Department of Energy & Climate Change

Smart Metering Implementation Programme

Government Response to the Consultation on the second version of the Smart Metering Equipment Technical Specifications

Part 1

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1. Executive summary

1 In August 2012, the Government launched a consultation on the second version of the Smart Metering Equipment Technical Specifications (SMETS 2). The consultation sought views on a range of issues to be addressed through an updated version of the SMETS, as well as on governance and assurance of security and interoperability; on operational licence conditions; and on the next steps for SMETS 2.

2 The consultation comprised 50 questions on the above topics. Analysis of responses to 16 of these questions is now complete, and the Government's conclusion to each is published in this, Part 1, of its Consultation Response.

3 Eleven of these questions have been addressed in order to notify the first iteration of SMETS 2 to the European Commission in parallel to the publication of this response, and thus facilitate availability of the next generation of GB smart metering equipment. The remaining five questions addressed in this first response relate to the Operational Requirements on data provision to be introduced into energy supply licences.

4 Detailed work to assess the submissions for the remaining 34 questions is ongoing. Part 2 of the Consultation Response, which is not expected to include decisions which impact on the decisions taken here, will cover the Government's conclusions to these outstanding questions, and is expected to be published later in Spring 2013.

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

5 The first version of SMETS (SMETS 1) was published in April 2012 to facilitate the Foundation stage of the Smart Metering Implementation Programme. It was subsequently notified to the European Commission, together with roll-out licence conditions, and designated on 18 December 2012.

6 The August consultation sought views on extensions to be introduced into an updated version, SMETS 2, including standards for communication between devices, and additional functionality. It also sought views on responsibility for the communications hub.

Communication between devices

7 Interoperability is at the heart of the Smart Metering Implementation Programme, both to support interconnection of equipment in the home, and the Change of Supplier (CoS) process. Interoperability requires that standards are specified for both the application and physical layers of Home Area Network (HAN).

8 Most respondents were strongly supportive of the application layer criteria and the proposal to adopt ZigBee Smart Energy Profile (SEP) version 1 and Device Language Message Specification / Companion Specification for

Energy Metering (DLMS / COSEM[1]) as standards for the HAN application layer. Some respondents noted a preference for the emerging IP-based ZigBee SEP version 2. However, version 2, with the required extensions for the GB market, will not be available within the required timescales for smart meter mass rollout.

9 The bulk of respondents agreed that equipment should be required to comply with the SMETS, and with a GB Companion Specification, setting out how these application protocols will be used with SMETS in the GB market. The first iteration of SMETS 2 is being notified to the European Commission in parallel to the publication of this response, and the GB Companion Specification is expected to be notified in Autumn 2013 following development with industry and protocol bodies.

10 The consultation sought views on the radio frequencies to be adopted as the HAN physical layer, and on the criteria used to determine the choice. Most respondents were strongly supportive of a model which will support both solutions based on 2.4GHz, and solutions based on 868MHz, notwithstanding the potential roll-out complexities inherent in such a approach. Meter manufacturers are confident that equipment incorporating a 2.4GHz based solution will be available in early 2014, and will achieve at least 70% coverage of GB consumers. An 868MHz based solution is expected to provide coverage of over 95% of consumers (the balance requiring a wired HAN solution).

11 Respondents agreed that an 868MHz solution is likely to require a number of years to be developed. In the light of this, 2.4GHz will initially be adopted as a HAN standard: it should be available in full in the next year and thus meets programme timescales, is established, and by being available soonest offers early benefits. However, subject to the development of application standards, the Government intends that an 868MHz solution will be included in a future version of the SMETS.

Responsibility for the communications hub

12 The consultation sought views on responsibility for procurement and provision of the communications hub. The communications hub will interconnect the Wide Area Network (WAN), which is provided by the Communications Service Providers (CSPs), and the HAN (and associated smart metering devices) provided by the energy supplier.

13 The majority of respondents supported the Government's preference for a CSP-led model, based on an assessment of technical integration, operational effectiveness and value for money. Energy suppliers noted that this model should offer clarity of responsibility for communications, reduce issues relating to technical interoperability, reflect suppliers' own lack of experience and / or funding in this area, and simplify business processes, particularly in the areas of installation and change of supplier.

14 In addition, analysis of the responses to the Invitation to Supply a Detailed Solution (ISDS) received from potential CSPs confirms they are able, in

[1] Henceforth referred to as DLMS in this document

principle, to support a CSP-led model. On the basis of responses to the consultation and to the ISDS, and further analysis by the Government, the CSP-led model will be adopted for communications hub responsibilities, subject to successful contractual agreement with the DCC / CSPs. From a date to be determined, in light of equipment availability and with appropriate notice, installations will have to include a CSP-provided communications hub in order to be compliant with the roll-out licence condition.

15 Suppliers raised a number of concerns over the 'costs lie where they fall' principle set out in the consultation, designed to avoid complex recharging arrangements for installation and maintenance. They were particularly concerned that a model which places the costs of repair and replacement on suppliers may not incentivise the CSP to procure equipment that is fit for purpose. The Government intends to include requirements in both the CSP contract, and in the Smart Energy Code (SEC), to address these concerns.

Additional functionality for SMETS 2

16 The consultation sought views on the requirements for a range of additional capabilities to be considered for inclusion in SMETS 2. In the light of strong support for each, the Government will adopt its position as set out in the consultation on the following SMETS 2 functionality:

- Maximum demand registers will be included in SMETS 2 meters – two to record maximum import demand, and a third for maximum export level; and
- SMETS 2 will support 'variant' electricity meters which include auxiliary load control switches, boost buttons, multiple measuring element meters and polyphase supplies.

17 In addition, the Government proposed in the consultation that SMETS 2 electricity meters should not include configurable voltage alert counter thresholds. Instead, DNOs would be able to subscribe to alerts, counters and event logs to support back office analysis. Respondents strongly supported this approach, which will be reflected in SMETS 2.

18 Smart grid operations offer DNOs the potential for remote enablement and disablement of meters. The consultation sought views on whether the logic to control such operations should be included in the meter, or built into the DCC's systems.

19 No significant evidence was offered in favour of either option, and the Government notes the arguments that both approaches are technically feasible.

20 Many respondents questioned whether DNOs should have access to such functionality at all. The Government recognises that regulatory, technical, operational and commercial issues remain to be resolved in this area.

21 The Government has concluded that evidence to determine the location of the control logic for remote disablement is extremely limited, nor is there any driver for an immediate decision. Instead, further consideration of this choice should be included in any future discussions on the wider issue of DNO access to remote disablement.

22 The consultation sought to establish whether a randomisation offset capability for auxiliary load control switches and registers should be included in SMETS 2, to facilitate load switching over a defined period, and thus enhance the overall stability of the electricity grid.

23 The proposal was strongly supported, and the following capabilities will be included in SMETS 2:

- Randomisation of on/off switching of auxiliary load control switches;
- Randomisation of switching between registers (i.e. of price changes); and
- The ability to align auxiliary load switching with the switching between registers.

24 Consumer groups noted the potential for customer confusion in this area, particularly in the calculation of the randomisation offset limit and how it will be applied. Clarity of communication will be needed to address this. The Government will also continue to work with industry to determine a starting randomisation offset limit.

Remaining SMETS 2 questions

25 Analysis of responses and the issues arising from the remaining 19 of the 30 questions included under the SMETS 2 heading in the consultation document is ongoing. Some significant issues remain outstanding, including development and implementation of the 868MHz frequency for the HAN physical layer, issues relating to the design of, and regulatory framework for the communications hub, and the specification of the PPMID and HHT interface

26 The publication of any decision in Part 1 of the Consultation Response must not set precedent for, nor prejudice, analysis of the remaining issues, and their publication in Part 2. The Government is satisfied that it has completed sufficient work on these issues to demonstrate that the publication of the first iteration of SMETS 2 is not dependent on, and can thus proceed in advance of, their resolution. In particular, the Government is satisfied that:

- the outstanding work on the 868MHz frequency as a standard for the HAN physical layer is independent of the decision set out in this document to proceed with a 2.4GHz based solution in the interim;
- CSPs will be responsible for the communications hubs. The outstanding matters relating to the design and operation of communications hub will be addressed in the remainder of the procurement process for the CSPs, and in the Communication Hub Technical Specification (CHTS). This document is planned to be notified in Autumn 2013;
- work on the specification of an intimate interface between the electricity meter and the communications hub is progressing in conjunction with industry, and can be incorporated into SMETS 2 and the CHTS as appropriate in due course;
- the provisions for Prepayment Meter Interface Devices (PPMIDs) and devices for installation and maintenance – including Handheld Terminals (HHTs) – and their associated interfaces included in SMETS 2, will support the further development of these devices by the market; and

- several options exist for pairing Consumer Access Devices (CADs) with the communications hub. The Government continues to assess these (particularly in terms of the consumer experience, and security), but is confident that none are likely to result in any further amendments to SMETS 2.

Governance and Assurance

27 The Government intends to continue to establish a mandatory independent security certification scheme to ensure compliance with the security requirements for smart metering equipment. This will apply to SMETS 2 equipment, but any equipment which meets the SMETS 1 specifications may also be certified through this scheme as a means of demonstrating eligibility, on security grounds, for enrolment into the DCC. Further information on this, and on other aspects of the governance and assurance of security and interoperability, will be addressed in Part 2 of the Consultation Response.

Operational Requirements

28 The consultation included proposals to introduce licence conditions and SEC requirements on suppliers to ensure consumers can access key data over the HAN and that SEC parties can receive services of value to them via the DCC. This is important in enabling the delivery of the benefits of smart metering. Draft operational licence conditions to require energy suppliers to make data available to consumers were published as part of the consultation. Proposals to require energy suppliers to make data and services available to SEC parties were also presented.

29 Responses to the consultation generally supported the Government's proposals, although a number of points were raised about the policy and the draft licence conditions. Concerns included the extent to which energy suppliers would be able to meet the proposed requirements in respect of SMETS 1 Smart Metering Systems. Consumer groups argued that additional functionality, including the display of the account balance, should be made available to consumers. Some comments were also made on issues relating to the timing of the introduction of the proposed operational requirements.

30 The Government intends to proceed with the implementation of operational requirements broadly as set out in the consultation, but will consider how greater clarity can be provided on the obligations on energy suppliers under the licence conditions. The Government also intends for data to be made available to SEC parties through DCC communications services that will be governed under the SEC. The Government believes that operational requirements will help ensure that the benefits of smart metering will be realised.

Impact Assessment

31 An updated Smart Meter Implementation Programme Impact Assessment is published alongside this consultation response document. The IA reflects the latest available evidence as well as policy decisions taken following the consultation.

Next Steps

32 In parallel to the publication of this document, the Government will also notify the first iteration of SMETS 2 to the European Commission, as required by the Technical Standards and Regulations Directive. After notification to the Commission, a standstill period of three months will apply, during which time the draft measures may not be adopted; this period may be extended if the Commission or a Member State believe the specifications represent a serious barrier to trade.

33 In the interim, work will continue on the assessment of responses to the remaining consultation questions with the aim of publishing Part 2 of the Consultation Response in Spring 2013.

