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DEPARTMENT OF ENERGY & CLIMATE CHANGE

Smart Metering Implementation Programme

Response to Prospectus Consultation

Functional Requirements Catalogue

Appendix to Support Document 3 of 5
Design Requirements

March 2011

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If you would like alternative formats of this consultation document, such as Braille, audio cassette or large print, these are available on request - please contact us at the address below. This also includes a Welsh language version.

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1. Overview

1.1. This document is an appendix to the third of five supporting documents to the Government's response to consultation. It relates to the minimum functional requirements for the smart metering system, as discussed in Chapter 4 of the Government response overview document.

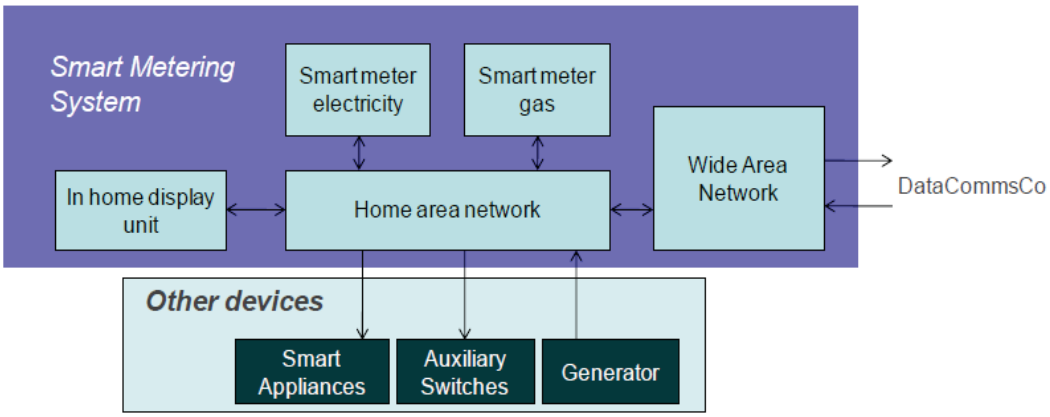
1.2. This document is complemented by the "Design Requirements" supporting document and its appendices. The "Design Requirements" supporting document includes further information related to proposals and decisions described in this document. Its appendices provide a summary of the consultation responses relating to the Statement of Design Requirements published alongside the Prospectus.

Overview of the scope of the functional requirements

1.3. The Smart Metering System Functional Requirements Catalogue (the "Catalogue"), published alongside the Prospectus, described the minimum functional requirements required to deliver the benefits set out in the Government's updated impact assessment.

1.4. The functional requirements are a description of what the smart metering equipment must deliver and not how it will deliver it. As such, multiple solutions may be possible using a variety of equipment. The scope of the requirements covers the smart metering equipment and associated communication interfaces. Figure 1 represents this as published in the Prospectus. It is not intended to define a particular architecture.

Figure 1 - Scope of Functional Requirements Catalogue (from the Prospectus)



1.5. The Catalogue published alongside the Prospectus proposed a set of minimum functional requirements for the smart metering equipment that could then be developed into technical specifications. Close attention will be paid to the need to achieve interoperability in developing the technical specifications.

1.6. One hundred and nineteen (119) functional requirements were presented in the Catalogue and categorised in logical sections. The Catalogue identified those functional requirements which were considered applicable to domestic, non-domestic or both sectors.

1.7. Following the consultation and analysis the government has concluded on a number of revisions to the functional requirements within the Catalogue. Just over five percent of requirements were removed, the text in a number refined and one added. The changes broadly cover:

- The removal of seven requirements is made on the grounds or redundancy or being overly technology prescriptive
- An additional requirement that currently exists in smart meter designs is included as a safety feature and carries no additional costs
- For both outage management and data storage at the meter, we will retain the functional requirement subject to further refinement during the development of the technical specification.

2. Functional Requirements Catalogue

Presentation of functional requirements

1.1. The functional requirements set out in this section are the minimum requirements that smart metering equipment should provide when installed as part of the rollout. The functional requirements are presented in tabular form as shown below:

Requirement	The requirement expressed as a sentence.
ID	The unique identifier for the requirement.
Narrative	An explanation of the requirement and its context.
Justification	Basis for inclusion. For example legislation, high-level list (The A-H list), or on the basis of our analysis of suggestions from stakeholders.
Domestic/Non-domestic	Does the requirement apply to the domestic (D) sector, non-domestic (ND) sector or both.
Change / Reason	Proposed change, with underlying justification, to the requirement as a result of consultation.

1.2. The functional requirements have been split into a number of logical sections. These sections are:

- Installation and Maintenance (IM)
- Operational (OP)
- Display and Storage (DS)
- Interoperability (IN)
- Prepayment and Credit (PC)
- Electricity Specific (ES)
- Gas Specific (GS)
- Diagnostics (DI)
- Security and Privacy (SP)
- HAN (HA)
- WAN (WA)
- IHD (IH).

Functional Requirements Catalogue

Installation and Maintenance Requirements

1.3. The installation and maintenance requirements relate to aspects of the smart metering equipment such as minimising consumer inconvenience during installation or any subsequent maintenance.

Requirement	The smart metering equipment components shall be installable in current existing meter locations at consumer premises.
ID	IM.1
\Narrative	Smart meters should be a like for like replacement in the majority of locations.
Justification	To minimise disruption for the majority of consumers. There will be exceptions for meters in difficult to reach locations.
Domestic/Non-domestic	D/ND
Change/Reason	Reword: clarified to “at consumer premises” as meters can be inside and outside consumer premises. Original: The smart metering system components shall be installable in current existing meter locations in consumer premises.

