ESMA- JRC Smart Metering Workshop

John Parsons

ESMA Project Coordinator

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ESMA

- ESMA is an organisation with the objective of minimising the energy demand of consumers in Europe through smart metering in support of Article 13 of the ESD
- It is part funded by the commission and has a wide membership covering energy regulators, energy agencies, academics, metering companies

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Project Participants

ESMA
European Smart Metering Alliance

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SUSTAINABLE ENERGY EUROPE 2005-2006

Progress

- Alliance – now has more than 100 members
  - Drawn from utilities, vendors, ESCOs, consultancies, academics, consumer bodies, technology developers
- Web site set up
  - http://www.esma-home.eu
  - With password controlled members area
- Reports on state of the art and Application Guide published

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Reports

- Impact Analysis on European Metering Industry Stakeholders
- Definition of Smart Metering and Applications and Identification of Benefits
- Report on Innovative Customer Energy Products
- Review and Consolidation of Smart Metering Experience
- Report on Effective Customer Feedback Mechanisms
- Report on Regulation and European Market Conditions Related to Smart Metering
- Report on Methodology for estimating Energy Savings related to Smart Metering
- Report on Barriers and Drivers for smart metering
- Financial Toolkit and Guide on its Use

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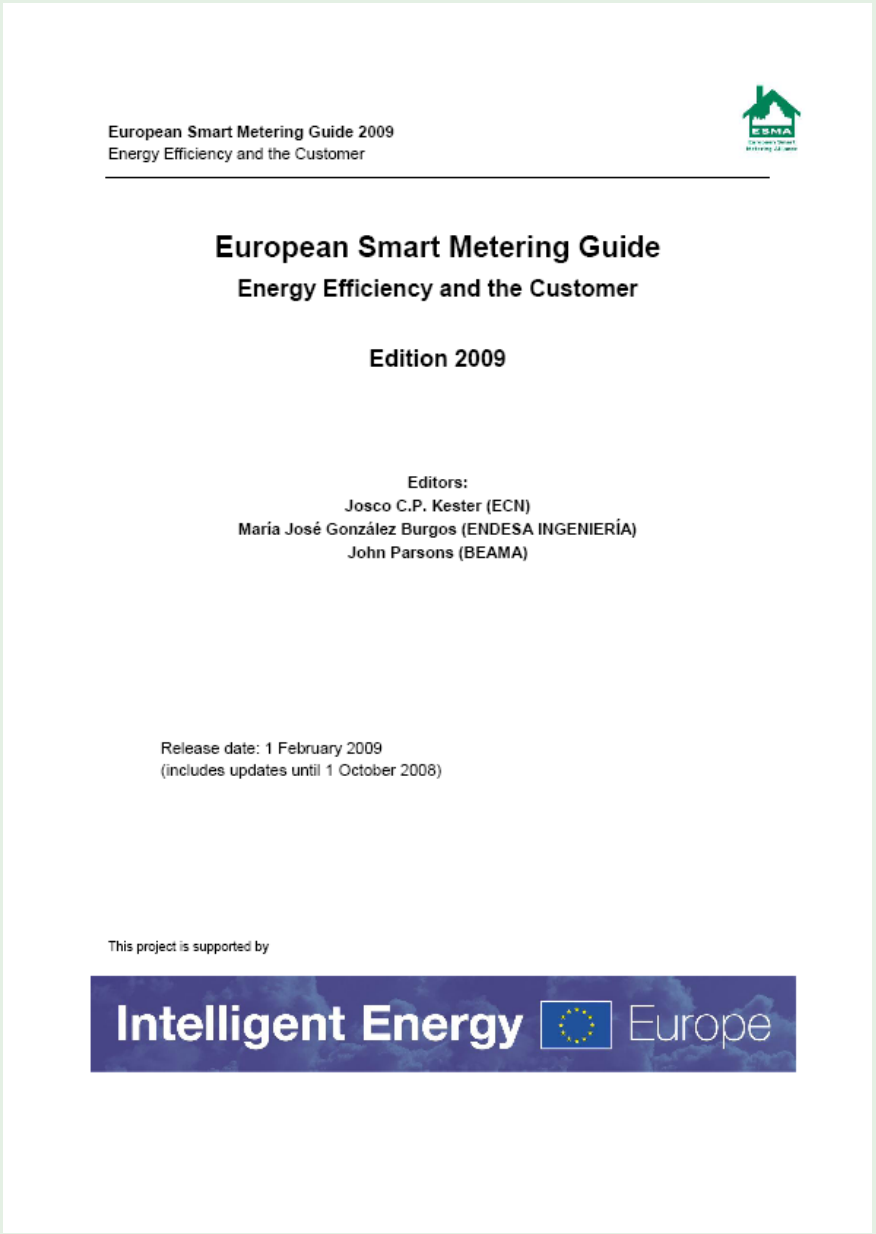

