



GEODE Position Paper on

Meter Data Management

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GEODE Position Paper on Meter Data Management

Executive summary

In order to operate an effective and efficient smart grid in the future GEODE believes that the smart meter will be a vital part of a chain of functions delivering electricity and data to and from the customer. GEODE also believes the DSO plays an important role in the development of Smart Metering.

Therefore, it will be necessary for a number of parties to interact and access data from the customers' meter. Furthermore, it is necessary to develop efficient processes and standards for the different actors to operate considering different timeframes and requirements when it comes to obtaining information from the meter.

For GEODE there are three main issues that need to be addressed when establishing Meter Data Management systems: information exchange, the DSOs regulated duties and the standard open interface.

The neutral, effective and secure exchange of information between the market actors is crucial. The way the data should be exchanged must be standardised within market area and the data exchange model chosen should be designed to support competition in non-regulated areas and the development of new services. The DSO should help to make this possible, providing information to each actor in a non-discriminatory and secure way.

There are some regulated duties that the DSO (or any similarly licensed actor) is obliged to undertake. To enable the DSO to operate their network and to maintain security of supply effectively and efficiently, certain smart meter data should be made available to DSOs as a matter of course. This data could be, for instance, consumption data for billing, data for calculation of net losses, information regarding meter tampering and illegal abstraction. There is also some data (Power Quality, Network Load Situation, etc) the DSO will need to operate their network in an optimal fashion, to the benefit of the customer and the whole energy system.

The consumer, who in the future energy market will often act as a producer as well, the so called "Prosumer", should be able to choose what types of, and how much, information provided by their smart meter should be available to other market participants -through the standardized open interface - with the exception of that data which is required for certain actors, such as



DSOs, to carry out their regulated duties. Other market actors, the supplier and the energy service providers, ESCOs, will also need access to information - if suitably authorised by the customer. There is a need to establish a European standard for the local open interface in the new smart meters to allow for data exchange among other market actors. This work is essential and GEODE supports the establishment of this within Commission Smart Grids Task Force activities on standardisation.

GEODE supports the need to establish minimum common functionalities in all future installed meters, such as providing meters with a standard open interface for customer use. The standard open interface should provide real-time energy consumption data locally to customer use.

Interoperability is crucial to ensure that all data captured by smart meters are readable by the DSO, the Supplier and other market actors (irrespective of who collects the data or who bills the Customer).

Finally, when defining the principles of meter Data Management at European level unique national situations due to historical traditions, technical development and current market structure should be considered.

Purpose of the paper

A new smart energy market is arising in Europe. Smart Grids are a hot topic, and the first thing everyone agrees upon as a necessary part of a Smart Grid is the Smart Meter. But what is most important to consider is how to handle and exchange the information the Smart Meter will provide.

The Commission, through the Smart Grids Task Force and CEER, is discussing the principles for information exchange, security, privacy and data management when designing the new market.

There is a need for GEODE to present the DSO view on how the Meter Data Management is performed.

Introduction to Meter Data Management (MDM)

A market cannot function efficiently without effective processes and standards. However, it is important that such processes and standards do not constrain or curtail innovation and competition, but rather provide a level playing field on which to build new and competitive customer services.

The meter is the customer-facing end point of the natural electricity network monopoly granted to the DSO. Even in those countries where another actor owns the meter, there is data derived from the meter that the DSO requires in order to operate the grid in an effective way.

In order to operate an effective and efficient smart grid in the future GEODE believes that the smart meter will be a vital part of a chain of functions delivering electricity and data to and from the customer.

It will be necessary for a number of parties to interact and access information from the customer's meter. Therefore, it is necessary to develop standardized ways for the actors to operate considering different timeframes and requirements when it comes to obtaining information from the meter.

The future MDM model should solve at least the following major issues:

- Ensure that the consumer can exercise control over their private data
- Provide appropriate parties (including the consumer) real time information regarding the consumption of energy
- Aid the development and delivery of cost transparent electricity retail products
- Allow energy service offerings to develop in healthy and competitive market conditions
- Provide clarity as to the ownership of the meter and the data it produces
- Preserve overall data privacy and integrity.

Information Exchange Model and Infrastructure

Smart Customer

Smart Grid



Smart Metering



The market actors

The DSO

In most European markets today the DSO is responsible for collecting consumption data (for regulated duties, for instance billing purposes). The DSO uses this information for a number of duties that benefit the customer and the whole energy system. These duties can be, for example, Grid operations and connection, Planned and unplanned interruptions, Energy efficiency, Customer service and Demand Response. (See GEODE Position paper on Electricity Market Design for more information¹.) From a DSO perspective there are a number of significant points to consider:

- DSO plays an important role in implementing Smart Grid technology in the grid.
- The DSO must have incentives to invest in smart grid and the DSOs must be allowed to recover the costs of investments through the regulatory model².
- The DSO has a natural monopoly. The DSO should use this position to facilitate market competition in a non-discriminatory way.
- The DSO will need information from the smart grid, including both energy consumption as well as other information, to effectively and efficiently operate their network and to maintain security of supply to the highest possible level.

