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What stage is this document in the process?

01	Modification Proposal
02	Initial Modification Report
03	Draft Modification Report
04	Final Modification Report

Stage 01: Modification Proposal

SECMCP0007:

Firmware updates to mandated HAN devices

This Modification Proposal proposes including the capability to update firmware Over-The-Air (OTA) for mandated HAN devices (IHD / PPMID / HCALCS) via the DCC's infrastructure.

The Proposer recommends that this Modification should be:



- progressed as a Path 2: Authority Determined Modification

This Modification Proposal should:

- be assessed by a Work Group



High Impact:

This change will impact SMETS2, CHTS and GBCS as well as DCC related documents.

It will impact Energy Suppliers, DCC, Device Manufacturers and Registered Suppliers Agents.

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MODIFICATION PROPOSAL FORM V1.0

1. Proposer's Contact Details

Details of Proposer

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Representative as Point of Contact

Details of Representative's Alternate

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2. Modification Proposal Details

Mod Submission Date	01/03/16
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Title of Mod Proposal:	Firmware updates to mandated HAN devices
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Description in Detail of the Proposed Modification:	<p>Background:</p> <p>The SMIP Technical Specifications (namely SMETS2, CHTS, GBCS and CPA Security Characteristics) currently capture OTA firmware updates via DCC to the CH, ESME and GSME only. Requirements for OTA firmware updates to Mandated HAN devices are not captured. Mandated HAN devices are IHD, PPMID and HCALCS as laid out in the SMIP Technical Specifications. The terms "Mandated HAN devices" and "IHD / PPMID / HCALCS" are used interchangeably throughout this document.</p> <p>Energy suppliers have advocated for a number of years for the inclusion of Mandated HAN devices based on the original agreed industry specifications as captured in the Industry's Draft Technical Specification (IDTS) (link to IDTS document). The latest baselined versions of SMETS2 and GBCS</p>
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do not cover this capability for IHD, PPMID and HCALCS; and DECC has maintained its SMIP position that there are other means to update firmware which do not involve using an OTA update for an IHD, PPMID or HCALCS via the DCC's infrastructure solution. For the avoidance of doubt, OTA upgrade capability for the CH, ESME and GSME is required to be fully functional for DCC Live (Release 1.2).

Energy UK members have identified and undertaken analysis to assess the various options available to carry out a firmware update to these Mandated HAN devices; an options paper ("Options Paper for Firmware Updates on Other HAN Devices" – a copy of this document is embedded in section 6 of this proposal) was produced and shared with DECC. These options included making use of existing capability within the SMIP Technical Specifications as well as using local means to carry out the update.

It was concluded that an enduring solution that delivers a fit for purpose service is required, and that this Modification Proposal supports and enhances the overall consumer smart experience, and that it should be delivered in the form of an OTA firmware update capability using the DCC's infrastructure solution.

Energy Suppliers agreed that not having the ability to carry out OTA firmware updates to these Mandated HAN devices will result in:

- Significant cost impacts for Suppliers associated with:
 - operating multiple OTA and non OTA update processes;
 - stranded assets; and/or
 - site visits to locally update firmware, or replace / remove devices.
- The need for Suppliers to manage multiple processes and systems for firmware updates on all smart metering devices (OTA and non OTA) at consumer premises; there will be additional costs associated with this.
- A realisation of a risk that devices which are not currently OTA upgradable (IHD / PPMID / HCALCS) may lose their ability to communicate on the HAN if there is a ZigBee stack upgrade that needs to be applied to address, for instance, a security related issue. This is especially relevant given that:
 - IHDs and PPMIDs are key to facilitating consumers' access to information;
 - PPMIDs are key to facilitating prepayment functionality; and
 - HCALCS are load affecting devices.
- Limiting the opportunity for value add / future innovation.

The impacts captured in the bullets above will result in a negative consumer experience; they will also add a reputational risk / damage to Suppliers as well as to the SMIP as a whole – thus impacting the overall smart metering benefits case.

Solution:

The solution proposed is to amend the SMIP Technical Specifications to include the capability to update firmware using OTA for mandated HAN devices (IHD / PPMID / HCALCS) – these requirements would need to be underpinned by the relevant SEC obligations and SEC Subsidiary Documents.