European Smart Metering Guide 2009
Energy Efficiency and the Customer

European Smart Metering Guide

Energy Efficiency and the Customer

Edition 2009

Editors:
Josco C.P. Kester (ECN)
María José González Burgos (ENDESA INGENIERÍA)
John Parsons (BEAMA)

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ESMA
European Smart Metering Alliance

SUSTAINABLE ENERGY EUROPE 2005-2008

1. Introduction	Josco Kester
2. Why smart metering?	John Parsons
3. Customer feedback and smart metering	Henk van Elburg
4. Smart metering systems - technical options	John Parsons
5. Smart metering systems - multi-utility issues	Marek Cherubin
6. Smart metering and the smart grid	Josco Kester
7. Smart metering services for demand response	Mikael Togeby
8. Smart metering services for smart homes	John Parsons
9. The utility and smart metering	Tomas Vorisek
10. Determining energy efficiency gains using field trials	Mikael Togeby
11. Metering and regulation	Andrei Z. Morch
12. Smart metering systems – standardisation	John Parsons
13. Marketing smart metering services	Tomas Vorisek

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The Main Themes for workshop

- These are exciting times - smart metering is happening
- Must make sure smart metering is designed to support energy efficiency
- Must discover how to use smart metering to promote energy efficiency
- The future will be very different
  - Ready availability of detailed usage data (individual and collective)
  - Opportunity to inform, educate and empower customers
  - Two way communications channel with energy retailer or ESCO
  - Support for demand management
  - Provides link to smart homes technology
  - Provides link to smart grids technology
- Need
  - Understand what interests and motivates customers
  - Educate energy professionals in the possibilities and use of smart metering
  - Need to work out how the parts fit together

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EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

ESMA
European Smart Metering Alliance

ESMA – JRC Smart Metering Workshop

16th – 17th February 2009

ESMIG

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Recommendations

Are these sufficient?

How do we develop them?

How do we promote them?

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Recommendations

- Regulators should require that all utilities introducing smart metering include a statement in their proposals on how they will use the smart metering to enable and support services that improve energy efficiency and help to save energy.

- Both costs and benefits of smart metering systems are highly dependent upon national and local circumstances and upon specific characteristics of final customer segments. A proper evaluation of the costs and benefits of introducing smart metering should therefore be done per country and per final customer segment.

- Before introducing Smart Metering for reasons of energy efficiency, a full energy analysis should be made of the system to be used. This energy analysis should not only take into account the expected increases in energy efficiency at the final customer side, but also the increase in energy consumption through the deployment of the smart metering system (including the stand-by consumption of the ICT equipment).

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Recommendations

- When designing customer feedback for smart metering schemes, the following observations should be fully taken account of:

- Consumers need to be able to see instantaneously and continuously what is happening to their consumption, without having to switch on an optional in-home feedback device first;
- Direct feedback promises to be more effective than indirect feedback;
- Feedback promises to be more effective when accompanied with goal setting;
- Historic feedback promises to be more effective than comparative or normative feedback;
- Direct displays in combination with better billing promises to be a more preferred way of communication for consumers than feedback through an indirect (delayed) personalized web page
- Internet promises to provide useful additional feedback through incorporation of further analysis and advice on a longer term basis.
- Regulators should ensure that there are no financial, commercial, legal or regulatory barriers to customers having access to real time data from utility meters measuring their supply.