2. Introduction

Overview of Consultation

34 The government published the first version of the Smart Metering Equipment Technical Specifications (SMETS 1) in April 2012. SMETS 1 provided a standardised and consistent definition of the functional requirements for smart metering equipment, allowing suppliers to install and operate smart meters during the Foundation Stage of the programme, and thus facilitate early learning and benefits.

35 In parallel to the publication of SMETS 1, the Government identified several issues which would require further consideration before their inclusion in a future version of the SMETS. In August 2012, a consultation was launched to seek industry views on these outstanding issues, and on related topics, presenting a proposed way forward on each.

36 The consultation set out proposals to address the following issues:

- Extensions to SMETS 1, including the proposed architecture of the Home Area Network (HAN); functionality of, and responsibility for the Communications Hub; and additional capabilities to be included in the SMETS;
- Governance of security requirements, and the provision of appropriate levels of assurance for both security and interoperability of the end-to-end smart metering solution;
- Operational licence conditions to be placed on energy suppliers to ensure the beneficial delivery of smart metering data for consumers, network operators, third parties and the wider economy; and
- Next steps, for the publication of SMETS 2, for the transfer of governance to the Smart Energy Code (SEC), and for expected equipment availability.

The Consultation Process

Response to the Consultation

37 All consultees were invited to submit their comments to a consultation email address (smartmetering@decc.gsi.gov.uk). The Consultation was available on the Department of Energy and Climate Change (DECC) website and a paper version of the consultation document was made available on request.

38 The Consultation invited all interested parties to comment on the proposals by 8th October 2012. 56 written responses were received, broken down by sector as follows:

Sector	Number of responses
Communications and Technology	12
Consumer Group	3
Energy Network	6
Energy Supplier	11

Sector	Number of responses
Industry participants	5
Member of the Public	1
Meter Manufacturer	9
Other Government	1
Security Specialist	1
Other	7

39 Annex 1 provides a list of the organisations that provided a written response to the Consultation and Annex 2 provides an overview of responses to the 16 Consultation questions included in this Part 1. The majority of responses were sent electronically. The collation and summary of responses has been prepared by DECC.

40 DECC has continued to meet with the SMETS Stakeholder Advisory Group[2] (SSAG) and the Overall Design Authority Group (ODAG) from the launch of the Consultation through to the publication of this response document. These groups, which included experts from consumer bodies, manufacturers, energy suppliers, DNOs and other interested parties, have continued to advise on the development of the SMETS.

Publication of the Government's response

Publication of SMETS 2

41 The Government has decided to publish its response to the SMETS 2 Consultation in two parts. This dual approach to publication is driven by the desire to facilitate equipment availability for the next generation of GB smart metering equipment. SMETS 2 reflects the original 'A-H Requirements' set out in the March 2011 Prospectus Response, and provides a strong basis for the industry's development programmes almost two years in advance of mass roll-out.

42 The questions in the SMETS 2 consultation are grouped into the following categories:

- SMETS 2 development – 30 questions;
- Governance and assurance – 9 questions;
- Operational licence conditions – 5 questions; and
- Next steps – 6 questions.

43 Part 1 of the Consultation Response (this document) contains the Government's response to 11 questions relating to SMETS 2 development, and all five questions relating to operational licence conditions.

44 Part 2 of the Consultation Response will contain the Government's response to the remaining 19 questions relating to SMETS 2 development, and to all questions relating to governance and assurance, and to next steps. Part 2 is anticipated to be published in Spring 2013.

45 Section 3 of this response addresses a number of outstanding questions that have had to be resolved in order to support the notification of SMETS 2 to the

[2] Superseded in December 2012 by the Solution Design Advisory Group (SDAG)

European Commission (including specifications for the gas and electricity meters, and the In-Home Display - IHD). These include:

- Specification of the application and physical layers for the Home Area Network (HAN) (questions 1 to 5), since these are included in SMETS 2;
- Responsibility for the communications hub (question 14) since this determines whether the Communications Technical Hub Specification (CHTS) is included in SMETS 2; and
- Additional functionality to be considered for inclusion in SMETS 2, including provision for maximum demand meters, additional voltage alerts, remote disablement, variant smart electricity meters, and randomisation offset (questions 19 to 23).

46 The analysis of consultation responses and the issues arising from the remaining 19 of the 30 questions relating to SMETS 2 is ongoing. The Government acknowledges that some significant issues remain outstanding, including those shown in Section 4. However, it has reviewed these issues, and is satisfied that SMETS 2 publication is not dependent on, and can thus proceed, in advance of their resolution.

Operational licence conditions

47 Section 5 of this document presents the Government's policy conclusions on how operational requirements should be placed on energy suppliers to ensure that smart metering functionality is made available to domestic and smaller non-domestic consumers and SEC parties.

48 The updated legal text for the operational licence conditions is planned to be published with Part 2 of the Consultation Response. Subject to successful completion of the parliamentary process, the intention is for these obligations to be introduced into suppliers' licences later in 2013. Operational requirements in respect of data and services for SEC parties will be consulted upon in a subsequent SEC Stage 2 legal drafting consultation in Summer 2013.

Next Steps

49 That part of SMETS 2 pertaining to gas and electricity meters, and the IHD, is being notified to the European Commission as per the requirements of the Technical Standards and Regulations Directive, at the same time as the publication of this document. Henceforth, that notified document is referred to as the first iteration of SMETS 2.

50 After notification to the Commission, a standstill period of a minimum of three months applies during which time the draft measures may not be adopted; this period may be extended if the Commission or a Member State believes the specifications may create obstacles to the free movement of goods in the internal market.

51 Evaluation of responses to the remaining SMETS 2 consultation questions which are not published in this document is continuing. It is expected that Part 2 of the Consultation Response will be published by Spring 2013.

52 As set out elsewhere in this document, ongoing work (for example, on the intimate interface, PPMID specifications and the data requirements arising

from the Energy Efficiency Directive) is likely to result in minor additions to SMETS 2 during the year. A second iteration of SMETS 2 will be published, which will contain the text as notified in the first iteration, as well as these additional elements.

53 In parallel, the Government will continue to develop the CHTS, the GB Companion Specification, and the CPA security certification regime. Together with the second iteration of SMETS 2, these will be notified to the European Commission when ZigBee SEP v1.2 is released (expected Autumn 2013). Designation of SMETS 2 (including the content of both notifications, subject to comments from the Commission) under the roll-out licence conditions is expected to be in 2014, co-incident with the availability of CSP-provided communications hubs. Energy suppliers can continue to install SMETS 1 compliant meters against their roll out targets until SMETS 2 is designated.

54 The Government is currently consulting on options for the implementation of the Energy Efficiency Directive provision to provide domestic consumers with easy access to at least 24 months of daily / weekly / monthly / annual consumption data, where they have a smart meter. The consultation is scheduled to close on 6 February 2013[3]. The draft requirements set out in the consultation have been provisionally included in the first iteration of SMETS 2, and will be confirmed / amended in the second iteration in light of responses to the consultation.

[3] https://www.gov.uk/government/consultations/easy-access-to-consumption-data-for-consumers-with-smart-meters-under-the-energy-efficiency-directive

3. SMETS 2 Development

55 The consultation sought 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 the wider regulatory framework.

56 This section summarises the evidence presented in response to the consultation, and the Government's conclusion, on questions relating to the HAN application and physical layers, responsibility for the communications hub, and additional functionality to be considered for inclusion in SMETS 2. The remaining questions will be addressed in Part 2 of the Consultation Response.

HAN Application Layer

Summary of issue under consideration

Interconnection of equipment in the home is supported by the use of HAN standards, and a defined application layer(s) is required for interoperability. Following consultation with industry experts, a number of application layers were identified and evaluated for use. The consultation sought views on the criteria used to evaluate the application layer standards (Question 1), on the proposal to adopt ZigBee SEP and DLMS as the HAN application layer standards for Great Britain (Question 2), and on a requirement that equipment comply with the SMETS and a GB Companion Specification for ZigBee SEP and DLMS (Question 3).

Government consideration of issue

57 A significant majority of respondents, including those from the energy supplier, meter manufacturer and communications and technology stakeholders agreed that ZigBee SEP v1 and DLMS should be adopted as the HAN application layer standards for GB to support interconnection of equipment in the home.

58 The Government proposes to mandate ZigBee SEP v1 as the HAN standard for gas and the IHD. For electricity, all communications with the DCC will use DLMS, 'tunnelled' over ZigBee SEP (a model which sends DLMS commands in a SEP 'envelope'). In-premises data transfer between the meter and the IHD, CAD, and / or PPMID will use ZigBee SEP v1. This choice of application layers is based on the rationale that it meets GB requirements and is available within the programme timescales. The Government notes that ZigBee SEP v1 supports most of the Programme's security requirements, but requires the development of additional functionality for signing of acknowledgements and sensitive messages. The Government will work closely with the ZigBee Alliance to develop these extensions, which will be notified as part of the GB Companion Specification.

59 One respondent asked that consideration is given to extending the electricity model of DLMS tunnelled over ZigBee SEP v1, to gas (c.f. gas meter use of ZigBee SEP v1 only). The Government notes that message lengths are longer in the DLMS protocol, than in ZigBee SEP. Longer messages require

an increased communication duration, which in turn is likely to impact the life of the gas meter battery, and necessitate more frequent revisits.

60 Two respondents disagreed with the proposed dual selection of ZigBee SEP and DLMS, preferring a single application layer standard (either SEP, or DLMS only), driven by concerns over the costs and complexities of supporting two protocols. The Government notes that industry has already undertaken significant work on the complexities inherent within a dual protocol approach, and has concluded that this is acceptable.

61 In addition, an approach based on a single application layer standard presents its own issues. A single approach based on DLMS was rejected on the grounds of its impact on gas meter battery life (see above). The lack of electricity metering equipment utilising ZigBee SEP mitigates against a single approach based on this protocol. One respondent noted that another ZigBee application profile (Home Automation) is being extended to cover the DLMS areas of functionality. However, this has yet to be widely implemented by meter manufacturers, with a consequent impact on equipment availability.

62 Whilst agreeing with the proposed application layers, a number of respondents expressed a preference for ZigBee SEP v2. They noted that it is IP based and in time, may therefore be more widely adopted worldwide. However, the Government notes that ZigBee SEP v2 (with required extensions for the GB market) will need considerable additional work, is not yet proven, and will not be available within the required timescales. More generally, the Government recognises that any relevant new protocols which emerge over time could be introduced into the SMETS, subject to the SEC modification procedures.

63 One respondent advocated the use of the M-Bus standard. However, the Government notes that M-Bus does not meet GB requirements, e.g. for prepayment meters and complex tariffs. In addition no conformance or interoperability test regime is in place to enable manufacturers to test their equipment.

64 In the light of agreement by all respondents, the Government has concluded that equipment should be required to comply with the SMETS and a GB Companion Specification for ZigBee SEP and DLMS.

65 The first iteration of SMETS 2 is being notified to the EC at the same time as the publication of this response.

66 The GB Companion Specification will reference the subset of those items detailed in the relevant base specifications for Zigbee SEP and DLMS, which are mandatory for the GB SMETS 2-compliant implementation. It will be drafted by DECC with input from industry, and is expected to be notified in Autumn 2013.