This proposal, to be included within the scope of the June 2017 release under the SEC, would require the following changes (subsection A provides a high level process summary):

A. High level process summary:

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In summary, the assumed high-level process for an OTA firmware update on IHDs, PPMIDs and HCALCS involves the following steps:

- Once a firmware image has been developed and gone through appropriate assurance, the Supplier sends a “Distribute Firmware” command containing the firmware image to the GUID of the target IHD or PPMID or HCALCS – this would be a Non-Critical command (‘one-to-many’ broadcast).
- Upon successful verification of the firmware image by the IHD or PPMID or HCALCS, the Supplier receives an alert confirming successful verification.
- Supplier sends an “Activate Firmware” command to the GUID of the target IHD or PPMID or HCALCS – this would be a Critical command (one-to-one broadcast).
- The IHD or PPMID or HCALCS performs the firmware activation and sends a response to the Supplier confirming successful completion.

The above summary process aligns with the current SMIP Technical Specifications (e.g. SMETS2, CHTS and GBCS) for the Supplier to distribute and activate firmware on the ESME and GSME (via an OTA update). The changes required to the SMIP Technical Specifications to cover the proposed new requirements for the IHD, PPMID and HCALCS firmware update (via OTA) process are captured in sub-section 4.2 impacts within this Modification form. There will be consequential changes to other SEC Subsidiary Documents once the base requirements have been updated in SMETS2, CHTS and GBCS.

This proposal seeks to update the SMIP Technical Specifications for the three Mandated HAN devices at the same time. However, if phasing is to be considered for a more optimal delivery of the changes proposed then the order of preference could be as outlined in these two options:

- a) IHD and PPMID in phase 1 and then followed by HCALCS in phase 2; or
- b) Current Type 1 devices (PPMID and HCALCS) in phase 1 and then followed by Type 2 devices (IHD) in phase 2.

It is expected that as part of the Modification Process and its impact assessment, the Technical Sub-Committee will have a view on the optimal delivery approach for this proposal. That delivery approach could be all three Mandated HAN devices at the same time or via a phased approach as captured in options (a) or (b) above.

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3. Path Type and Urgency Recommendation

Proposer's recommendation on Path Type (delete as appropriate)::	Path 2
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Statement for recommended Path Type::
The proposal satisfies one or more of the criteria for a Path 2 Modification and a Path 2 is therefore recommended.

Statement of whether Proposal is intended to be Fast-Track Modification (only raise this type of Modification):
N/A – Not a Fast-Track Modification.

Is the Proposal Urgent? (delete as appropriate):	No
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Statement of whether Proposal should be treated as an Urgent Proposal:
N/A – Not an urgent Modification

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4. Modification Impact Assessment

4.1 SEC Objectives

Facilitation of SEC Objectives	Tick
General SEC Objectives (C1.1)	
(a) the first General SEC Objective is to facilitate the efficient provision, installation, and operation, as well as interoperability, of Smart Metering Systems at Energy Consumers' premises within Great Britain;	<input checked="" type="checkbox"/>
(b) the second General SEC Objective is to enable the DCC to comply at all times with the General Objectives of the DCC (as defined in the DCC Licence), and to efficiently discharge the other obligations imposed upon it by the DCC Licence;	<input type="checkbox"/>
(c) the third General SEC Objective is to facilitate Energy Consumers' management of their use of electricity and gas through the provision to them of appropriate information by means of Smart Metering Systems;	<input checked="" type="checkbox"/>
(d) the fourth General SEC Objective is to facilitate effective competition between persons engaged in, or in Commercial Activities connected with, the Supply of Energy;	<input checked="" type="checkbox"/>
(e) the fifth General SEC Objective is to facilitate such innovation in the design and operation of Energy Networks (as defined in the DCC Licence) as will best contribute to the delivery of a secure and sustainable Supply of Energy;	<input type="checkbox"/>
(f) the sixth General SEC Objective is to ensure the protection of Data and the security of Data and Systems in the operation of this Code;	<input checked="" type="checkbox"/>
(g) the seventh General SEC Objective is to facilitate the efficient and transparent administration and implementation of this Code.	<input type="checkbox"/>
Transition Objective (X1.2)	
X1.2 The objective to be achieved pursuant to Section X: Transition is the efficient, economical, co-ordinated, timely, and secure process of transition to the Completion of Implementation.	<input type="checkbox"/>
Charging Objectives (C1.3) (in respect of the Charging Methodology)	
C1.4 The First Relevant Policy Objective:	<input type="checkbox"/>
<p>(a) applies in relation to Smart Metering Systems installed (or to be installed) at Domestic Premises; and</p> <p>(b) requires the Charging Methodology to ensure that Charges (other than Charges for Elective Communication Services) in respect of such Smart Metering Systems do not distinguish (whether directly or indirectly) between Energy Consumers at Domestic Premises in different parts of Great Britain.</p>	

