CONCERTED ACTION
ENERGY EFFICIENCY
DIRECTIVE

Service market development for smart electricity and gas metering

Executive Summary 3.7

Metering and Billing

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1 Summary

The rollout of smart electricity and gas meters is gradually becoming a reality for many Member States (MS). Constant feedback on energy use to the consumer has been identified as key to leveraging the energy efficiency potential of smart meter data. Therefore, meters have to be appropriately equipped and manufacturers of appliances and devices and software developers are expected to build functional services around smart metering systems to provide additional benefits for final consumers and the electricity system at large. For this reason, it is relevant to discuss how to foster the emergence of markets for new services which smart meters could enable.

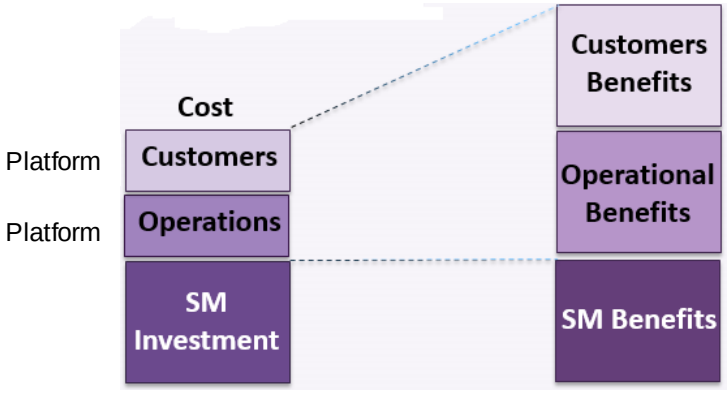
The smart meter rollout is already opening the door to numerous new services and products that will change the way suppliers interact with their customers and compete in the market. The list of benefits will continue to grow over time and in ways that we cannot yet imagine.

Utilities can derive increasing economic benefits from smart meter/grid investments such as:

- investment in the smart meter (mainly installation costs);
- investment in smart meter infrastructure to get the data from the smart meter to the utility;
- investment in the processing and development of services, including feedback/information to the final customer.

We know that the acquisition and installation price of a smart meter/grid will have an initial cost for the final customer, but this investment may be recovered at the end of a couple of years from consumer behaviour changes brought about by increased knowledge of their consumption (Great Britain, The Netherlands, Romania and Italy CBA source). We must ensure that all MS understand the importance of a successful smart meter/grid rollout in Europe. If final customers know how to use a smart meter and how it can help reduce their energy bills, they will be interested in acquiring new services and products which will contribute to the development of this market around Europe. After the implementation of this technology, we will be able to get to know the energy consumption behaviour of European consumers and it will be easier to apply more effective energy efficiency measures.

This dividend is directly proportional to the degree to which utilities leverage their advanced metering infrastructure (AMI) data across their organisations to transform the way they engage their customers and operate their infrastructure.



The energy utilities have a fundamental role in the whole of this process. It is important that energy utilities make the right investments to strengthen both the customer side, by engaging their customers in more cost efficient and effective ways, and the operations side, increasing grid operational efficiencies, reliability and safety of their business.

The development of a market for smart metering services is not a primary responsibility of MS. However, Article 9 (2.d) of the Energy Efficiency Directive (EED) requires that it will be possible for final customers to ask for their metering data to be made available to them, or to a third party service of their choice, so as to allow them to compare deals and save on costs. Furthermore, Article 9 (2.a) requires that the smart metering systems to be installed provide final customers with information on real time use and that energy efficiency objectives and benefits are taken into consideration when minimum functionalities for such systems - and obligations of market participants - are devised. To guide MS, the Commission has tabled a Recommendation (2012/148/EU) that includes a list of minimum functionalities for smart metering systems that fulfil these requirements while placing due regard to privacy, data protection and security (related to EED provisions under Article 9 (2.b)). These functionalities have also been designed to support a wide range of services.

Generally, smart metering does offer great opportunities for the development of services that benefit consumers and increase energy savings, as well as energy cost savings at the individual and the energy system level. Yet, as the rollout of smart metering systems is at an early stage in many MS, understanding and demand for these services is only starting to develop among consumers in many places. Parallel to the development of services around smart metering that address concrete consumer needs and offer real benefits, the market needs to significantly improve communication with regard to smart metering.

MS were surveyed to gather their views on smart metering related service markets, and the key barriers and challenges for market development. 23 MS responded to the survey. In addition, 7 interviews were conducted with MS experts on smart metering, to better understand the technical and practical aspects of smart meter rollout and the development of services around smart metering.

