



25th world gas conference  
"Gas: Sustaining Future Global Growth"

# Introducing smart meters in Europe: The challenge of standards

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General

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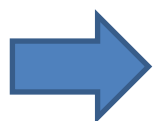
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- **Introduction of intelligent (or smart) metering systems is promoted and facilitated by the European Union through legislation:**
  - Directive 2004/22/EC on Measuring Instruments (MID)
  - Standardisation mandate M/374 (October 2005) for the harmonisation of utility meters under the Measuring Instruments Directive (MID)
  - Directive 2006/32/EC on energy end-use efficiency and energy services
  - Standardisation mandate M/441 (March 2009) on the development of an open communication architecture for utility meters
  - Third Energy Package – Directives 2009/72/EC and 2009/73/EC provisions on 'intelligent metering' in electricity and gas
  - Draft Directive on Energy Efficiency (2011)

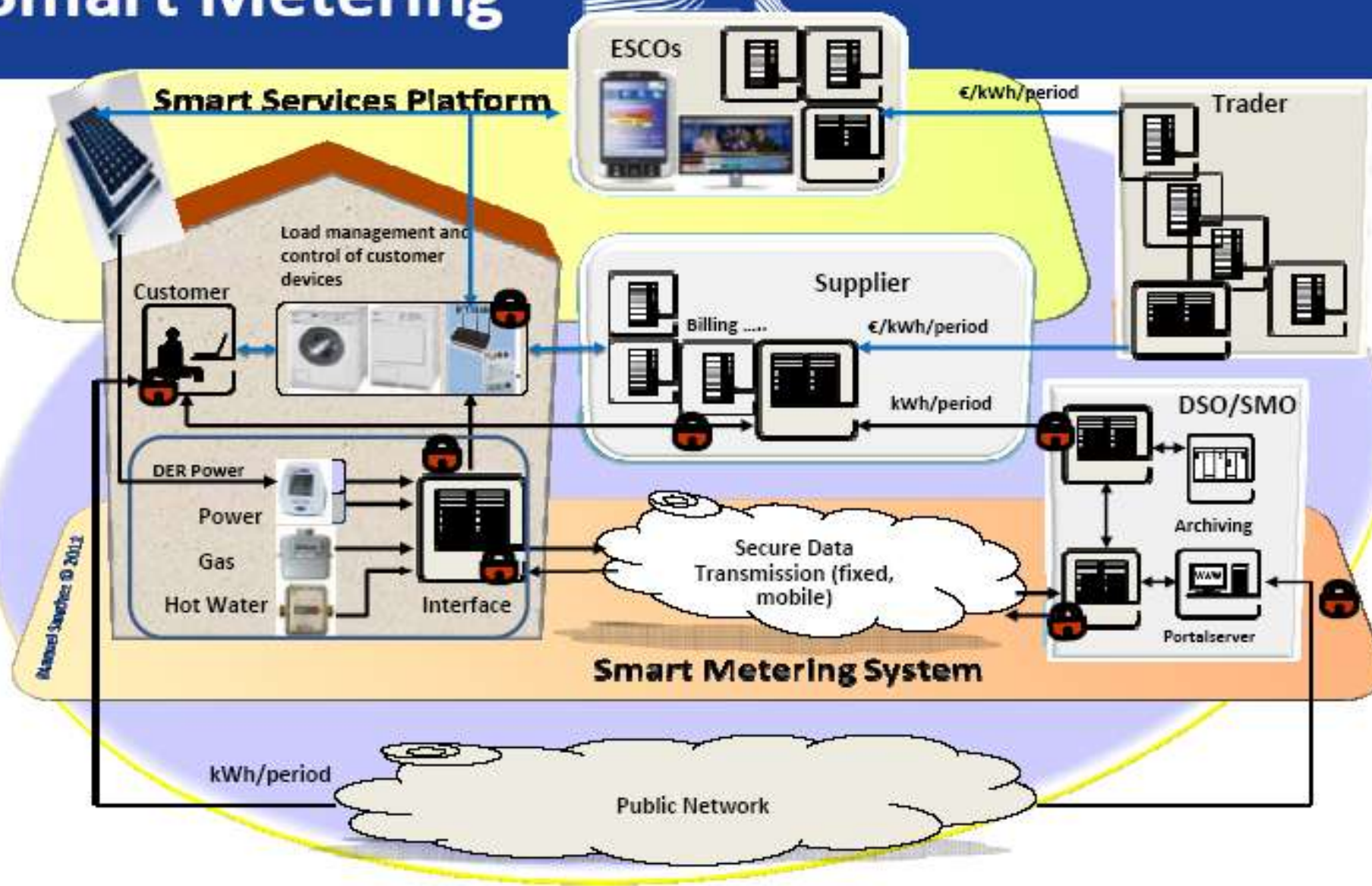
# Smart metering systems roll out

- **European Member States requested to implement smart metering systems to assist customers**
- **An economic assessment of long term benefits/costs may be carried out (before 3rd September 2012)**
- **Recommendations from the EU Commission (09th March 2012):**
  - data protection/security considerations
  - methodology economic assessment
  - common minimum functionalities
- **Decisions taken at national level, but EU Commission will check**



