

# Smart Metering – A role for standards?

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# Topics to be discussed

- The basics of a Smart Metering System
- Some of the key drivers
- Some of the conflicts
- Dynamics of gas and electricity networks and appliances used: the consequence for a Smart Metering System
- Issues associated with a Smart Metering System
- Examination of the role for standards
- *And finally:* current work and activities

# Introduction

- So what is Smart Metering?
  - It means all things to all people - there is no generally accepted definition
  - Could it be a meter with additional functionalities?
- It is generally accepted it includes a meter and communication system
  - Data transmission to / from a back office function
- It will probably have the ability to store / retrieve data
  - On the meter
  - In the house via a home display unit or the internet
  - Or a combination of one or more of these

# Introduction (Cont)

- Could it be as simple as this?
- An Electronic Token Meter has two-way communication, ability to update tariffs, a valve to shut-off the gas supply when credit has run out...



# ESCO

- Energy End-use Efficiency Services Directive 2006/32/EC
  - One of its primary objectives is to “improve energy end-use efficiency”. It does this by:
    - Setting indicative targets
    - Providing mechanisms, incentives, ..., legal frameworks to remove market barriers and imperfections that impede the efficient end-use of energy
  - Article 13 is the main Article concerning metering and billing information

# ESCO Article 13

- Article 13: “Metering and informative billing of energy consumption”
  - It covers meters for gas, electricity, heat...
  - It requires that Member States shall ensure that, in so far as it is technically possible (etc.) customers are provided with:
    - Competitively priced individual meters that accurately reflect the customer's **actual energy consumption**
    - Information on actual time of **energy use**
    - Information presented is in clear and understandable terms

*Note: Energy (kWh) not m<sup>3</sup> or kg as for gas*

# ESCO Article 13 (Cont)

- Billing shall be performed frequently enough to enable customers to regulate their own energy consumption
  - The bill to include:
    - Current actual prices and actual consumption of energy
    - Comparisons of the final customer's current energy consumption with consumption for the same period in the previous year, preferably in graphical form
    - Wherever possible, comparisons with an average normalised user of energy of the same user category

# Metrological Controls

- In Europe since 30<sup>th</sup> October 2006 all new gas meter designs must comply with the Measuring Instruments Directive 2004/22/EC
- The MID:
  - Has the objective to ensure honesty in transactions and free movement of goods of measuring instruments in the European Union
  - Is goal setting (new approach)
  - Establishes requirements for specific measuring instruments including gas meters and volume conversion devices



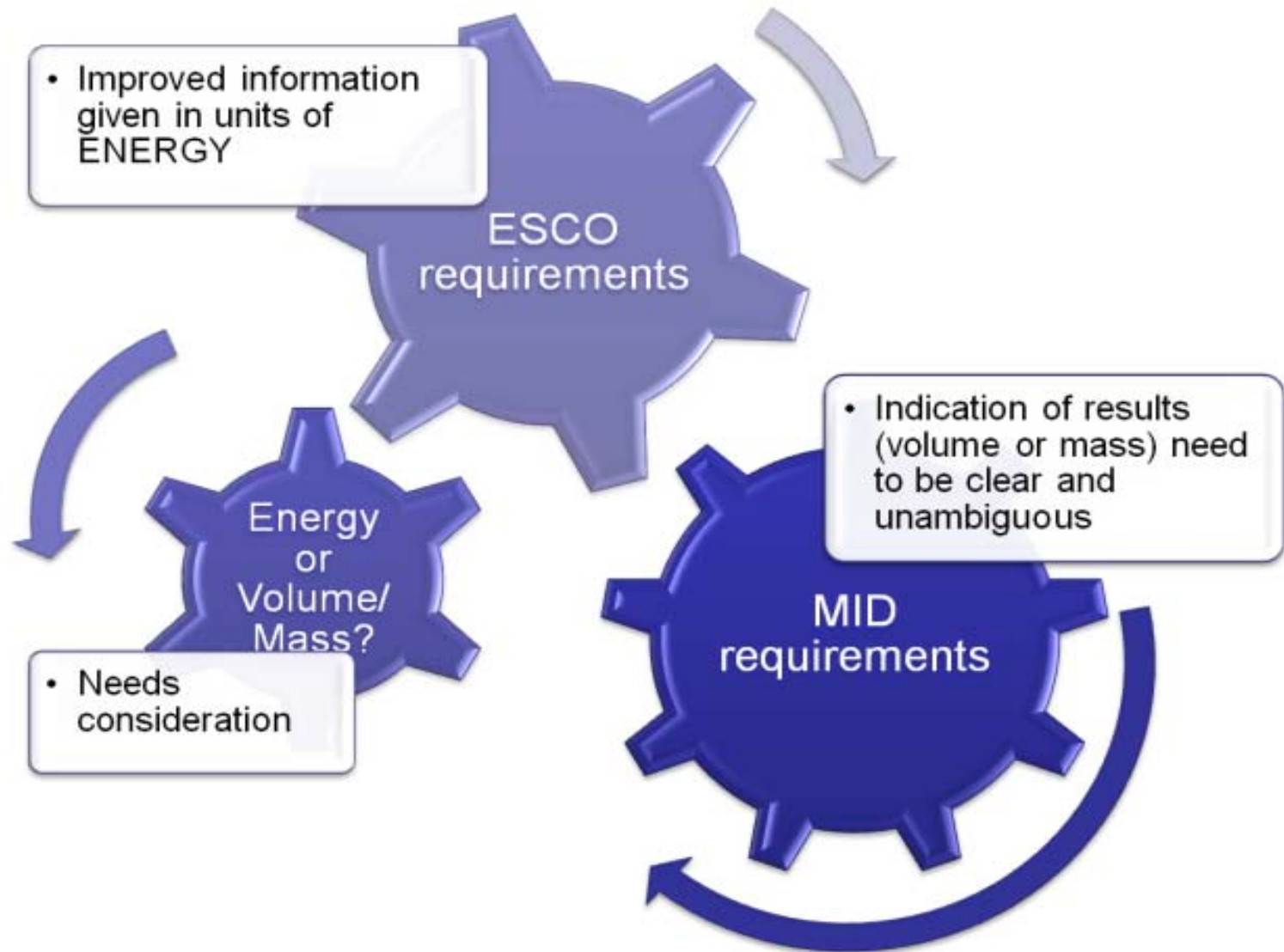
# MID (Metrological characteristics)