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Recommendations

- Smart meters should contain an interface to enable the data contained in them to be communicated to other devices and systems within the home.
- This communication should be supported by the adoption of open interface and data communications protocols. The smart metering industry across Europe should agree a common approach to local data exchange with utility meters.
- The design of the WAN should allow for future growth in communication performance requirements (such as data rates, availability and speed of response) arising from the introduction of new product offerings. For some services communication availability and response time are much more critical than high data rates and the impact of these on the final customer experience should be considered at the design stage.
- As much of the cost and risk of a smart metering over its lifetime are related to WAN communication. It is recommended to pay special attention to this when designing smart metering; again considering the impact of future growth in communications.
- The security of the system must be managed appropriately to ensure that only approved parties can access the meter data and that final customers and others cannot access data within the meter that they are not approved to view.

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Recommendations

- It is recommended to implement multi-utility meter systems with expandable data standard for each of the media used.
- It is recommended to design multi utility systems based on optimization of energy use. This shall be planned together with the DSM concept. In particular this is very important in systems with optional supply solutions.
- Regulators should consider if it is necessary to create an external independent data acquisition company for reduction of operational reading costs, rather than using a distribution system operator where energy retailers must share the system. Such systems should provide appropriate security for both the energy retailers and the customers.
- For district heating companies, the first step is to assure basic thermal metering requirement at thermal nodes and heat substation. For District heating companies there is a need to develop specifications for smart metering and identify complimentary services that can be delivered with the smart metering system.
- Careful consideration should be given where multiple utilities are displayed in the same location to ensuring that appropriate environmental messages are conveyed; for example, gas and electricity should show their equivalent carbon emissions.

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Recommendations

- TSOs, DSOs, regulators should consider which functionality is needed for new power consuming devices with a potentially high simultaneous peak demand, such as plug-in electric or plug-in hybrid vehicles. Time varying prices may be the easiest way to avoid peak loads in the grid.
- DSOs, regulators and utilities should formulate a vision and action plan on the transition towards a Smart Grid, before investment decisions about smart metering are made. This vision and action plan should indicate if, which, where and when Smart Grid services will be introduced to the final customers and in the power grid.
- The ICT architecture of smart metering systems should be designed in such a way that it introduces no unnecessary barriers for a future introduction of Smart Grid services.
- In all situations in which an upfront investment to make the smart metering system 'Smart Grid-ready' does not seem justified, it is recommended to include in the design of the smart metering system at least a Smart Grid upgrading plan.
- The communication infrastructure of the smart metering system should be based upon open standards, to enable shared use of the communication infrastructure for services for the Smart Grid and for final customer energy management.
- Where metering services are highly 'unbundled' consideration should be given to regulatory and commercial models that allow the DSO access to the smart metering system.

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Recommendations

- When preparing for the roll out of smart meters, demand response should be included in the cost benefit calculation
- Relevant design features related to demand response should be included in the meter requirements. These include the time resolution of the metered values (days, hours, quarter hours or minutes) and the feedback and communication possibilities.
- Utility planners should be aware that the need for demand response may be different in the future. Tight capacity balance, more local generation or more wind power may increase the benefit of demand response.
- The acceptability of the scheme to customers should be considered and tested through field trials.

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Recommendations

- Real time access to consumption data directly from the smart meters to the Home Area Network (HAN) should be provided.
- Agree a communications protocol between the smart meter and smart homes systems. This should be supported by the provision of hardware bridges to provide a connection between smart meter LANs and Smart home HANs if a common system is not used.
- Ensure that approved agents can make use of the smart meter communications link to pass data to smart homes devices. This would require the negotiation of a commercial basis to cover the cost of the communications service.
- Ensure that smart metering data protocols make provision for passing through messages relevant to smart homes applications.

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Recommendation

- Regulators should ensure that smart metering is introduced in such a way that it supports a market for new ESCO products.
- Any implementation of smart metering should be accompanied by proper promotion activities directed at final consumers to explain why a smart meter is beneficial, what functionalities it is to bring, and how can it be used for their good (e.g. to lower their present energy consumption and energy costs and improve their comfort).