Ultimately it is the customer who will benefit from an effective and efficiently operated distribution network performing their regulated duties.

A DSO needs to know as quickly as possible if there is an outage, power quality issues (e.g. voltage drop or flicker) or if there might be tampering or other illegal activities occurring on the network. In the future the smart meter will be an integrated part of the Smart Grid and for the DSO it will be an important part of DSO investments in the Smart Grid. This will lead to better quality of the supply and will affect the DSO cost which in the end the customer will benefit from.

The Consumer/Prosumer

Tomorrow's customers will be more active users of the electricity grid. There will be a need to adjust, change or move energy consumption over time as well as to use energy efficiently to achieve the expected benefits of the future Smart Grid.

¹ GEODE Position Paper on electricity market design. September 2012 (available at www.geode-eu.org)

² Many cost benefit analysis made today have an unbalance between where the costs are and who will get the benefit. Future CBAs should try to include ideas to transfer either the cost to the ones that benefit or the other way around. Otherwise this will create friction in the implementation phase.



Already in today's smart electricity market the consumer is in many cases also a part time producer of electricity, a so called prosumer and this will increase in the future. This particular segment of users will have a diverse range of needs which will need to be catered for.

From a DSO perspective it is important to be aware of these customers and to interact with both the existing consumers, but also the 'prosumers'.

The market model should therefore be designed to allow the consumers as well as prosumers to be an active participant in the market, enabled by the Smart Grid.

To aid consumers to use energy in the most efficient way possible (i.e. reduce or move their consumption over time) there is a need to provide them with real time information regarding their energy consumption and production. The most efficient way to achieve this is through a standardized information interface in the smart meter. This interface will benefit customers who want more advanced services. While electricity is only one form of energy used by the end consumer, the total energy consumption could then be presented to the consumer with a local interface from each of those meters. These meters could be, gas, district heating etc.

GEODE's view is that information on energy consumption should be separated from information on energy price. Information on energy price should not be available through the standardized interface for real time information.

The Prosumer should have the ability to choose what types of, and how much information produced from their smart meter, should be available to other market participants (through the standardized open interface) - with the exception of that data which is required for certain actors, such as DSOs and suppliers, to carry out their regulated duties (e.g. accurate billing).

The Supplier

Depending on their contract with the Consumer (and or prosumers), the Supplier will need different types of information from the smart meter. The Supplier may also perform the role of an ESCO. In order to offer the customer advanced electricity products, the supplier needs daily consumption data on at least hourly basis. Due to that, any future meter data management solution needs to be very flexible.

Pricing issues are a separate matter that should be presented to the customer by the supplier or ESCO using consumption information from the local interface. Price information will be a complex structure with many sources that must be collected at the customer's premises based on several sources.



The Energy Service Company (ESCO)

The information required by ESCOs will likely be complex. Some ESCOs may only use statistics for their business purposes while others will need to install active equipment at the customer's site to be able to control consumption (i.e. demand response/management). In many cases, the ultimate user of this information are the customers themselves changing their behaviour or installing new equipment bases on advice from the ESCO using the standardized open interface in the smart meter.

Three important issues regarding Meter Data Management

1. Information exchange
 - Effective exchange of information between the market actors is crucial
 - The amount of data is growing day by day
 - Ensuring data privacy and security
2. DSO and regulated duties
 - DSO must be able to use data from the electricity meter for regulated duties
 - Only the meter operator (DSO in many countries) should have direct access and ability to control the smart meter
3. Standard open interface
 - There should be a standardized open interface in the smart meter to aid customers in undertaking energy efficiency actions

1) Information Exchange

We see three main approaches for exchanging smart meter data within the electricity market:

- Direct bilateral information exchange
- A Central Database (CDB)
- A Central Data Platform (CDP)

These information exchange approaches have different advantages and, in conjunction with suitable regulation, policies and technology, all of them will work. Today there are different solutions in many European countries.

