CONCERTED ACTION
ENERGY EFFICIENCY
DIRECTIVE

# Smart meters and consumer engagement

**Executive Summary 3.5/6.5**

**Core Theme 3 Metering and Billing, Demand Response and Grid Issues**
**Core Theme 6 Consumer information programmes, training and certification of professionals**

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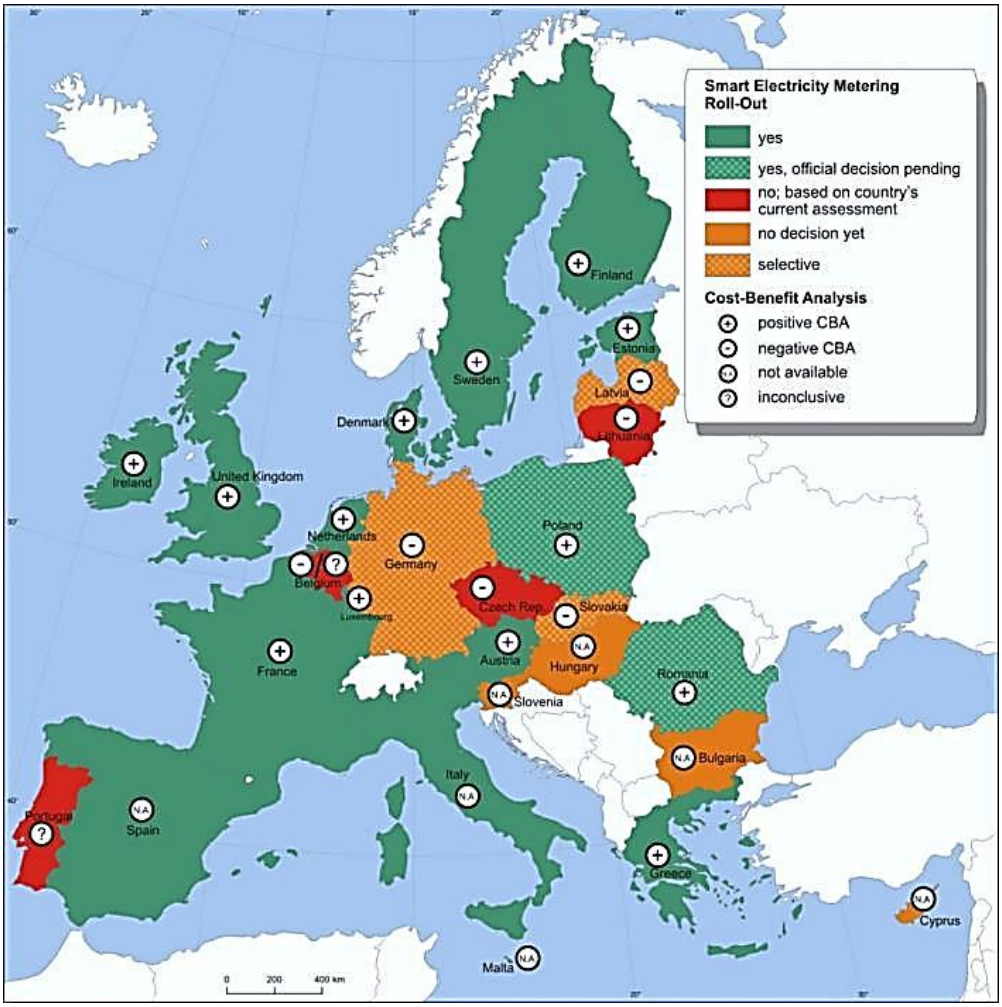
# 1 Summary

Smart metering[1] provides many advantages both for end users, energy companies and Distribution System Operators (DSOs) compared to conventional metering systems, such as cost effectiveness, accuracy and interactivity. The roll-out of smart meters for electricity and gas is making progress in the EU mainly due to Directives 2009/72/CE and 2009/73/CE and EC Recommendation 2012/148/EU.