67 In addition, the Government agrees with additional points relating to the GB Companion Specification which were raised by respondents. These are that:

- It should apply only to SMETS 2 and later equipment. SMETS 1 meters should not be required to comply with the GB Companion Specification;
- Documentation should be complete and unambiguous;
- Industry and protocol bodies should be involved in its development; and

- It must support relevant aspects of the security architecture.

68 The Government is confident that the development of SMETS 2, and the GB Companion Specification for ZigBee SEP and DLMS, will provide a platform which helps to secure technical interoperability, and an associated interoperability test regime, in time for mass roll-out of smart metering from 2014.

69 A significant majority of respondents, including those from the energy supplier, meter manufacturer and communications and technology stakeholders agreed that the criteria used to evaluate the application layer standards were appropriate. One respondent suggested that compatibility with existing European standards, and standardisation activities, should have been included as an additional evaluation criterion.

70 The Government notes that European compatibility was considered as part of the 'Open standards' evaluation criterion. In addition, the Smart Metering Implementation Programme is closely following European standardisation activity. DLMS is already an accepted European standard (IEC 62056). ZigBee has been accepted by CENELEC[4] as a work item in the European standardisation process, and recent discussions with the ZigBee Alliance indicate that it should be adopted as a standard in 2013.

Government Conclusion

ZigBee SEP v1 will be specified in SMETS 2 as the HAN application layer standard for gas and the IHD. For electricity, all communications with the DCC will use DLMS, 'tunnelled' over ZigBee SEP. In-premise data transfer between the meter and the IHD, CAD, and / or PPMID will use ZigBee SEP v1. Suppliers will be required to demonstrate compliance of their equipment against the SMETS and the GB Companion Specification.

HAN Physical Layer

Summary of issue under consideration

Wireless HAN standards can be implemented on a variety of radio frequencies but limiting the number of frequencies will aid interconnectability, and 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. The consultation sought views on the proposal to consider solutions based on 2.4GHz technology and solutions based on 868MHz technology (Question 4). It also sought views on the criteria used to select these frequency options (coverage of GB properties and bandwidth to deliver the SMETS functionality) (Question 5).

Government consideration of issue

71 The majority of respondents agreed with the criteria used in the evaluation of the physical layer of the HAN. The Government confirms that in reaching its

[4] The European Committee for Electrotechnical Standardization

conclusions with respect to coverage, the analysis included equipment capability factors such as antenna gain, transmit power, receive sensitivity, packet length, packet error rates and modulation. These represent the principal equipment capability considerations.

72 On the overall approach proposed in relation to the HAN physical layer, the majority of respondents favoured a model which supported both solutions based on 2.4GHz, and solutions based on 868MHz. In proposing this approach, respondents reflected:

- That a 2.4GHz based solution is already well advanced, and meter manufacturers have expressed confidence that SMETS 2 equipment based on this will be available in early 2014;
- That a 2.4GHz based solution has been shown in other deployments to achieve greater than 70% coverage; and
- That a 868MHz based solution will still be required to increase coverage to over 95%[5]. However, a period of between two and four years may be needed to develop an 868MHz based solution and gear up for volume equipment production.

73 One respondent set out an alternative approach, arguing for a single wireless HAN standard based on 868MHz. They suggest that this would eliminate confusion both for suppliers (when installing additional equipment) and consumers (when purchasing Consumer Access Devices). The Government notes that the adoption of a single 868MHz-based standard risks significant delay to the Programme, whilst this solution is developed.

74 The Government has concluded that a model should be adopted which supports both solutions based on 2.4GHz, and on 868MHz. This model will balance the more immediate availability of the former, with the potential for greater coverage of the latter. A decision to support 2.4GHz based solutions now will not prejudice the further development of 868MHz based solutions. Instead, it will allow the rollout of smart metering to proceed within the planned timescales, and in doing so, to provide lessons which can further influence the development and deployment of 868MHz-based solutions. In order to reflect this phased introduction of standards, the Government has decided that the first iteration of SMETS 2 will initially specify a requirement for solutions based on 2.4GHz, driven by the earlier availability of equipment utilising this frequency.

75 The Government also recognises the importance of an 868MHz-based solution. Subject to the development of application standards, it intends that an 868MHz-based solution is included in a future version of SMETS.

76 In time, therefore, the solution is expected to support both frequencies. The Government recognises that this phased approach impacts on the specification for the communications hub, and in particular whether the hubs should support one or two frequencies. This point will be considered further during the ongoing procurement of the Communications Service Provider. The Government will then publish its conclusion on this matter in Part 2 of the

[5] The remaining properties – estimated at some 3-5% - are expected to need a wired HAN solution. A wired HAN trial is currently underway and will be reported further in Part 2 of the Consultation Response.

Consultation Response expected in Spring 2013, and subsequently reflect this in the CHTS, due for notification to the Commission in Autumn 2013.

77 A small minority of respondents raised concerns about the potential for the wireless communications proposed for smart meters to cause health effects. The consultation noted that smart meters are covered by UK and European product safety legislation, which requires manufacturers to ensure that any product placed on the market is safe.

78 The Government shared these responses with its independent adviser on health, the Health Protection Agency (HPA) as part of HPA's commitment to keeping evidence under review. The Agency has confirmed that they do not affect the conclusion of the independent Advisory Group on Non Ionising Radiation (2012) report that *"although a substantial amount of research has been conducted in this area, there is no convincing evidence that RF* [radio frequency] *field exposures below guideline levels cause health effects in adults or children"*.

79 The HPA continues to advise that the evidence to date suggests exposures to the radio waves produced by smart meters do not pose a risk to health. We recognise that there will be some consumers who will continue to have concerns about receiving a smart meter, including people with concerns about electro-sensitivity. As the programme develops, we will be considering further, together with the energy companies who will be responsible for the rollout, how best to respond to these individual concerns.

Government Conclusion

SMETS 2 will initially set out a requirement for solutions based on 2.4GHz. Future versions of SMETS will be extended to include solutions based on 868MHz, as these become available.

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 Providers (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.

The consultation sought views on the Government's marginal preference for the CSP-led model for provision of the communications hub, in contrast to a supplier-led model (Question 14). Under the CSP-led model, the DCC would procure communications hubs via the CSP contract, and the CSP would supply communications hubs to energy suppliers for installation and maintenance, operating under a general principle of 'costs lie where they fall' for these activities, to avoid complex recharging arrangements for installation and maintenance.

The consultation also sought views 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.

Government consideration of issue

80 The consultation document proposed a CSP-led model based on three key criteria: technical integration, operational effectiveness, and value for money. The majority of respondents who addressed this question were supportive of the Government's proposal.

81 Large energy suppliers were strongly supportive of a CSP-led model, echoing a number of the advantages spelt out in the consultation. Suppliers particularly highlighted the advantages of clarity and lack of complexity in the business processes offered by a DCC-led model, and their own lack of expertise in this area.

82 Some small energy suppliers were concerned that, especially as new entrants, they may not have the expertise or funding required to support the supplier-led model.

83 Network operators and respondents from the communications and technology sectors were supportive of a CSP-led model, as it set out clear responsibilities for the provision of fit-for-purpose communications, and would reduce issues relating to technical interoperability. Meter manufacturers and metering agents noted that the CSP-led model will reduce Change of Supplier (CoS) risk, simplify logistics, and lead to a lower cost of funding.

84 In addition, potential Communications Service Providers submitted their responses to the Invitation to Supply a Detailed Solution (ISDS), in November. Analysis of these confirms in principle that they are able to support a CSP-led model, subject to negotiation of terms and conditions, and securing of suitable financing arrangements and business processes.

85 A small minority of respondents supported the supplier-led model. Their reasons were varied, but included the complexity for suppliers of dealing with a different CSP in each of the three proposed regions, the greater potential for a supplier-led model to support innovation, and the opportunity for end-to-end (supplier) responsibility for intimate communications between the meter and the communications hub. The Government proposes to consider requirements in the CSP contract to support innovation, and will address responsibility for intimate communications in its ongoing work on the definition of device management responsibilities.

86 Addressing the question why they were not better positioned to support communication hubs against a CSP-provided specification, energy suppliers advanced few new arguments beyond those already presented through Energy UK and SMETS Stakeholder Advisory Group (SSAG) in Summer 2012. Suppliers reconfirmed the advantages of clarity and lack of complexity in the business processes offered by a DCC-led model, and their own lack of expertise in this area.

87 Having analysed the material presented both in response to the consultation, and to the CSP ISDS, the Government has concluded that CSPs will be responsible for communications hubs. Further work will be completed as part of the SEC development process to determine specific roles and responsibilities in the supply chain.

88 The Government's decision is based on respondents' support for the arguments in favour of a CSP-led model set out in the Consultation – including technical integration, operational effectiveness, and value for money. In addition, the Government notes a number of potential issues it considers are inherent within a supplier-led model, including:

- Consistency of operation, and interoperability;
- Potential complexity of the commercial model and charging regimes;
- Service reliability; and
- Potential issues for consumers on Change of Supplier.

89 Suppliers raised concerns over the 'costs lie where they fall' principle, designed to avoid complex recharging arrangements for installation and maintenance. Some acknowledged that initial installation costs should be borne by the supplier, but all noted that a supplier responsibility for the costs of repair and replacement activities may not incentivise the CSP to procure equipment that is fit for purpose.

90 The Government proposes to address these concerns by introducing a certification regime for communications hubs (similar to that for meters) to deliver assurance of fitness for purpose at the time of test. In addition, it intends to clarify:

- The definition of 'type faults' – i.e. the conditions under which the CSP equipment is deemed not fit-for-purpose, and therefore should be replaced at the CSP's cost (including the field service cost); and
- The basis, and process, for any decision to upgrade or replace communications hubs, and in particular, a requirement on the CSP to include both the potential impact on consumers, and field services costs in the cost / benefit justification for upgrades or replacement plans.

91 The Government plans to include requirements in the SEC to cover the 'type fault' and upgrade / replacement conditions. The SEC will set out the rules defining type faults and the arrangements to apply when a type fault occurs, including charging/payment arrangements. Furthermore, the SEC will set out arrangements for the upgrade / replacement of communications hubs as required. The contract between the DCC and the CSP will need to reflect the DCC's role in relation to these matters under the SEC.

Government Conclusion

The CSP-led model will be adopted for communications hub responsibilities. The principle of 'costs lie where they fall' will be adopted, in order to avoid complex recharging arrangements for installation and maintenance. Measures will be included in the commercial terms for the CSP, and in the SEC, as appropriate, to ensure CSPs are properly incentivised to supply fit-for-purpose equipment. From a date to be determined, in light of equipment availability and with appropriate notice, installations will have to include a CSP-provided communications hub in order to be compliant with the roll-out licence condition.

SMETS Additional Capabilities – Maximum Demand Recording

Summary of issue under consideration

The consultation noted that data showing the highest half-hourly electricity demand and export at a metering point will be of value for network planning and operation. Such data could be provided either by including three registers in the meter – two to record maximum import demand, one for maximum export level – and retrieving the single value held on each register via the DCC (Option 1 in the consultation); or by retrieving a set of half-hourly data from the meter's data store via the DCC, and deriving the maximum value in 'back office' systems (Option 2).

The consultation sought views on the cost implications of the two options (Question 19), and asked whether respondents agreed with the proposal to include maximum demand registers in SMETS 2 (Option 1).

