



SMCG/Sec0022/DC

**SMART METERS CO-ORDINATION GROUP (SM-CG)**

**Item 5. M/441 first phase deliverable – Communication – Annex: Glossary**

This version is the result of the work done by the SMCG Report Group. SMCG participants are invited to raise general comments/questions during the next SMCG meeting (to be held on 2010-06-14).

More detailed comments have to be sent by the end of June 2010 (date to be confirmed during the SMCG meeting). Practical details will be given during the next SMCG meeting (2010-06-14).

## APPENDIX I GLOSSARY OF COMMON USED TERMS IN RELATION WITH SMART METERING

### Sources:

- S1 - Electricity metering - Glossary of terms, IEC 62051, 1<sup>st</sup> edition 1999-3
- S2 - Electricity metering - Glossary of terms , part 1 - Terms related to data exchange with metering equipment using DLMS/COSEM, IEC 62051-1, 1<sup>st</sup> edition 2004-1
- S3 - System Requirements Specification - version 1 – October 2009 – UCA Iug - OpenSG – AMI-ENT TF
- S4 - UtilityAMI 2008 Home Area Network System Requirements Specification V1.04, August 19, 2008
- S5 - ETSI Draft TR 102 725 V0.2.0
- S6 – ETSI Draft TR 102 691 V0.4.1
- S7 – Wikipedia
- S8 – Dutch Smart Meter Requirements (DSMR) V3.0, March 2010, Netbeheer Nederland
- S9 - EN14154- Water meters – Part 1 – general requirements and OIML R49-1: 2000
- S10 - EN 50470-1 - Electricity metering equipment (a.c.). General requirements, tests and test conditions, edition 2006
- S11- International Electrotechnical Vocabulary (IEV) Part 691 – Tariffs for electricity
- S12 – IEC 62055 - Electricity metering – Payment systems - Parts 21 and 31

## List of abbreviations

<b>Abbreviation</b>	<b>Description</b>
AMI	Advanced Metering Infrastructure
AMM	Automated Meter Management
AMR	Automatic Meter Reading
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CIS	Customer Information System,
COSEM	Companion Specification for Energy Metering
CCG	Customer Communications Gateway
CPE	Customer Premises Equipment
DC	Data Concentrator
DR	Demand Response
DSM	Demand Side Management
DER	Distributed Energy Resource
DLC	Distribution Line Carrier
DLMS	Distribution Language Message Specification
DNO	Distribution Network Operator
ETSI	European Telecommunications Standards Institute
HAN	Home Area Network
HHU	Hand-held unit
HBES	Home and Building Electronic Systems
HBES/BACS	Home and Building Automation and Control products
HES	Head End System
IEC	International Electrotechnical Commission
ISO	International Standards Organization
ISP	Independent Service Provider
LAN	Local Area Network
MDA	Meter Data Aggregator
MDC	Meter Data Collector
MDMS	Meter Data Management System
MDO	Meter Data Operator
MID	Measuring Instruments Directive
MO	Meter Operator
MDUS	Meter Data Unification and Synchronisation System
M2M	Machine to Machine
OBIS	OBject Identification System
OSI	Open Systems Interconnection
PLC	Power Line Carrier
TCO	Total Cost of Ownership
TOU	Time-of-use
VAS	Value Added Services
WAN	Wide Area Network
WS	Web Service
WSDL	Web Services Description Language