Requirement	The smart metering system shall enable remote firmware upgrades.
ID	IM.2
Narrative	This avoids premises visits in the event that the software running on the meter needs changing. Does not include metrological firmware.
Justification	High-level list B
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support in situ exchange of WAN communication technology (without removal of meter).
ID	IM.3
Narrative	Encourages modular design to minimise costs associated with whole meter exchange.
Justification	Offsets risks associated with WAN life being less than 15 years.
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall resume normal operation without technician intervention after a failure in the metering system power supply.
ID	IM.4
Narrative	The system should "reboot" without the need for any physical intervention at the meter.
Justification	Impact assessment
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system components shall be uniquely identifiable electronically where applicable.
ID	IM.5
Narrative	Meters, communications modules, etc. must have a unique electronic identifier for audit trail purposes.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system components shall be uniquely identifiable physically where applicable.
ID	IM.6
Narrative	Meters, communications modules, etc. must have a label/engraving with a unique identifier.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system components' batteries shall only be exchangeable by authorised personnel.
ID	IM.7
Narrative	Members of the public must not be able to exchange or remove the batteries. Effected by use of, for example, through seals. Excludes in-home display.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system components shall support local access and configurability by authorised personnel.
ID	IM.8
Narrative	For example to check/change the settings of the meter.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall allow in situ maintenance for non safety critical maintenance.
ID	IM.9
Narrative	For example, changing any batteries without having to disconnect the gas supply or changing modules in the meter without supply interruption or meter exchange.
Justification	Consumer (shorter premises visits)
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support remote identification (by authorised parties) of devices attached to the HAN.
ID	IM.10
Narrative	This will help with help desk calls. Subject to consumer consent.
Justification	High-level list B
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support a simple installation without the need for manual data entry to the system components.
ID	IM.11
Narrative	Implies that meters should be supplied pre-configured or are configured by, for example, an installer using a simple handheld unit.
Justification	Consumer (shorter premises visits)
Domestic/Non-domestic	D/ND
Change/Reason	Reword. Clarification to allow other mechanisms for simple installation. “Simple installation” is less prescriptive than the original wording. Original: The smart metering system shall self configure on installation without the need for manual data entry to the system components.

Requirement	The smart metering system shall be installed and maintained in a manner that protects public safety.
ID	IM.12
Narrative	All smart metering equipment must conform to all applicable safety legislation and standards. For example, The International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines on limiting human exposure.
Justification	Public safety and Health and Safety at Work
Domestic/Non-domestic	D/ND
Change/Reason	No change

Operational Requirements

1.4. The operational functional requirements relate to aspects of the smart metering equipment such as timing, power consumption, minimum modes of operation and fault recovery.

Requirement	The smart metering equipment components shall not rely on systems or services that are owned or operated by third parties, including consumers, where there is no specific provision to ensure the availability of such systems or services.
ID	OP.1
Narrative	Billing cannot depend on any form of consumer interaction such as line rental or payment for energy to power the system components.
Justification	Existing obligation and high-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to include other third parties and not just consumers. Original: The smart metering system components necessary for remote reading in the consumer premises shall operate independently (normal operating conditions) of any consumer interaction (including provision of energy supply and communications).

Requirement	The smart metering system shall use UTC for all timing functions/date & timestamps.
ID	OP.2
Narrative	UTC is Coordinated Universal Time which is another name for GMT (Greenwich Mean Time). This avoids confusion over time changeovers during the year.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support “last gasp” communications to notify loss of energy supply.
ID	OP.3
Narrative	Last gasp is the ability, in the event of supply interruption greater than a few minutes, for the smart metering system to communicate this event before reverting to any back up supply (for example to keep the legal metrology function active)
Justification	High-level list B (remote diagnostics)
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system components at the consumer premises comprising single phase electricity meter, communications module, and a mandated IHD shall consume no more than 4.6W combined when averaged and under quiescent operating conditions.
ID	OP.4
Narrative	Limits the amount of energy used to operate the system. Mandated equipment only. Assumes a current baseline of 2W as defined in EN standards plus 2.6W set out in the impact assessment. Meter variants shall meet this unless otherwise specified.
Justification	Impact assessment
Domestic/Non-domestic	D/ND
Change/Reason	Reword. Clarification that 2.6W in the impact assessment is in addition to a baseline defined in a current EN standard for electricity meters. Original: The smart metering system components in the consumer premises shall consume less than 2.6W average combined.

Requirement	The smart metering system time shall be accurate to within 0.5s within 24 hours.
ID	OP.5
Narrative	For example, EN IEC 62054-21 sets time standard for electricity metering. Alternative standards may also be applicable.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarity and ability to reference to existing EN standard rather than a code of practice. Original: The smart metering system time shall be accurate to within 20 seconds of UTC.

Requirement	The smart metering system shall support a default mode of operation which is the minimum functionality.
ID	OP.6
Narrative	In the event of a supplier switch/fault condition there should be a default mode of operation (as some suppliers may exceed minimum requirements).
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support firmware upgrades while maintaining normal metrology functionality.
ID	OP.7
Narrative	Metrology software must be unaffected.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall be designed such that, if the enablement/disablement mechanism has interrupted the consumer's supply, the restoration of this supply cannot occur without reliable local intervention.
ID	OP.8
Narrative	For safety reasons, a user should be in the premises when the supply is re-enabled in order to check that all appliances etc. have been switched off. See also GS.10. Networks require remote disablement and enablement of electricity without local intervention which conflicts with this requirement. Further work will be required to resolve this.
Justification	Consumer/safety
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification that local intervention is required after all meter disablement events regardless of whether the meter was disabled locally or remotely. Original: The smart metering system shall enable robust and reliable local (in consumer premises) user interaction to re-enable energy supply in the event of activation of the enablement mechanism.