Government consideration of issue

92 The majority of respondents who addressed this question supported the requirement for maximum demand recording, and agreed that this should be delivered via Option 1 - the inclusion of three registers within the meter. Meter manufacturers confirmed that the cost of adding this functionality will not impact significantly on equipment costs. Option 1 is also more consistent with the Government's commitment to 'privacy by design'[6].

93 Option 2, proposing the 'back office' analysis of data to determine maximum demand, received no support. DNOs confirmed that the costs of back office data retrieval and processing were likely to be significant.

94 Two respondents disagreed with the Government's proposal to include maximum demand recording at metering points on the grounds of additional complexity and therefore cost. Instead, they proposed that demand should be aggregated at substation / feeder level. However, the respondents did not provide any supporting arguments or cost / benefit assessments; nor did they propose a solution to the problem of disaggregating export and import data at substation / feeder level.

95 The Government notes that data showing maximum import and export at metering level will be of particular value as distribution networks come under increasing pressures arising from renewable generation, microgeneration, electric vehicles and the electrification of heat. Given this, and the strong preference amongst respondents for Option 1, the Government confirms that maximum demand and export registers will be specified in SMETS 2.

Government Conclusion

Maximum demand registers will be included in SMETS 2. Two registers will record maximum import demand and a third will record maximum export level.

[6] See: https://www.gov.uk/government/consultations/smart-meter-data-access-and-privacy

SMETS Additional Capabilities – Additional Voltage Alerts

Summary of issue under consideration

SMETS 1 requires the capability to generate an alert when voltage exceeds a configurable threshold, and to log and count these 'excursions'. DNOs also want to determine when an 'excursion' counter crosses a threshold. This will allow them to differentiate between occasional (or even one-off) and repetitive / frequently occurring voltage issues. Such additional alerts could be provided either by including additional functionality in meters; or by counting single alerts and producing 'counter alerts' in a 'back office' database.

Prior to the consultation network operators (via SSAG) provided analysis indicating that the benefits gained from providing such functionality in meters rather than via a 'back office' solution were 'small' compared to cost. Manufacturers also highlighted that the provision of such functionality might delay equipment availability, and that cost estimates in their analysis were based on non-configurable counter thresholds.

In the light of this, and absent any further evidence prior to the start of consultation that could justify including such functionality, the Government proposed not to include the capability to set configurable voltage alert counter thresholds in SMETS 2 (Question 20).

Government consideration of issue

96 The majority of respondents, including DNOs, supported the proposal that the capability to set configurable voltage alert counter thresholds should not be included in SMETS 2. Respondents supporting this approach cited potentially significant additional development costs, complexity, and potential delay to the availability of SMETS 2-compliant equipment.

97 DNOs also confirmed that this route would offer them only minor cost savings. Instead, they could access all alerts using SMETS 1 / 2 compliant equipment and count them in their back office.

98 It is not certain how many voltage alerts will be generated by smart metering equipment. This approach would also allow DNOs flexibility in configuring counter thresholds, particularly if these need to change through time in the light of emerging experience.

99 Following analysis of consultation responses, the Government finds no evidence to challenge its proposal set out in the consultation document.

Government Conclusion

The capability to set configurable voltage alert counter thresholds will not be included in SMETS 2. However, SMETS 1 and SMETS 2 meters will retain the capability to produce alerts each time an over or under voltage 'event' occurs, and to count the number of voltage events. A DNO will be able subscribe to these alerts, and will have 'read' access to counters and voltage event logs in which all voltage events will be recorded.

SMETS Additional Capabilities – Remote Disablement

Summary of issue under consideration

DNOs have raised the possibility that under smart grid operations they might need remotely to disable and enable smart electricity meters. This raises an issue that if a supplier wishes 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.

The consultation sought to establish whether the control logic for remote disablement and enablement should be built into DCC systems, or meters, and if the latter, whether it should be specified in SMETS 2 (Question 21) . Views were sought on the costs of the different approaches, and on any associated safety issues.

Government consideration of issue

100 Many of the responses to this question focused on whether DNOs should be given access to remote disablement functions, rather than the location of the control logic for this. This matter is addressed further below.

101 Of the responses that addressed options for location of the control logic for remote disablement, the majority argued that it should be included in the DCC. However, a significant minority argued for an alternative approach, proposing inclusion in the meter, or that either option would be acceptable.

102 Respondents in favour of the DCC-based option argued that the logic would be implemented only once, rather than across the meter population as a whole. The logic would be easy to update, without reliance on firmware upgrades. Finally, the logic could be introduced at a later date, reducing development time now and avoiding nugatory costs in the event that DNOs are not allowed remote access.

103 By contrast, those arguing in favour of the meter-based option noted that it would represent only a marginal cost to meter firmware, and that it would offer a failsafe in the event of WAN failure.

104 No significant evidence in support of either option was presented relating to the customer experience, costs or benefits. A general theme of ‘security’ ran through many responses, but was not addressed in detail, nor offered further evidence to discriminate between the two options.

105 In analysing the responses, and in particular noting the absence of any safety-related arguments, the Government notes the feasibility of either option for the location of the control logic for remote disablement and enablement.

106 In particular, the Government notes the argument put forward by one respondent, that if it did not prove possible reliably to implement the control logic once, at the DCC, it would need to be held in the meters. This could be achieved either through a firmware upgrade to SMETS 2 meters, or by extending SMETS to include it in the next generation of meters. As the numbers of these are likely to form the majority of the population in the longer

term, this approach could provide a sufficient disablement function for effective network management by DNOs.

107 Many of the responses questioned whether DNOs should be given access to remote disablement functions, rather than the location of the control logic for this. The Government recognises that security requirements and regulatory arrangements may limit the potential use of remote disablement by DNOs. Furthermore, the commercial arrangements which will needed to support contracts between consumers and DNOs for load management are not clear at this point.

108 One respondent proposed that in all cases supply should be restored by re-arming the meter rather than enabling it remotely. This counters a working group proposal that suppliers would re-arm (with supply enabled by the consumer pressing a button on the meter) whilst DNOs would enable (without re-arming) – as per current practice under fault conditions. This issue will need to be re-examined if any proposal to grant access to remote disablement is considered in future.

109 The Government acknowledges respondents' concerns over DNO access to remote disablement, but notes no proposals for such access are currently under consideration.

110 The Government notes:

- the evidence that remote disablement logic could be implemented either in the DCC or the meter;
- that it could be invoked later (either in the DCC via a change to the DSP requirements, or in the meter via a firmware upgrade); and
- that the wider issue of DNO access will determine whether this functionality is necessary.

111 In addition, in order to write the required rules into the meters, it would be necessary to anticipate the policy scenarios likely to arise.

112 In the light of the above, the Government has decided that it is neither necessary nor appropriate to choose either option at this time. Instead, it will be for the SEC Panel to evaluate implementation options if and when DNOs are permitted to access this functionality, taking into account the best information then available on operational effectiveness, costs and security.

Government Conclusion

There is no strong technical, operational or commercial evidence to determine whether control logic for remote disablement should be included in the DCC, or in the meter, nor any driver for an immediate decision.

SMETS Additional Capabilities – Electricity Meter Variants

Summary of issue under consideration

Nearly five million premises have non-standard arrangements for electricity metering, principally associated with radio teleswitch, and polyphase installations. The consultation proposed that, whilst the installation of 'variant' meters would be optional, the required functionality of meters with additional auxiliary load control switches, boost buttons, multiple measuring element meters and polyphase supplies would be specified in SMETS 2 to ensure that any supplier could operate any variant meter (Question 22). Views were also sought on any associated cost uplift.

Government consideration of issue

113 The majority of respondents agreed with the proposals for electricity meter variants, arguing that these are needed in order to reflect the range of meters and electrical installations in current use; and to ensure that suppliers and authorised parties are able to configure and read information from 'variant' meters. A number of respondents noted proposals to decommission the current radio teleswitch service (RTS), supporting the inclusion of variant smart meters in SMETS 2 as a long term replacement for this functionality.

114 Respondents offering views on any associated cost uplift were consistent: that this would be similar to the uplift for dumb meter variants. A number of respondents explained that software or memory costs will be similar for 'base' and variant meters, and that the cost uplift is driven by the need for additional physical hardware (e.g. contactors and measuring elements).

115 Very little quantitative information was submitted on cost uplifts. One respondent noted that the cost uplift for a twin element meter (either smart, or dumb) over its standard counterpart is in the order of 10% in both cases.

116 Having analysed the consultation responses, the Government finds no evidence to support any change to its proposal on variant meters, and acknowledges industry advice that the maximum number of metering elements in a multiple measuring element meter is two.

117 In addition, in the light of evidence to suggest that the cost uplift for optional variant smart meters is similar to that for dumb meters, the Impact Assessment will not be affected.

Government Conclusion

SMETS 2 will include requirements applying to 'variant' meters which include auxiliary load control switches, boost buttons, multiple measuring element meters and polyphase supplies. These specifications must be followed where variant functionality is added to a meter by a supplier, but do not apply to 'standard' meters without that functionality.

SMETS Additional Capabilities – Randomisation of Auxiliary Load Control Switches

Summary of issue under consideration

The electricity supply system is put under stress when many loads come on or turn off at the same time. This increases the cost of system operation and increases the risk of outages. The consultation sought views on whether a randomisation offset capability for auxiliary load control switches and registers should be specified in SMETS 2 such that load switching can be spread over a defined period (Question 23).

The capability would allow suppliers to apply a randomisation offset to the programmed time at which a meter generates a command to open or close an auxiliary load switch, and switch to a new tariff. The auxiliary load switch may be within a 'variant' meter, or connected via the HAN interface.

Views were also sought on the proposed range of the randomisation offset (0 to 1799 seconds), and on the cost of introducing this functionality.

Government consideration of issue

118 The majority of respondents agreed that a randomisation offset capability for auxiliary load control switches and tariff registers should be included in SMETS 2, as it accords with current industry practice, supports the need for load control and thus enhances the overall stability of the electricity grid.

119 Two respondents disagreed with the proposal, arguing that randomisation could better be provided by the DSP and / or CSP. The Government notes that this would not cater for randomisation of switching between registers, which is managed by meters.

120 In addition, consumer groups have also stressed the need to avoid customer confusion in this area. To address this, clarity is needed on how the randomisation offset will be calculated and applied.

121 The randomisation offset is calculated by multiplying a randomisation offset limit (configurable) by a random decimal number (between 0 and 1 and fixed for the life of the meter). For example, if the meter's calendar is configured to switch an auxiliary switch and to switch to a different tariff rate at 2pm, and the randomisation offset limit is set at 10 minutes, all meters on the same tariff will switch between 2pm and 2.10pm. The actual time of switch for any one meter within this period will be determined by the randomisation offset specific to that meter (e.g. at 2.02pm if the random number for that meter is set to 0.2). The randomisation offset for any meter would only change when the randomisation offset limit is reconfigured.

122 Meters will be capable of applying the same randomisation offset (e.g. two minutes in the example above) to all calendar-based switching, and the supplier will be able to inform the customer that switching will always occur at two minutes past x o'clock. The randomisation offset value will also be available over the HAN interface to any CADs.

123 One respondent was concerned that the proposed approach would significantly complicate the calculation of accurate energy costs by the IHD. The Government proposes that SMETS 2 will specify that IHD calculations are done on the electricity meter and made available to CADs via the HAN interface. This will ensure that cost and consumption information provided to CADs and IHDs is consistent, and takes account of the randomisation offset.