The vast majority of survey respondents (19 out of 23) indicated that new business opportunities might arise from the rollout of smart meters in their countries. The business opportunities mentioned were:

- Hardware development and sale;
- Development of auxiliary devices such as displays, energy storage equipment and devices;
- Development of smart appliances and devices which should be able to communicate with smart meters in general;
- Installation of smart meters and training of professional installers;
- Development of services and platforms to visualise the specific consumption of one or more forms of energy;
- Possibility of developing dynamic tariffs and demand side management;
- Development of bundled metering services.

Asked about the barriers for the development of a market for services around smart meters, all respondents provided input, such as:

- Lack of demand for smart metering services, e.g. due to a lack of knowledge regarding the opportunities for these services and / or due to small potential for individual cost savings;
- Lack of a rollout policy or slow rollout of smart meters: the economic impracticality of the smart meter rollout when high costs of rollout meet relatively small individual opportunities for savings (due to low energy consumption or costs);
- Data security, or the availability of data.

Asked about challenges for the rollout of smart meters, the responses of several MS indicated confusion as to the differing barriers for the rollout and the development of smart metering services. The key challenges identified were:

- Low funding for the rollout, or economic impracticality due to various reasons;
- Low confidence in the technology and privacy issues;
- Lack of professional structures.

In some MS, where services around the usage of data from smart metering have already developed or are being developed, **demand response and/or home automation services** were the most common business opportunities suggested. Furthermore, **virtual power plants** have been established and **dynamic tariffs** introduced. Finally, several MS reported improvements regarding consumer information about energy consumption and improved billing.

Although most MS said that smart metering would not increase the cost of energy, about half of those who were able to give an answer (20 out of 23) indicated that smart metering would have a cost effect (albeit not necessarily on the cost of energy).

During the further interviews, experts were asked about the state of play in their MS and the sectors in which smart meters were already in use. Despite much discussion about smart meters and grids, development had been slower than expected in some MS. In order to understand what stage had actually been reached for each country, the experts were asked to identify barriers that each MS is presently facing, particularly with a view to finding out if consumers perceive a strong value proposition for smart meters and grids. Finally, the experts assessed if the level of regulatory support was clear for all potential consumers. The expert interviews largely confirmed the questionnaire results and provided valuable additional context and perspectives.

2 Conclusions and recommendations

The survey responses, expert input and presentations on practical examples from Finland, Estonia and the Netherlands allowed several conclusions to be drawn regarding the development of smart metering services and smart metering provision.

In general, all experts agreed that there can be value for consumers in having access to information regarding their energy consumption, especially if information on electricity is provided on a near real-time basis. However, it was clear that there is limited interest from most consumers in proactively accessing and analysing this information. While other market actors, such as systems operators and service companies, are willing and able to use the information gathered through smart metering to optimise their offerings and to develop responsive devices, consumer interest remains limited even in MS where smart meter rollout is well under way.

Therefore, user friendly services, tariffs and applications providing concrete end-user benefits and advances in consumer rights need to be associated with smart metering. The practical example from Finland (see section 3.2) introduced a smart tariff that builds on hourly rates and allows consumers to significantly lower their energy expenses. Hourly priced electricity is available to all consumers and they have the opportunity to affect their own energy costs.

Another important finding was that consumers should have a choice regarding smart metering. The practical example from the Netherlands (see section 3.3) illustrated that consumers may choose whether their smart meter is in fact collecting and/or transmitting data to the utility. Moreover, the availability of an in-house interface on the meter, enabling real-time access to data for the consumer or third party service providers or solutions they have chosen to work with, has proven important.

In Estonia (see section 3.1), smart metering builds upon an online platform that gives consumers the ability to control which parties may access their smart meter data and for what purposes. This portal gives developers a chance to access consumers' data information flow. By interpreting and combining data, they can create useful applications for themselves or end consumers.

The Westland Greenhouse Area (see section 3.3) is an example of a working commercial local smart grid, as well as a contracting project to supply geothermal heat via a private network with the heat being marketed via a capacity mechanism. Both examples built, inter alia, on the Office of Technology Transitions (OTT) trade of energy for efficient network usage.

The most important recommendation is that consumers should be better informed about potential opportunities to save energy with advanced meter infrastructures (smart meter and grid). There is experience to suggest that some form of in-house display is critical to engage a broader range of consumers beyond the "energy-literate" and experts. Giving consumers a choice with regard to the level of remote data access enabled on their smart meter can be a way of overcoming/addressing consumer concerns regarding smart meters. Network operators and companies providing energy services must cooperate to a better extent and there should be a level playing field.

3 Practical Examples

Three MS provided practical examples that demonstrated that smart metering is already a reality in some places around Europe. A summary of these good examples can be found below.