Display and Storage Requirements

1.5. The display and storage functional requirements cover the visual interfaces of the smart metering equipment within the consumer premises as well as data storage. It should be noted that the European Measuring Instruments Directive (MID) also sets out specific requirements for the display of consumption data.

Requirement	The smart metering system shall display any currency information using £ and pence (but be Euro compatible).
ID	DS.1
Narrative	Possible future proofing in the event of currency change over 20 year operational life.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to broaden requirement beyond billing information. Original: The smart metering system shall display any billing information using £ and pence (but be Euro compatible).

Requirement	The smart metering system shall be capable of storing 13 months of half hourly (kWh and cubic metres) consumption data.
ID	DS.2
Narrative	Allows analysis of usage profile by the consumer or suppliers and 3rd parties (subject to consumer approval).
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	Reword: (i) 12 months has been changed to 13 months to allow comparison of months over an annual cycle and (ii) kWh and cubic metres added for clarity. Original: The smart metering system shall be capable of storing 12 months of half hourly consumption data.

Requirement	The smart metering system shall support display of mode of operation (credit or prepayment).
ID	DS.3
Narrative	Can be implemented on meter and IHD for consumer information.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change.

Requirement	The smart metering system shall display energy supply status (enabled or disabled).
ID	DS.4
Narrative	Can be implemented on meter and IHD. Could help in fault situations. May not be possible to rely on IHD alone.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall display local time unambiguously (where it is displayed).
ID	DS.5
Narrative	To avoid consumer confusion between UTC/GMT and British Summer Time (BST). Does not apply to time stamps.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support erasure of data stored locally.
ID	DS.6
Narrative	For example when a consumer moves house. Must be done within the constraints of the MID.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, there are some registers and previous consumption that should not be cleared (keeping data protection in mind). Original: The smart metering system shall support erasure of any consumption data stored locally.

Requirement	The smart metering system shall support the provision of information in a manner that takes account of the requirements of persons with disabilities.
ID	DS.7
Narrative	Covers any service offered by suppliers such as IHDs, websites, etc. Guidelines will be developed in the absence of suitable standards.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support English and Welsh language for any human communication.
ID	DS.8
Narrative	Ensures consumers are able to understand messages, commands and instructions.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall unambiguously identify all of its registers.
ID	DS.9
Narrative	In the event of multiple registers it must be easy to distinguish them.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Interoperability Requirements

1.6. The interoperability functional requirements set out the minimum levels of technical interoperability of the smart metering system. Technical interoperability is the ability for different smart metering system components to exchange data and work together independent of manufacturer. This ensures that different suppliers can install in premises without having to change existing equipment at change of supplier, thereby minimising disruption to the consumer.

Requirement	The smart metering system shall be capable of supporting at least two suppliers (i.e. for gas and electricity) in the same premises as well as switching between any licensed suppliers.
ID	IN.1
Narrative	Technical interoperability requirement. Similar to that in other smart meter functional specifications. Two suppliers will be the norm, in the future there may be more than two (eg additional suppliers for export).
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to specify the number of suppliers. Original: The smart metering system shall be capable of supporting two different suppliers (i.e. for gas and electricity) in the same premise as well as switching between any licensed suppliers.

Requirement	The smart metering system shall allow for change of supplier remotely without premises visit.
ID	IN.2
Narrative	Technical interoperability requirement. Similar to that in other smart meter functional specifications.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support non proprietary data formats for provision of data to consumers.
ID	IN.3
Narrative	Where consumers receive data electronically it should be in a format that can be read by freely available software (eg .txt, .csv files)
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Prepayment and Credit Requirements

1.7. The prepayment and credit functional requirements define a common level of functionality associated with credit tariffs and prepayment, including operation in the event of WAN not being available.

Requirement	The smart metering system shall be remotely switchable between prepayment and credit mode of operation.
ID	PC.1
Narrative	Allows payment options to be remotely configurable without the need for a visit to the consumer's premises.
Justification	High-level list F
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support prepayment mode of operation via remote top-ups.
ID	PC.2
Narrative	A number of remote top up options (eg shop, phone, internet, cash machine etc.) are possible.
Justification	High-level list F
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, reference to tokenless payment removed as remote top up implies tokenless top ups with respect to the meter. Original: The smart metering system shall support "tokenless" prepayment mode of operation via remote top ups.

Requirement	The smart metering system operating in prepayment mode shall support remote configuration of emergency/friendly credit.
ID	PC.3
Narrative	Replicates the functionality found in some current prepayment systems. Covers requirements around energy supply overnight, during weekends and public holidays.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system operating in prepayment mode shall support remote configuration of debt recovery.
ID	PC.4
Narrative	Replicates the functionality found in some current prepayment systems.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system operating in prepayment mode shall be capable of maintaining supply to premises independent of WAN communications.
ID	PC.5
Narrative	Mainly for use in exceptional situations (emergencies, unreliable WAN, etc.).
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall store the history of the last 10 debt payments (of each type) from the meter balance/vend and synchronise this data with the head-end system. The payment history shall be retained in the smart metering system and be capable of being displayed locally and shall, as a minimum, include the last five top ups in prepayment/Pay-As-You-Go mode with amount, dates and times.
ID	PC.6
Narrative	Replicates the functionality found in some current prepayment systems.
Justification	Consumer
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, the quantity of data stored for 3 months varies per customer, so quantitative values have been added. Original: The smart meter operating in prepayment mode shall store top up, debt recovery, and emergency credit history for the last 3 months.

