Trends in the value chain and Smart Grids

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Trends in the future energy landscape demands innovation

**Production**
- Plannable generation
- Intermittent
- Centralized
- Decentralized
- Stable
- Flexible

**Customer**
- One-way
- Bi-directional
- Energy
- Demand
- No transparency
- Awareness

**Network**
- Instability
- Congestion
- Fixed prices
- Dynamic pricing
Market needs and new tech enablers develops the new energy landscape…

Drivers & Needs

- New customer behaviours
- Customer expectations
- DSO as market facilitator
- Intermittent generation
- Lower OPEX
- Lower CAPEX

Enablers

- Cheap IT
- Cheap sensors
- Internet of Things
- Big Data
- Power Electronics
- Storage

Drivers

- Demand response & new services
- Metering & Data management
- Network monitoring & control
- Asset management & maintenance

Needs

- Metering & Data management
- Network monitoring & control
- Asset management & maintenance
- Demand response & new services
Smart Grids – Focus of ongoing development projects

How to upgrade an existing network?
Most of the network will not be built from scratch so how to cost efficiently support new functionality and services in existing network is critical.

Advanced SCADA with integrated information
Use all available information (big data) from different systems to ensure resilient system with more secure operation and shorter outages.

Maximize use of existing Smart Meters
Use existing meters for improved outage management, higher safety, efficient network planning and faster connection of small scale generation.

Dynamic rating of assets
Increase capacity of existing assets based on real-time conditions. For example increased capacity of overhead lines based on wind speed and temperature.

Customer transparency & energy services
Provide the customer with information to act in a transparent way towards the market and enable a broad range of energy services from 3rd parties.

Monitoring of LV network
Monitor the LV network, which is 50% of our network, in way that outages are minimized, the quality of service secured, flexibility increased and network re-investment optimized.
Case: Why do we need to monitor the low voltage network?

- Increased monitoring of the low voltage network is a necessary next step to improve our customer service
- The low voltage network is 50% of our total network and is not monitored through traditional network operation
- Regulative pressure on reliability requires outage management improvements in the whole network
  - Especially for conditions with multiple (weather related) faults in a limited area
Case: With Smart Meters and analytics the last 50% of the network can be monitored.
Conclusions

Smart Meters are required to **enable market access** and **transparency for the customer**, and is also an **important tool for process and service improvements** by the DSO.

**Millions of events** from individual Smart Meters must be combined with network and customer information to **transform data into information** that can be acted upon.

Using Big Data and analytics a **100% monitoring of the network is a reality** enabling clear, efficient and non-ambiguous service **to each individual customer**.
Tack!

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