- All instruments must meet Essential Requirements (ER) of Annex 1
  - Allowable errors
  - Reproducibility & repeatability
  - Discrimination & sensitivity
  - Durability & reliability
  - Suitability
  - Protection against corruption
  - Information accompanying instrument
  - Indication of results
  - Further processing
  - Conformity evaluation
- Plus an instrument specific Annex
  - (MI-002 for gas meters and volume conversion devices)

# MID ER Indication of results

- Annex 1 Essential Requirements, Clause 10
  - Indication of result:
    - Display or hard copy – gas meter display (m<sup>3</sup> or kg)
    - Clear and unambiguous and inform the user of the significance of the result
    - Easily read under normal conditions of use
  - Additional indications may be shown provided they cannot be confused with the metrologically controlled indications
  - Whether or not it can be remotely read it shall be fitted with a metrologically controlled display accessible without tools to the consumer
  - Reading of the metrological display is the measurement result that serves as the basis for the price to pay

# Volume versus Energy



# Comparisons: Gas and Electricity

- The electricity industry has a clear understanding of how a Smart Metering System can enhance the electricity network's operability
  - Electricity industry requires real-time responses to changes in demand as electricity cannot be stored
  - Smart Metering System could be used as part of a Smart Grid network
- Because of the response of the majority of electrical appliances, consumers may get instantaneous information on how to rationalise their electrical energy use
  - Multiplicity of electrical appliances in the home could lead to complex optimization of electricity consumption by customers
- The electrical industry appear to have a win-win situation by installing Smart Metering Systems

# Comparisons: Gas and Electricity (Cont)

- The gas industry appears to be unclear as to how to obtain the benefits from a Smart Metering System
  - Gas Networks store huge amounts of energy therefore react slowly over time to changes in demand
    - Could a smart meter enhance the gas network operability?
- The range of gas appliances are limited mainly to heating, hot water and cooking
  - The majority of these react slowly to changes in operation
  - It is therefore difficult for the consumer to readily see instantaneous changes to operating behaviours
- Which stakeholder could see the greatest benefit from a Smart Metering System?
  - Improve billing, ability to instantly change tariffs, ease switching process, network modelling

# Issues

- Smart Metering Systems may have different drivers for the gas and electricity market
  - There are some very clear drivers for the electricity system
- The cost benefit analysis may be more difficult to accept for gas than electricity system
- It is possible that the requirements for additional functionality between the gas and electricity system could be different?
- Is the time right to consider the system providing results in energy?
- Are the gas industry clear about the benefits a gas Smart Metering System may offer?