## Glossary

Term	Explanation	Source
<b>Actuator</b>	Device which performs some physical action. NOTE: An actuator might act on the flow of a gas or liquid or on the electricity distribution through a mechanical operation. Dimmers and relays are examples of actuators. The decision to activate the actuator may come from any Object or M2M device (including the M2M gateway)	S5/S6 - modified
<b>Additional Functionality</b>	Function that an end-to-end smart metering system provides over and above the metrological functions covered by the Measuring Instruments Directive.	S5/S6 – modified
<b>Advanced Metering Infrastructure (AMI)</b>	Infrastructure which allows two way communications between the Head-End System and the meter(s) and other in-house devices.	S3 - modified
<b>Architecture</b>	Structure and behaviour of the technology infrastructure of an enterprise, solution or system. NOTE 1: A system architecture applied specifically within the context of information systems encompasses both the application architecture and data assets, and their logical interrelations to the business processes they support. NOTE 2: A technical architecture fully details the software and hardware capabilities to fully describe such applications and data services.	S7 – modified
<b>Ancillary Device</b>	Device intended to perform a particular function directly involved in elaborating, transmitting or displaying measurement results.	S9 - modified
<b>Asset Responsible Entity</b>	Organisation responsible for installing, configuring and maintaining one or more elements related to Advanced Metering Infrastructure (AMI) assets (e.g. meters, data concentrators, communication devices, gateways).	S5/S6
<b>Automated Meter Management (AMM)</b>	Technology intended to achieve more efficient use of energy based on advanced metering infrastructure	SMCG
<b>Automatic Meter Reading (AMR)</b>	Technology for obtaining metering data from an on-site meter by communication from an access point outside the premises.	S3
<b>Authentication</b>	Monitoring and verifying of the identity of each party at the beginning of and during a communication.	S1
<b>Block Tariff</b>	Tariff in which the charge is based on a series of different energy/volume rates applied to successive usage blocks of given size and supplied during a specified period	S11
<b>Calculator</b>	Part of a meter which receives as input signals from transducer(s) and possibly from associated measuring instruments, performs a calculation and, if appropriate, stores the result(s) in memory until they are required. NOTE: A calculator may also be capable of bi-directional communication with ancillary devices	S9
<b>Checking facility</b>	<ol style="list-style-type: none"> <li>1. Facility incorporated into electronic water meters which enables significant faults to be detected and acted upon.</li> <li>2. Facility incorporated into a transmission device to verify that all the information which is transmitted (and only that information) is correctly received by the receiving equipment</li> </ol>	S9
<b>(Data) Concentrator</b>	Intelligent station in a hierarchical communications network where incoming data (generated by multiple meters) is processed as appropriate and then repackaged, retransmitted, discarded, responded to, consolidated, prioritized or increased to multiple messages.	S1 - modified
<b>Consumer</b>	End user of electricity, gas, water or heat. NOTE 1: The Meter Data Collector (and when applicable also his supplier) may communicate with the consumer through the AMI. NOTE 2: As the consumer can also generate energy using a Distributed Energy Resource, he is sometimes called the "Prosumer".	S6 - modified
<b>Companion Specification for Energy Metering (COSEM)</b>	Interface model for communicating with energy metering equipment, providing a view of the functionality available through the communication interfaces. NOTE: The modelling uses an object oriented approach.	S2 – modified