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Recommendations

- Include a control group and a before period, if possible
- Trace selection process
- Combine electricity consumption data with data, e.g. from questionnaire or existing databases
- Involve a ‘social’ person from the beginning of the planning, to check that relevant social and cultural issues have been taken into account in selecting participants and carrying out the trial.
- Remember the ‘Hawthorne effect’ and allow for it.
- Involve a statistician from the beginning of the planning process
- Consider using statistical methods, e.g. regressions analyses to document impact
- Consider keeping data as individual data, e.g. per household
- Look for sub groups with high savings – as a supplement to the study of average impact
- Only start with a field test if significant results are expected
- Smart meters, ICT and communication systems may increase electricity demand. To be effective the energy savings realised by final customers must outweigh this extra consumption. This additional load should be accounted for in the energy saving analysis of the field trial.

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Recommendations

Authorities:

- It is important to identify an optimum detailing level for the Regulation: poor, overly complex and unpredictable regulation may have negative impacts on the implementation of smart metering and reduce the expected benefits.
- Implementation of minimum functional requirements, which are most relevant for the given country (-ies), would secure sufficient functionality of the Smart Meters and reduce potential technical issues and business risks.
- The energy efficiency can be improved by providing the final customer (and other actors) with access to metered data giving a consumption feedback and supporting development of new products and services
- The functional requirements should be coordinated with other relevant Authorities, for example, Office of Weights and Measures, Data Inspectorate (data security and privacy issues) etc.
- Risk of stranded assets can be reduced by gradual implementation, starting with new build installations.
- The implementation schedule should not create organisational and logistical bottlenecks due to lack of equipment or skilled manpower

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Recommendations

- There should be an agreement on common minimum functionality and interoperability regarding provisioning of feedback from smart metering systems.
- European stakeholders should commence investigating the feasibility of adopting existing standards or developing new standards for use across Europe. These standards would need to cover physical and data layers and meet the needs of all European member states. As much as possible, the standards should allow freedom to innovate smart metering systems and feedback techniques.
- Data standards should be expandable to allow inclusion of entities such as those required to show environmental impact; such as carbon equivalent (for example, kg CO2/kWh) of the energy stream.
- Physical and data standards should be agreed for local communications with meters. These should enable non-utility devices and systems to access meter data. Standards should allow the control of what data can be made available by the meter and access to the data.

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Recommendations

- A major plank of any successful roll-out will be that consumers understand and broadly accept the reasons for smart meter installation. It is therefore recommended that to the DSO or energy retailer:
- Involves the end customer and marketing departments as early as possible
- Begins with surveys and trials to identify the services that will be well received by final customers and effective in reducing energy consumption
- Designs the marketing plan for mass-scale smart metering introduction based on the results of the surveys and trials
- Minimises the inconvenience for final customers during the installation phase and especially make sure that there are sufficient properly trained staff to deal with customer queries and complaints arising from the installation of smart meters (this should include t he installers)

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Recommendations

Utilities:

- The cost/benefits analysis should consider the possibility of future changes in the national Regulation regime, which may increase or decrease the value of both core and additional functionalities.
- After the first implementation, new and improved requirements can be introduced within a reasonable period of time. This has to be considered during initial design of the system with regard to flexibility, compatibility, standardisation and modularity.

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Review of ESMA

- ESMA has made solid progress
- Not everything successful
  - Lack of broad engagement with the Alliance
  - Delays in implementing smart metering systems
  - Delays in smart metering trials
- ESMA project is funded to the end of 2009

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The Role of ESMA

- To present the case for smart metering via energy efficiency – to make it happen
- To ensure that other groups are represented and considered – to make it happen right
- To foster the growth of an energy efficiency services community – to make it happen better

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ESMA Future

- ESMA Guide and recommendations should be owned by energy efficiency community and updated by them
- ESMA should be minimal cost network group – based around web site
- It should organise an annual self funded conference
- Sponsor should be utilities and vendors who want to keep a ‘watching brief’ on developments

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