124 The majority of respondents agreed with the proposed range for randomisation (0 to 1799 seconds). A small number of respondents suggested that the range was too wide, raising concerns over customer confusion and settlement issues. The Government notes that the randomisation offset limit is a configurable value which may be set within the proposed range, and agrees with a parallel recommendation from SSAG members, that further work will need to be done to establish a starting randomisation offset limit.

125 Very limited evidence was submitted regarding the cost of functionality to support randomisation offsets. Some respondents noted that such functionality is already standard within meters, and additional costs should not therefore be incurred. One respondent noted that whilst self-generation of randomisation offsets by the meter may not significantly add to costs, configurable offsets may be more complex and thus costly.

126 In the absence of any evidence to the contrary, the Government finds no reason to vary its proposal on the provision of randomisation offset capabilities as set out in the consultation document. In addition, in view of evidence to suggest additional costs are unlikely to be incurred, the Impact Assessment will not be affected.

Government Conclusion

The following capabilities will be 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.

4. Remaining SMETS 2 questions

127 This document sets out the Government's response to 11 of the 30 questions relating to SMETS 2 in the consultation document. As noted in Section 2, these questions have had to be resolved in order to facilitate the production of SMETS 2-compliant meters through notification of the first iteration of SMETS 2 to the EC.

128 Analysis of the responses to the remaining 19 questions included under the SMETS 2 heading is ongoing, and the Government aims to publish its conclusions in Part 2 of the Consultation Response, during Spring 2013. The Government acknowledges that some significant issues remain to be resolved, but has satisfied itself that publication of the first iteration of SMETS 2 is not dependent on, and can thus proceed, in advance of their resolution.

129 The outstanding issues relate to three groups of questions:

- Remaining issues relating to the specification of the physical HAN - including further details pertaining to the delivery of an 868MHz based solution (questions 6 to 10), and the provision of wired HAN (question 11);
- Outstanding questions relating to the specification and use of the communications hub (questions 12, 15-18, 24 – 26 and 29);
- Remaining issues including the use of an intimate communications hub interface (question 13), the PPMID (questions 27 and 28), and the HHT interface (question 30), and an outstanding issue relating to the length of a UTRN which was not directly addressed by the consultation document, but has arisen as a result of further work on the security architecture.

Outstanding issues relating to the physical HAN

130 In Section 3, the Government has set out an initial approach based on the adoption of solutions based on 2.4GHz, allowing for the later addition of 868MHz based solutions as these become available.

131 Work is ongoing to address the following outstanding issues, and will be reported in Part 2 of the Consultation Response:

- The costs, benefits and regulatory framework for the three options for deploying wireless solutions (i.e. 2.4GHz as a default, dual band communications hubs, or a market led approach);
- Any options to accelerate the development of an 868MHz based solution;
- The case for a 'fit-for-purpose' installation obligation on suppliers; and
- The potential for, and benefits of, access to the reserved spectrum (870 – 872 MHz).

132 Whilst the above all impact on the detailed approach for an 868MHz based solution, none impact on the proposal for a 2.4GHz based solution as set out in this document.

133 A wired HAN trial is being conducted, the scope and approach to which will be updated in Part 2 of the Consultation Response. Again, the wired HAN trial does not impact on the proposal for a 2.4GHz based wireless solution, but will be an important strand in providing full HAN coverage.

Outstanding issues relating to the communications hub

134 Work is progressing to resolve a number of outstanding issues relating to the specification and use of the communications hub, including:

- Confirmation of the scope of functional requirements;
- Whether, and in what circumstances, the use of CHTS-compliant hubs should be mandated for non-domestic sites, and responsibility for any installation and / or removal costs incurred at opt in / opt out;
- The detailed implementation of outage reporting functionality;
- Options for 'pairing' CADs to the HAN; and
- Support for optional multiple smart electricity meters.

135 Considering the preferred approach for CAD 'pairing', question 24 sought views on two options by which CADs could be linked (or paired) into the HAN to enable consumers (or their smart devices) to access price, consumption and other data from meters on a read-only basis: Option 1 (local pairing) and Option 2 (remote pairing).

136 All devices will need to be paired to the HAN. Meters and the IHD will be remotely paired to the HAN - the energy supplier will issue pairing commands via the DCC to the communications hub, which in turn will act as the pairing controller for the HAN.

137 Remote pairing of CADs to the HAN is technically possible, and further work is being undertaken to assess the commercial options to support remote pairing. Mandating that suppliers perform this function is one of the options under consideration. These options will be discussed further in Part 2 of the Consultation Response.

138 In principle, local pairing would allow consumers to initiate pairing of CADs to the HAN, and avoid the need for DCC involvement. However, such approaches would be novel and are not supported by the relevant established HAN communication protocols (Zigbee SEP in this case). Further work is being undertaken to consider the feasibility of adopting protocols in the longer term to support local pairing models on a secure and consumer-friendly basis.

139 None of the above impacts on the first iteration of SMETS 2, and notification of this can proceed in the meantime.

140 Question 13 relates to the specification for an 'intimate' interface between electricity meters and communications hubs. The Government recognises the strong industry support for this, and the potential benefits. A working group is currently developing proposals for its design specification, scheduled for completion in January 2013. Subject to final agreement with the industry, the following approach to notification is proposed:

- SMETS 2 will be extended to recognise an electricity meter which will support an intimate interface as a valid variant. The specification for this is expected to be published in Spring 2012, and subsequently included in the second iteration of SMETS 2;
- The specification for the communications hub side of the interface will be documented in the CHTS, to be included in the Invitation To Submit Final Tenders for the CSP expected in early 2013 (and to be made public); and

- The CHTS is intended to be formally notified to the EC with the GB Companion Specification in Autumn 2013.

Other outstanding issues

141 Questions 28 and 29 in the consultation sought views on proposals for the provision of Prepayment Interface Devices ('PPMIDs'), and question 30 referenced the use of Hand Held Terminals ('HHTs'). Both of these are devices which would communicate with the HAN via a defined interface.

142 Respondents were strongly supportive of the provision for PPMIDs to address meter access issues, subject to the resolution of safety concerns.

143 Addressing the need for an HHT interface, respondents were strongly supportive of their use for system configuration. Support for the use of HHTs for diagnostic activities was more limited, and significant concerns were expressed over their use for credit management.

144 The Government proposes to address these issues as follows:

- The first iteration of SMETS 2 specifies that meters must support interfaces to PPMIDs and HHTs in line with the overall end-to-end security model;
- PPMIDs and HHTs are defined as roles in the Role Based Access Control (RBAC) included as part of the first iteration of SMETS 2;
- The allowable commands specific to each role in the RBAC will be set out in the GB Companion Specification; and
- The Government will work with stakeholders further to develop the specifications for a PPMID and notify these as part of the second iteration of SMETS 2, in parallel with the GB Companion Specification (expected Autumn 2013).

145 Whilst the Government also considers that the market should drive decisions on the application and specification of HHTs, provided they comply with the overall security architecture, it is currently discussing with industry their use for meter installation and maintenance. The discussions will also include the provision within SMETS 2 of a Configuration Code for the purposes of rearming supply, in the event this cannot be done remotely.

146 Under normal circumstances, the prepayment consumer would add credit to their meter remotely via the WAN. However, in the event the WAN is unavailable, a Unique Transaction Reference Number (UTRN) would be provided to the consumer - a one-time code that can be applied directly onto a prepayment meter in order to add credit.

147 Work on the security architecture carried out in parallel to the SMETS 2 consultation has highlighted a potential need for a UTRN longer than the 20 characters working assumption considered to date. The Government has considered whether two button entry of long UTRNs by the consumer into the prepayment meter is viable, or whether a keypad should be mandated to facilitate consumer use.

148 The Government has decided provisionally to include a mandatory requirement for a keypad in the first iteration of SMETS 2. It will undertake further work to assess the impact of adding a keypad to meters, including

consulting with stakeholders, and subsequently undertake analysis to decide whether this position is justified. The final decision will be included in Part 2 of the Consultation Response.

Energy Efficiency Directive provisions

149 The Government is currently consulting on options for the implementation of the Energy Efficiency Directive provision to provide domestic consumers with easy access to at least 24 months of daily / weekly / monthly / annual consumption data, where they have a smart meter. The consultation will close on 6 February 2013.

150 The consultation sets out a preferred approach to implementation:

- to include the capability to store 24 months of daily consumption data in the technical specifications for smart meters (SMETS 2 only) and the communications hub; and
- to place a requirement on suppliers to provide access to data via the internet, at the request of the customer.

151 The consultation also proposes the additional storage and data items that would be required to implement 24 months of daily storage. These have been reflected as provisional requirements in the first iteration of SMETS 2. Subject to the outcome of the consultation, the Government anticipates being able to confirm these requirements during Spring 2013, and to include them in the second iteration of SMETS 2, and in CHTS.

5. Operational Requirements

152 This section summarises the evidence presented in response to the consultation, and the Government's conclusion, on the proposed operational requirements to be introduced on energy suppliers (questions 40 to 44).

Summary of issue under consideration

The consultation sought views on the introduction of operational requirements to ensure that a range of smart metering functionality was made available to consumers and SEC parties. The Government proposed that requirements relating to the provision of information to domestic consumers and micro-businesses would be included in licence conditions, and requirements relating to information and services to SEC parties would be included in the SEC.

The requirements would apply to any compliant smart meter installation in domestic premises, including SMETS 1 meters installed from the time the licence conditions come into effect. Energy suppliers that gain customers with a smart meter would have to meet the requirements once the meter had been enrolled with the DCC. For all meters in domestic premises, including any that are not enrolled in DCC, energy suppliers would be expected to deliver all the specified functionality by the end of 2019. It was proposed that the requirements would not apply to non-domestic meters, except that a sub-set of them would apply to meters in micro-businesses that were enrolled with the DCC.

Government consideration of issue

153 Respondents broadly supported the Government's proposals for operational requirements, and generally accepted that such requirements would help ensure that key consumer-related benefits of smart metering could be realised. Respondents also generally agreed that the operational licence conditions as drafted underpinned the Government's policy intentions. However, some respondents expressed views about particular aspects of the proposals and how they would be implemented, especially the proposed drafting of the conditions.

Operational licence conditions for consumer data

154 A number of respondents raised concerns about the proposed requirement to provide consumption, export and tariff information over the HAN to CADs, and particular concerns were raised in relation to SMETS 1 meters, where there is no prescribed HAN standard.

155 The Government recognises that responsibility for establishing a communications link with a CAD does not lie solely with the energy supplier. It will be for the consumer, for example, to ensure that any CAD that he or she purchases is compatible with the installed smart metering system. The Government believes that energy suppliers should provide consumers with the technical information that they need to understand the types of CADs that they can connect and what they need to do to connect them to the smart metering system. The Smart Metering Installation Code of Practice (SMICoP), a draft of which is currently subject to an Ofgem approval process,

may be an appropriate vehicle for committing energy suppliers to provide this information.