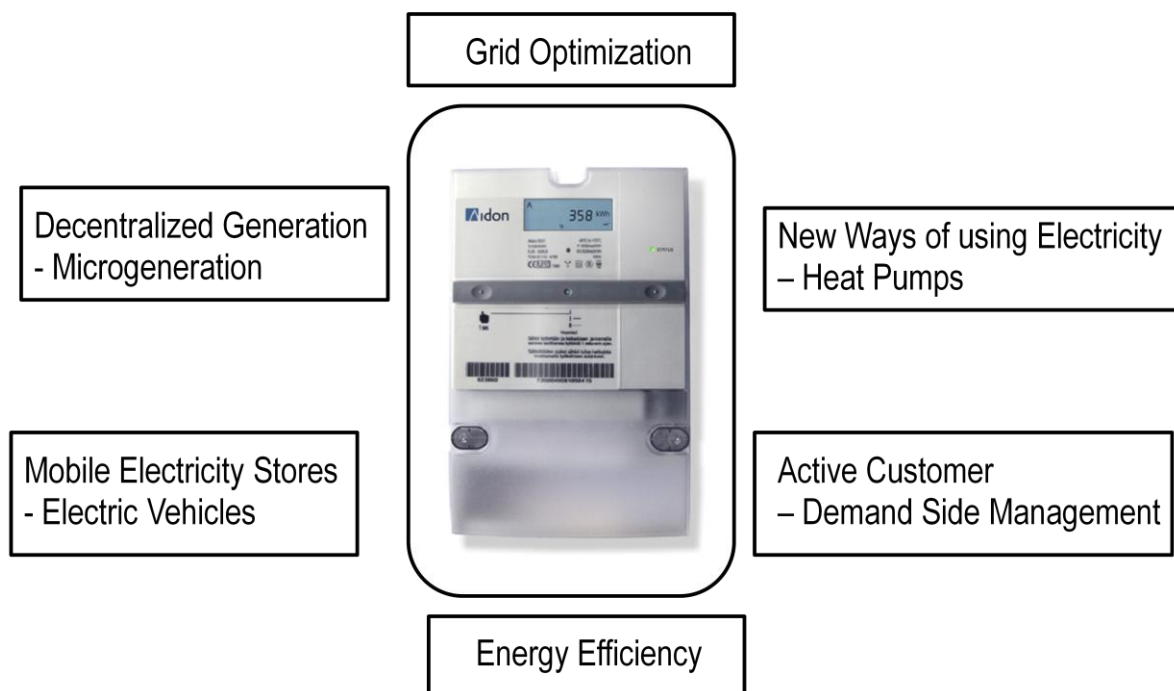
Therefore it is essential to ensure some common principles applied to all markets:

- **A standardized interface for communication between market actors**
- **DSO role to ensure for end users:**

- **Securing data privacy (information exchange based on regulated duties and customer acceptance)**
- **Cost efficiency in communicating with meters on a local/geographical area**
- **Neutrality towards suppliers and ESCOs respecting data privacy and data protection issues**

The information model chosen should be designed to support competition in non-regulated areas; it should support development of new services, not create unnecessary administrative costs and be able to adapt to future customer needs.

GEODE recognizes that de-regulation in itself does not solve the problem with harmonization of information exchange. This must be regulated at least in a minimum perspective, critical data and the way the information should be exchanged must be standardized and the same no matter which party is responsible of providing the data.



2) DSO and regulated duties

There are some regulated duties that the DSO (or any similarly licensed actor) is obliged to undertake. To enable the DSO to perform these duties effectively and efficiently certain smart meter data should be made available to DSOs as a matter of course. This data could be, for instance, consumption data for billing, data for calculation of net losses, information regarding meter tampering and illegal abstraction. There is also some data (Power Quality, Network Load Situation etc.) the DSO will need to operate their network in an optimal manner.



- Information from the smart meter

GEODE's position is that the Customer, with advice from DSO, Suppliers and/or ESCOs must be able to exercise control over the way in which their electricity related data (with the exception of data required for "regulated duties") is used.

In GEODE's proposed meter data management model the DSO (or in some countries the Meter operator or supplier) is responsible for collecting billing data. For this purpose a daily communication with the smart meter will be needed to obtain suitability granular consumption data (at least hourly values) and this communication should also support some basic information exchanges and interactions (e.g. in support of regulated duties). This basic information should, when implemented and being part of the national legislation, be made available to the actors in a non-discriminating way.

Only one single actor, the meter operator (in many countries that will be the DSO) should be able to have direct control of the smart meter; programming, receiving consumption data, connect/disconnect actions etc. Any other actors should use the standard open interface to interact with the smart meter if approved by the customer, or use agreed messages to the meter operator for actions to be executed.

- Basic minimum functionalities in smart metering systems

- Record at least hourly consumption and production information (actual import and export values separately)
- Information collected on a daily basis and delivered to market actors with regulated duties
- Provide access (two way communication) from meter operator to information needed for maintenance and control
- Possibility to connect/disconnect site remotely (the DSO and/or Supplier)
- Outage information
- Load management
- Fraud prevention and detection
- Standard open interface for customer use.

- Implementing new functionalities

When implementing new requirements for smart meters functionalities it should be mandatory for all new installed meters only. As a principle new functionalities should not be mandatory for existing meters. In the case where new functionalities are also mandatory for existing meters, a



reasonable timeframe for implementation should be provided, in consideration of the investments already made.