The roll-out of smart meters is mandatory, meaning that at least 80% of consumers must be equipped with intelligent metering systems by 2020 unless a cost benefit analysis proves that the business case is negative for a specific Member State (MS). This means a heightened expectation for the deployment of smart grids to modernise the electrical grid for the 21st century as well as the development of energy services markets, such as the market for home energy management systems, demand response services and other flexibility increasing services.

In this context, 16 MS have planned large-scale roll-out of smart meters for electricity by 2020 or earlier and 3 MS are focusing their roll-out on particular groups of customers (Figure 1). For gas, 5 MS have so far decided to roll-out smart meters by 2020 or earlier.[2]

**Figure 1 - Smart Electricity Metering Roll-Out in Europe**




[1]Smart metering system means an electronic system that can measure energy consumption, adding more information than a conventional meter, and can transmit and receive data using a form of electronic communication (2012/148/EU)

[2] Benchmarking Smart Metering Deployment in the EU-27 with a focus on electricity" Commission Report (COM(2014) 356). The report and the country fiches for individual countries can be downloaded by following the links.

Consumer engagement and acceptance is a critical success factor for the roll-out of smart meters. The Energy Efficiency Directive (EED) requires that appropriate advice and information shall be given to customers at the time of installation of smart meters (Articles 9 and 12). A questionnaire was sent to all MS in December 2014 and 26 MS responded. 6 MS have already developed a consumer engagement strategy. As the roll-out of smart meters is still in an early phase, the majority of MS do not have a strategy yet but are likely to develop one: 14 MS answered that they do not have a strategy yet but outlined their thoughts and ideas related to such a strategy.

In most MS, the DSO is responsible for the roll-out of smart meters and is thus the primary link to the consumer for their installation. The DSOs are therefore strategically important for smart meter consumer engagement: in 9 MS the government or another authority is giving guidance to the DSOs on how to inform consumers at the time of the smart meter installation. In many countries, the obligation for DSOs to inform consumers about energy efficiency during the roll out is required by law.

Once in place, interactive smart meters can allow users to control and manage their individual consumption patterns, providing strong incentives for efficient energy use through behavioural change. Some studies have estimated the average savings to be around 3% for electricity and 1.7% for gas. According to the results of the questionnaire, 11 MS had pilot studies or similar where actual savings from smart meters had been measured. It can be concluded that smart metering in combination with direct feedback, particularly in-home displays, can lead to considerable and persistent household energy reductions. Showing average savings up to 6% for electricity and 7% for gas in pilot studies, in-home displays appear to be the most important factor and a crucial 'stepping stone' in kick-starting active consumer interest and engagement for accessing energy information.

According to EED Article 9, MS shall ensure that the objectives of energy efficiency and benefits for final customers are fully taken into account when establishing the minimum functionalities of the meters. 62% of MS that responded to the questionnaire affirm their interest in retaining all 10 functionalities recommended by the European Commission (16 MS). Among these, 10 MS will include additional functionalities and new measures.

MS shall also ensure the security of the smart meters and data communication and the privacy of final customers. The importance of privacy and protection of data gathered by smart meters is consistent among all MS. As a response MS have independently assembled interdisciplinary work groups in order to minimise any possible problems which may occur in the future.

Another important area is the development of energy services based on data from smart meters, demand response and dynamic prices where progress has recently been made.

# 2 Conclusions and recommendations

Undoubtedly, the most important conclusions of this research are directly related to consumer engagement and smart meters and the principal key points are:

- Consumer engagement during the roll-out of smart meters is regarded as important among MS.
- The implementation of smart meters is still in an early phase in most of the MS. This explains for instance the fact that an engagement strategy of consumers for the roll-out of smart meters exists so far in only 6 MS.
- The government or another authority gives advice to DSOs on how to advice consumers in 9 MS. Advice giving is based in law in most of those MS. On the other hand, 9 MS reported that no advice is given to DSOs for the implementation of consumer information.
- It is important to inform and teach consumers about the benefits of smart meters and the effective utilisation of the metering system and the energy saving potential. Besides, consumers have to be aware of their rights concerning privacy. It is necessary to carry out surveys to understand the consumer's need and reveal possible problems or unclear issues regarding smart meters and their potential.