**Potential market of > 100 millions gas smart metering systems!**

# Smart Metering



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## ▪ **Unique model:**

- 3 European Standards Organisations (ESOs) officially recognised by the European Union: CEN, CENELEC & ETSI
- Effective co-operative tool: provides support to EU legislation
- National delegation principle: full consensus process + national implementation
- Voluntary and market driven
- Strong link with international standardisation platforms (ISO, IEC)

## ▪ **Values and principles:**

- WTO TBT (Technical Barriers to Trade) code and principles
- Openness, transparency, consensus
- Coherence / consistency (at European and national level)
- National commitment (national delegation, national vote, national implementation)

## ▪ Objective of the mandate

- To improve customer awareness of actual consumption in order to allow timely adaptation to their demands
- By means of:
  - European standards allowing **interoperability** of utility meters (for electricity, gas, water and heat)
  - Fully integrated solutions, modular and multi-part solutions
  - **Architecture** must be scalable and adaptable to future communications media
  - **Secure data exchange**

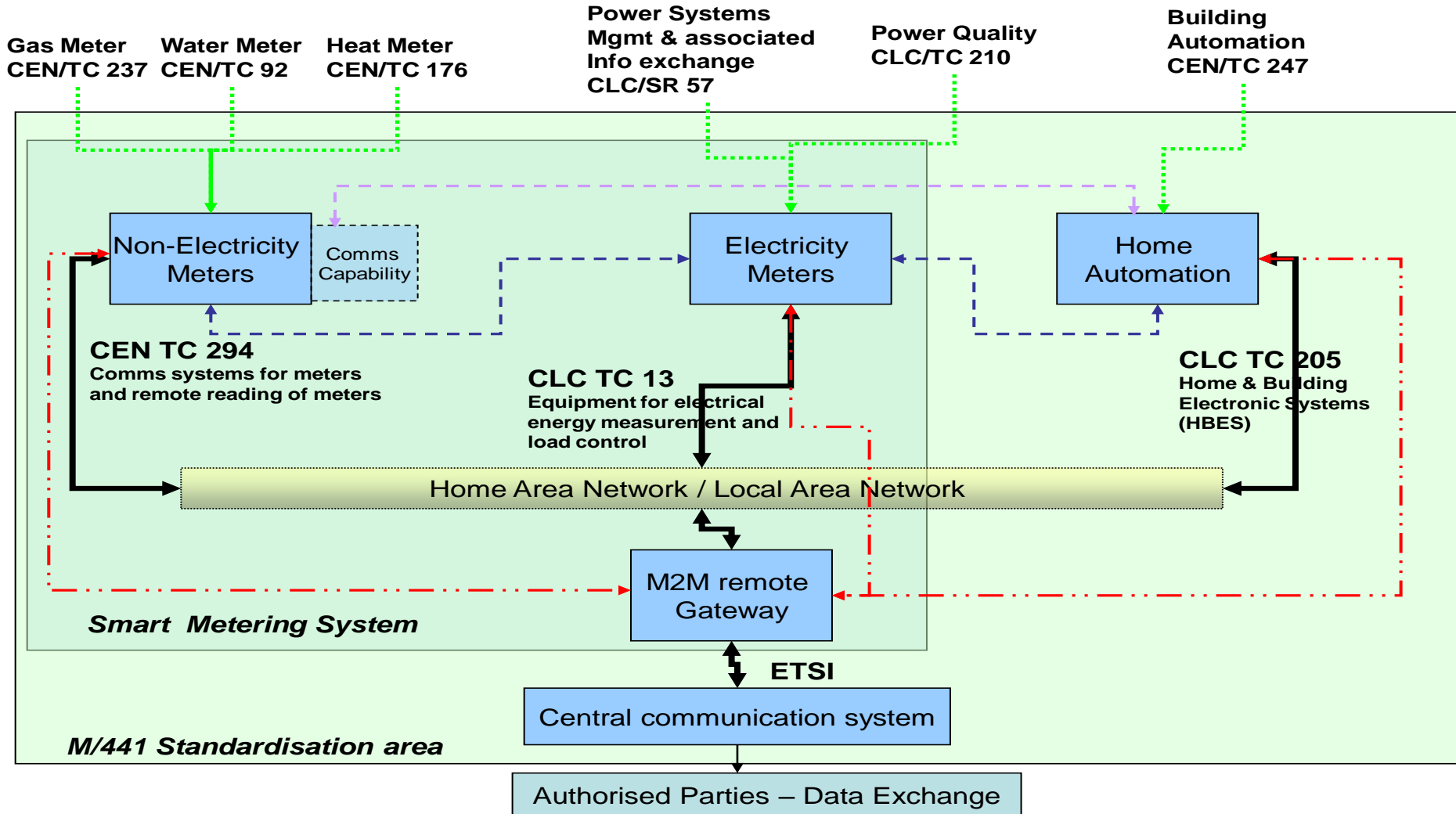


# European Mandate M/441 (2)

- **M/441 formally accepted by the European Standards Organizations (ESOs) in July 2009**
- **Formation of Smart Meter Co-ordination Group and relevant sub-groups:**
  - All stakeholders represented: Energy Regulators, Gas Industry, manufacturers, consumers
  - Benefit to be taken from the existing standardisation activities
- **Comments:**
  - In this context , standardisation **does not mean imposing identical solutions** on all projects in European Member States
  - Aim is to ensure that what a European Member State may want to do in smart metering is covered by suitable standards (**toolbox concept**)
  - **Does not cover 'back office'** or other industry IT systems impacted by smart meters but work will have implications
  - Standards for communications are not a best practice solution or recommendations but an **interoperability and quality statement** for technical solutions



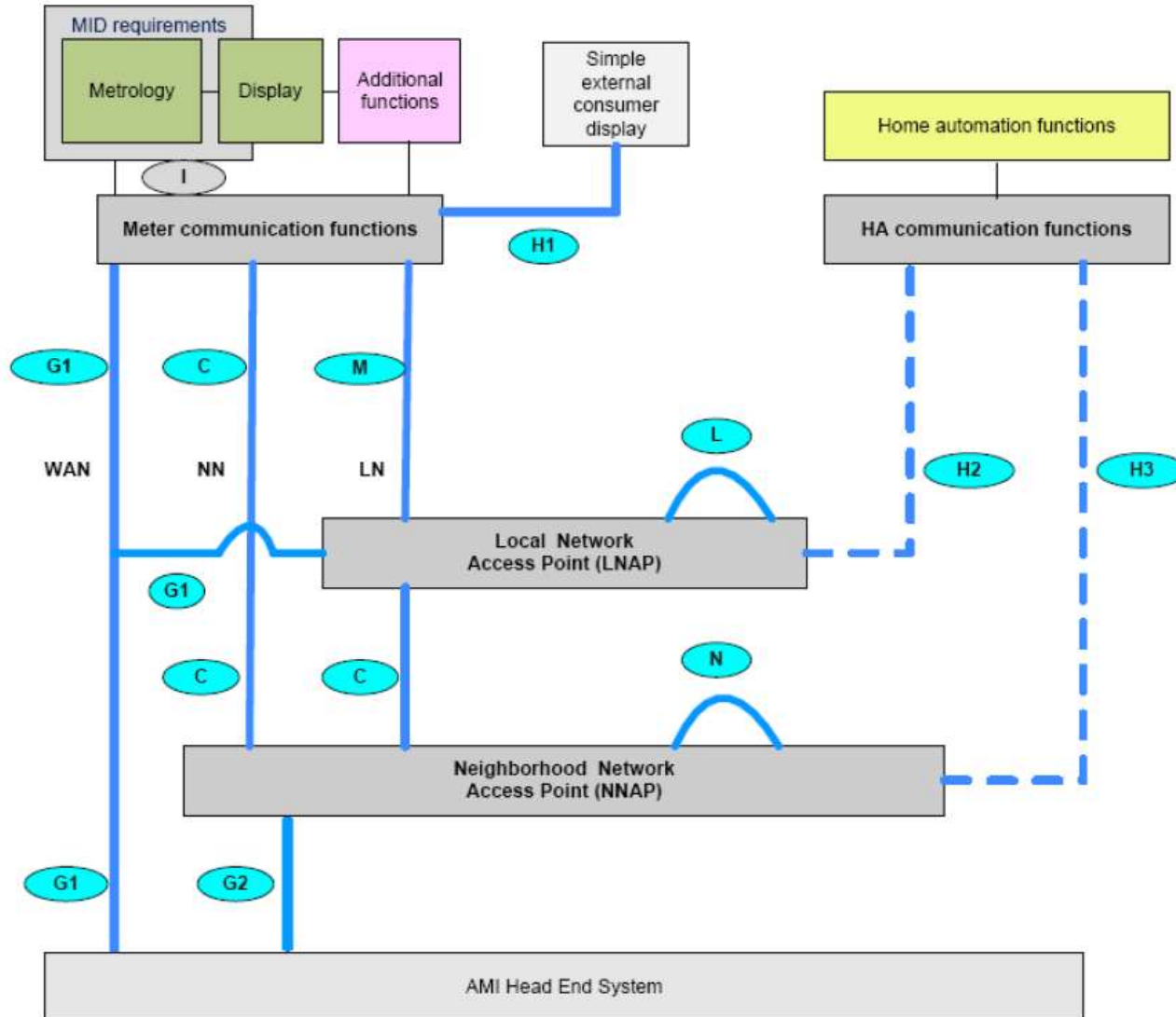
# European Mandate M/441: Scope and structure