Requirement	The smart metering system shall store data used for billing and settlement purposes for at least 3 months.
ID	PC.7
Narrative	This depends on the tariff the consumer is on (i.e. quarterly read would see only one reading stored). MID requirement (Annex MI-003) requires that "…the amount of electrical energy measured shall remain available for reading during a period of at least 4 months". This refers to the availability of the display, and not data storage.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Removed non-volatile memory as it could be technology prescriptive. Original: The smart metering system shall store data used for billing and settlement purposes for at least 3 months in non volatile memory.

Requirement	The smart metering system shall support real time (defined here as 30 minutes) remotely and locally configurable tariff structures (tiers and rates).
ID	PC.8
Narrative	This covers current tariffs as well as future one such as: time-of-use (TOU), critical peak (electricity), real time, block (tiered) tariff structures.
Justification	High-level list D
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification around real time in the context of this requirement. Original: The smart metering system shall support real time remotely configurable tariff structures.

Requirement	The electricity smart meter shall support at least 48 configurable time-of-use periods for its consumption registers.
ID	PC.9
Narrative	Minimum requirement for half hourly settlement (eg COP 10).
Justification	Balancing and Settlements Code
Domestic/Non-domestic	D/ND
Change/Reason	Remove. Redundant, as covered in reworded PC.8

Requirement	The smart metering system operating in prepayment mode shall support local credit top up.
ID	PC.10
Narrative	For example over the HAN, in the event of WAN difficulties or difficult to reach meters.
Justification	Consumer groups
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart meter system shall support prompt and timely register of remote top ups.
ID	PC.11
Narrative	For example, within 30 minutes of a consumer making a payment.
Justification	Consumer groups
Domestic/Non-domestic	D/ND
Change/Reason	No change

2.1. NOTE: Output from prepayment workshops organised by the programme and subsequent documents submitted to the Programme on prepayment issues have been noted (eg possibility of wired interfaces and enhanced IHD for prepayment). Functional requirements and Use Cases will be developed in Phase 2 to reflect this.

Electricity Specific Requirements

1.8. The functional requirements associated with electricity include enablement/ disablement, registers for consumption and demand data, smart grids data and support for load control.

Requirement	The smart metering system shall support remote enablement and disablement of supply into the consumer premises.
ID	ES.1
Narrative	For example, through use of a contactor within the smart metering system.
Justification	High-level list F
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification with respect to disablement/disconnection and enablement/connection. Original: The smart metering system shall support remote connect and disconnect of supply into the consumer premises.

Requirement	The smart metering system shall support at least one total register for cumulative import kWh.
ID	ES.2
Narrative	For metering active energy flow into the premises. MID requirement.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarifies that this refers to a legal metrology register Original: The smart metering system shall support at least one total register for import kWh.

Requirement	The smart metering system shall support at least one total register for cumulative export kWh.
ID	ES.3
Narrative	For metering active energy flow out of the premises where the consumer has installed microgeneration capability. MID requirement.
Justification	High-level list G
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarifies that this refers to a legal metrology register. Original: The smart metering system shall support at least one total register for export kWh.

Requirement	The smart metering system shall support at least one total register for cumulative import kVarh.
ID	ES.4
Narrative	Reactive energy measurement capability.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarifies that this refers to a legal metrology register. Original: The smart metering system shall support import kVarh measurement.

Requirement	The smart metering system shall support at least one total register for cumulative export kVarh.
ID	ES.5
Narrative	Reactive energy measurement capability.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	Reword. Clarifies that this refers to a legal metrology register. Original: The smart metering system shall support export kVarh measurement.

Requirement	The smart metering system shall support import kW measurement.
ID	ES.6
Narrative	Expected to be stored for 3 months as kWh at half hourly intervals. (Dependent on DS.2 (13 months storage)).
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support export kW measurement.
ID	ES.7
Narrative	Expected to be stored for 3 months at half hourly intervals.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support import kVAr measurement.
ID	ES.8
Narrative	Network requirement, may have to be stored for 3 months at half hourly intervals.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support export kVAr measurement.
ID	ES.9
Narrative	Network requirement, may have to be stored for 3 months at half hourly intervals.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support measurement of other power quality data including: RMS voltage, over/under voltage, sag/swell.
ID	ES.10
Narrative	Network requirement, RMS voltage may have to be stored for 3 months at half hourly intervals.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification in line with network requirements. Original: The smart metering system shall support measurement of other power quality data including: voltage, frequency and sag and swell information, harmonic distortion.

Requirement	The smart metering system shall support capture of consumption and demand data at 5 second intervals.
ID	ES.11
Narrative	Supports the requirement for real time information on an IHD.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall allow the supply switch to be configurable to be open or closed for a range events.
ID	ES.12
Narrative	For example if agreed load is exceeded, if credit runs out, etc.
Justification	High-level list F
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification “safety critical” removed as this refers to how the function is used. Original: The smart metering system shall allow the supply switch to be configurable to be open or closed for a range of non safety critical events.

Requirement	The smart metering system shall support auxiliary switching and load control commands from remote authorised parties.
ID	ES.13
Narrative	This will be achieved via the HAN. It is expected that switch time randomisation will be implemented at the local device level.
Justification	High-level list E
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, changed “remote third parties” to “authorised parties”. Original: The smart metering system shall support auxiliary switching and load control commands from remote third parties.