156 Energy suppliers would not be expected to establish a communications link with a CAD that utilises a different HAN standard than the meter. The energy supplier would, however, be responsible for ensuring that information is freely available over the HAN to a compatible CAD. This principle applies equally to SMETS 1 meters as to others. We therefore intend to retain a requirement for energy suppliers to take all reasonable steps to ensure that all consumption, export and tariff information held on the meter is made available, free of charge, over the HAN.

157 Some energy suppliers also anticipated difficulties in providing smart functionality for Foundation meters inherited from other energy suppliers that have not been enrolled with the DCC. They argued that the obligation for all domestic meters to meet the operational requirements by the end of 2019 could result in increased complexity and costs and could have security implications. On the other hand, consumer groups argued that once a smart meter was installed it should be operated in smart mode, even after change of energy supplier.

158 Energy suppliers will have a number of options if they gain a customer with a non-enrolled Foundation meter once DCC goes live. These will include:

- enrolling the meter in DCC;
- using the previous energy supplier's Smart Meter System Operator;
- modifying the inherited metering system to enable enrolment; and
- replacing the inherited metering system.

159 The Government expects that most Foundation meters will be enrolled in DCC over time. It also believes that there are significant incentives for energy suppliers to operate the meter in smart mode. This will be facilitated by Ofgem's recently implemented "Effective Switching" licence conditions[7] and would be enhanced if the Smart Change of Supplier provisions set out in the Foundation Smart Market consultation were adopted. The Government has proposed DCC enrolment criteria in the Foundation Smart Market consultation.

160 Given the options that are available to energy suppliers, the Government believes that it is appropriate to require that by 2019 all SMETS-compliant meters in domestic premises should be operated in smart mode. The Government believes that this provides energy suppliers with sufficient time to be able to make arrangements for consumers to access the required functionality from meters installed by previous suppliers. It recognises that gaining energy suppliers may not be able to operate all Foundation meters in full smart mode from the outset, especially before DCC go-live. It is anticipated, however, that gaining suppliers will operate most smart meters in smart mode from the point they gain the new customer, given the natural incentives for them to do so. These include the cost savings from taking meter readings remotely and boosting levels of customer satisfaction.

[7] See: www.ofgem.gov.uk/Markets/sm/metering/sm/Documents1/smart%20meters%20-%20effective%20switching.pdf

161 Some respondents expressed concern about the security arrangements for non-enrolled meters inherited from previous energy suppliers and with connecting meters to CADs. During the Foundation stage, energy suppliers will be obliged to take such steps and do such things as are within their powers to provide a secure end-to-end system. The Government believes energy suppliers should be able to manage any security risks that could be posed by a CAD being connected to a smart metering system. The energy supplier will also be responsible for managing any security risks which may be encountered when it inherits a meter that was installed by a previous energy supplier. It is expected that energy suppliers will be subject to similar arrangements for meters that are not enrolled with the DCC in the post-Foundation stage. The Government's current Foundation Smart Market consultation is considering arrangements for security in the process by which SMETS 1 meters can be enrolled with the DCC. The SMETS will also incorporate security requirements to protect against the risk of security breaches.

162 A number of energy suppliers were also concerned about the proposal that they should be required to establish and maintain a connection between the meter and the WAN when the responsibility is not solely theirs. The Government recognises that the extent of energy suppliers' responsibility will be greater for meters that are not enrolled with the DCC, where they manage communication with their head-end systems, than for enrolled meters. For enrolled meters, much of the responsibility for the communications link will rest with the DCC's CSPs (especially where they own the communications hub), with the supplier's responsibility being considerably more limited (for example, taking all reasonable steps to establish the link at installation and maintaining it thenceforth). However, given that suppliers will have some influence in each instance it will retain the obligation to take reasonable steps to establish and maintain a WAN connection.

163 Consumer groups raised a number of specific concerns about functionality that was not proposed to be mandated, including display of the account balance for credit customers; prepayment customer services (such as provision of friendly credit); information about quality of supply; and use of smart data to provide accurate bills.

164 Ofgem is the most appropriate body to consider whether further requirements are needed in respect of the use of smart metering data for accurate billing, or of services for prepayment customers. The Government considered additional evidence provided by a consumer group on the potential value of account balance information, particularly for vulnerable customers. However, given the difficulties in applying an obligation to display a credit customer's account balance (these were set out in the Government Response to the roll-out consultation in April 2012[8]), it will not be mandated at this stage. The capability to provide the account balance remains in the SMETS and so energy suppliers can choose to offer this information to some, or all, of their

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

customers. Furthermore, the option to mandate the use of this functionality remains open should further evidence emerge. Similarly, the Government was not convinced of the case for mandating the availability of information about quality of supply and so no additional requirements will be added at this stage.

165 The large majority of respondents agreed with the Government's proposals for the timing of the implementation of operational requirements, arguing that it was a reasonable expectation that smart services were provided from the point of installation. One respondent was concerned that problems encountered during early installations of smart meters, which could prevent compliance with the operational requirements, might trigger regulatory action. It was suggested that an exemption from the licence condition could be applied to suppliers until they had reached a defined threshold of installed meters. The Government does not believe that such an exclusion is necessary. The operational licence conditions only apply to SMETS compliant meters (before a new and replacement obligation is introduced, energy suppliers are not required to install these) and any SMETS compliant meters should enable these licence conditions to be met.

166 The Government has concluded that the final drafting of the operational licence conditions should require installing suppliers to take all reasonable steps to operate a smart meter in smart mode from installation. The Government recognises that there will be some circumstances where suppliers may face particular difficulties in operating smart meters in smart mode from the point of installation, for example when conducting trials, and the requirement on suppliers to take 'all reasonable steps' is an acknowledgement of this.

167 The Government is reviewing the drafting of the licence conditions to ensure that they provide for all these requirements in a clear and coherent manner. Revised licence conditions will be published alongside Part 2 of the Consultation Response.

Requirements for non-domestic consumers

168 Most respondents broadly agreed with the proposed approach for non-domestic consumers. Some had concerns about creating different rules for different non-domestic sectors. These concerns included the availability and cost of data and the complexity arising from sub-dividing the sector.

169 The Government's view is that the non-domestic market contains a range of customers with different needs, and with different relationships with energy suppliers and other industry parties. It is appropriate that the operational requirements reflect these differences, and so specific provisions are made in draft licence conditions for micro-businesses. In December 2012, the Government published its response to its April 2012 consultation on data access and privacy[9]. This confirmed that, as a minimum, any non-domestic consumers with smart meters should have the same right of timely access to half-hourly electricity or hourly gas data as those with advanced meters.

[9] Smart Metering Implementation: Programme Data access and privacy - https://www.gov.uk/government/consultations/smart-meter-data-access-and-privacy

170 These requirements should ensure that all non-domestic consumers will have access to detailed consumption data and those micro-business consumers with meters enrolled in DCC will have access to a more prescribed range of data and services. Furthermore, whilst the Government has proposed minimum requirements, energy suppliers may offer services beyond these requirements.

171 The consultation did not propose that non-domestic consumers should be given "free" access to electronic data. Some respondents were concerned that, if non-domestic customers were required to pay for data, the anticipated benefits of smart metering could be reduced. The Government notes that energy suppliers and data service companies take varying approaches to recovering costs of data provision. In some cases, the cost of data provision may be itemised and a separate charge made for it. In others, costs may be bundled in an overall supply or service price, and we understand that a number of energy suppliers are taking, or plan to take, this approach. If energy suppliers or others providing meters are seen to charge excessively for data provision, they risk losing customers.

SEC requirements for data and services to SEC parties

172 The Government proposed obligations on energy suppliers to be placed in the SEC to configure smart metering systems so that DCC can offer services, including access to certain information. This received strong support, particularly from network operator and communications and technology respondents. The proposed requirements, with additional configuration rights, were seen as important for the network benefits of smart metering to be delivered. Some concern was expressed about how data would be obtained from meters that were not enrolled with the DCC. Clarification on how the costs of providing the specified data to SEC parties was also sought.

173 The Government believes that all the data items included in the consultation should be available to Network Operators and ESCOs to access as appropriate. The data specified was as follows:

- Power quality information and related log;
- Real-time alerts associated with power quality thresholds;
- Real time outage management information (interruption and restoration)[10];
- 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);
- Six minute gas consumption log; and
- Tariff information (including all tariff information used for billing purposes).

174 The Government proposed that the DCC will be required to provide core communications services to SEC parties and to offer terms upon request for elective communication services[11]. It is envisaged that access to these data

[10] SMETS 1 meters are only required to be capable of providing outage management information on a non-real time basis.

[11] Draft DCC Licence and draft Licence Application Regulations: https://www.gov.uk/government/consultations/smart-meter-data-and-communications-company-dcc-licence-conditions-and-licence-application-regulations-data-and-communications-company-dcc-licence-conditions-and-licence-application-regulations

items would be available to DCC users as core or elective communication services.

175 The Government considers that a further SEC requirement should be placed on energy suppliers for smart metering systems to be configured to enable the DCC to provide the specified information via communications services.

176 The Government recognises that SEC parties may also want services from domestic meters that are not enrolled with DCC. At this time it is not clear that the benefits of such a service would justify the costs and so this requirement will not be applied. However, the Government will keep this under review.

177 In accordance with our established approach to DCC charging, charges for data will be fair and transparent. The DCC will recover costs across classes of user via a mixture of fixed and explicit charges on a cost reflective basis, consistent with the charging principles within the DCC licence.

Government Conclusion

The Government will introduce licence conditions to require energy suppliers to give domestic consumers and micro-businesses access to smart meter functionality that is key to delivering benefits to them and to the wider economy. Under these licence conditions, energy suppliers will be required to take all reasonable steps to make available over the HAN all consumption, export and tariff information held on the meter; establish and maintain a WAN connection between the meter and the DCC or their own head-end system; and provide access, free of charge, to the full range of IHD functionality, as set out in SMETS (for domestic consumers only). Meters in non-domestic premises, other than those in micro-businesses which are enrolled with the DCC, will not be subject to these operational licence conditions.

The Government is reviewing the licence condition drafting of the to ensure that these requirements are provided for in a clear and coherent manner. Revised licence conditions will be published alongside Part 2 of the Consultation Response.

We expect the licence conditions to enter into force later in 2013. The requirements will immediately apply to new smart metering systems that are installed in domestic premises from when the licence conditions take effect. Energy suppliers who gain customers with a smart meter would have to deliver the requirements only from the earlier of: the enrolment of the meter with the DCC or 31 December 2019. The requirements in relation to meters in micro-businesses would take effect as soon as they are enrolled with the DCC. From 2019, the requirement would apply to all domestic meters.

The Government proposes that key data will be made available to SEC parties via obligations in the DCC licence and the SEC. These will include an obligation in the SEC for energy suppliers to configure smart metering systems to allow the DCC to provide the specified information by way of communication services.

6. 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.

Application Layer

Application Layer, in this context, is taken from the ISO standard Open Systems Interconnection (OSI) model for communications systems. In the OSI model, the Application Layer is the layer which provides the functionality required to deliver the end service. For Smart Meters the Application Layer would facilitate, for example, the ability to read or set variables within a standard scheme of data items related to Smart Meter operation.

Communications Hub

A device or set of devices located at the customer's premises which will have the capability to communicate with the HAN and the WAN.

Communications Hub Technical Specification (CHTS)

The Communications Hub Technical Specification sets out the minimum physical requirements, minimum functional requirements, minimum interface requirements and minimum data requirements that will apply to a Communications Hub.