# Mandate M/441 deliverables

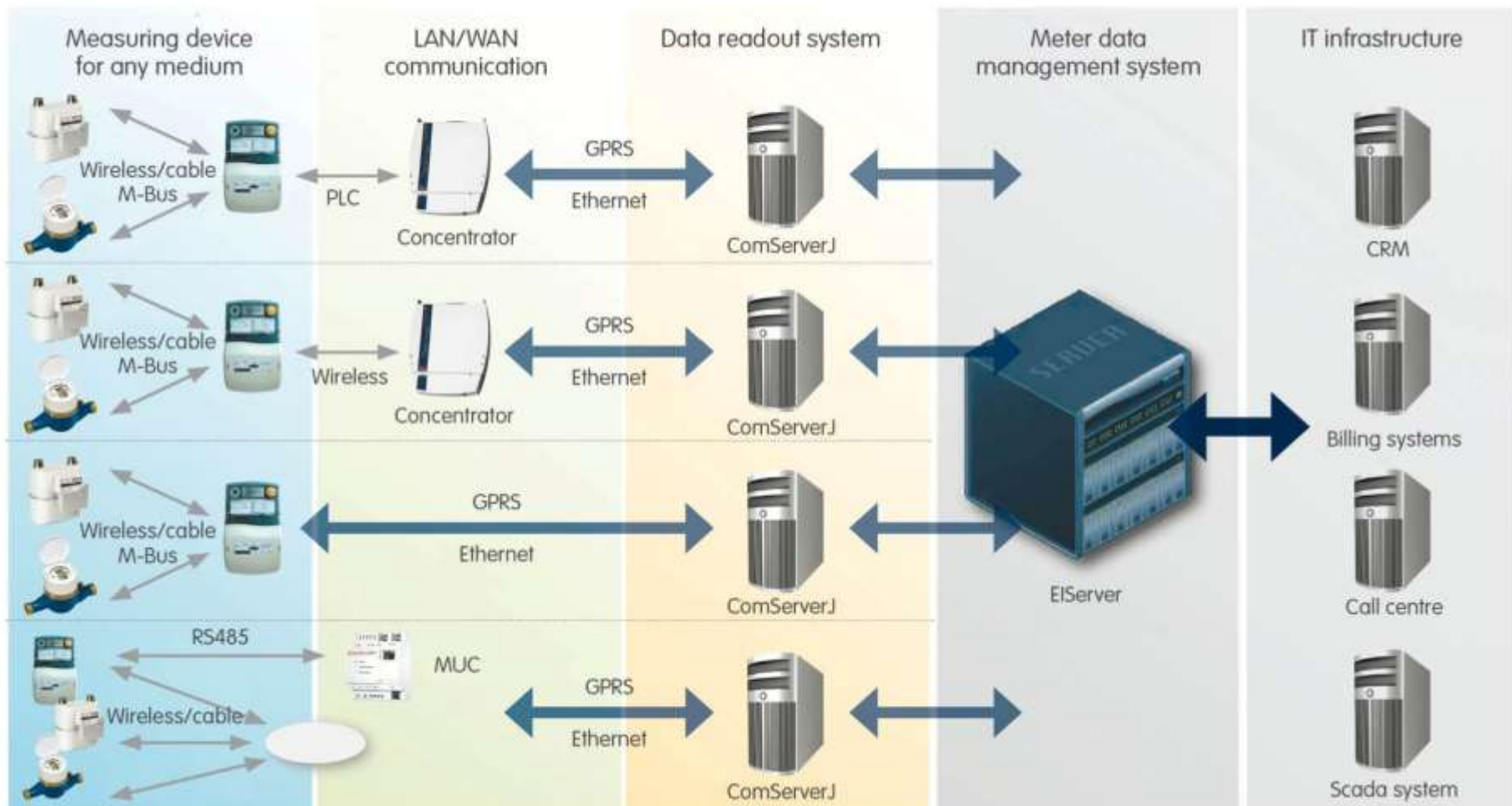
- **CEN-CLC-ETSI Technical Report 50572:2011 'Functional reference architecture for communications in smart metering systems'** adopted in December 2011
  - Define a **reference architecture** for standards development
  - Repository of **use cases**
  - Standards **work programme**
  - Technical report is freely available on the CEN and CENELEC websites:
    - CEN:  
<http://www.cen.eu/cen/Sectors/Sectors/Measurement/Smartmetering/Pages/default.aspx>
    - CENELEC:  
<http://www.cenelec.eu/aboutcenelec/whatwedo/technologysectors/smartmetering.html>
- **On going work programme: more than 50 standards currently in preparation !**