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C1.5 The Second Relevant Policy Objective is that, subject to compliance with the First Relevant Policy Objective, the Charging Methodology must result in Charges that:

- (c) facilitate effective competition in the Supply of Energy (or its use) under the Electricity Act and the Gas Act;
- (d) do not restrict, distort, or prevent competition in Commercial Activities that are connected with the Supply of Energy under the Electricity Act and the Gas Act;
- (e) do not deter the full and timely installation by Energy Suppliers of Smart Metering Systems at Energy Consumers' premises in accordance with their obligations under the Energy Supply Licence; and
- (f) do not unduly discriminate in their application and are reflective of the costs incurred by the DCC, as far as is reasonably practicable in all of the circumstances of the case, having regard to the costs of implementing the Charging Methodology.



Statement of how the proposed variation would better facilitate the achievement of the SEC Objectives:

Please outline your reason for raising this Modification and how implementation of the variation would better facilitate the achievement of one or more of the SEC Objectives, than if the variation were not made.

This Modification Proposal would facilitate the achievement of SEC Objective:

- a) because it would provide for a fit for purpose, efficient and effective process for updating firmware on the IHD, PPMID and HCALCS. It would additionally allow Energy Suppliers to avoid unnecessary costs relating to replacement of devices and site visits thus helping to ensuring the sustainability of devices for the longer term.
- c) because it would allow consumers to better manage their energy usage by having sustainable most-up-to-date devices that provides them with energy related information.
- d) because it would allow Energy Suppliers to use a fit for purpose, efficient and effective process for updating firmware on the IHD, PPMID and HCALCS – this process would be consistent between all Energy Suppliers as well as aligned to the process for updating firmware on the ESME and GSME.
- f) because it would cover any potential security vulnerabilities on the IHD, PPMID or HCALCS that may need be addressed using a fit for purpose, efficient and effective process for updating firmware on these devices.

4.2 Impacts

Statement of impact on Greenhouse Gas Emission:

Although it would be difficult to quantify whether there is a material impact on Greenhouse Gas Emissions, the proposal will have positive impact as it removes the requirement to carry out vehicle site visits to replace devices or update their firmware. It also reduces the instances of devices becoming redundant and thus needing to be disposed of due to outdated technical capability.

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High-level changes required to SMETS2, CHTS and GBCS:

Document	Required Changes
SMETS2	<p>This includes the following items:</p> <ul style="list-style-type: none"> Add a new SMETS2 section 9 to cover “Variant HAN Devices”. The purpose of this discrete / new section is to capture additional requirements over and above the existing base requirements for IHDs, PPMIDs and HCALCS (in existing sections 6, 7 and 8). The discrete / new section will allow Suppliers to have optionality in procuring devices that are OTA or non OTA upgradable. It will not impact manufacturers who are currently developing non OTA upgradable devices based on the existing base SMETS2 requirements. Thus, a manufacturer can choose to develop non OTA upgradeable devices based on the current SMETS2 base requirements; and / or OTA upgradable devices with the new section 9 functionality. Add commands for firmware distribution and activation to IHD, PPMID and HCALCS in the new SMETS2 section (Variant HAN Devices). Add alerts for firmware verification for IHD, PPMID and HCALCS in the new SMETS2 section (Variant HAN Devices). Add security related coverage for IHD, PPMID and HCALCS in the new SMETS2 section (Variant HAN Devices). Add Firmware Version as an Operational data item for IHD, PPMID and HCALCS in the new SMETS2 section (Variant HAN Devices). Add a “Read Operational Data” command (to allow reading of the Firmware Version) to IHD, PPMID and HCALCS in the new SMETS2 section (Variant HAN Devices). Add coverage of IHD Security Credentials to enable receipt of remote commands, capturing the relevant certificates, in the new SMETS2 section (Variant HAN Devices). Note: a variant IHD (with OTA firmware update capability) would make this variant IHD a Type 1 device Add Device Log as a data item for IHD in the new SMETS2 section (Variant HAN Devices). Add a new glossary item “Variant HAN Device” to cover the new proposed variant IHD / PPMID / HCALCS. Or, add new glossary terms “Variant IHD”, “Variant PPMID” and “Variant HCALCS”.
CHTS	<p>These are as follows:</p> <ul style="list-style-type: none"> Add buffering coverage for commands destined to IHD, PPMID and HCALCS. Consider output from the DECC TSIRS work (including relevant IRPs being developed by DECC): <ul style="list-style-type: none"> these relate to the current CH minimum capability of 750kbytes per firmware image (as defined for ESME / GSME firmware updates) – it is assumed that IHD / PPMID functionality that involves sophisticated screen features can carry a more substantial firmware image size compared to that of an ESME or GSME. it may need to consider any timeout implications for the IHD and PPMID given that their power on / off status is under the control of the customer (the IHD or PPMID may be switched off when a Supplier tries to initiate an OTA firmware update). allowing firmware image patching (via IRP394 “Firmware Image Contents” which proposes clarifications to GBCS) is likely to impact this functionality; it may further complicate the firmware management process.
GBCS	<p>Various sections will need updating to reflect the above additions to the base requirements; these include:</p> <ul style="list-style-type: none"> New Use Cases for IHD / PPMID / HCALCS to cover: <ul style="list-style-type: none"> firmware distribution (Non Critical command); firmware activation (Critical command); and reading of the Firmware Version data item. New Alerts to cover IHD / PPMID / HCALCS firmware verification. Extend the coverage of firmware image construction and transport to IHD / PPMID / HCALCS. ZSE implementation coverage for IHD, PPMID and HCALCS having a ZSE OTA as a Client.

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| | <ul style="list-style-type: none"> • Ensure alignment with the latest IRPs (noted in the CHTS requirements above) linked to the DECC TSIRS work. • Ensure alignment with the new SMETS2 concept of variant IHD / PPMID / HCALCS. |
|--|--|

The proposed changes above to the SEC Technical Specifications (SMETS2 / CHTS / GBCS) will need to be underpinned by SEC obligations to govern them. Additionally, the CPA Security Characteristics will need to be aligned with the new requirements; and the SEC Certified Products List will need to reflect the inclusion of device types IHD, PPMID and HCALCS.

There will be consequential changes required as a result of the above to a number of DCC products as the changes will need to be reflected within them – these DCC products are (but not limited to):

- DUIS and MMC to reflect the new commands, responses and alerts for IHD, PPMID and HCALCS firmware related messages. Consideration needs to be given on whether coverage is required in CH Support Materials.
- Inclusion of an IHD, PPMID and HCALCS Firmware Version on the Smart Metering Inventory.
- Consideration of whether a new device type / variant (for IHD / PPMID / HCALCS) is required to align the requirements proposed for the baselined SMETS2 section (Variant HAN Devices).
- It intended that the above changes will be required to be part of the core DCC service.

IHDs, PPMIDs and HCALCS will require the necessary hardware to cover security chips and 2-way communication interfaces (relevant to the proposed new Variant IHD only (with OTA firmware update capability) – this would make a variant IHD a Type 1 device) to facilitate their receipt of the firmware distribution and activation commands and the relevant alerts / responses relating to them.

Assurance of the overall process will need to be considered – this includes activities such as interface testing with DCC as well as device level certification and testing. The Firmware Management Design Note will need updating to reflect changes to the process as specified above.