- 9 MS reported that they have informed customers sufficiently of smart metering. Different communication methods and channels are used in these MS. Websites and information given at the time of the installation of a new meter are the most used information channels to consumers. Emails, information campaigns, newsletters to customers, site visits and phone calls are also used.

As regards the functions and uses of smart meters, the Commission published a Recommendation on preparations for the roll-out of smart metering systems (Recommendation 2012/EU/148), which states that every smart metering system for electricity should offer at least 10 defined functions. 16 MS, 62%, will adopt all 10 functions recommended: 10 of these MS have written additional functionality for the smart meters into national law.

MS are conscious that smart meters alone will not reduce energy consumption, hence the need for additional functionalities that allow the final user to communicate with energy providers and manage their consumption. Only through this interaction will it be possible to realise the full potential of this technology.

As concern over the privacy and security of data gathered through smart meters is consistent amongst all MS, various measures to mitigate security and data breaches are being explored. At this moment of smart meter roll-out, it is important to involve all stakeholders to ensure necessary efforts to avoid undesirable situations due to the lack of experience in this specific area.

The Commission has produced specific guidance on data protection and privacy in the form of Commission Recommendation 2014/724/EU of 10 October 2014 on the Data Protection Impact Assessment Template for Smart Grid and Smart Metering Systems. The Commission recommends inter alia that MS during a 2-year test phase cooperate with industry, civil society stakeholders and national data protection authorities to stimulate and support the dissemination and use of the Data Protection Impact Assessment Template for Smart Grid and Smart Metering Systems ('DPIA Template')

According to the results of the questionnaire, 11 MS had pilot studies or similar where actual savings from smart meters had been measured. It can be concluded that smart metering in combination with direct feedback, particularly in-home displays, can lead to considerable and persistent household energy reductions. Showing average savings of up to 6% for electricity and 7% for gas in a pilot study carried out in 1 MS, in-home displays appear to be the most important factor and a crucial 'stepping stone' in kick-starting active consumer interest and engagement for accessing energy information.

As regards innovative services based on smart meter data, several interesting examples have been given by MS. Examples from Slovakia, France and Italy could be of particular interest to other MS.

A recommendation drawn from the discussion at the Plenary Meeting is that in order for the roll-out to become as *successful* as possible – in order for all consumers independent of age, level of education and level of interest to be engaged in their energy consumption - the market should offer solutions that are easy to understand, easy to set up and cost effective. The market is evolving in the right direction but all MS should learn more from each other.

# 3 Results from the study

### Consumer engagement during the roll-out of smart meters

Examples of consumer engagement strategies during the roll-out in 3 MS were given, as well as experiences from the roll-out in Australia. These gave evidence that MS are moving forward with the implementation of smart meters and that aspects related to communication with consumers are taken into account. There are on-going efforts on how to involve the customer: the challenge is to choose the right message for the consumer and not focus too much on the technical details of the meters. One of the conclusions from this session was that in-home displays are a key feature in order to engage consumers.

In the UK, there will be installation visits to 30 million customers during the roll-out programme that lasts until 2020. Proactive consumer engagement activities to ensure that consumers understand what smart meters can do for them are an essential part of the roll-out. A survey showed that to date 89% of the customers were satisfied with the installation and 72% were satisfied with the meter and the in-home display, whereas 4% were dissatisfied.

In Finland the roll-out of smart meters for electricity is complete and the roll out of smart meters for district heating is in progress. As a result of this, there is a growing market for services based on smart meter data. These services include fault detection and early alert, user-friendly reporting on consumption including comparisons with expected values and time-based tariffs.