Communications Service Provider (CSP)

Bodies awarded a contract to be a service provider of the DCC's communications services.

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. The DCC will be responsible for the procurement and contract management of data and communications services for the End-to-end Smart Metering System.

DLMS / COSEM

Device Language Message Specification / Companion Specification for Energy Metering - 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 premise through the DCC to suppliers, DNOs and authorised third-party service providers.

Energy Service Company (ESCO)

A professional organisation, scheme or trust that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises.

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.

Hand Held Terminal (HHT)

A HAN connected device used by authorised personnel for meter installation and maintenance purposes.

Head End

The entry and exit point for messages flowing from and to the DCC Data Service Provider over the WAN.

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 effected.

In-Home Display (IHD)

An electronic device, linked to Smart Metering System, which provides information on a consumer’s energy consumption and ambient feedback.

Interoperability

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

Load 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 the Premises.

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.

Network Layer

Network Layer, in this context, is taken from the ISO standard Open Systems Interconnection (OSI) model for communications systems. In the OSI model, the Network Layer is the layer which routes data packets across point-to-point links within a communications system that has multiple endpoints.

Network Operators

The companies that are licensed by Ofgem to maintain and manage the electricity and gas networks in Great Britain.

Outage detection

The ability for an electricity supply interruption to be identified and communicated to the WAN.

Physical Layer

Physical Layer, in this context, is taken from the ISO standard Open Systems Interconnection (OSI) model for communications systems. In the OSI model, the Physical Layer is an electrical, mechanical, and procedural interface to the transmission medium. It describes the shapes and properties of any electrical connectors, or for wireless technologies, the frequencies to broadcast on.

Polyphase Meter

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

Prepayment Meter Interface Device

A prepayment meter user interface separate from, but connected to the meter via the HAN.

Prepayment Mode

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

Smart Energy Code (SEC)

The Code, spanning gas and electricity, 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 services for the new data and communications activities. Suppliers, Network Operators and other users of the DCC's services will also 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.

Wide Area Network (WAN)

The network that is used for two way communication between smart metering systems and the DCC.

ZigBee Smart Energy Profile (SEP) v 1.X / 2

An application layer protocol (version 1.X or 2 as specified).

Annex 1: Responses received

AMO	Energy UK	Northern Power Grid
ARM Holdings	ESTA	Npower
Arqiva	EUA	NXP Semi Conductors
BEAMA	First Utility	Ofgem
BluePrint for Water	Gazprom Energy	Panasonic
BRE Global	Gemalto-Cinterion	Pilot System
British Gas	Gemserv	Scottish Power
Cable and Wireless	Gridmerge Ltd	Siemens
Cambridge Consultants	Haven Power Ltd	Smart Energy Network
CMAP	HP Enterprises	SP Energy Networks
Consumer Focus	ICoSS	SSE
DNV Kema Energy	IET	Supremacy Associates Ltd
E.ON	IPSO Alliance	Trilliant
EDF Energy	Joanne Green	UK Power Networks
Electrosensitivity UK	Landis+Gyr	Utilita
Elexon	McAfee-Intel	Waterwise
Elster Metering Ltd	Motorola Mobility UK Ltd	Western Power
EM-Radiation Research Trust, BEMRI.org, Mast Sanity, SSITA	National Grid	Which
Energy Network Association	Network Rail	

Annex 2: Summary of responses to Consultation Questions

Chapter 4 – SMETS 2 Development	
Q1	**Do you have any comments on the criteria used in the evaluation of the application layer standards?** A majority of respondents agreed that the criteria used in the evaluation of the application layer standards were appropriate. A small number of respondents suggested additional criteria should have been included, including one to cover health effects, one to cover governance / change management and one relating to compatibility with existing European standards and European standardisation activity.
Q2	**Do you agree with the proposal to adopt ZigBee SEP / DLMS as the HAN application layer standards for GB?** A majority of respondents agreed with the proposal to adopt ZigBee SEP 1.X and DLMS as the HAN application layer standards for GB. The following points were also raised: • That a clear technical architecture showing where each application layer is used should be made available; • That consideration is extended to the use of DLMS tunnelled over the SEP application layer for both gas and electricity; and • That further thought needs to be given to governance arrangements to manage future iterations and any changes to SMETS. Whilst accepting the use of ZigBee as an application layer, a number of respondents requested consideration of v2 in preference to v1.X. Concerns were raised over v1.X interoperability (given the complexity of GB requirements), and also security, noting that it does not support end-to-end encryption, and thus necessitates the use of intermediary gateways which might be vulnerable to attack. Some respondents favoured the choice of ZigBee SEP 2 as it is IP based, and thus more likely to be adopted worldwide. One communications and technology respondent noted that If the intention is for IEEE 802.15.4 adoption, other standards that also utilise it for the physical layer should also be considered, such as 6LoWPAN. A small number of respondents disagreed with the proposal to select both ZigBee SEP and DLMS, preferring a single application layer approach. They argued that a dual approach is likely to increase complexity and therefore costs, due to increased memory and processing requirements. One respondent noted that a single protocol based on ZigBee application layers could be available as early as 2013. Finally, a number of respondents noted that application layers for difficult buildings must also be a development priority
Q3	**Do you agree that equipment should be required to comply with SMETS and a**

	GB Companion specification for ZigBee SEP / DLMS? All respondents agreed that equipment should be required to comply with SMETS and a GB Companion specification for ZigBee SEP / DLMS. A number of additional points relating to the GB Companion Specification were raised by respondents, including that: • It should apply only to SMETS 2 and later equipment. Compliance should not be made retrospective for SMETS 1; • Documentation should be complete and unambiguous, and all stakeholders must share a single interpretation; • Industry and protocol bodies must be involved in its development; • It must also include relevant aspects of the security architecture; • Accreditation / certification regimes must acknowledge that there will be a lead time required to adapt products that can be tested against the specification. It cannot be assumed that products will be compliant soon after the GB Companion specification is published; • There are concerns around how quickly / DCC compliant meters will become available in the market ; and • DECC must work to ensure that all areas of uncertainty which are found in the protocols or Companion Specifications (e.g. in which order multi-byte meter register components are sent from the meter to the communications hub), are dealt with in the same way by all CSPs – and such clarifications shared openly with the DSP, meter manufacturers and DCC users without delay. Details of how this compliance is to be realised will need to be elaborated by DECC.
Q4	**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.** A majority of respondents who addressed this question agreed with the overall proposal to permit solutions based on 2.4GHz technology, and solutions based on 868MHz technology, to be deployed as the HAN physical layer. A number of additional points were raised by respondents, including: • That wired HAN and solutions for difficult buildings must also be a development priority; • The DECC HAN trial only measured 120 properties. Other deployments, such as an EDRP (1000 properties) and an energy supplier deployment (5000 properties) suggest that 2.4GHz will achieve greater than 70% coverage; • Concerns that solutions required for 100% coverage (including 868MHz and wired HAN) will not be available in time for mass deployment; • New technological developments should not be stifled; and • Future deployments must embrace backwards compatibility as a fundamental criterion. A small number of respondents disagreed with the proposed approach. Their arguments included: • A single HAN physical layer based on 868MHz will reduce consumer confusion and operational complexity, and therefore volumes of 2.4GHz should be limited

	to trials and testing. No new material evidence was presented in relation to these points; • Consideration should be given to a mandated optical port to support local installation and maintenance activities; and • More consideration needs to be given to the Physical layer in terms of the OSI model.
Q5	**Do you have any comments on the criteria used in the evaluation of the physical layer of the HAN?** A majority of respondents who addressed this question agreed with the criteria used in the evaluation of the physical layer of the HAN. A small number included the following caveats: • That technology specific parameters such as modulation schemes, antenna design, mesh capabilities, error correction etc should have been considered; • That more consideration should have been given to available bandwidth, throughput and data rates available at each frequency; • That co-existence with other communications and protections against interference - both creation and resistance – should have been considered; • That technology evolution improvements in radio performance at 2.4GHz should have been considered; and • That the analysis is based on a small sample size of GB properties. A number of respondents raised additional points: • That wired HAN and associated evaluation criteria must also be a development priority; • That consideration should be given to a traffic model to quantify the interference risk associated with licence exempt bands now and in the future; and • Consideration should be given to the quality and performance of antennae.
Q6	**What are your views on the compatibility of the reserved spectrum 870-876MHz with 868MHz and the value of considering the use of this band?**
Q7	**Do you consider that additional measures should be taken to encourage the development of an 868MHz solution?**
Q8	**Do you agree with the approach to allow the market to determine the balance between 2.4GHz and 868MHz? If not, please provide rationale and evidence.**
Q9	**What are your views on the costs and benefits of the three options identified for deploying wireless solutions (i.e. 2.4GHz as the default; dual-band communications hubs; or market led)?**
Q10	**Do you agree with the proposal for a 'fit for purpose' installation obligation on suppliers?**
Q11	**Do you have any views on the proposed approach to developing a wired HAN solution?**
Q12	**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)?
Q13	**Do you have views on the specification for an 'intimate' interface between electricity meters and communications hubs?** A summary of responses to these questions will be included in Part 2 of the Government Response to the SMETS 2 Consultation.
Q14	**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?** A large majority of respondents who addressed this question agreed with the proposed responsibilities for the communications hub, although a number of additional points were raised. The large energy suppliers were all in agreement with the proposal, but voiced strong objections to the 'costs lie where they fall' condition. Some acknowledged that the initial installation cost should be borne by the installing supplier. However, all expressed concerns that if the supplier were to bear the cost of maintenance and replacement activities, the CSP would not be incentivised to purchase equipment of a quality fit for purpose. Some suppliers also noted that field service costs vary by geography and type of property, which might introduce location-specific variables when other costs are 'postalised'. Smaller energy suppliers expressed concerns that this group (particularly new entrants) may not have the expertise or funding required under the supplier-led model. All network operators supported the proposed position, noting that it would reduce technical inter-operability issues. In addition, both they and respondents from the communications and technology sector noted that the proposed approach avoids ambiguity around the obligation to provide fit-for-purpose communications. Finally, meter manufacturers and metering agents were also generally in favour of the proposed approach. They argued that it will eliminate the Change of Supplier risk, and lead to a lower cost of funding. It will also simplify logistics, especially the stocking of installers' vans. A small minority of those who responded to this question disagreed with the proposed approach. Their reasons were varied, but included: • That it might be more complex / costly for a supplier to have to deal with a different CSP in each of the three proposed regions; • That a supplier-led model was more likely to support innovation, and a simpler supply chain; • That assigning responsibility could be difficult in the case of intimate communications; • That a CSP-led approach may not allow the communications hub to fall under 'postage stamp' pricing; and • That CSPs may not possess relevant expertise and may not wish to supply