Statement of impact on likely changes to other Energy Codes:

There are no impacts on other Energy Codes

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Statement of impact on likely Party Categories:

Large Supplier Parties	<input checked="" type="checkbox"/>	Small Supplier Parties	<input checked="" type="checkbox"/>
Electricity Network Parties	<input type="checkbox"/>	Gas Network Parties	<input type="checkbox"/>
Other SEC Parties	<input type="checkbox"/>		
Energy Suppliers are responsible for the procurement, installation and maintenance of SMETS2 devices in customers' premises. They have an obligation to ensure devices are operating as they should be and therefore a fit for purpose firmware management process covering all mandated devices would support Energy Suppliers in delivering their obligation consistently.			

Statement of impact on Central Systems:

DCC Systems	<input checked="" type="checkbox"/>	User Systems	<input checked="" type="checkbox"/>
Smart Metering Systems and/or Communications Hubs	<input checked="" type="checkbox"/>	Other (i.e. on Smart Metering Key Infrastructure, or security)	<input type="checkbox"/>
<p>The proposed change impacts Energy Suppliers systems, DCC systems and the following devices as covered by CHTS and SMETS2 respectively:</p> <ul style="list-style-type: none"> • CH. • IHD, PPMID and HCALCS. 			

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5. Proposed Timetable

Proposed Timetable for Modification Proposal:

Implementation would be desired as soon as possible in time for Release 2 (post DCC Live). The proposed changes are likely to be complex and require careful consideration and orchestration and will therefore need a Working Group assessment ahead of any consultation on it.

The proposed timetable below has been put together built around a June 2017 Release 2 implementation date, noting that the implementation date may need to be flexible, based on the necessary implementation (and testing lead times), if the Modification Proposal is approved.

The timetable includes some assumed timescales for the turnaround of DCC detailed Impact Assessments (40 Working Days) and Authority (SoS) determination (25 Working Days),

The timetable does not currently capture the 3 month EC notification. The changes associated with this Modification Proposal may require EC Notification as part of the Authority (SoS) approval process. Modification require EC Notification as part of the Authority (SoS) approval process.

Stage	Start	Finish
Stage 1 - Modification Proposal Raised	Thu 18/02/16	Fri 04/03/16
Stage 2 - Panel reviews IMR	Mon 07/03/16	Fri 11/03/16
Stage 3 - Refinement process*	Mon 21/03/16	Fri 02/09/16
Working Group 1	March 2016	
Working Group 2	May 2016	
Working Group 3	July 2016	
WG Consultation	August 2016	
Working Group 4	August 2016	
Stage 4 - Modification Report stage**	Mon 05/09/16	Wed 12/10/16
Stage 5 - Change Board vote	Thu 13/10/16	Wed 19/10/16
Stage 6 - Authority Decision	Thu 20/10/16	Fri 25/11/16
Implementation	June 2017	

*The Refinement Process includes several additional steps, which will be outlined in more detail in the Initial Modification Report.

** Includes second consultation on the Modification Proposal, followed by Panel's review of the Draft Modification Report, and Panel's decision on whether to proceed to a Change Board vote on the Modification Proposal.

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6. Additional Information

Additional information:

We believe that implementing this proposal will have these likely impacts on industry:

- Cost and benefits:
 - There will be costs associated with hardware development of the IHD, PPMID and HCALCS; as well as costs as a result of changes to DCC and Suppliers systems.
 - The benefits to the consumer are providing a fit for purpose, efficient and effective process for updating firmware on the IHD, PPMID and HCALCS devices.
 - Suppliers will be able to avoid unnecessary costs relating to replacement of devices and site visits; this will also help ensure the sustainability of devices for the longer term.
 - These combined benefits will support the benefit realisation in the Government's Impact Assessment for the SMIP.
- Time: it is intended that the change is progressed on the basis of post DCC Live implementation so that there is no impact on the current DCC Live delivery timescales.
- Regulatory / legal: the implementation of this proposed change will allow Suppliers to better deliver their consumer experience by having a fit for purpose, efficient, consistent and effective process in place for managing firmware on their devices – this will need to be underpinned by robust regulatory requirements where appropriate.
- Risks / issues: these will relate to the impact of change on manufacturers of IHDs / PPMIDs / HCALCS; and the changes required to DCC / Suppliers systems. Ensuring that any risks / issues are appropriately managed will be key to successfully delivering the proposed changes.
- Testing: any new functionality (be it changes to DCC systems and/or devices) will need to undergo the relevant testing, certification or assurance where appropriate.
- Environmental: the proposed change will have a positive impact as it removes the requirement to carry out site visits to replace devices or update their firmware. It also reduces the instances of devices becoming redundant and thus needing to be disposed of due to outdated technical capability.

