Quality assurance and use of metered data

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Energy Demand-Side Workshop  
Trondheim, April 14th
Metered data – a key for commercial products

- Meter read once a year by utility - good old days
- Meter read by customer quarterly - reality in Norway
- Meter read by customer quarterly - mainly a vision
- Meter read by customer monthly - a vision
- Remote read monthly - discussed in Sweden
- Remote read daily - Vattenfall!
- Remote read hourly - increasing
New products – driving forces
- utilities perspective

1990 2005

Interest

Deregulation  Capacity constraints  Framework  Customer  Quality

POWEL
Metered data a prerequisite

- Billing
- Settlement
- Load profiling
- Bidding
- Balance accounting

Efficient retail wheeling
Powel MDMS
- one solution - several software products

Examples
a) Powel MDMS - metering
b) Trade Organizer – management of trade and settlement
c) Powel Demand – short term demand forecast
d) Powel Device Manager – logistics and work order
e) Time series calculator – the generic toolbox for time series
a) Powel MDMS for metering businesses

- Collect metered data from "all" type of FrontEnd.
- Management of "all" kind of metered data (multi utility…).
- Sophisticated routines for control and correction.
- Reports for quality and logging of events.
- Web-reports
- Calculations and management of data
- Interfaces with billing engines and third parties
- Exchange of EDI-messages

Main market target is distribution companies
Case: Vattenfall

- **Device manager work orders**
- **Terminal**
- **Meter**
- **MDMS**
- **web**
- **Curry (billing)**
- **Change**
- **EDI**
- **Customer**
- **Supplier**
- **System Operator**
- **Balance op.**

**NIS/GIS**

- **intranet**
- **customer**

**POWEL**
b) Powel Trade Organiser - background and benefit

- Main challenge in power market: Keep track of all information
- Routines and content of information depends on market movements and company role.
- Product code – balance responsibility – metering – supply obligations
- Most routines operated manually – in conflict with company strategy.

Prevents chaos!
Validation of metered values

— Some methods applied by MDMS

- Methods for control:
  - Test on specific values
  - Test on changes from last value
  - Test on number of repeated values
  - Test on consumption during i.e. last week
  - Test based on comparison with time series from back-up meter
  - Test based on value from manual read meter

- Methods for correcting values with error code as status:
  - Value replaced of constant value
  - Value replaced with last correct metered value
  - Value based on interpolation
  - Value based on extrapolation
  - Value based on mean values from other time series
  - Value estimated based on deviation from manual read meter
Definition

<table>
<thead>
<tr>
<th>Raw data series</th>
<th>Control routines</th>
<th>Not-OK report</th>
<th>Correction routines</th>
<th>Correction report</th>
<th>Corrected series</th>
<th>Raw data series Corrections Status code</th>
</tr>
</thead>
</table>

Validation without overwriting original values – traceability of all changes!
Correction of correction – a challenge!

- Meter
- Collect
- MDMS
- Billing

Re-read

a) metered data collected – value missing
b) missing value “corrected”
c) validated data for billing
d) re-read meter values – no value missing
e) difference between corrected and re-read value for billing
Observed challenges

- Logistics and work orders
  - Change of meters, audits, terminating….
- Reduce rate of errors in communication
  - No contact, no data, wrong value…
- Efficient management of large amount of metered values
  - Import, export, store, validation, analysis…
- System integration
  - Read, collect, management, billing, services, web….
Quality of metered values – what is the situation?
- Some results from 115 distribution companies in Norway in 2001:

- Errors caused by installation of meters
  - Manual read meters: 0.84% with observed error
  - Remote read meters: 1.9% with observed error

Remote read meters:
Wrong parameters, lack of communication, wrong installation are the most common reasons for errors
How do you correct errors?

<table>
<thead>
<tr>
<th>Method</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimates value</td>
<td>20%</td>
</tr>
<tr>
<td>Value from last week</td>
<td>55%</td>
</tr>
<tr>
<td>Value from terminal</td>
<td>25%</td>
</tr>
<tr>
<td>Value from meter registry</td>
<td>50%</td>
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</tbody>
</table>

Manual routines dominates.
Load Duration curve

Display from highest consumption
Demand side response – best estimate
Distribution of monthly read consumption to predefined profiles

January 2003, consumption of 5500 kWh
Summary

- Validated metered data – the starting point for demand side products!
- Utility industry in a process to digitalize from meter and cash.
- Powel MDMS – a system well fit for demand side response products.
- Products regarding demand side response and quality – moving closer each other.
- Web reports with “fresh” data – increasing interest.
- The metering process – driven by market or regulatory framework???

Innovation oscillates between Norway and Sweden!