SmartRegions

Smart Metering for Commercial and Public customers

– aiming for smarter energy management

Effective use of smart metering technology is crucial for reaching the 2020 energy efficiency and renewable energy targets and for the future smart grids. However, smart meters themselves are only enabling technologies, which need to be coupled with innovative smart metering services.

This brochure will help energy utilities and suppliers, policy makers and service developers by presenting important aspects to be considered when developing and deploying new smart metering services for commercial and public customers.

The brochure brings focus on different service categories that can be offered the customers one by one or in combination.

Commercial and Public customers

As the energy costs and environmental issues gain importance, rational energy use is a must for an ever larger group of companies, municipalities and public organisations. Thus they need timely and accurate information about their consumption and its distribution between different activities.

For these customers, the distribution of energy costs and incentives for rational energy use usually differ regarding ownership, management and use of a building. Smart metering and reporting can give them a total picture of their energy use, costs and potential for savings, enabling effective energy management.

These customers do not represent a homogenous group. There are large differences regarding appliances installed, volume of energy used, the load pattern and the potential for demand response. When developing new smart metering services, small pilot actions can be important – to easier face the customers' behaviour.

Information and feedback

Information and feedback about the actual energy consumption and costs will make customers more aware of their own consumption and motivate them to save energy.

The basic feedback types are direct feedback (in real time) and indirect feedback (based on processed data). Real-time feedback will mainly affect the moment-to-moment behaviour, whilst periodic feedback shows longer term effects.

Important aspects are:

- Easy accessible information through a user friendly interface
- Prevent information overflow
- Measure energy consumption, total and for different appliances
- Visualise energy consumption
- Analyse the load profile, addressing the largest loads and occurance of maximum and minimum demand
- Compare consumption to previous periods
- Make energy saving rewarding - presenting energy consumption in monetary and energy terms and emissions
- Help customers set energy saving goals and track consumption
- Advice how to benefit from the service
- Possibility for interaction with the service provider

Demand response and innovative variable tariffs

Customers can change their consumption according to supply conditions and price signals, if they get proper and easily understood incentives to do this.

Demand response offers flexibility at low cost. In shortage periods a small amount of demand response can make the difference between a reliable system and rolling blackouts. Demand response included in market bids can contribute to reduced prices.

Experiences from demand response show that predictable peak price periods give incentives to reduce consumption.

Important aspects are:

- Incentives should be related to the market or the energy system
- Customers need information and knowledge about importance of demand response
- Same time steps in energy price and settlement
- A reminder of expected peak price periods will influence the routines for the customers
- The need for demand response may increase due to tight capacity balance, more local generation and wind power
- Technology for automatic load control is important to secure a stable and predictable demand response

Direct load and consumption control

Direct load and consumption control carried out from the utility is automatic and inconscpicuous to the customer. It can contribute to reduced peak loads according to external incentives, enable demand response in the market bids, reduced costs for stakeholders, ease the stress of the system, reduced energy consumption and increased energy efficiency.

Technology for automatic load control can disconnect loads with thermal storage capacity for a limited period in time, shift in time of other appliances and/or run appliances when renewable energy is available. The use of different appliances can be coordinated to reduce the total consumption, and thereby reduce the energy bill and ease the stress of the energy system.

Several Commercial/Public customers have installed control system, and load control is usually performed to reduce peak load and energy consumption for their own benefit. Load control should also be related to incentives from the market or the energy system.

Technology for load control should make secure disconnection and reconnection possible. Random reconnection of loads will reduce the stress on the energy system and satisfy the purpose of the load control. To avoid negative effect on customers' comfort, reliable load control technology for suitable loads is important.

Important topics when discussing direct load and consumption control are:

- Compensation to the customer
- Limitations regarding disconnection (when, duration, resting time) and the possibility to opt out for a certain appliance and/or time
- Required response time when load control is activated
- Responsibility if no demand response is achieved, even if load control is activated

EnerControl reporting service (Finland)
This service gives customers information about their energy use (heat, electricity, water, cooling) in the buildings, and electricity consumption for specific appliances.

The reporting service include monitoring of consumption; consumption changes from previous year; day/night consumption; max, min and average consumption; long term consumption trends and comparison reports for selected periods. Energy efficiency improvements are easily seen and proven.

The objective of the service is energy savings through information and feedback, supporting building management through monitoring and perceiving abnormal situations. The service is a cost-effective way to gain energy savings through increased awareness of energy use, and it is easily adapted and transferred to other countries and markets.

Load profile management by AVU AG (Germany)
The objective of this service is to advice customers how to shift or reduce peak demand and thereby to save on the energy bill. This also includes advices concerning which appliance operations can be shifted in time to reduce the highest loads. To ease the load shifting, technology to automatically cut peak loads and shift them to other times is installed. The service requires metering data for at least 15 minutes intervals.

In Germany the highest load during one period (15 min.) is taken into account when calculating the energy costs for industrial customers. Reducing the maximum load will therefore account for savings for the customer. This service is well established for medium and large businesses. Technology for automatic reduction of peak loads makes it easy for the customer to shift loads in time.

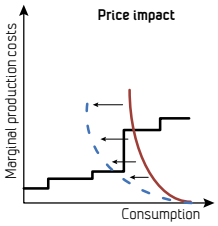
Time of Day (ToD) network tariff and load control (Norway)
To test the possibility for demand response a new ToD network tariff was offered to a commercial building with a building control system installed. The control system was used for load control and for shifting loads from peak to off-peak periods, especially loads with thermal capacity (electrical water heaters, heater cables and panel heaters, ventilation system and the heating of water in an indoor swimming pool).

The new ToD network tariff consisted of a peak payment part, which implies that only power registered in defined peak periods (hours 08:00-11:00 and 17:00-20:00 on working days during the winter period) were included in the settlement. The tariff gave incentives to adapt the consumption according to the power situation. The defined peak periods were coinciding with the peak load hours in the power system.

The price signal was on an hourly basis, so hourly metering was necessary.

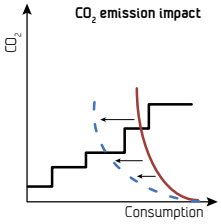
For further information, please study the project website or read ***D2.1 European Smart Metering Landscape Report***, downloadable from this website.

Economical, environmental and societal impacts



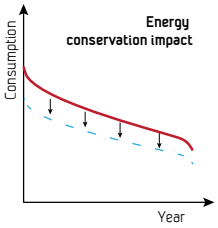
Price impacts

Demand response will result in reduced peak prices due to avoided use of expensive peak load production.



CO_2 emission impacts

Demand response will result in reduced CO2 emission due to avoided use of polluting power plant.



Energy conservation

Load management and feedback regarding energy consumption will result in reduced consumption due to customers' awareness.

SmartRegions project – and further inspirations

The SmartRegions project promotes the uptake of innovative smart metering services and aims to inspire and encourage energy utilities, energy service providers as well as law makers across Europe to initiate the development of such services.

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