3) Standard open interface

The smart meter should be equipped with a standardized open interface enabling the customer (together with the Supplier and/or ESCO of their choice) to access data for different purposes, e.g.:

- Energy displays
 - o Could be aggregated with all energy consumption in a building (heat, cold, gas oil etc) which may help to achieve better outcomes in terms of overall energy/cost efficiency, rather than just electricity
- Energy efficiency equipment
 - o Could be connected to internet tools as well as standalone to provide detailed information on the energy efficiency of in-home equipment and appliances
- Energy pricing and other information, statistics tools, etc.

The standard open interface should provide real-time energy consumption data locally for customer use. This feature would help to future proof the information need as well as any timeframe need. The possibility the customer has is to influence his energy awareness and create a platform for market competition between market players. The actors and their objectives from a meter data management perspective are not limited by any interval used for collecting data for regulated duties.

- Overall system setup

The meter operator (in many countries the DSO) has to build the smart meter infrastructure as secure as possible and adjust this work continuously (e.g., encrypted data transmission). This means to ensure continued investment to the safe operation of the infrastructure. The smart meter manufacturers must produce the products so that an update of the security mechanisms (eg upgrading to a new encryption) at any time, at least until the end of the smart meters lifetime is possible.

Enhanced interoperability between the market actors

It's important that all data captured by smart meters required to perform regulated duties will be made available to the DSO and the Supplier (irrespective of who collects the data or who bills the Customer).



In order to set the ground rules for information exchange there is a need for standards and protocols defining not only meter data, but also power outage information, pricing information (i.e. energy tariffs) as well as methods for obtaining instantaneous readings from a smart meter (even when the actor requesting this is not the meter operator/DSO but a third party authorised by the customer). Most European electricity markets currently lack these standards and it will be a significant task to establish them.

There is a need to establish a European standard for the local open interface in the smart meter. This work is important and GEODE supports the establishment of this within European Commission Smart Grids Task Force activities on standardisation.

Future work of standardization regarding smart meters should also include mechanical interface;

- Mounting socket (i.e. making change of meter without electricity disruption possible)
- Communication module for meter (mechanical socket and protocol)

The need for proper incentives for investments

Smart metering systems imply enormous investments for the DSOs. At least initially, it is likely that the benefits will not match the costs for the investor. **GEODE believes that DSOs have to be incentivised to invest in innovative technology to the benefit and the development of Smart Grids. Without a strong engagement from the DSOs, there will be no smart grid. For that reason, the DSOs must be guaranteed cost recovery for their investments.** In this context regulatory authorities are the key facilitators of a smarter future – they have to empower DSOs to take an active part in developing smart grid solutions.

Conclusion

The Smart Grid implies the development of new market models, new business cases, further and new cooperation between market actors and technology sector in the production level, in the electricity grids as well as in the customer premises.

GEODE believes that the smart meter will be a vital part of a chain of functions delivering electricity and data to and from the customer. GEODE also believes the DSO plays an important role in the development of Smart Metering, and thus Smart Grids by operating a reliable grid where producers and consumers can connect their equipment in a safe and competitive way, and providing meter data in a cost effective way. This will enable a neutral platform of services



based on meter data to Customers, Suppliers and ESCOS while still performing the regulated duties of the DSO in an effective and efficient way, ensuring network stability at all times.

Furthermore, once the deployment of Smart Meters has taken place, the Customer should be given the right to decide how energy efficiency measures should be implemented. The Smart Meters should include a standard open interface that can be used locally for this purpose. (The customer could do these activities or an ESCO or supplier could perform these matters as a service). This will increase competition for Energy Efficiency measures and will not inhibit development of new products (like display, controls etc.) In that way Smart Meters will contribute to fulfilling the 2020 targets and aid the transition to a low carbon economy.

Recommendations

- It is necessary to develop efficient processes and standards for the different actors to operate, interact and access data from the customer meter.
- The neutral, effective and secure exchange of information between the market actors is crucial.
- The way the data should be exchanged must be standardised and the data exchange model chosen should be designed to support competition in non-regulated areas and the development of new services.
- To enable the DSO to operate their network and to maintain security of supply effectively and efficiently, certain smart meter data should be made available to DSOs as a matter of course.
- There is a need to establish a European standard for the local open interface in new installed smart meters to allow for data exchange among other market actors.
- It is necessary to establish minimum common functionalities in all future installed meters.
- Interoperability is crucial to ensure that all data captured by smart meters are readable by the DSO, the Supplier and other market actors (irrespective of who collects the data or who bills the Customer).
- Only the meter operator (DSO in many countries) should have direct access and ability to control the smart meter.



Abbreviations

DSO - Distribution System Operator
CDB - Central Data Base
CDP - Central Data Platform
CEER - Cooperation European Energy Regulators
ESCO - Energy Service Company
MDM - Meter Data Management