# Reference Architecture



# Example of smart metering configurations

## Supply chain



# Additional functionalities

- **F1** – Remote reading of metrological register(s) and provision to designated market organisations (*Automatic Meter Reading*)
- **F2** – Two-ways communication between the metering system and designated market organisation(s) (*Information exchange*)
- **F3** – To support advance tariffing and payment systems (*prepayment*)
- **F4** – To allow remote disablement and enablement of supply and flow/power limitation (*gas flow shut down, reopening?*)
- **F5** – To provide secure communication enabling the smart meter to export metrological data for display and potential analysis to the end consumer or a third party designated by the end consumer (*Energy Services*)
- **F6** – To provide information via web portal/gateway to an in-home/building display or auxiliary equipment (*customer display*)

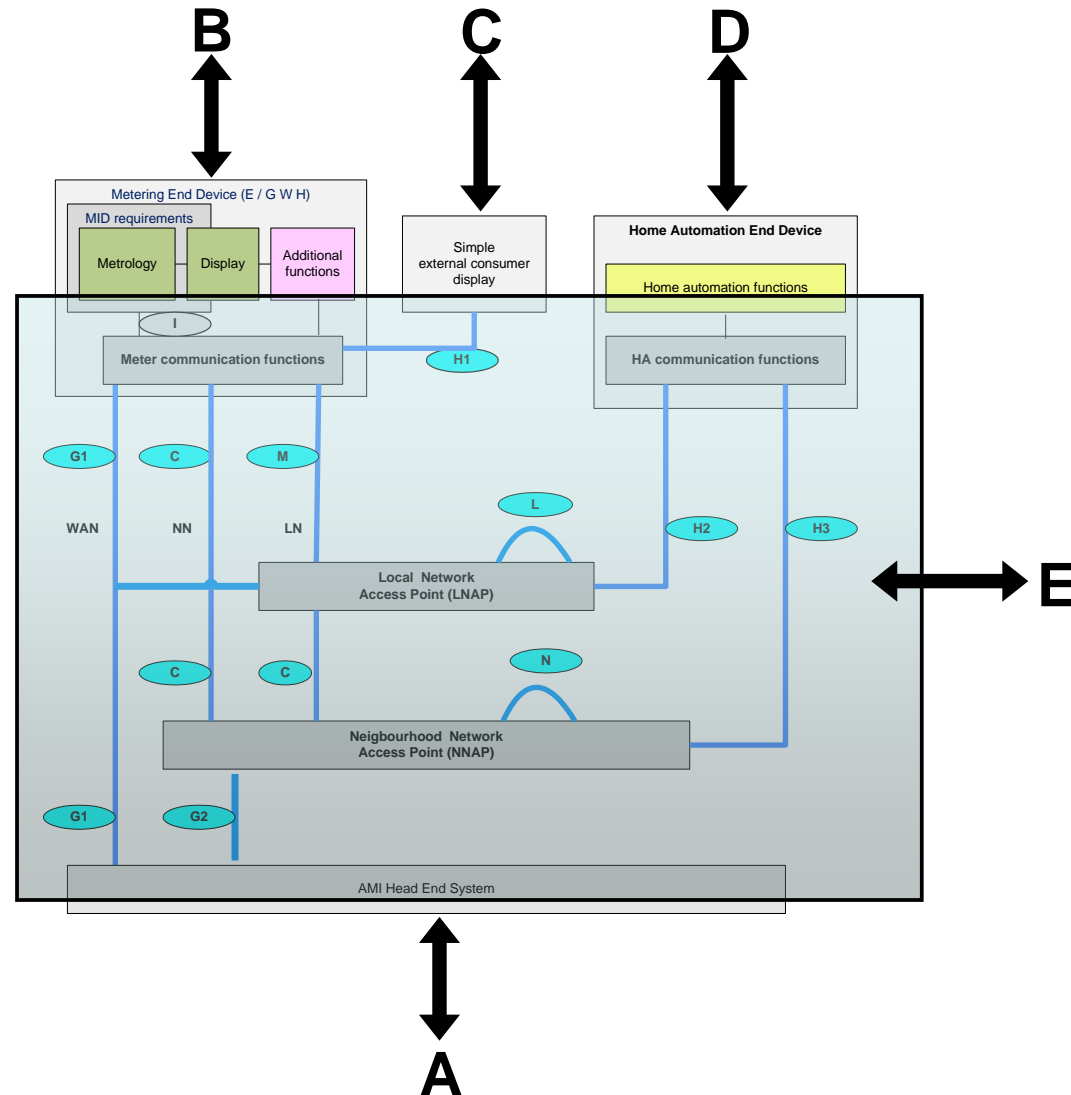
- To identify where new standards might be required, it was deemed appropriate to determine functionalities in more detail
- To clarify standardisation requirements
- To ensure interoperability and consistency in the smart meter data flows
- Technical Report shows how Use Cases relate to each functionality

