Consumer Experience and Regulatory needs for Demand Response
Over 10 year experience

Meter Data Management –

MDM

Core differentiation is technology platform

Processes large volumes of data in real time

Intelligently integrates with appropriate utility systems for action

Adaptability for regulatory and technical change

eMeter
During this presentation:

1. What does the integration of demand response imply?

2. What Demand Response requests:
   - 2.1 A Business Case that supports it (Vattenfall/eMeter)
   - 2.2 Consumer Access to Information to improve their Energy Efficiency

3. Consumer experience: PowerCentes DC

4. Aspects that regulators should support aiming to promote DR (Dynamic tariffs, etc)
Demand Response

Demand Response happens when consumers provided with the right tools and incentives, control electricity load.

Right tools refer to at least Hourly Smart Metering

Right incentives come mainly from regulators
1. What does the integration of demand response imply?

- More flexibility of grid services
- Bigger use of information to coordinate and optimize grid operations
- Incorporation of new technologies (such as smart information services) and communication infrastructure (eMeter services)
- Communication of more information to consumers (web)
- Incentives to consumers to use this information
2.1 Successful Business Case

Smart metering and smart grid create an opportunity to engage directly with customers in a two-way communication. Smart grids don’t just mean the replacement of old meter readers and an automated data collection system.

Vattenfall identifies the following business case:

1. **Automatic collection and compilation of Outage Statistics**
2. **Identification of power outage (before the customer) / Proactive fault tracing**
3. **Identification of remaining outage in the low voltage grid**
4. **Indicators for analyse the disturbance in the high voltage grid**
5. **Automatic analyse of load and voltage regarding disturbance sources.**
6. **More automatized power quality measurements**
7. **Spontaneous meter readings for Customer Service Center**
8. **Ordered meter readings**
9. **Automatic tariff change**
Successful Business Case, cont.

10. Customer complains
11. Alarm when zero (earth) fault occurs
12. Load analysis
13. Network dimensioning using precise peak load meter values
14. Load-categorization of customer
15. Locate thefts of electricity, energy
17. Internal analysis of reactive demand
18. Process improvement – unified handling of meter readings
2.2 Consumer Access to Information

• Energy information feedback
  – Real-time displays
  – Next-day online
  – “Pushed data” (monthly bill inserts, etc.)

• Efficiency mechanisms
  – Behavioral changes: turn lights off, reduce vampire loads, etc.
  – Equipment changes: buy more efficient appliances over time
3. PowerCentsDC Case Study

Smart Grid pilot

– About 1,000 residential customers throughout District of Columbia

– Integrated “Smart” approach
  – “Smart,” dynamic prices
    (Critical Peak Pricing, Critical Peak Rebate & Hourly Pricing)
  – Energy information feedback: with bills, in home, online
  – Smart appliances: automated control via smart thermostats

– Consumers had ability to manage their energy costs

– By shifting use from peak to other times

– By reducing total electricity use
Participant Education

• Welcome Kit
  – “Smart price” brochure
  – Refrigerator magnet
• Informational meetings
• Ongoing
  – Electric Usage Reports
  – Monthly bill insert
  – Consumer engagement website
  – Smart thermostat in home display
• Blog
Hourly Pricing

• Real-time pricing option
  – Vary hourly according to PJM market price
• First to combine with smart thermostat
• Notifications provided prior to high-price days

Hourly Prices July 2008-February 2009
Bill Savings

• Prices designed to be revenue neutral
  • Average customer pays same bill if no peak load reduction

Analysis for CPP and CPR customers

• 91% of participants saved money
• Average 12-month savings was $43.83 (4%)
• Average 12-month bill increase for the other 9% was $17.43 (2%)
What actions, if any, did you take to reduce your electricity use during critical peak periods or during times of high energy prices?

<table>
<thead>
<tr>
<th>Action</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turned off almost everything</td>
<td>28%</td>
</tr>
<tr>
<td>Turned off lights</td>
<td>44%</td>
</tr>
<tr>
<td>Turned off computers/gaming systems</td>
<td>22%</td>
</tr>
<tr>
<td>Adjusted the electric water heater</td>
<td>4%</td>
</tr>
<tr>
<td>Turned off one or more televisions</td>
<td>29%</td>
</tr>
<tr>
<td>Avoided use of appliances</td>
<td>60%</td>
</tr>
<tr>
<td>Adjusted the heating system</td>
<td>25%</td>
</tr>
<tr>
<td>Adjusted air conditioner</td>
<td>59%</td>
</tr>
</tbody>
</table>
4. Regulatory Aspect

1. Sweden, Hourly Data will support DR and the integration of new wind

2. Spain, New Tariff of Use to support Electric Vehicles

3. Promote the use of intelligent thermostat

4. Promote transparency of price signals

5. Dynamic pricing
To conclude:

Demand Response has to be a successful business case for both the utility and the consumers.

National regulators need to launch the right mechanism and initiative to support it.

Thanks,

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