Gas Specific Requirements

1.9. The functional requirements associated with gas include enablement/ disablement, registers for consumption data and local storage of calibration data (defined here as calorific value and other conversion factors). Other requirements include how frequently gas data is transmitted, recognising that battery life for gas meters can be an issue.

Requirement	The smart metering system shall support local storage of energy calculation data (calorific value and PTZ conversion factor).
ID	GS.1
Narrative	Allows for possibility of more accurate and frequent billing calculation in the meter (eg for prepayment).
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to include other data required for energy calculation. Original: The smart metering system shall support local storage of calibration data (calorific value, conversion factors, etc.).

Requirement	The smart metering system shall support at least one cumulative register for gas consumption.
ID	GS.2
Narrative	Assumption is that a single import register is sufficient.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, added “cumulative”, removed “total” with respect to the register Original: The smart metering system shall support at least one total register for gas consumption.

Requirement	The smart metering system shall support at least 48 wake up events per 24 hour period.
ID	GS.3
Narrative	For battery life reasons the gas meter cannot be in permanent listening mode. It will wake up at predetermined times to send/receive data and commands.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support capture of gas consumption data at 6 minute intervals.
ID	GS.4
Narrative	Could be used for short term local diagnostics/testing mode. Impact on battery life is recognised and therefore does not imply the data has to be stored or transmitted at this interval.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Change 5 second to 6 minute due to concerns over battery life. Original: The smart metering system shall support capture of gas consumption data at 5 second intervals.

Requirement	The smart metering system shall support a valve for enablement and disablement of gas supply.
ID	GS.5
Narrative	Through use of a valve within the smart metering system.
Justification	High-level list F
Domestic/Non-domestic	D
Change/Reason	No change

Requirement	The smart metering system shall continue normal operation in the event of a gas supply interruption (valve will retain state).
ID	GS.6
Narrative	This includes situations where the valve has operated.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification added. Original: The smart metering system shall continue normal operation in the event of a gas supply interruption.

Requirement	The smart metering system valve shall be configurable to either retain state or be closed in the event of battery failure.
ID	GS.7
Narrative	Allows configuration for a number of scenarios.
Justification	Consumer
Domestic/Non-domestic	D
Change/Reason	Reword: Clarification that the valve should retain state or close rather than open or close when battery fails. Original: The smart metering system valve shall be configurable to be open or closed in the event of battery failure.

Requirement	The smart metering system shall support 15 year battery life under normal operating conditions including prepayment operation.
ID	GS.8
Narrative	An indication of normal operating conditions and operating profile will be required in the technical specification.
Justification	High-level list F
Domestic/Non-domestic	D
Change/Reason	Reword. An operating profile needs to be defined to clarify what operations are expected in 15 years. Original: The smart metering system shall support 20 valve operations per year within the 15 year battery life requirement.

Requirement	The smart metering system shall support measurement of peak demand for gas supply.
ID	GS.9
Narrative	Not an instantaneous value but one that is measured and averaged over 30 minutes. Data item may be used by network operators for planning purposes.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	Remove: Can be derived from half hour measurements. Original: The smart metering system shall support measurement of peak demand for gas supply.

Requirement	The smart metering system shall check if there is uncontrolled gas flow at the point of local acknowledgement at re-enablement.
ID	GS.10
Narrative	Added for safety reasons (existing smart functionality).
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	New: Added for safety reasons – does not add any additional hardware cost to the smart metering system. Uses the same flow measurement that is used to measure consumption.

Diagnostics Requirements

1.10. The diagnostics requirements cover the need for an agreed set of configuration and diagnostics data that can be stored and accessed by third parties.

Requirement	The smart metering system shall support logging of meter events such as faults, tampers, thresholds associated with extreme levels etc. This will include but is not limited to the time and date stamping and recording of the originating device for the event.
ID	DI.1
Narrative	Smart meter log / event items table will be developed as a part of technical specification.
Justification	High-level list B
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification as the original list is not exhaustive and open to interpretation. Minimum list of events will be defined in the technical specification. Original: The smart metering system shall support logging of the following diagnostic, fault and tamper information, including date stamping of the information: meter faults, supply faults, communications faults, cover removal, clock resets and faults, improper running of the registers, unauthorised logical access, energy flow exceeding agreed extreme levels, interruption to neutral supply of meter (electricity only), bridging of internal switches (electricity only), remote enablement, disablement events, etc.

Requirement	The smart metering system shall support remote configuration of logs, alarms and thresholds.
ID	DI.2
Narrative	Suppliers and other authorised parties may wish to configure the logs in different ways. This should be possible without a home visit.
Justification	High-level list B
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support configuration of alarms associated with usage thresholds.
ID	DI.3
Narrative	To ensure, for example, measurements outside limits are registered.
Justification	High-level list B
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall store its configuration data in non volatile memory.
ID	DI.4
Narrative	To ensure, for example, that necessary information/data/settings remain after loss of power.
Justification	High-level list B
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system components shall be identifiable within any diagnostic log information.
ID	DI.5
Narrative	To ensure clear and unambiguous recognition/understanding.
Justification	High-level list B
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart meter system shall communicate battery status for metrology related functionality.
ID	DI.6
Narrative	The MID covering gas meters states warning has to be shown once 90% of lifetime reached (Annex MI-002, 5.2).
Justification	Regulatory
Domestic/Non-domestic	D/ND
Change/Reason	No change

Security and Privacy Requirements

1.11. The security requirements are currently being updated using the risk based approach described in Section 6 of the "Design Requirements" supporting document. As part of this process security requirements are being developed in the areas of governance and technical security and these requirements will align back to the risk assessment findings. This will ensure that security controls are proportionate to the security risks faced by the smart metering system.