<b>Customer</b>	Purchaser and/or user of a product or service supplied by an organisation. The "Customer" may be the ultimate consumer, user, beneficiary or purchaser. NOTE: In the context of Smart Metering the Customer is the same person as the Consumer.	S1 - modified
<b>Customer communications gateway (CCG)</b>	Protocol converter between the internal message standard and the communications channel message standard. NOTE: Not necessarily a separate device, it may be an integrated function.	S1
<b>Customer premises equipment (CPE)</b>	Equipment installed at the customers premises.	S1 – modified
<b>Data encryption</b>	Method to ensure data confidentiality. Encryption transforms intelligible data, called plaintext, into an unintelligible form, called ciphertext. This process is reversed through the process of decryption. Once data is encrypted, the ciphertext does not have to be protected against disclosure	SMCG
<b>Data integrity</b>	Ability of a communications system to deliver data from its source to its destination with an acceptable and measurable residual error rate.	S1
<b>Data security</b>	Prevention of one or more of the following: a) unauthorized access to information within a data stream; b) unauthorized alteration of information within a data stream; c) unauthorized generation of messages which could be taken as valid by the receiving equipment d) denial of service  Also see Security.	S1
<b>Demand Response (DR)</b>	See Demand Side Management	S3
<b>Demand Side Management (DSM)</b>	Implementation of programmes designed to influence product or service demands. NOTE: Such programmes allow the network to benefit from changes in the timing and magnitude of demand so as to maximize the cost effective use of network resources and enable the customer to benefit by being better able to control total consumption and cost.	S1 – modified
<b>Disconnection</b>	Removal of supply from a consumer premises by physical disconnection of the supply.	S1- modified
<b>Distributed Generation</b>	Electricity generation from multiple small energy sources thus allowing more efficient energy distribution. NOTE: Energy is generated closer to the point of consumption, thus reducing network losses.	S3 - modified
<b>Distributed Energy Resource (DER)</b>	Small energy source generating energy locally. NOTE: Examples of a DER are windmills and solar panels installed at consumers premises.	ESMIG
<b>Distribution Line Carrier (DLC)</b>	Communications technology that enables the transmission and reception of digital information over low-voltage and medium-voltage power distribution networks. NOTE: DLC is often referred to as "Low voltage PLC" and therefore in practice PLC is also used as synonym for DLC.	S1
<b>Device Language Message Specification (DLMS)</b>	ISO-OSI Application Layer specification, independent of the lower layers and thus of the communication channel, designed to support messaging to and from (energy) distribution devices in a computer-integrated environment. NOTE: DLMS is specified in IEC 62056-53 and is an evolution of the Distribution Line Message Specification specified in IEC 61334-4-41.	S2
<b>Distribution Network Operator (DNO)</b>	Organisation responsible for managing the electricity, gas, heat and/or water network supplying consumer premises.	S5/S6
<b>Electronic device</b>	Device employing electronic sub-assemblies to perform some special function. Electronic devices are usually manufactured as separate units and are capable of being tested independently. NOTE: Electronic devices as defined above may be complete meters or parts of meters/metering systems	S9
<b>Energy Services Provider</b>	Organisation offering energy related services to the consumer	S5/S6 – modified

<b>Extensible Markup Language (XML)</b>	Set of rules for encoding documents electronically. NOTE 1: XML is defined by the W3C in the XML 1.0 Specification and several other related specifications. NOTE 2: XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format, with strong support via Unicode for the languages of the world.	S7
<b>Function</b>	Process which constantly or at defined intervals, automatically or on demand, performs specific activities such as sampling data, reading a data set, verifying or changing a status, or activating a switch. An application is composed of one or more functions. A function can be basic or optional.	S1
<b>Gateway</b>	Device that fully implements the ISO-OSI model for all layers and is used to convert data protocols between different communication systems and standards. NOTE: Gateways work on all seven layers of ISO-OSI architecture. The main job of a gateway is to convert protocols between communications networks	S1/S7
<b>Hand-held unit (HHU)</b>	Portable device for reading and programming equipment or meters at the consumer's premises or at the access point.	S1
<b>Home and Building Electronic System (HBES)</b>	System for the integration of control applications and the control and management aspects of other applications within a domestic or building environment, including gateways to different transmission media and public networks.	Scope definitio n of TC205
<b>Home and Building Automation and Control (HBES/BACS) products HBES/BACS system</b>	Devices intended to be used for the control, monitoring, operation or management of building services and/or home electronic systems that can interact via a communication network. Any combination of HBES/BACS products (including their separate connected/detachable devices) linked together via one or more HBES/BACS networks. NOTE: Other names used to describe types of HBES/BACS systems include "Home Control Network", "Home Control System", "Home and Building Electronic System", "Building System", "Building Automation System", "Home Automation System", etc.	EN 50491-1
<b>HBES Open Communication System</b>	Specialized form of automated, decentralised and distributed process control dedicated to the needs of home and building applications. NOTE: The HBES open Communication System is define in EN 50090-1	prEN 50090-1
<b>Head End System (HES)</b>	Central Data System collecting data via the AMI of various meters in its service area. It communicates via a WAN directly to the meters and/or to Data Concentrators or Gateways.	ESMIG
<b>Home Area Network (HAN)</b>	In-house LAN which interconnects domestic equipment and can be used for energy management purposes. NOTE: There can be multiple HANs inside a customer's premises.	ESMIG
<b>Independent Service Provider (ISP)</b>	Company independent of grid operators, supply companies and metering companies that uses an infrastructure which supports smart metering (AMI).	S8 - modified
<b>Index</b>	Current reading of a non-electricity meter representing the related quantity (e.g. volume in m3), totalizing since a defined (re-)set operation. NOTE: for Electricity Meters referred to as Register	TC 294
<b>Interface</b>	Point or means of interaction between two systems.	S1
<b>Interchangeability</b>	Ability to exchange one device by another without reducing the original functionality of the total system	SMCG
<b>Interoperability</b>	Ability of a system to exchange data with other systems of different types and/or from different manufacturers.	S2 – modified
<b>Interval Data</b>	Information on energy consumed or demand during a pre-defined interval, typically 15, 30 or 60 minutes. Each value is completed with a time stamp and status.	SMCG
<b>Load Balancing</b>	Ability to use network information and/or on-site intelligence to reconfigure distribution networks or to limit customer loads to maintain desired levels of service and improve the utilisation of assets	S1 - modified