In Latvia, a 2 year pilot project of smart metering for households has been carried out. The project included a customer web portal and in-home display with benchmark comparisons. Substantial energy savings were achieved during the pilot.

From outside the EU, an enlightening example from Australia was given where a roll out of smart meters failed in first instance due to lack of consumer engagement and trust and therefore a campaign to change customer perception was crucial. It is clear from the Australian example that a 100% positive attitude may not be realistic at the start of the roll-out.

The key learnings that emerged from this experience are to involve stakeholders (community engagement), to show potential benefits of smart meters before the roll-out and also to manage expectations among the consumers. During the roll-out it is crucial to inform the consumers and be responsive to them throughout the process.

## Functionalities of smart meters, data privacy and protection

The issue about privacy and protection of smart meter data was also covered in the study. In this context the first clear topic to address was the Commission Recommendation COM(2014/724/EU) from October 2014 on the Data Protection Impact Assessment (DPIA) Template for Smart Grid and Smart Metering Systems. This template is an evaluation and decision-making tool which helps entities planning or executing investments in smart grids to identify and anticipate risks to data protection, privacy and security. The DPIA provides guidance to help ensure fundamental rights with regard to the protection of personal data and to privacy in the deployment of smart grid applications and systems and smart metering roll-out.

A 2-year test phase for the application of the template is laid out in the Recommendation, which asks that MS support the organisation of this test phase as well as encourage data protection-competent national authorities to offer their support and guidance to data controllers throughout the test phase. DG ENER promoted the test phase kick-off on 5 March 2015.

Based on the feedback gathered in the test phase and in light of the upcoming Data Protection Reform, the template could be further fine-tuned to enhance its efficiency, usefulness and user-friendliness.

Due to the lack of experience in this specific area it is important to have a a test phase and some time to learn and identify all necessary requirements for a positive and secure smart meter and grid implementation and operation.

In order to gather a broader opinion from different stakeholders, the Dutch regulator shared the means by which smart meters are being installed and the different interventions in smart infrastructure in the field of electric energy.

Figure 2 shows that, with regard to securing data from smart meters, privacy sensitivity varies relative to the frequency in energy readings. Measures to protect consumer data are therefore paramount if we wish to achieve real readings every 15 minutes.

