

Meter-ON: Smart Metering for Europe's Smart(er) Households

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1 ABSTRACT

Smart meters are one of the pillars of the smart grids and since few years are attracting much attention. They will help in the transition towards “active networks evolution” to massively integrate renewable energy sources into the grid and they will enable the full exploitation of technologies like electro-mobility and active demand programs with great benefits in terms of the overall sustainability of the energy system, positively impacting both the society and the environment. The massive introduction of intelligent metering systems will assist the active participation of consumers in the energy market, promoting transparency and competition and favouring the emergence of a well-functioning and non-discriminatory retail market in the whole Union. The paper presents initial results regarding consumers’ involvement of the European project Meter-ON, a coordination and support action which aims to steer the implementation of smart metering solutions throughout Europe by effectively collecting the most successful experiences in the field and highlighting the conditions that enabled their development.

Meter-ON Consortium is led by the European Distribution System Operators for Smart-Grids, including 32 leading DSOs and associations throughout the European Union. The Consortium comprises university-linked foundations (EnergyLab), technological institutions (RSE and CEIT Alanova) and communication experts (ZABALA).

2 INTRODUCTION

In most cases smart metering involves the installation of an intelligent meter at residential customers and the regular reading, processing and feedback of consumption data to the customers. Smart metering is often referred to as automated meter reading (AMR), or in the case of real-time, two-way communications, as advanced metering infrastructure (AMI) (Van Gerwen et al, 2006).

The evolution of power grids into smart active networks is key in enabling the transition towards more sustainable and environmental friendly energy systems, and smart metering is a core tool to develop smart grids in the future. In this field, Distribution System Operators (DSOs) from all over the world are designing, developing and implementing different smart metering systems, and testing them in pilot projects before proceeding with large scale roll-outs. Different transmission technologies and protocols are used. Although the first objective of smart metering infrastructures is the “metering and billing”, it emerged they are also key to enable other advanced services related to smart grid features and to make consumers more active players in the energy market (Bavarian et al, 2012).

The intelligent meters will enable the massive penetration of distributed energy resources by supporting the bi-directional flow of communication and energy needed to effectively integrate electricity produced from green energy sources. Smart meters will also allow the introduction of electro-mobility and the deployment of related charging infrastructures. According to the feedbacks, Meter-ON has observed from its first collection of data that even if supportive smart metering regulation is not already in place throughout Europe, DSOs are exploring smart metering deployment possibilities and, leveraging on this infrastructure, they are developing other advanced services that can support the development of smart grids at large.

The successful deployment of smart metering infrastructures relies on different interlinked aspects: technical, economic, regulatory and consumer involvement issues. This paper aims to take a deeper look on the consumers’ side, as they represent the end-user but also (in many cases) the less experienced actors when it comes to smart metering.

3 METHODOLOGY AND OBJECTIVES OF THE METER-ON PROJECT

The Meter-ON project is a coordination and support action financed by the Seventh European Framework Program (FP7) which aims to steer the implementation of smart metering solutions in Europe by effectively

collecting the most successful experiences in the field and highlighting the conditions that enabled their development. On the basis of the lessons learned, the goal of Meter-ON is to provide to any stakeholder an open information platform with clear recommendations on how to tackle the technical barriers and the regulatory obstacles endangering the uptake of smart metering solutions in Europe. Meter-ON will address completed, on-going and planned smart-metering projects and is consisting of a three-step approach performing the following activities (as shown in Figure 1):

- (1) collection of information related to smart metering projects;
- (2) analysis of each project according to the identified set of information domains (see below);
- (3) drawing conclusions and recommendations on the way forward based on the lessons learned from the most successful smart metering experiences.