<b>Load Profile</b>	Recording and storage of consumption data over a period of time for a specific installation. NOTE: The data would typically be recorded at appropriate intervals, typically hourly or half-hourly, to allow consumption to be profiled on a daily or weekly basis and to permit Time of Use billing data to be extracted.	S1 – modified
<b>Load Shedding</b>	Process of deliberately disconnecting selected loads from the utility supply system in response to excess demand in order to maintain the stability of the system, to provide supply to as large a number of consumers as possible, or to avoid excessive supply costs.	S1 – modified
<b>Load Switch</b>	Device allowing to connect or disconnect loads on various conditions. The load switch may be integrated with the meter. For gas and water referred to as Valve.	SMCG
<b>Local Area Network (LAN)</b>	Data communication network, connecting a limited number of communication devices (meters and other items) and covering a moderately sized geographical area. NOTE1: may be referred to as Meter Network when dedicated to metering. NOTE2: may be referred to as Neighbourhood Area Network as a network between the Data Concentrator and the Meter or Gateway.	S1 - modified
<b>Logical Data Model</b>	Representation of an organisation 's data based upon entities and attributes of those entities. NOTE: A logical data model is often a logical representation of a business' integration or business requirements.	S3
<b>Meter</b>	Device for measuring and totalling the consumption of a commodity. NOTE: In general, a meter as a minimum consists of a sensor (or sensors) with an integrating device and a display showing consumption in metrological units.	S1 - modified
<b>M-bus (Meter Bus)</b>	Communication standard for data exchange with end devices, including, but not limited to utility meters using wired or wireless media	TC294
<b>Meter Data</b>	Meter readings that allow calculation of the quantity of electricity, gas, water or heat consumed over a period. Meter data thus includes daily and monthly meter readings, interval readings and actual meter register values. Other readings and data may also be included (such as quality data, events and alarms)	S8
<b>Meter Data Aggregator (MDA)</b>	Entity which offers services to aggregate metering data by grid supply point on a contractual basis. NOTE: The contract is with a supplier. The aggregate is of all that supplier's customers connected to that particular grid supply point. The aggregate may include both metered data and data estimated by reference to standard load profiles	S1 - modified
<b>Meter Data Collector (MDC)</b>	Entity which offers services on a contractual basis to collect metering data related to a supply and provide it in an agreed format to a data aggregator (that can also be the DNO). NOTE: The contract is with a supplier or a pool. The collection may be carried out by manual or automatic means.	S1 - modified
<b>Meter Data Management System (MDMS)</b>	System for validating, storing, processing and analyzing large quantities of meter data.	S3 - modified
<b>Meter Operator (MO)</b>	Entity which offers services on a contractual basis to provide, install and maintain metering equipment related to a supply. NOTE: The contract may be with the customer, the supplier or the DNO. The meter may be rented to, or owned by, the customer	S1
<b>Micro Generator</b>	Source of electrical energy and all associated equipment designed to operate in parallel with the low voltage system, rated up to specified current / power levels. These levels can vary between Member States.	SMCG
<b>Micro Generation</b>	Local supply of electrical energy to the low-voltage network. Maximum power or current levels are individually set by Member States,.	
<b>M2M</b>	<b>Machine-to-Machine: involves communication without (or only limited) human intervention.</b> <b>To be checked by ETSI</b>	<b>S5/S6 ?</b>
<b>M2M Area Network</b>	Network providing connectivity between M2M Devices and M2M Gateways.	S5/S6

