a Smart Meter Communication Service granted pursuant to sections 7AB(2) and (4) of the Gas Act 1986 and sections 6(1A) and (1C) of the Electricity Act 1989.
Micro-Business Consumer	has the meaning given to it in Standard Condition 7A of the Standard Conditions for Electricity Supply Licences.
Relevant Period	means in respect of a Smart Metering System installed on or after the Smart Metering Designated Date, the period which commences on the date on which the Smart Metering System is installed at the relevant premises and ends 12 months after that date.

Gas Supply Licence - Condition RR: Smart Metering Systems and In-Home Displays – Operational Requirements

Application

1 This Condition applies in respect of Smart Metering Systems installed at Domestic Premises and at Designated Premises of Micro-Business Consumers (the **relevant premises**).

Smart Metering System – Operational Requirement

2 The licensee must take all reasonable steps to ensure that where there is a Smart Metering System installed at the relevant premises that Smart Metering System is configured to operate in such a manner as to comply with the requirements of paragraphs 3 and 4.

3 The requirement of this paragraph is that there is established a Communications Link:

(a) between the Smart Metering System and the licensee's Head End System, across a WAN Interface; and

(b) between the Smart Metering System and either the IHD or any other Consumer Device at the relevant premises, across a HAN Interface.

4 The requirement of this paragraph is that the Domestic Customer or the Micro-Business Customer (as the case may be) can, at any time and in the case of the Domestic Customer free of charge, access by means of a suitably-configured Consumer Device at the relevant premises any information that:

(a) is capable of being stored in or held by the Smart Metering System (or any part of it);

(b) the Smart Metering System (or any part of it) is capable of sending to the Consumer Device; and

(c) is of a type set out in paragraph 9 (**Customer Information**).

5 The obligation in paragraph 2 is subject to paragraphs 6 and 7.

Commencement of Operational Requirement – Premises of Micro-Business Consumers

6 The obligation in paragraph 2 does not apply in respect of a Smart Metering System at a Designated Premises of a Micro-Business Consumer where that Smart Metering System is not enrolled into the Smart Metering Inventory in accordance with the Enrolment Service provided by the holder of the DCC Licence.

Commencement of Operational Requirement – Domestic Premises

7 Subject to paragraph 8, the obligation in paragraph 2 does not apply in respect of a Smart Metering System at Domestic Premises where that Smart Metering System was not installed or arranged to be installed by the licensee.

8 The exception in paragraph 7 applies only until the earlier of:

(a) the date that the Smart Metering System installed at the relevant premises is enrolled into the Smart Metering Inventory in accordance with the Enrolment Service provided by the holder of the DCC Licence; or

(b) 31 December 2019.

Customer Information

9 Customer Information is any information which provides details of or relates to any one or more of the following:

(a) the quantity of gas measured by the Gas Meter as having been supplied by the licensee to the customer at the relevant premises;

(b) the customer's tariff, including the standing charge (where applicable) and the unit rate (expressed where applicable in pence per kWh), used to calculate the Charges for the Supply of Gas;

(c) where the Gas Meter forming part of the Smart Metering System is a Prepayment Meter:

(i) the amount of credit (by reference to sums of money) that at any given time remains available for use by the customer;

(ii) the amount of Outstanding Charges, if any and by reference to sums of money, being recovered through calibration of the Prepayment Meter, the level of such Outstanding Charges, and the period within which such Outstanding Charges are to be recovered.

In-Home Display – Operational Requirement

10 The licensee must ensure that any In-Home Display it provides to a Domestic Customer at a Domestic Premises pursuant to its obligations in Condition BB is during the Relevant Period configured to operate in such a manner as to comply with the requirement of paragraph 11.

11 Subject to paragraph 12, the requirement of this paragraph is that the Domestic Customer can, at any time during the Relevant Period and free of charge, access by means of the In-Home Display all information:

(a) which is communicated to it from the Smart Metering System across the HAN Interface; and

(b) which the In-Home Display is required to be capable of displaying in accordance with the requirements of the IHD Technical Specification applicable at the date of its provision.

12 Except where the Gas Meter forming part of the Smart Metering System is a Prepayment Meter, the In-Home Display need not be configured to operate so as to enable the Domestic Customer to access information which provides details of or relates to:

(a) the amount of credit (by reference to a sum of money) that may be, or is, available to the Domestic Customer; or

(b) Outstanding Charges.

Definitions and Interpretation

13 For the purposes of this Condition:

(a) each of the terms 'Communications Link', 'Consumer Device', 'HAN Interface', 'Head End System' and 'WAN Interface' has the meaning given to that term from time to time in the SME Technical Specification; and

(b) each of the terms 'Enrolment Service' and 'Smart Metering Inventory' has the meaning given to that term from time to time in the DCC Licence.

DCC Licence	means the Licence for the Provision of a Smart Meter Communication Service granted pursuant to sections 7AB(2) and (4) of the Gas Act 1986 and sections 6(1A) and (1C) of the Electricity Act 1989.
Micro-Business Consumer	has the meaning given to it in Standard Condition 7A of the Standard Conditions for Gas Supply Licences.
Relevant Period	means in respect of a Smart Metering System installed on or after the Smart Metering Designated Date, the period which commences on the date on which the Smart Metering System is installed at the relevant premises and ends 12 months after that date.

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