Embedded document “Options Paper for Firmware Updates on Other HAN Devices”:



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APPENDIX 1: Glossary of Terms

The table below illustrates useful definitions of the terms used in this form. If you require any further information please contact the [SECAS Helpdesk](#).

Term	Definition
DCC Systems	Means the Systems used by the DCC and/or the DCC Service Providers in relation to the Services and/or this Code (Section A1, SEC Stage 3.0). The Proposer may wish to consider anticipated impacts on the DCC Licensee's enterprise systems (e.g. billing) or the Data Service Provider or Communications Service Providers.
Fast-Track Modifications	Means Modification Proposals (Path 4 Modifications) to correct typographical or other minor errors or inconsistencies to the Code (Section D2.8, SEC Stage 3.0).
General SEC Objectives	Has the meaning given to that expression in Section C1 (SEC Objectives) (Section C1, SEC Stage 3.0). The SEC Objectives are those objectives that the SEC has been designed to achieve.
Greenhouse Gas Emission	Means emissions of Greenhouse Gases, as defined in section 92 of the Climate Change Act 2008 (Section A1, SEC Stage 3.0).
Other Systems	Other systems identified in the section Statement of Impact on Central Systems. The Proposer may wish to consider Prepayment vendors, Electricity Central Online Enquire Service (ECOES), Single Centralised Online Gas Enquiry Service (SCOGES), BSC Settlement Systems, etc.
Path Type	Means the Modification Path to be followed in respect of a Modification Proposal. The type of Path will depend upon the nature of the variation proposed in the Modification Proposal (D2.1, SEC Stage 3.0). The four Modification Paths under the SEC are: <ul style="list-style-type: none"> • Path 1 Modifications: Authority-led (Section D2.4/D2.5, SEC Stage 3.0) • Path 2 Modifications: Authority Determination (Section D2.6, SEC Stage 3.0) • Path 3 Modifications: Self-Governance (Section D2.7, SEC Stage 3.0) • Path 4 Modifications: Fast-Track Modifications (Section D2.8, SEC Stage 3.0)

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Party Category	<p>Means one of the following categories:</p> <ul style="list-style-type: none"> (a) the Large Supplier Parties collectively; (b) the Small Supplier Parties collectively; (c) the Electricity Network Parties collectively; (d) the Gas Network Parties collectively; or (e) the Other Sec Parties collectively. <p>(Section A1, SEC Stage 3.0).</p>
Smart Metering Systems	<p>Means a system installed at premises for the purposes of the Supply of Energy to the premises that, on the date it is installed, as a minimum;</p> <ul style="list-style-type: none"> (a) consists of the apparatus identified in; (b) has the functional capability specified by; and (c) compiles with the other requirements of, <p>the Smart Metering Equipment Technical Specification that is applicable at the date (Section A1, SEC Stage 3.0).</p> <p>In summary, this includes:</p> <ul style="list-style-type: none"> • Gas Smart Metering Equipment; • Electricity Smart Metering Equipment; • In Home Display; • Prepayment Interface Device; and • HAN Connected Auxiliary Load Control Switch.
Urgent Proposal	<p>Means a Modification Proposal deemed an Urgent Proposal where the Authority directs the Panel to treat the Modification Proposal as an urgent Proposal (whether following a referral by the Panel pursuant to Section D4.5, or at the Authority's own initiation) (Section D4.5/D4.6, SEC Stage 3.0).</p>
User Systems	<p>Means, in respect of each User (DCC User), the Systems of that User (including, where relevant, those of its Supplier Nominated Agent) used in relation to the Services and/or Smart Metering Systems (Section A1, SEC Stage 3.0).</p> <p>The Proposer may wish to consider Suppliers; Network Operators; Registration Data Providers; Other DCC Users (e.g. Authorised Third Parties / Switching Sites); Supplier Nominated Agents.</p>

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