1.12. The security requirements are produced through the Security Technical Expert Group (STEG). STEG is an advisory group comprising security specialists from both industry and government. A STEG security requirements working group has been formed with a remit of reviewing the initial high-level security requirements and will consider the next iteration of security requirements as the design of the end-to-end system develops and becomes more detailed.

1.13. The approach to security is end-to-end and therefore security requirements will apply to smart metering equipment, central communications and data management (DCC), energy suppliers as well as to the communication channels between these entities. The requirements that are relevant to smart metering system equipment will form part of the technical specification produced by the programme.

1.14. As the programme - through STEG - is currently developing the more detailed set of security requirements, the initial set of requirements from the Prospectus (with some minor changes) is included in the Catalogue.

Requirement	The smart metering system shall support strong mechanisms for authentication, authorisation and access control.
ID	SP.1
Narrative	This enables access rights to different aspects of the smart metering system.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall support secure data communication to ensure the confidentiality, integrity and availability of the data and commands.
ID	SP.2
Narrative	This requirement ensures the data privacy and security of personal information system functionality by protecting the confidentiality, integrity and availability of the communications.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall be protected from physical tampering or interference, eg security seals, tamper switches, etc.
ID	SP.3
Narrative	A current requirement for conventional meters.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system components and modules shall protect metrological and other features and functions from interference or tamper. This protection shall persist even when a component or module is being maintained or changed.
ID	SP.4
Narrative	A current requirement for conventional meters.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to include modules and provide more detailed description.. Original: The smart metering system components shall be inaccessible to unauthorised parties.

Requirement	The smart metering system shall ensure that any keys and certificates used for access control and secure communications are securely stored.
ID	SP.5
Narrative	To ensure the security of communications and access control the keys and certificates used by this functionality need to be protected to prevent unauthorised access and use.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarified as original was technology prescriptive. Original: The smart metering system shall ensure that keys and certificates used for access control and secure communications are securely stored.

Requirement	The smart metering system encryption keys and certificates (or any other authentication mechanism) shall be remotely manageable in a secure manner.
ID	SP.6
Narrative	It may be necessary to be able to change any keys and certificates used in the system to ensure tight access control and secure communications. This needs to be done in a secure manner.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change.

Requirement	The smart metering system shall be appropriately robust to prevent local or remote electronic attack or unauthorised use.
ID	SP.7
Narrative	System hardening methods such as removal of unused services and blowing of security (JTAG) fuses increases security by reducing the potential attack points on a meter.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall ensure that firmware upgrade is secure.
ID	SP.8
Narrative	Firmware needs to be updatable remotely to fix security vulnerabilities and provide functionality updates. This needs to be done securely to prevent unauthorised use.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The communication interfaces of the smart meter shall be secure and robust.
ID	SP.9
Narrative	Many communication interfaces (wired, radio and optical) have been proven to be insecure and vulnerable to attack.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system and associated WAN communications security shall be demonstrated to be fit for purpose through rigorous testing.
ID	SP.10
Narrative	Many embedded devices undergo functionality testing - rigorous security testing is required to ensure that the smart metering system is secure and robust to attack.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to remove the word “independent” as other forms of testing may be acceptable. WAN communications added to capture end-to-end requirement. Original: The security smart metering system shall be demonstrated to be fit for purpose through rigorous independent testing.

Requirement	The smart metering system functionality that can affect the supply of energy (eg remote enable/disable or demand side management) shall be appropriately protected from unauthorised use by access control measures.
ID	SP.11
Narrative	Control capability present in the meter needs to be appropriately protected to prevent wide scale remote misuse.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification around enablement/connection and disablement/disconnection. Original: The smart metering system functionality that can affect the supply of energy (eg remote disconnect or demand side management) shall be appropriately protected from unauthorised use by access control measures.

Requirement	The smart metering system shall ensure that only authorised devices may connect to the smart meter.
ID	SP.12
Narrative	Consumers may require devices to be connected to the smart meter for collection of their own energy consumption information. Controls are needed to ensure that only authorised devices can connect.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system communications shall be designed and implemented to restrict the numbers of smart meters that are visible to each other to prevent one meter being able to attack other meters.
ID	SP.13
Narrative	Network segmentation is needed to prevent meters being an attack point to other meters and to prevent possible worm infections.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	Remove: Technology prescriptive, could rule out all mesh architectures. Original: The smart metering system communications shall be designed and implemented to restrict the numbers of smart meters that are visible to each other to prevent one meter being able to attack other meters.

Requirement	The smart metering system shall incorporate security logging for physical tampering and electronic security events.
ID	SP.14
Narrative	Logging of physical and electronic security events will be an important element in ensuring the security of the smart metering system and in detecting security incidents.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall follow the principle of least privilege.
ID	SP.15
Narrative	The principle of least privilege increases security by limiting the functionality available to a service if it is compromised.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The smart metering system shall follow a secure development lifecycle for software.
ID	SP.16
Narrative	Following a secure development lifecycle will minimise the number of vulnerabilities present in software.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

HAN Requirements

1.15. The HAN requirements describe the expected functionality of the links between the devices that are on the HAN. They also call for a HAN solution that has some degree of future proofing given the emerging requirements of other "smart" applications such as water metering.