## → **'Guidelines for development SM Use Cases'**

- Definition of Use Case levels (Prim. / Sec.)
- Complete list of primary and secondary Use Cases
- Use Case template (IEC/PAS 62559) and explanation
- Example Use Cases based on the template

# Use Cases - Primary/External Actors

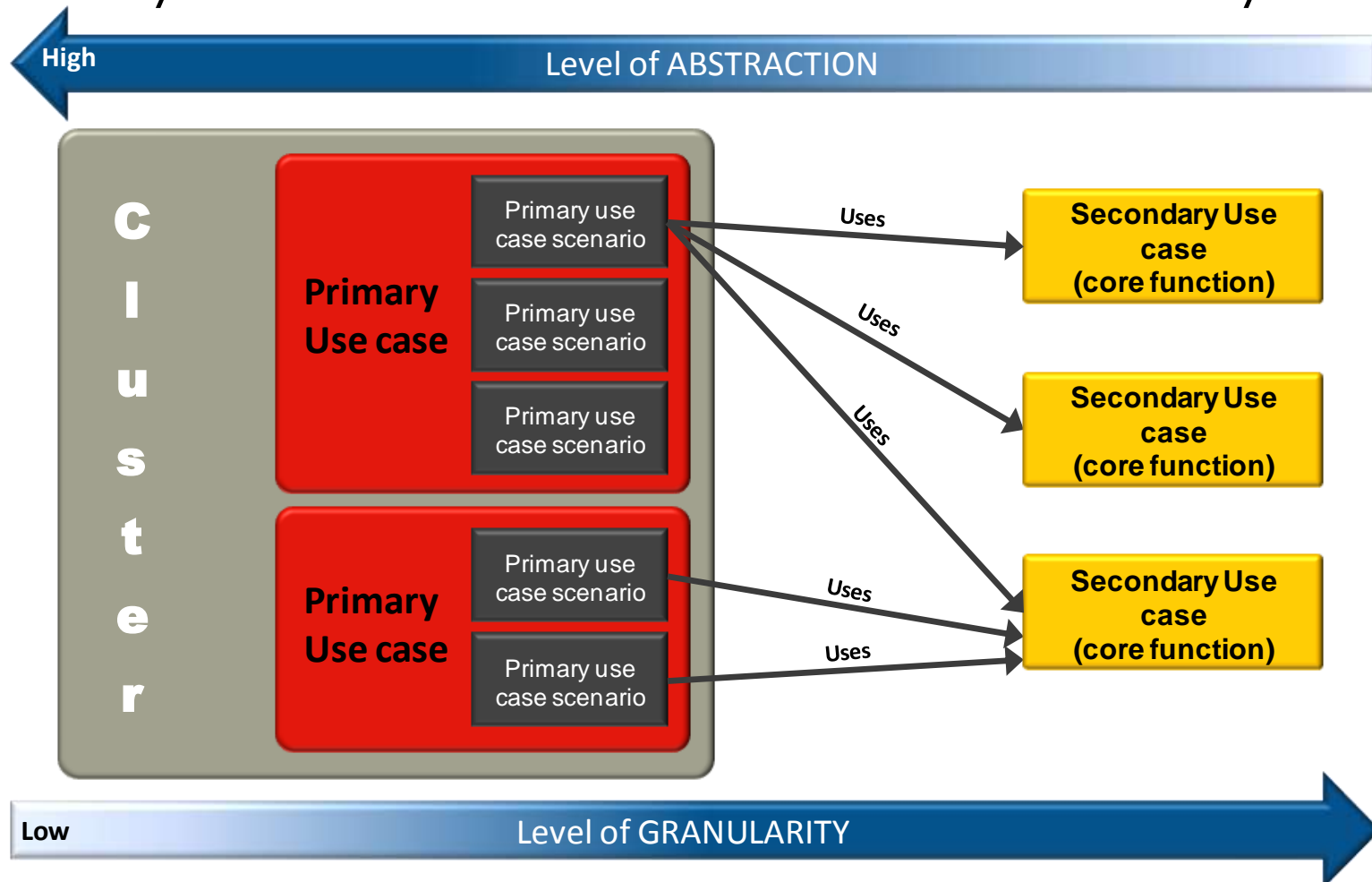
- External actors were labelled by a letter A/B/C/D/E because the actual roles of the system users are dependent on local market organisation
- E.g.: Actor A = external actor interacting with system via the HES. Could be meter operator, meter data collector, supplier etc...



