Adaptive protection pilot
Background

• Little of who I am
• My PhD thesis
  – Protection requirements for future Smart Grids

• Past research
• What is going on now – Adaptive protection pilot
  – Sundom Smart Grid
Microgrid protection

- Telecommunication based protection approach for MV microgrid
- Distinguishing between LV and MV faults
Microgrid protection

- Distance protection
DG protection

• Benefits of using telecommunication based protection with DG
  – Prevent false and nuisance tripping

• Distance protection as an alternative
  – Intermediate in-feed
  – Microgrids
DG protection

- Power Line Carrier based LOM
  - Simulations with PSCAD
  - LOM detected in 20 ms at best
  - PLC signal during voltage disturbance
Adaptive protection

- Restructuring the network after fault
  - Dividing the power system to protection zones
- Enabling different functions or settings according to network state
Sundom Smart Grid

- Project coordination
- Developing predictive fault management
- New fiber optics and server solutions
- New services to customers
- Cost-efficient investments
- Research activities

- Strong regional development
- Global markets for Grid Automation
- New ICT market segments
- New business models
- Supply reliability and customer satisfaction
- Top expertise
Research themes

- Piloting Smart Grid technologies with modern IEDs and fast telecommunication
- Grid technologies for better reliability – effects of regulation models
- Integration of distributed generation
- Active customer participation - prosumers
Sundom Smart Grid

Sundom Smartgrid Concept Example

- HV/MV Substation
- Smart secondary substation
- Solar Photovoltaic
- Wind turbine
- Communication
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- PSCAD model of the network
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- Field tests
  - Continuous and permanent earth faults
  - Intermittent earth faults
  - Fault resistance 0 – 10000 Ω
  - Test the operation of primary and secondary substations

Pictures: Jukka Rinta-Luoma
Sundom Smart Grid

- Field tests
Sundom Smart Grid

- What else has been done in the project
  - Prosumers
  - Cost-efficiency of cabling
  - Real time measurement

- What possibilities are there
  - Infrastructure has been built
  - More field tests
  - Implementation and effects of DG units
  - Protection verification
  - Microgrid simulation or tests
  - Living lab
    - Real time measurement
Thank you!

Questions?