

A stylized logo consisting of several overlapping, curved leaf-like shapes. The top-most shape is blue, followed by a light green, a medium green, and a dark green. The shapes are arranged in a fan-like pattern, pointing towards the right.

GEODE
Demand Response Electricity Market

GE  DE

Demand Response

Three distinct options

1. By Agreement – Demand is reduced based on contract with customer
2. By Price – Network load and Spot prices are informed and billed to the customer – Time of use Tariffs
3. By obligation - Demand from TSO or other, depending on country, in order to drastically reduce demand

Demand Response

Agreed by contract

DSM (Demand Side Management) is an important tool for the DSO to even out load peaks in the grid and fosters the introduction of new products by the supplier, saving energy and reducing costs for the customer.

Three options:

1. Customers themselves reduces consumption compared with the normal consumption pattern based on the given network load and price forecast. The customer is paid for the “unused” energy.
2. An agreement with the customer to reduce consumption by controlling customer appliances by the DSO or other market participant when network load and spot prices are high in order to reduce cost for customer.
3. An agreement with the customer that their consumption will be reduced through control of their appliances, by the DSO or other market participant , the energy ”saved” will be sold and the profits shared

Demand Response

Agreed by contract

Needed:

- Consumption must be measured, settled and billed per hour or more frequently
- There must be business models in place. These models must take into account the high cost of handling these forms of Demand Response
- A functioning market for trading "saved" energy (e.g. aggregators)

For option 2 and 3:

- There must be processes for selection of customers, which appliances, length of time of reduction, etc
- There must be secure systems, hardware and communication infrastructure in place for the DSO/Supplier/Third Party in order to control appliances.
- Smart appliances and Smart home automation is thus needed



Demand Response

Agreed by contract

Option 1, Customers themselves reduce consumption, is likely to be the most cost effective way of solving Peak Demand Response at customer site.

In the Swedish study Market Design, it was also found to be the most effective when it came to percentage of reduction in consumption for households.

(Market Design Project; Elforsk 06:41)

In option 2 and 3, the DSO controls network load in a way that guarantees security of supply without any discomfort for the customer, by intelligent load management



Demand Response

Price – Time of Use Tariffs

- Consumption must be measured, settled and billed per hour or more frequently
- Energy and network price information must be given to customers in advance

Demand Response

Forced

- Extremely quick response time required
- If using Smart Metering system and breakers on meters:
 - Very large volume of actions – (20% of customers, 300 000 customer, 60 000 disconnections)
 - Extreme demand for system, processes and routines
 - Demands a very robust communication infrastructure with high bandwidth
 - A small percentage of failed re-connection will lead to massive problems
- Alternative: Using breakers at primary or secondary substation level
- In either case prioritization of customer is essential



Demand Response

Forced

Questions;

- Who is responsible for informing customer?
- How should information be handled?
- Who will handle customer complaints?
- How should financial compensation be handled? For example computer crashes, dentists, hairdressers...
- How should this be handled contractually with end customers?
- How will cost for systems and processes be covered (DSO if substation, DSO/Supplier (UK)/Third party (D) if Metering System)
- Who is liable?
- Who is responsible for decision to disconnect supply?



There is a need for legal framework on how this should be handled and how costs will be covered. ERGEG should define guidelines for the national regulators

Summary

1. The DSO involvement is necessary for many of the options outlined.
2. All options put high demands on systems, infrastructure, processes and customer information. This creates costs that must be covered for the responsible party.
3. Demand management is likely to induce further stresses on the existing grids if not controlled by the DSO, for example when power is restored to electrically heated homes
4. DSM will foster more efficient energy usage but it also introduces a severe potential security problem. Not only can false or manipulated price information cause enormous economical damage. It is evident that the information infrastructure for DSM must follow the highest available security standards.
5. Clear legal framework is needed in each Member State– e.g.:
 - how will customers be informed?
 - who will be responsible for what in the processes?
 - how will cost for responsible party be covered?
 - Prevention of emergency situations



Conclusion

In order to create a functioning Peak Demand Management, GEODE believes that two options are the most likely to work:

1. For the Agreed by contract, Option1 and 2 where Customers themselves reduce consumption, are the best solutions.

If Option 1 doesn't lead to change of consumption patterns based on given network load and price information, load control by DSO has to be introduced.

Thus for the DSOs the DSM area is an essential component in the SG topic, enabling the handling of the coming Demand Management challenges.

2. Time of Use Tariffs - Informing customers of the forthcoming spot price whilst consumption is measured, settled and billed per hour or more frequently



Conclusion

The most crucial aspect is the security of supply.

DSM only based on price information may easily lead to peak loads and introduce additional stress on the grid, eventually causing congestions or black outs.

DSM allows for more accurate planning of grid capacity, thus avoiding expensive reserve capacity, which leads to reduced costs or remunerations for the consumer.

The conclusion is that DSM needs to be moderated by the DSO to avoid overload in the grid or in parts of it.

Thank you

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