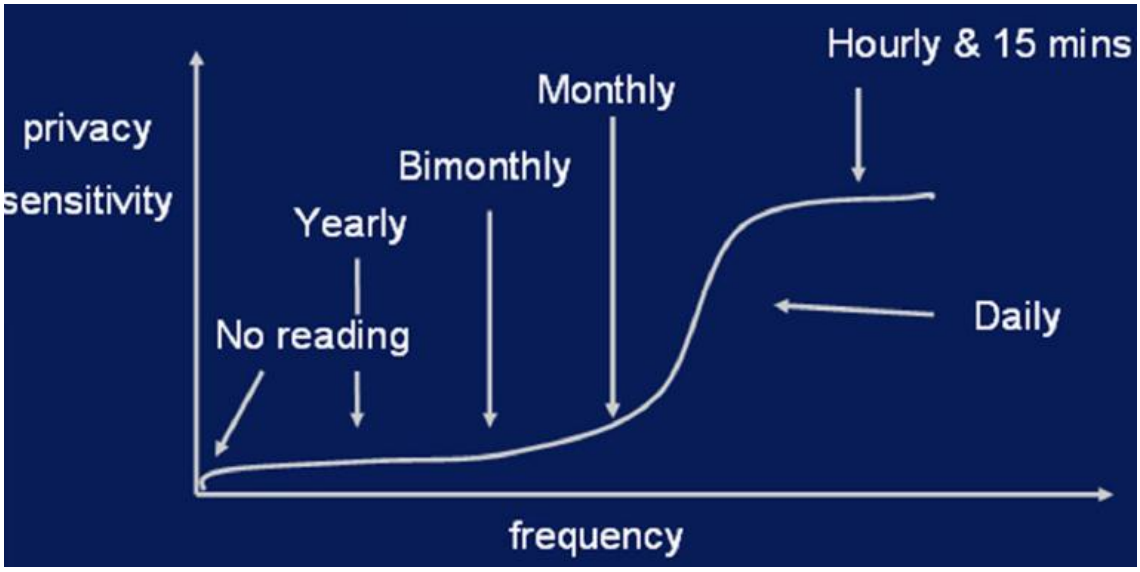



**Figure 2 – Relation between privacy sensitivity and meter frequency readings**

It became clear during the research that privacy, market roles and responsibilities and technical requirements go hand-in-hand. It also became clear that smart meters are an enabler for smart grid functionalities as ESCOs, suppliers and DSOs are able to retrieve high frequency meter readings that can be used for network management. However, explicit consent by a consumer is required under all circumstances. The key lesson is that consumer awareness and consumer commitment should be an integrated element of all smart grid plans.

## Innovative services based on smart meter data

Three pilot projects were presented: Enel Info + from Italy, the Smart Electric Lyon Project from France and Heat2Go from Slovakia. There are many on-going pilot projects across Europe; the challenge is to migrate the pilots to large scale services. MS are encouraged to learn from the many existing pilot projects before launching new pilots.

A researcher from the Centre for Environmental and Resource Economy in Sweden dealt with the question of how flexible the electricity consumer is. Is the incentive given by the differentiated electricity tariffs enough for consumers to change their habits, e.g. run the washing machine at another time of the day? The conclusion appears to be that the current incentives in many cases are too small to initiate a change of behaviour. Even with some kind of reward system, the consumer's incentive to change behaviour is very small. This indicates that there is little consumer flexibility in the electricity market.

## Challenges in MS

Participants were asked to identify the main challenges in their MS as regards smart meters and consumers. The challenges were centred on information and attractiveness to consumers, benefits of smart meters and the availability of services. Data privacy and protection was considered an important issue where the main challenge is to build trust among consumers. The identified challenges are listed below.

Information and attractiveness to consumers

- A lack of information for consumers
- Lack of interest among consumers
- Need to allow time to make consumers to become familiar with home energy unit
- Consumer engagement/privacy
- Encouraging consumers to use their in-home display for ongoing monitoring of energy use and take action to address it to deliver long-term sustainable savings

- Smart meters are designed to allow for time-of–use pricing: consumer engagement is for later
- Taking into account different consumers
- How to ensure that vulnerable consumers also benefit

The future challenges

- Heating costs in apartments decrease due to nearly zero energy buildings and renovation -> cost saving potential decreases
- Is privacy a more important question in the future?

Benefits of smart metering

- Low level savings from smart meters
- Energy saving and roll-out of smart meters don't attract all people
    - the potential saving (€) is too low
    - they have other things more interesting to do
- Key issue: increasing electricity price so that it reflects its' real cost
- Low energy prices – no incentive for savings
- High payback time for investment
- The main problem might be unpredictability of the benefits of installing remote meter readings. The benefits are crucial when it comes to government's decision
- It's very difficult to foresee how the consumers will behave. Estimations based on the behaviour of one group are not necessarily reliable when considering another group
- Energy bills are a small part of available income
- Negative business case -> are there benefits?
- Effective post-installation support mechanisms are needed, these are lacking today
- Services should be more important than meters
- Time of use tariffs have not been introduced at a large scale

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## Legal Disclaimer



The Concerted Action for the Energy Efficiency Directive (CA EED) was launched by Intelligent Energy Europe (IEE) in spring 2013 to provide a structured framework for the exchange of information between the 29 Member States during their implementation of the Energy Efficiency Directive (EED).

For further information please visit **http://www.ca-eed.eu/** or contact the CA EED Coordinator Lucinda Maclagan at **lucinda.maclagan@rvo.nl**

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