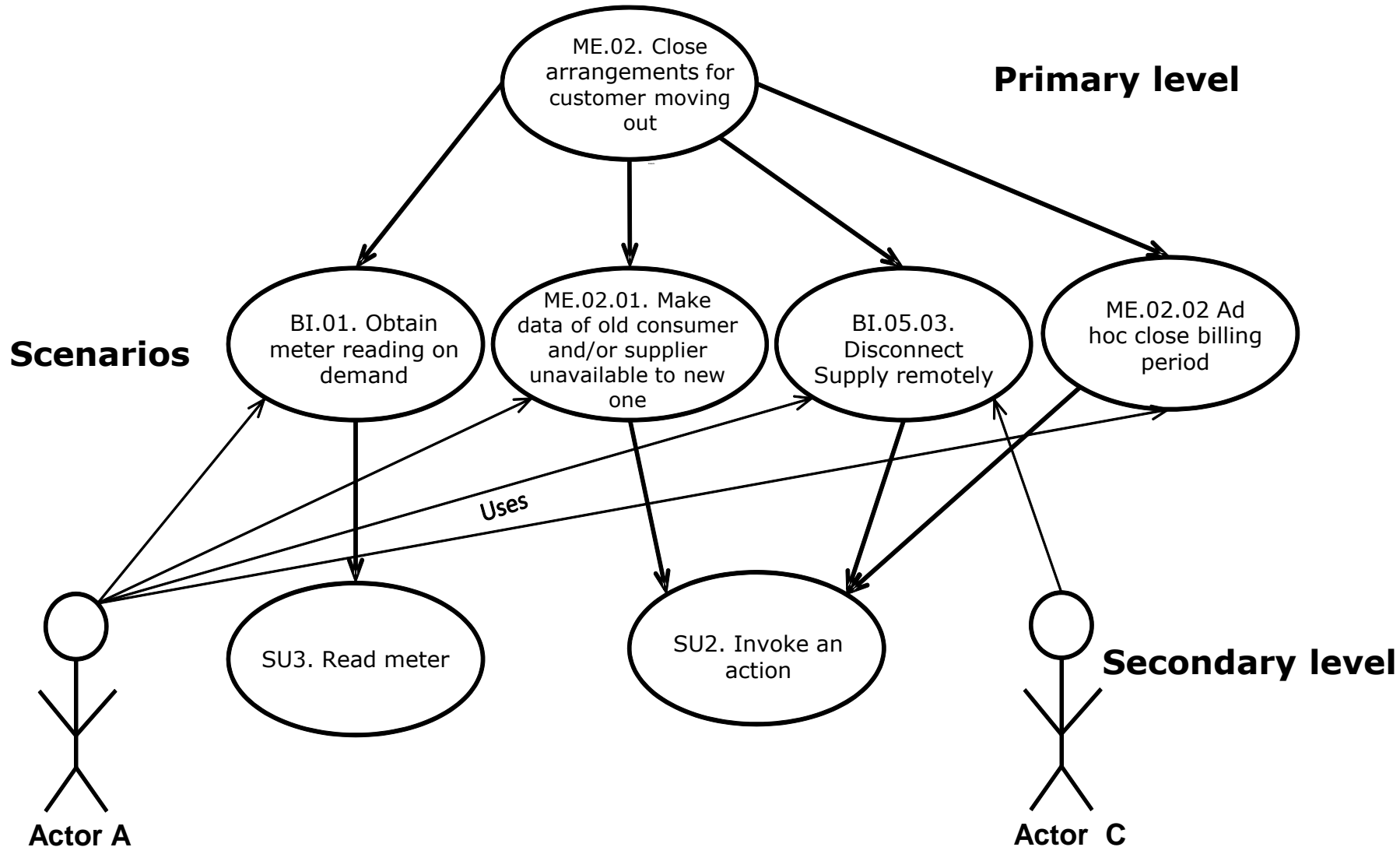


# Use Cases - Clustering

- The following diagram depicts the relation between, clusters, primary use cases and their scenarios and secondary use cases