# A role for standards?

- Traditionally the gas industry is slow to change, however we are now seeing a step change in technological requirements
  - The majority of existing gas meters use well established technologies allowing products to be made to a standard
- Could the process of developing standards help by:
  - Clarifying what the gas industry require?
  - Getting all stakeholders around a table?
  - Providing the basis for ensuring interoperability between the dataflow and Supplier?
- Benefits of developing standards:
  - Reduce the amount of duplication
  - Increase clarity
  - Ultimately save costs?

# How could standards help?

- This simple slide illustrates the key areas for standardization
- Meter, communication, and a back office...improved customer information...ability to update tariffs.....





# Areas of interest

- The gas meter is subject to a CEN Technical Committee, (CEN/TC 237) which I chair
- Communication systems are under Technical Committees CEN/TC 294 and CENELEC/TC13
- The back office system require industry protocols to be developed to ensure interoperability and smooth switching
- What is new is that stakeholders from the metering sector and the Communications and Systems sectors need to work more closely...

# What is happening now/next steps

- The Commission issued a Mandate on 12 March 2009 to the European Standards Bodies (CEN, CENELEC and ETSI) to produce a standard for Smart Meters
- Marcogaz have publish a paper to influence stakeholders
  - Including the Commission, CEN...
- CEN/TC 237 have a Task Group under its Working Group 5 to produce a CEN Technical Report – this is near completion
- Communications standards developed by CEN/CENELEC are available but may need refining to cover all new functionalities
- Utility Industries - Gas, Electricity, Water and Heat need to discuss protocols to determine if a common approach can be reached

# Smart meters – Commission Mandate (Cont)

- Mandate directs European Standards Organizations to develop an open architecture for utility meters involving communications protocol enabling interoperability
  - To co-ordinate the development of standards
  - The Commission believe the standardization process has the power to accelerate the access to innovation to both domestic and global markets
- How will this work be organised
  - A Smart Metering Coordination Group is formed which includes ESOs, TC Chairman and other stakeholders such as the Commission, European Trade Associations, European Regulators, OIML, WELMEC etc.

# Smart meters – Commission Mandate (Cont)

- The mandate requires
  - CEN, CENELEC and ETSI to present a work programme to the Commission within 3 months of acceptance of the mandate
  - The work programme to include a precise timetable for the completion of the work and a full list of standards to be developed
  - The European Standard for communication has to be presented within 9 months of the acceptance of the mandate
  - The harmonized European Standards for the additional functions have to be completed within 30 months of the acceptance of the mandate

# Smart Meter – What are CEN/TC 237 doing

- New work item raised at its Plenary on 29/30 April 2009 for an overarching standard
- Title “Gas meters – additional functionalities”
  - As a new standard it is therefore under the normal track (ENQ/FV)
  - Issue – normal timeline ENQ/FV is more than 30 months
  - Call for experts to be sent out shortly to European National Standards Bodies
  - An initial ad-hoc meeting is to take place in June
  - The first meeting of the WG will take place in July with subsequent meeting taking place approximately monthly

# Scope of new work item of CEN/TC 237

- Produce an overarching standard for gas meters which will allow additional functionalities to be added to gas meters covered by the MID, as appropriate to the specific technology. The following additional functionalities will be considered:
  - Remote index reading
  - Data display
  - Data communicated
  - Interval data-logging
  - Separate registers and recovery of data
  - Prepayment
  - Remote control/automatic shut-off
  - Time clock
- These functionalities could be integral to the meter or via a directly connected module
- This standard relies on work carried out by other experts working under Mandate M/441 EN, e.g. Communications, to transmit data from and/or to the meter

# Issues

- Metrological controls
  - Do any parts of the additional functionality need to be under metrological control? e.g.:
    - The real time clock - If there is a reliance on the clock to change rates?
    - Registers – In the case of multi registers what of the accuracy, storage time and ability to retrieve data - how will a bill be disputed if the meter does not hold register data for long periods
- Safety
  - Activation or deactivation of any remote control/automatic shut-off device?
  - How gas tight do any valve need to be?

# Conclusions

- There could be conflicts between the MID and ESCO Directives; however they should be seen as complementary:
  - MID metrology, ESCO improve end-use energy efficiency
- Functionality could be different between gas and electricity Smart Metering
- The gas industry needs clarity on how to gain the benefits from a Smart Meter
- A Smart Metering System does not have to be complicated
- The process of standardization of the Smart Metering System will focus the minds of all stakeholders
- The requirement for energy information at the meter needs further consideration
- The Commission Mandate sets very aggressive time scale for producing European Standards



Thank you for your attention!

Any Questions?