Requirement	The HAN interface shall be based on open and non proprietary standards.
ID	HA.1
Narrative	An example would be by using a protocol based on an EN standard.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN interface shall only support authorised devices (ie no unauthorised linking of devices).
ID	HA.2
Narrative	For example, this can be achieved through local button presses on meter and devices or by phone call to supplier. Prevents unauthorised addition of devices which could present a security/privacy threat.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN interface shall support real-time (better than ten seconds, target of five seconds) two way communication from mains powered nodes.
ID	HA.3
Narrative	This enables real-time updates to IHDs. Expected to better than ten seconds.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification on definition of real time to better than ten seconds as less technology prescriptive. Original: The HAN interface shall support real-time two way communication from mains powered nodes (5s delay/update).

Requirement	The HAN interface shall support network coordinator functionality for smart meter system components.
ID	HA.4
Narrative	This allows the network to be configured as a star as well as mesh.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Remove: Specifying a coordinator is technology prescriptive.

Requirement	The HAN interface shall be certified and tested for interoperability.
ID	HA.5
Narrative	A reinforcement of the general requirement for technical interoperability.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, remove reference to “independently” as other forms of testing may be acceptable. Original: The HAN interface shall be independently certified and tested for interoperability.

Requirement	The HAN interface shall support operation over the radio frequency physical layer.
ID	HA.6
Narrative	Minimum requirement as the gas meter cannot have wires running into it.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Remove. Specifying a physical layer is technology prescriptive

Requirement	The HAN interface shall support load and device control events.
ID	HA.7
Narrative	This includes Economy 7 type control events. Further clarity (numbers of events etc. will be defined in the technical specification).
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to include load control events. Original: The HAN interface shall support appliance control events (minimum 100 events per 24 hour period, minimum response rate of 5s once signal sent from HAN interface).

Absence of HA.8 was an error in Prospectus numbering.

Requirement	The HAN interface shall support the use of repeaters, boosters and other devices of equivalent function to extend range.
ID	HA.9
Narrative	All HAN solutions will have range issues in some instances and therefore the ability to extend range is essential.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN interface shall support acknowledgement of signals.
ID	HA.10
Narrative	For occasions where delivery receipt is required, such as appliance control or remote top-up.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN interface shall support 30 minute update (wake up) frequency from battery powered nodes.
ID	HA.11
Narrative	It is recognised that a 15 year battery life for a gas meter is not compatible with real-time communication, hence a relaxed requirement for battery powered nodes.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN interface firmware shall be remotely and locally upgradeable.
ID	HA.12
Narrative	This recognises that HAN software changes over time and upgrades must not cause disruption for the consumer.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification to add local firmware upgrades. Original: The HAN interface shall be remotely upgradeable.

Requirement	The HAN interface shall support authorised gateway/bridging devices to access data made available on the HAN.
ID	HA.13
Narrative	An important category of device that enables a consumer to download data locally or get real-time information via the internet if they wish to.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, addition of word “authorised” to indicate that not any device can be added. Original: The HAN interface shall support gateway/bridging devices to access data made available on the HAN.

Requirement	The HAN shall support a defined application profile for devices that connect to the HAN. This profile shall support the smart metering services, meter requirements and IHD requirements defined in the Catalogue.
ID	HA.14
Narrative	This helps with interoperability across different suppliers and manufacturers.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification on what the defined application profile does. Original: The HAN shall support a defined application profile for devices that connect to the HAN.

Requirement	The HAN shall support alphanumeric messaging.
ID	HA.15
Narrative	For example, IHD messages, user interaction with touch screens, etc.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN shall support the security and privacy requirements.
ID	HA.16
Narrative	As set out in the security and privacy section.
Justification	Security and privacy
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN shall be capable of supporting other utility meters where the data or physical (eg range) requirements do not exceed those of gas and electricity smart meters.
ID	HA.17
Narrative	For example micro generation meters or water meters.
Justification	High-level list H
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN shall be capable of being physically switched on and off by authorised personnel.
ID	HA.18
Narrative	For instances where consumers have legitimate reasons for not having an operating HAN.
Justification	Safety
Domestic/Non-domestic	D/ND
Change/Reason	Remove: Other options available such as logical switch off or fitting a meter without a HAN. Original: The HAN shall be capable of being physically switched on and off by authorised personnel.

Requirement	The HAN shall support addition of new devices classes.
ID	HA.19
Narrative	Allows a degree of future proofing.
Justification	High-level list C
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN shall be backwards compatible.
ID	HA.20
Narrative	HAN has to be supported for at least 15 years to avoid technical obsolescence issues.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The HAN applications profile shall be used by all smart metering system components in a consumer premises where possible.
ID	HA.21
Narrative	Multiple HANs within a consumer premises are undesirable, but in some exceptions (eg blocks of flats etc.) instances may be required for technical reasons.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, may be technically impossible to have a single HAN in all premises. Use of a single profile allows greater flexibility. Original: The HAN shall be used by all smart metering system components in a consumer premises.

Requirement	The HAN shall not interfere with existing prevalent premises networks.
ID	HA.22
Narrative	For example, a consumer's Wi-Fi network.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, reference to “accredited” is overly prescriptive. Original: The HAN shall not interfere with existing accredited premises HANs.

1.16. Smart metering equipment, including the HAN, will be required to operate in compliance with guidelines published by The International Commission on Non-Ionizing Radiation Protection (ICNIRP). It is also an independent scientific organisation with responsibility in this area. The ICNIRP guidelines cover limiting human exposure to Electro magnetic fields (EMF).

WAN Requirements

1.17. The WAN requirements describe the expected functionality of the link between the premises and DCC. The key parameters of bandwidth, availability and latency (responsiveness) are subject to the level of traffic associated with DCC services. It has been recognised that as requirements emerge it may be necessary to upgrade the WAN without replacing the meter.