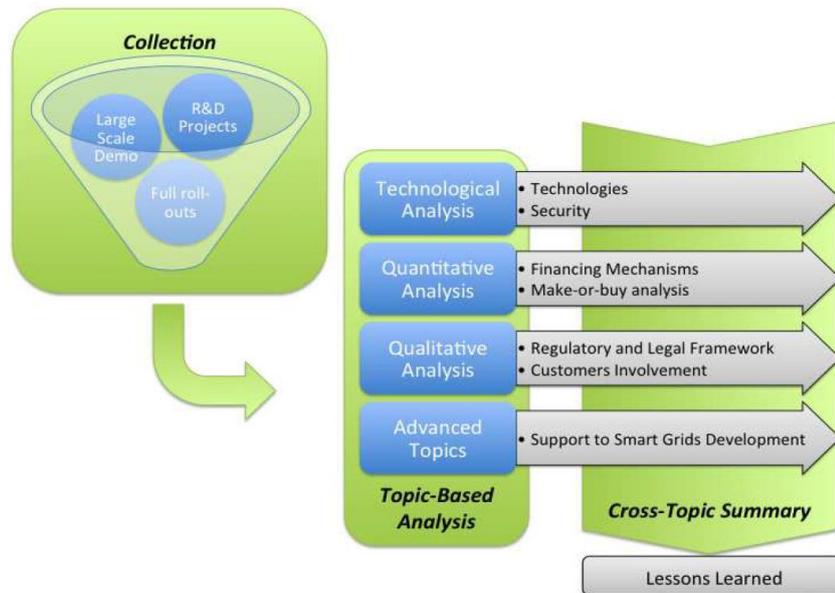


Figure 1 Meter-ON Approach

During the Topic-Based Analysis, each project goes through the following analysis:

- Technological analysis of the grid characteristics of the company running the smart metering project, of the overarching smart metering architecture, of the smart meter devices installed, of the cyber security and privacy policies applied by each smart metering solution presented.
- Quantitative analysis, comprising cost and benefit originating from the project and information on the supply chain development process related to each project.
- Qualitative analysis on the regulatory and legal framework in place in each country where the project is running and on user acceptance and customer involvement assessment, to evaluate consumers perceptions and attitudes towards smart meters.
- Advanced topics, comprising information on the impact of electricity smart meters on distribution network operations, information on smart metering solutions as supportive of electric vehicle infrastructure, demand response programs and the existence/plans of smart metering solution for other energy carriers (heat, gas and water), when applicable identifying also multi-utility approaches.

4 QUESTIONNAIRES AND FEEDBACK

Aside from the available literature, the consortium has developed a questionnaire having four main information domains, as described above. This has been distributed to the utilities involved in the project in order to receive direct input but also to make sure that sharing experiences ensure a win-win situation for all parties involved. In the first collection phase of the project, 15 project information questionnaires have been gathered. Projects collected take place in 10 European countries (Figure 2) and according to the information available in total it is foreseen that by 2020 about 100 million meters will be installed. The project information sample comprises 1 project in the R&D phase, 5 projects in the pilot phase, 1 project in the

demonstration phase and 8 projects in the roll-out phase (on-going or completed), in the countries outlined below:



Figure 2 Meter-ON coverage

5 CONSUMER FOCUS

The involvement of the customer is noted to be a complex point linked to the regulation in place in each Member State, where customers are expected to be engaged in these changes, but as some evidence show the information needs to be shared in a more accessible and understandable manner for them to do not see smart meters as a danger and to experience real benefits from their usage.

Three matters are recurrent in the acceptance and involvement of customers' vis-à-vis smart metering solutions: security and privacy related issues, cost related issues and energy efficiency. Even if the latter is used as a tool to convince the user of the importance of the smart meter, there is evidence showing that energy savings are reached not only by installing the device, but by having a combination of advice, precise billing and smart meter (Klopfert & Wallenborn, 2011).

The concerns related to data collected from smart meters range from how is this information handled to what might happen in case of unauthorized accesses. Along with this issue, trivially, consumers might fear they are charged the costs related to the infrastructure without receiving back the corresponding benefits.

As a general rule it is observed that effective information campaign promoting consumer awareness and knowledge should be performed by the company running the smart metering project, not only to mitigate their resistance to the technology but to promote at an early stage the interaction with the meter, to support those advanced smart metering uses, such as demand response programs, where the involvement of the customer is crucial.

Information collected by Meter-ON shows that in some cases companies running the smart metering projects adopted a clear strategy targeting the engagement of the end-users, but in other cases it is clear how the focus was more on the technological side and how the customer was not involved at the early stage of implementation. The initiatives to engage the consumers in the smart metering implementation range from basic informative letters on the matter with updates throughout the process, to round-table meetings with the stakeholders and to large-scale surveys and Customer Service platforms to attract customers in providing their opinions and to enhance their interaction with the smart meter. In the next phases Meter-ON will try to identify the most successful strategies to involve consumers in the smart metering field.

6 CONCLUSION

This paper highlighted that the customer should be put at the core of smart metering developments, as he/she is the first actor concerned by the deployment of this technology. It is observed that effective information campaign promoting consumer awareness and knowledge should be performed by the responsible company, to promote at an early stage the interaction with the meter and thus supporting those advanced smart metering uses, such as demand response programs, which are expected to bring energy savings.

Meter-ON project has gathered already information from 15 projects that are going to involve about 100 million customers in the next few years. Considering the high number of households affected by the deployment in various cases, the consumer needs to be a priority at all levels. Creating a transparent environment around smart metering will facilitate understanding about the topic among consumers and consensus at the higher decision levels.

7 ACKNOWLEDGEMENTS

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- For more information please visit www.meter-on.eu or contact the authors of the paper.