<b>M2M Device</b>	Device that runs application(s) using M2M capabilities and network domain functions. NOTE: An M2M Device is either connected straight to an Access Network or interfaced to M2M Gateways via an M2M Area Network	S5/S6
<b>Object Identification System (OBIS)</b>	System defining identification codes for commonly used data items in metering and other equipment.	S2 - modified
<b>Open Systems Interconnection (OSI)</b>	Framework for communications processes, defined by ISO, in which the process is divided into seven functional layers, arranged vertically with each having separate and defined responsibility. Each layer communicates only with the layer immediately above and below.	S1 - modified
<b>Payment Meter</b>	Meter with additional functionality that can be operated and controlled to allow the flow of energy according to agreed payment modes	S12 - modified
<b>Prepayment Mode</b>	Payment mode in which disconnection occurs when available credit is exhausted	S12 - modified
<b>Power Line Carrier (PLC)</b>	Communications technique using high frequency signals to transmit data over (high voltage) transmission lines transporting electrical power. NOTE: In practice the term PLC is also used for communication over distribution lines (Low-Voltage PLC).	S1 - modified
<b>Process</b>	Logically linked sequence of tasks that enables a system to achieve particular objectives. NOTE: A process may interact with other processes. Processes may be business processes or support processes	S12 - modified
<b>Protocol</b>	Rules for communication system operation that must be followed if communication is to be effected.	S1
<b>Read Data Recipient</b>	Organisation or person authorized to receive meter reading data from the smart metering system. NOTE: This actor can be any of the other actors defined in the scope that is authorized to receive read data.	S5/S6
<b>Register</b>	Specific section in the memory of the control and metering unit that records data as determined by the programme in the unit. NOTE1: For non-electricity meters referred to as Index NOTE2: Registers can normally be displayed and output to another device.	S1/S2
<b>Requirement</b>	Statement that identifies a necessary attribute, capability, characteristic, or quality of a system in order for it to have value and utility to a user. NOTE 1: In systems engineering, a requirement can be a description of what a system must do, referred to as a Functional Requirement. A requirement may alternatively specify something about the system itself, and how well it should perform its functions. Such requirements are often called Non-Functional Requirements, or 'Performance Requirements' or 'Quality Of Service Requirements'. NOTE 2: One common way to document a requirement is stating what the system shall do by, for example, generating a Use Case.	S7
<b>Security</b>	Measures that protect and defend information and information systems by assuring their confidentiality, integrity, access controls, availability and accuracy. See also “ <b>Data Security</b> ”.	S4
<b>Sensor</b>	Device that measures a physical quantity and converts it to an analogue or digital signal that can be read by a programme or a user. NOTE: Sensed data can be of many types: electromagnetic (e.g. current, voltage, power), mechanical (e.g. pressure, flow, liquid density, humidity), chemical (e.g. oxygen, carbon monoxide, ...), acoustic (e.g. noise, ultrasound), ...	S5/S6 – modified
<b>Service Capabilities</b>	Functions that are to be shared by different applications. NOTE 1: Service Capabilities make functionalities available through a set of open interfaces using Core Network functionalities. NOTE 2: Service Capabilities also simplify and optimise applications development and deployment, and to hide network specifics from applications. NOTE 3: Service Capabilities may be M2M specific or generic, i.e. providing support to other than M2M applications. Examples include: Data Storage and Aggregation, Unicast and Multicast message delivery, etc.	S5/S6 – modified