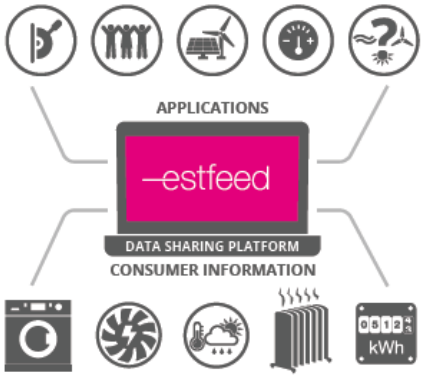
3.1 Estonia

In Estonia, there is a data hub named Andmeladu, which is a system that holds all agreements related to electricity transfer and consumption and all measurement data. Consumers can have access to this hub in order to look at their electricity consumption points and their agreements, view historical electricity consumption data and authorise one or more electricity sellers to access their data so they can make personalised offers.

In order to use this information and make it comprehensible for end users, Estonia has created an energy data sharing platform. This platform named Estfeed was launched at the beginning of 2016.

Smart Grid data sharing platform Estfeed - http://estfeed.ee/en/

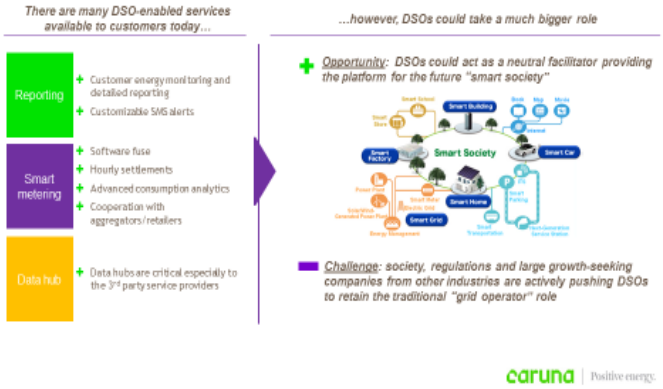
Estfeed is a data sharing platform that allows network companies, energy producers and consumers to interact more efficiently and make the data collected during energy consumption understandable and usable for end users.



The objective of the Estfeed project is to create a smart grid that allows market players to get energy consumption information securely and transparently, understand customer needs related to the metering point and change their behaviour accordingly. Estfeed brings together data sources and applications. Data sources range from electricity, gas and district heating smart meter readings to weather forecast and energy day-ahead prices. It can also include consumption information from individual devices in industry, offices or households. This platform and its applications turn the data into valuable information for consumers, energy producers, network companies and other participants in the energy market.

3.2 Finland

In Finland, consumers can monitor their own consumption at hourly intervals. Hourly priced electricity is available to all consumers and they are able to affect their own energy costs, either via their own activity or with the help of automation. Consumers have better awareness of consumption and costs.



In addition, distribution system operators (DSO) are responsible for smart metering and data reporting (hourly metering) and they can take advantage of smart metering in order to enhance their business. Smart metering enables the development of network tariffs towards a more cost reflective and fair tariff structure (e.g. power band tariff). DSOs could take a much bigger role due to their unique position in the modern energy system. They could act as a neutral facilitator providing the platform for the future "smart society".

3.3 The Netherlands – Westland Greenhouse Area

In the Netherlands, smart grid projects are a reality in greenhouse farms. The Westland Greenhouse Area provides an in-depth look at future energy systems that are based on sustainability, flexibility and energy efficiency.

Westland Infra is a network company, specialising in transportation of energy. They manage a reliable and energy saving infrastructure within the Westland and Midden Delfland region. In the 1990s, Westland Infra had its first experience in local matching of supply and demand, with the aim of reducing costs and improving available infrastructure. The knowledge derived from this formed the basis of a commercially developed smart grid for the greenhouse sector and a sustainable future.

Like all energy markets, this smart grid has some golden rules, especially:

- When there is unused capacity in the grid
  - Customers in the system are allowed to use more than the energy power contract (kW)
  - The electricity used above the energy power contract (kW) is only charged for the kWh component
  - Customers in the system can sell or buy energy power contract (kW) from other participants (market place)

and

- When there is no unused capacity in the grid
  - Customers in the system are not allowed to take off more than the energy power contract (kW) from the grid
  - The power supply is shut down every time that the consumer exceeds the contracted power (kW) or penalties are applied

Electricity meters are the point of interface between the utility and the consumer. Households or businesses equipped with a smart meter can monitor their electricity usage and make adjustments that reduce overall usage and/or shift usage to non-peak hours when rates may be lower (e.g. running a washing machine at night rather than in the afternoon). This also benefits the utility, because the lower demand during peak hours reduces the amount of electricity it needs to produce at maximum cost and limits the new capital investments that it would have had to make to handle higher peak-hour demand.

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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 **www.ca-eed.eu** or contact the CA EED Coordinator Lucinda Maclagan at **lucinda.maclagan@rvo.nl**

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