	communications hubs. The Consultation also sought views 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. Responses included: • The need for clear demarcation of the service boundary; • Avoidance of complexity where there are separate gas and electricity suppliers, and in the handover of warranty at CoS; • Encouragement of innovation and flexibility; and • Their lack of communications expertise.
Q15 **Q16** **Q17** **Q18**	**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?** **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?** **Do you agree that the design and implementation of outage reporting functionality should be assigned to CSPs, documented in the communications hub technical specification?** **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.** A summary of responses to these questions will be included in Part 2 of the Government Response to the SMETS 2 Consultation.
Q19	**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.** A majority of respondents agreed that maximum demand registers should be included in SMETS 2. One respondent noted that the costs of adding such registers is not significant to meter manufacturers. A second respondent noted that retrieving single maximum demand values from meters is likely to offer significant cost savings over the retrieval of half-hourly data from meters' profile data logs, and the subsequent identification of the maximum demand from profile data in the back office. A small minority of respondents disagreed with the proposal to include maximum demand registers in SMETS, noting that it would add unnecessary complexity.
Q20	**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?** A majority of respondents were in favour of the proposal not to include the capability

	to generate voltage alerts based on counter thresholds in SMETS 2. One respondent suggested that this functionality would require the implementation and configuration of counters, counter thresholds and the generation of alerts when such thresholds are exceeded, at an individual level. This had potential to introduce significant additional complexity into meters and to systems required to manage and configure these parameters via the DCC. Whilst agreeing with the decision, one respondent noted that the counting functionality might be facilitated by means other than in the meter itself, provided that the required functionality was included within the overall smart metering system. Assuming the counter thresholds for each event were configured at the point of meter manufacture, and not subsequently configured in the field, one respondent noted that the costs of such functionality might not be significant. However, it could cause delay to equipment availability timescales. One respondent noted that the volume of voltage related alerts is uncertain at present. However, it did not expect the costs of receiving all alerts and analysing these in the back office to be significantly greater than receiving alerts once a threshold had been crossed. A small minority of respondents disagreed with the proposal not to include this functionality within SMETS 2, arguing that DNOs might potentially require it. However, no further detail, nor quantification of benefits, was submitted.
Q21	**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.** Many of the responses to this question focused on whether DNOs should be given access to remote disablement functions, rather than the location of the control logic for this. Of the responses that addressed the latter, the majority argued that the logic be included in the DCC. However, a significant minority argued an alternative approach, including proposals supporting inclusion in the meter, in the communications hub, or in either. Three principle arguments were put forward in favour of inclusion of the logic in the DCC: • The logic could be introduced later (and might never be required if DNOs are not permitted to perform remote disablement). This would reduce development time now, and potentially avoid nugatory cost; • The logic would be implemented once (at the DCC), avoiding the need, and therefore costs, of including it in commodity devices (i.e. meters); and • Any subsequent changes to control logic could be updated more easily, without reliance on firmware upgrades in the meters. Some of these arguments were shared by those in favour of inclusion of the logic in the communications hub, in particular focusing on the need to simplify meter functionality and complexity where possible. In contrast, those arguing in favour of inclusion of logic in the meter noted that it

	would represent a marginal cost to meter firmware, and that inclusion in the meter would offer a failsafe in the event of WAN failure. One respondent noted that – albeit under exceptional circumstances – a customer might be remotely disabled for any reason, then experience a WAN failure at the time the supplier (or DNO) attempts to re-arm the supply. With regard to other evaluation criteria: • Customer experience – no significant differences were identified between the options, although one respondent noted the potential for consumers to see remote disablement by their supplier or DNO as a threat, and therefore a risk to adoption of smart metering; • Cost and benefit – no respondent presented any cost evidence, nor quantified the benefits of any approach; • Time – respondents noted that inclusion of logic in meters could delay the availability of SMETS 2 meters; • Future flexibility – inclusion of logic in the DCC would allow flexibility for subsequent change; and • Risk – a security-related concern ran through many responses, but was not addressed in detail by any of them.
Q22	**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.** A majority of respondents agreed that variant smart electricity meters should be included in SMETS 2. A single dissenter noted that this proposal was not required, as standard meters should be able to meet all customer requirements. Of those who addressed the question on cost uplift, all agreed that this is likely to be similar to the uplift for dumb meter variants, as it is driven by the need for additional physical hardware (e.g. contactors, measuring elements, other additional components), rather than software or memory requirements. One respondent noted that the cost uplift for a twin element meter (either smart, or dumb) over its standard counterpart is roughly the same, in the order of 10%.
Q23	**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.** A majority of respondents agreed that a randomisation offset capability for auxiliary load control switches and registers should be included in SMETS 2, as it accords with current industry practice, supports the need for load control and thus enhances the overall stability of the electricity grid. A small minority disagreed, noting: • That randomisation could better be provided by the CSP or DSP; or • That it would significant complicate the calculation of accurate energy costs by the IHD; or

	• That the provision of such functionality would add unnecessary complexity. A majority of respondents also agreed with the proposed range for randomisation (0 to 1799 seconds), with no submissions to suggest it was too narrow. A small number of respondents queried that the range was too wide, citing concerns over customer confusion and settlement issues. Very limited evidence was submitted regarding the cost of this functionality. Some respondents noted that such functionality is already standard within meters, and additional costs should not therefore be incurred. One respondent noted that whilst self-generation of randomisation offsets by the meter may not significantly add to costs, configurable offsets may be more complex and thus costly.
Q24	**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.**
Q25	**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?**
Q26	**Do you consider that other CAD installation options should be pursued? If yes, please explain the approach you favour and your reasons.**
Q27	**Do you agree with the proposal to include in SMETS 2 a specification for a PPMID, connected via the HAN, as described above?**
Q28	**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.**
Q29	**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?**
Q30	**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.** A summary of responses to these questions will be included in Part 2 of the Government Response to the SMETS 2 Consultation.
Chapter 5 - Governance and Assurance of Security and Interoperability	
Q31	**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.**
Q32	**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.
Q33	**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.**
Q34	**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?**
Q35	**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?**
Q36	**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.**
Q37	**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.**
Q38	**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?**
Q39	**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.** A summary of responses to these questions will be included in Part 2 of the Government Response to the SMETS 2 Consultation.
Chapter 6 - Operational licence conditions	
Q40	**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.** A substantial majority of respondents to this question, across each sector, broadly supported the Government's proposals to place a requirement on energy suppliers

	to operate specific aspects of smart metering functionality for domestic consumers. Ensuring that consumers had access to their data was recognised by many as being essential if the benefits of smart metering were to be realised. Concerns were expressed, particularly by energy suppliers but also some meter suppliers, with the proposed operational requirements in relation to the CAD for SMETS 1 meters. The absence of a HAN standard, it was pointed out, could result in consumers being unable to access data through CADs that they had procured which were not compatible with the meter. It was suggested that customers would need to be informed of the capabilities of CAD functionality, including limitations, at the time of installation. A number of energy suppliers commented that it should be clarified that energy suppliers should not have responsibility for the WAN itself as failures could be a result of activity by the DCC, CSP and other parties over which they have no control. Some energy suppliers mentioned difficulties in providing full smart functionality for Foundation meters inherited from other suppliers that had not been enrolled with the DCC. They argued that the obligation for all domestic meters to meet the operational requirements by the end of 2019 could result in increased complexity and costs and could have security implications. However consumer groups argued that once a smart meter was installed it should be operated in smart mode, even after change of supplier. Challenges to providing full functionality to all meters by the 2019 roll-out deadline were mentioned by a few energy suppliers, including the successful development of a end-to-end solution.
Q41	**Do you agree that the licence conditions as drafted effectively underpin the Government's policy intentions for consumer operational requirements?** Most agreed with, or accepted, the concept of setting some requirements in respect of non-domestic customers. Some queried whether Government needed to set rules in this sector, while others suggested that domestic and micro-business customers could be treated identically. Of those who agreed with the concept, some approved of the proposed approach, while others had concerns about creating different rules for different groups of non-domestic customers. There were further concerns about specific issues, including the availability and cost of data. While some energy suppliers were comfortable with the proposal to apply different rules to different parts of the non-domestic sector, a minority were not. They noted the potential complexity of applying different rules to different groups of non-domestic customers, and the difficulty of identifying those groups. A consumer group wanted to strengthen and broaden the requirements, for instance by requiring free data access. It suggested that, if businesses (who were often not very engaged when making decisions about energy-related contracts) had to pay for data, anticipated smart benefits would be reduced. One supplier agreed with this argument.
Q42	**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?**

	While the large majority of respondents to this question agreed that the operational licence conditions underpinned the Government's policy intentions, a number of energy suppliers raised issues with particular conditions. Only a few energy suppliers expressed the view that the licence conditions did not support the Government's aims. Other categories of respondent either fully or broadly supported the proposed licence conditions. Many of the concerns that were expressed centred on the requirements on energy suppliers relating to establishing a WAN link and data to be made available via the HAN. It was suggested that the drafting of the licence conditions needed to reflect that the WAN was not the responsibility of the energy supplier and was dependent on the DCC. The obligation in relation to the CAD was seen by some as inappropriate since the ability of the CAD to function will be determined by factors outside the control of energy suppliers, including where it is located within a consumer's premises and whether it is compatible with the metering system. Other issues raised included the need for greater clarity on the term "licensee's Head End Systems" as it was difficult to interpret whether this was intended to refer to the energy supplier's communications systems for operating smart meters before the DCC was in place or those of the DCC once it had been established.
Q43	**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?** The Government's proposals for obligations to be placed in the SEC for data to be made available to Network Operators and ESCOs were supported by a substantial majority of respondents. Network operator and communications and technology respondents were strongly in agreement with the Government's proposals while energy suppliers tended to be more qualified in their support. Network operators drew attention to the obligation being essential in order for the network benefits of smart metering to be delivered. It was suggested that in addition to making the specified data being available, the DCC should provide services to network operators including meter configuration and responding to commands. The main concern that was expressed by energy suppliers was that it had not been made sufficiently clear how data would be provided to Network Operators and ESCOs for those sites that opt-out or are not enrolled with the DCC and whether this would be required. Some respondents from different sectors argued that data and services should be made available to network operators from non DCC enrolled and opted-out meters. Other issues raised by energy suppliers included the additional costs that would be associated with configuring meters to enable the DCC to supply the services in question and the need for appropriate security and data privacy safeguards to be put in place.
Q44	**Do you agree with the Government's proposals for the timing of the introduction of operational requirements? Please explain your reasoning.** A large majority of respondents to this question, across most sectors, agreed with the Government's proposals for the timing of the implementation of operational requirements. While most energy suppliers agreed with the proposals, some identified issues

	which could threaten the meeting of the timetable as set out in the consultation. A number noted dependencies for meeting the proposed timetable including the specification of HAN and WAN solutions and arrangements for security, assurance and certification. The ability of industry to develop compliant SMETS equipment in the required volume and of energy suppliers to develop their systems and process could also prove important factors. However, one supplier proposed that there should be an exemption for meters installed during the trial phases of suppliers' installation programmes. Network operators also commented that arrangements had yet to be made to enable access to data from non-enrolled meters by the 2019 deadline.
Chapter 7 – Next Steps	
Q45	**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?**
Q46	**Do you agree that the equipment development and availability timelines are realistic? Please give evidence.**
Q47	**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?**
Q48	**What are your views on when responsibility for the SMETS modifications process should transfer from the Government to the SEC?**
Q49	**Which of the options (standing sub-committee or non-standing sub-committee) would you prefer in relation to modifications to the SMETS?**
Q50	**Are there any particular areas of expertise that the sub-committee will need to fulfil its role, in terms of membership composition?** A summary of responses to these questions will be included in Part 2 of the Government Response to the SMETS 2 Consultation.

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