# Example of a primary Use Case: Consumer moves out

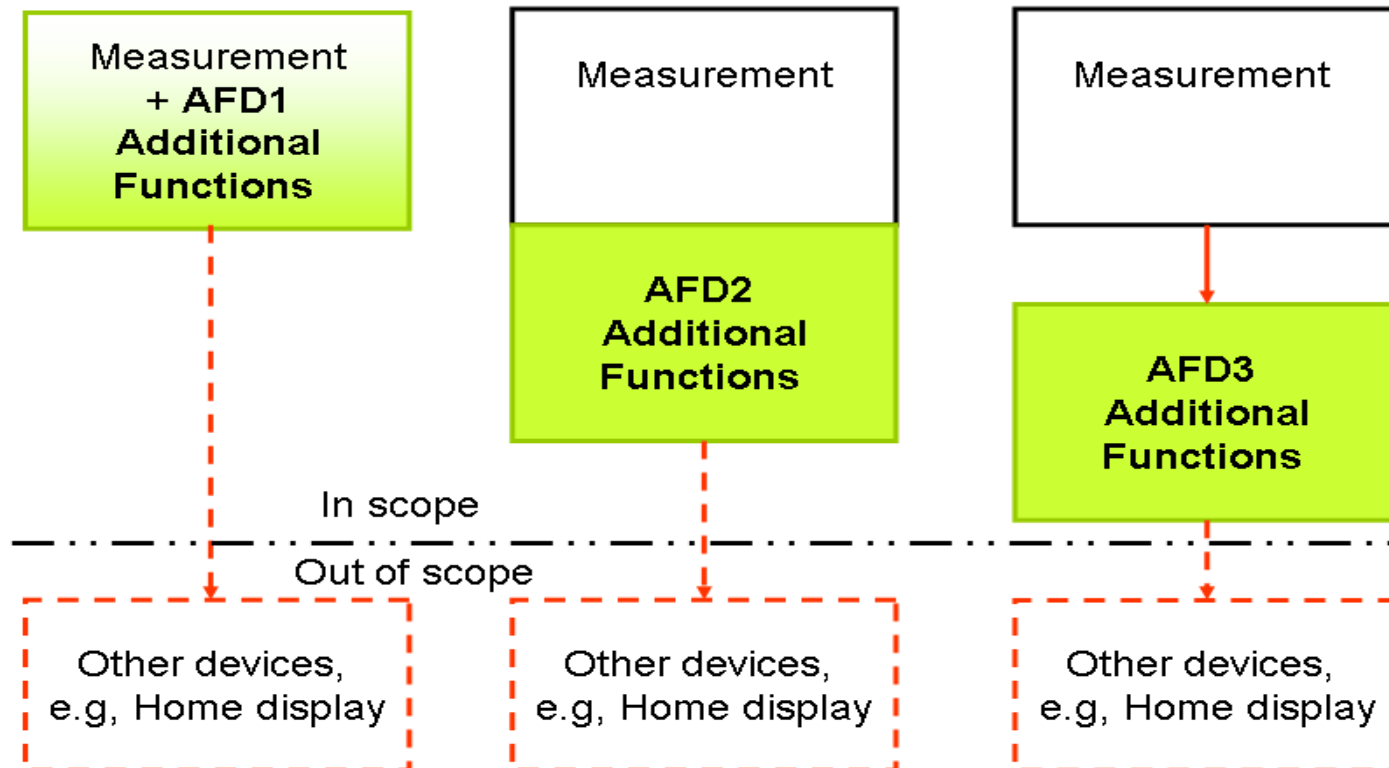


- **Product standard to developed by CEN/TC 237 "Gas Meters"**
- **Formal vote scheduled for December 2012**
- **Proposal to reduce the maximum capacity at 40m<sup>3</sup>/h**

## **Main issues:**

- **Metrological characteristics not affected by new functions**
- **Gas valve for meters 10m<sup>3</sup>/h maximum**
- **Valve used for gas interruption only**
- **Battery life time (10 years, 20 years??)**

## AFD1, AFD2 and AFD3



## Link with Smart Grids

- Important additional objective of **facilitating smart grid applications**, notably through the incorporation of distributed generation
- Smart grids outside EC Mandate M/441 scope, however, smart metering is a **key enabler for smart grids**, providing 2-way information flows between the meter and the designated market organization(s)
- A new **Mandate M/490** defined for smart grids. Parallel Smart Grid Co-ordination Group established. Close liaison is maintained between these initiatives.
- The functionality to use the Smart Metering Infrastructure for **Demand Side Management** purposes is covered by the M/490 Mandate
- The approach to defining security requirements for Smart Grids is also defined under the M/490 Mandate and is applicable to Smart Metering
- But most of the discussions concern **electricity, not gas!**

# Conclusions

- **European smart metering standardisation programme is **unique**.**
- **European standardisation's objective is to agree on common specifications to respond to the needs of Authorities, Industry and **meet consumer expectations****
- **Electricity, gas, water and heat utilities are concerned**
- **1<sup>st</sup> set of standards ready by December 2012.**
- **It mixes **traditional utilities** with the fast changing world of **communications (IT)****
- **It is very challenging by its **goals** and **size****
- **It will have a major role in **influencing** the **design of product** and **processes****
- **It will strongly support **innovation** and **growth****
- **Hundreds of millions of meters could be changed in the next 8/10 years!**
- **At which cost?**

Many thanks for your attention

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