<b>Service provider</b>	Organization providing a product or service. Such service could be the reading of the data and/or status information of metering devices	S1
<b>Service oriented architecture (SOA)</b>	Concept of grouping business functionality around business processes. These services are then packaged as interoperable services. NOTE: An SOA architecture allows for the transmission of data between multiple systems as they participate in multiple business processes.	S3
<b>Simple Object Access Protocol (SOAP)</b>	Protocol for exchanging XML messages for web services in a service oriented architecture implementation.	S3
<b>Service Level Agreement (SLA)</b>	That part of a service contract where the levels of the services are agreed upon between two systems.	S3
<b>Smart Grid</b>	Electricity network that intelligently integrates the behaviour and actions of all users connected to it – generators, consumers and those that do both – in order to efficiently ensure a more sustainable, economic and secure electricity supply	Eurelectr ic - Modifie d
<b>Smart Meter</b>	Meter with additional functionality allows the meter to collect usage data and transmit this data back to the MDO via the AMI. NOTE 1: Load control and tariff management are examples of possible extra functionality. NOTE 2: The Smart Meter may have provisions for a consumer interface that enables the consumer to monitor energy usage	S3 - modified
<b>Supervisory Control and Data Acquisition (SCADA)</b>	System that monitors and controls electric power generation, transmission (SCADA-EMS), or distribution (SCADA-DMS). NOTE: Such systems offer real-time updating of measurements and control of network assets. Network control SCADA systems usually also contain Network Applications such as load-flow and state estimation applications.	S3 – modified
<b>Supplier</b>	Entity that offers contracts for supply of energy to a consumer (the supply contract) and bills the consumers for energy usage based on meter data received from the Meter Data Operator or Collector. The bill may also include grid-related costs charged by the network to the supplier, in which case the consumer gets only one bill.  NOTE: In some countries referred to as Retailer	S1 – modified
<b>Tariff</b>	Price structure (normally comprising a set of one or more rates of charge) applied to the consumption of a product or service provided to a consumer.	SMCG
<b>Tamper monitoring</b>	Function to detect attempts to corrupt the metering equipment or the data stored within it. It may automatically raise an alarm.	S1 – modified
<b>Theft detection</b>	Facility to identify attempts to circumvent the metering system. It may automatically raise an alarm.	S1 – modified
<b>Time-of-Use (ToU) metering</b>	Meter that records metered or measured quantities according to the periods of the day (e.g. consumption for peak load hours, consumption for day hours, consumption for low load hours) and/or different days of the week, month or year.	S1
<b>Time-of-Use (ToU) tariff</b>	Price structure with rates that can vary according to the time of use based on time and/or the day (weekday, weekend, holiday, etc). Rates may also vary according to the time of the year.	S1
<b>Unified Modeling Language (UML) Use Case</b>	General purpose modelling language commonly used for object/data modelling. UML is also used to model the interaction between one or more actors in a Use Case. Description of the interaction between one or more actors, represented as a sequence of simple steps. NOTE 1: Actors are entities that exists outside the system ('black box') under study, and which take part in a sequence of activities in a dialogue with the system to achieve a specific goal. Actors may be end users, other systems, or hardware devices. NOTE 2: Each Use Case is a complete series of events, described from the point of view of the actor.	S3 – modified S7 - modified
<b>Use Case Actor</b>	Entity involved in a Use Case, e.g. organisations (Consumer, Distribution Network Operator, Read Data Recipient, etc.) and/or systems (HES, CIS, DC, Meter, Gateway, etc)	S5/S6 – modified

<b>Use Case diagram</b>	Type of behavioural diagram generated using the Unified Modelling Language (UML) and defined by and created from a Use-case analysis. NOTE 1: The purpose of a Use Case Diagram is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. NOTE 2: The main function of a use case diagram is to demonstrate what system functions are performed for which actor. Roles of the actors in the system can be thus depicted	S7 – modified
<b>Value Added Service (VAS)</b>	Additional Service that can be provided at the consumer premises, e.g. energy management, security and medical alarms, etc.	S1
<b>Valve</b>	Device for connecting and disconnecting the supply of a non-electric commodity	SMCG
<b>Wide Area Network (WAN)</b>	Extended data communication network connecting a large number of communication devices over a large geographical area.	S1 - modified
<b>Web Service (WS)</b>	Typically application programming interfaces (API) or web APIs that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services. NOTE: In common usage, the term refers to clients and servers that communicate over the Hypertext Transfer Protocol (HTTP) protocol used on the web	S7 – modified
<b>Web Services Description Language (WSDL)</b>	Use of XML format to describe web services and the messages that interface with the web services.	S3