Neste generasjon IKT-infrastruktur for DSOer - Eksempel fra UPGRID, et nytt stort EU-prosjekt

Ulrika Morild, Vattenfall
ulrika.morild@vattenfall.com
Tfn 070 399 11 39
Agenda

• The Grid4EU project
  - Scope,
  - Solution
  - Draft results
• The Discern project
  - Scope
  - Solution
• The UPGRID project
  - Background
  - Purpose
  - Planned solution on high level
• Questions
Project Grid4EU – Demo 2
GRID4EU – The largest on-going Smart Grid project in Europe

GRID4EU Demo2 focusing on Low Voltage Network Monitoring

- Improved Quality of Supply
  - Faster Power Outage detection
  - Power Quality monitoring

- Project lead by 6 DSOs, covering altogether more than 50% of metered electricity customers in Europe
- 27 partners
- Duration: 51 months from November 2011 to January 2016
- Total eligible costs: €54M - requested EC Grant €25.5M
- www.grid4eu.eu
GRID4EU Demo2 – Low Voltage Network Monitoring

- Stand-alone system environment for both ABB MicroSCADA Pro and DMS and EnergyIP MDMS
- Information from AMM system Titanium received from Vattenfall Integration Platform
- Smart meter information sent to both EnergyIP and SCADA/DMS
- RTU data from secondary substations sent to EnergyIP
- GPRS communication with overlying SCADA, using IEC 104 protocol

- Deployment of ABB RTU 560CMD11 and Multimeter 560CVD
- Measurement on each outgoing feeder, 3 phases, using a snap-on CT
GRID4EU Demo2 – Draft results

1. Detection of power outage and Power Quality events in real time (<15 sec), e.g.
   - Phase loss
   - Under- and Over Voltage

2. Fault Management
   - Visualization of faults in DMS for both single LV feeders and Smart Meters
   - Alarm list of events in MicroSCADA
   - Historical analysis of Power Quality in Historian application

3. Power Quality Management
   - Visualization of data in EnergyIP MDMS from both RTUs and Smart Meters
   - Analysis of customer consumption in comparison to neighbours
   - Analysis of overloaded transformers

4. ICT solution important for reliable RTU communication
   - RTU reliability not satisfactory, on average below 75% with GPRS communication
   - Smart Meter Data Concentrator availability around 99.5%

5. Smart Meter Event analysis support LV Network Power Quality Monitoring
   - Real time event analysis need some more system tuning
Project DISCERN GOTLAND

Distributed Intelligence for Cost-Effective and Reliable Distribution Network Operation

www.discern.eu
DISCERN FP7 project

DISCERN Gotland focusing on Enhanced monitoring of MV Network

- Improved Quality of Supply
  - Faster MV distribution grid fault identification
  - Power Quality monitoring

- Project lead by 5 DSOs
- 6 partners
- Duration: 36 months from February 2013 to January 2016
- www.discern.eu
DISCERN Gotland

- Implement and evaluate possible Smart Grid level with use of only simple and smart sensors in the MV/LV Network
- Geographically pinpoint faults in the MV network
- Evaluate the functionality of MV monitoring for fast and reliable fault identification and indicating distance to faults.

70/10 kV substation:
- Substation computer, COM600A, from ABB for fault analysis
- Protection REF615 from ABB

A technical solution for:
- Fault localisation
- Control
- Distance to fault calculation

10 kV line:
- Protrol IPC4012 and current transformers as "sensors"

A technical solution for:
- Fault identification/localisation

GPRS and VPN connection are used for communication with the 70/10 kV substation and the Fault Passage Indicators in the grid.
DISCERN Gotland – Deployment of FPIs (“sensors”)

"Grid-split" with 2 FPI (S2 och S3)
Project UPGRID – Demo 3
Main purpose – Proof of concept

Vattenfall strategic Vision is to become the *Smart Energy Enabler* for our Customers, to improve the Quality of Service for our Customers.

Smart Grids experience from e.g.
- Grid4EU
- Discern
- Smart Grid Gotland

UPGRID

The UPGRID demonstration will be the enabler for defining and testing strategic choices in order to illustrate how full scale DSO smart grid solutions will be managed in the daily business operation, using the same IT support.
UPGRID Demo3 is focusing on MV and LV Monitoring

- Testing of Smart Grid solutions in real Vattenfall system applications
- Interoperability of equipment with system environment
- Improved Quality of Supply

UPGRID Horizon 2020 Project

- Project lead by 4 DSOs
- 19 partners
- Duration: 36 months from Jan 2015 to December 2017
- www.upgrid.eu
Objectives

Consolidate earlier Smart Grid related projects and illustrate how the developed improvements can be implemented in the DSO’ daily operation.

A break down of the overall objective is to demonstrate how:

1) To develop and harmonize the system functionalities to support intelligent equipment in the MV and LV network to be able to support and enable Power Quality and Energy efficiency improvements.

2) To identify cost-efficient and supplier independent solutions for monitoring and control of the LV/MV network to be able to fulfil the future demands of the customers and the society in general.
UPGRID – Functional areas

Expectations from Vattenfall on the project:

1) Electrical calculations w. hourly values

2) Total visualization of DER/RES in maps/tables illustrating loadflow etc...

3) Total visualization of Network Losses in maps/tables etc.

4) LCC calculations of best technical/financial solution with new equipment

5) Optimized data exchange (LV Network) between NIS/SCADA

6) Find a solid solution for replacing existing "PER-database"

7) Develop all necessary system functionality to monitor the LV Network

8) Reliable operation of supplier independent field equipment focusing on Fault Location and improved Power Quality
Questions?
Thank you!