Requirement	The WAN interface shall be based on open and non proprietary standards.
ID	WA.1
Narrative	An example would be by using a protocol based on an EN standard. Reflects the HAN requirement. Suppliers must have the ability to select equipment from a number of suppliers.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The WAN interface shall support interrogation of WAN enabled devices in line with agreed DCC service levels.
ID	WA.2
Narrative	No requirement for always on communications. It is recognised that the response rate is a function of other parameters; the figure presented is an average.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, technology prescriptive – requirement appears to define a minimum WAN latency of 1 minute. Original: The WAN interface shall support real-time interrogation of WAN enabled devices with response rate of 1 minute or better.

Requirement	The WAN interface shall support acknowledge signals.
ID	WA.3
Narrative	To, for example, test the integrity of the WAN connection to the smart metering equipment within the premises.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The WAN interface shall be certified and tested for interoperability.
ID	WA.4
Narrative	A reinforcement of the general requirement for technical interoperability.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, as other forms of testing may be acceptable. Original: The WAN interface shall be independently certified and tested for interoperability.

Requirement	The WAN shall support the security and privacy requirements.
ID	WA.5
Narrative	As set out in the security and privacy section.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	No change

Requirement	The WAN interface shall be capable of being disabled and re-enabled by authorised personnel.
ID	WA.6
Narrative	For example, for testing.
Justification	High-level list A
Domestic/Non-domestic	D/ND
Change/Reason	Reword: Clarification, physically switching off will require a site visit to enable. Original: The WAN shall be capable of being physically switched on and off by authorised personnel.

Requirement	The WAN shall support simultaneous communication with a large number of meters within a short timescale.
ID	WA.7
Narrative	"Broadcast mode". For example, 100,000 meters in 1 hour, 1,000 meters in 15 minutes.
Justification	Smart grids
Domestic/Non-domestic	D/ND
Change/Reason	Remove. This is covered by WA.2 which references the DCC services and service levels.

1.18. Smart metering equipment, including the WAN modules, will be required to operate in compliance with guidelines published by The International Commission on Non-Ionizing Radiation Protection (ICNIRP). It is also an independent scientific organisation with responsibility in this area. The ICNIRP guidelines cover limiting human exposure to Electro magnetic fields (EMF).

IHD Requirements

1.19. The IHD requirements apply to any IHD that is provided to the consumer as the result of an obligation. They are necessarily high level (to avoid restricting innovation) and cover the minimum information provision as well as power requirements.

Requirement	The IHD shall support mains power operation.
ID	IH.1
Narrative	Avoids issues with batteries.
Justification	High-level list C
Domestic/Non-domestic	D
Change/Reason	No change

The table for IH.2 is split over the following two pages.

Requirement	The IHD shall show the following information for gas and electricity: • Indicative real-time usage in kW • Indicative real-time rate of consumption in pence per hour • Electricity - Metered cumulative consumption in kWh and indicative £ for current day/week/month/billing period • Gas - Metered cumulative consumption in m3, Indicative (within CV variance) cumulative consumption in kWh and £ for current day/week/month/billing period • A high-level requirement that historical data should be presented in a meaningful way so as to allow a consumer to compare current usage with past usage • Account balance information (amount in credit or debit) in real time for prepayment customers and on at least a monthly basis for credit customers • Current and next tariff rate (ie cost per unit in pence per kWh) • Local time • Status of communication link. All information will be displayed in digital numerical format as a minimum. In addition, information on real-time energy rate (kilowatt) and cost of current level of consumption (pence per hour) will, as a minimum, be displayed in a visual (non numerical) way which allows a consumer to easily distinguish between low and high current consumption. Guidelines for "ambient" feedback will be developed by the programme as part of the technical specification process. Aspiration for real time update for electricity is 5 seconds, for gas it is 30 minutes.
ID	IH.2
Narrative	The minimum data set based on consumer research and stakeholder input. Further clarity and guidelines for indicative values will be developed. Privacy issues around the display of account balance information have been noted.
Justification	High-level list C
Domestic/Non-domestic	D

Change/Reason	Reword: Clarification of (i) accurate changed to metered as this ties in with that displayed on the meter (II) 15 minutes changed to 30 minutes to make it consistent with the HAN requirements HA.11 (iii) current and next tariff rate reflects that tariffs will evolve from present day situation. Original: The IHD shall show the following information for gas and electricity: • Indicative real-time usage in kW • Indicative real-time rate of consumption in pence per hour • Accurate cumulative consumption in kWh and £ for current day/week/month/billing period • A high-level requirement that historical data should be presented in a meaningful way so as to allow a consumer to compare current usage with past usage • Accurate account balance information (amount in credit or debit) in real time for prepayment customers and on at least a monthly basis for credit customers • Current tariff (ie cost per unit in pence per kWh) • Local time • Status of communication link. All information will be displayed in digital numerical format as a minimum. In addition, information on real-time energy rate (kilowatt) and cost of current level of consumption (pence per hour) will, as a minimum, be displayed in a visual (non numerical) way which allows a consumer to easily distinguish between low and high current consumption. Minimum real time update for electricity is 5 seconds, for gas it is 15 minutes.

Requirement	The average IHD power consumption shall be less than 0.6W.
ID	IH.3
Narrative	As per the impact assessment.
Justification	High-level list C and impact assessment
Domestic/Non-domestic	D
Change/Reason	No change

Existing Metering System Variants

2.2. There are a number of existing variants in terms of meter design, such as polyphase supply and internal meter switches for specific circuits and devices in the home (eg Economy 7). Solutions for these variants must also meet the minimum functional requirements.