


0893 - INTEGRATION OF AMM FUNCTIONALITY INTO OPERATING SYSTEMS OF ELECTRICITY DISTRIBUTION COMPANY FOR LV NETWORK FAULT MANAGEMENT



Sauli ANTILA - Vattenfall Distribution, Networks Finland

Jukka KURU - Tekla Oyj, Finland

Ville MAKSIMAINEN - Vattenfall Distribution, Networks Finland



Frankfurt (Germany), 6-9 June 2011

Business environment

Remotely monitored network today

Remotely monitored network in past

High voltage network
1 500 km



Medium voltage network
22 000 km



Low voltage network
38 000 km



Substations
130 pcs



Distribution transformers
21 000 pcs



Customers
390 000 pcs

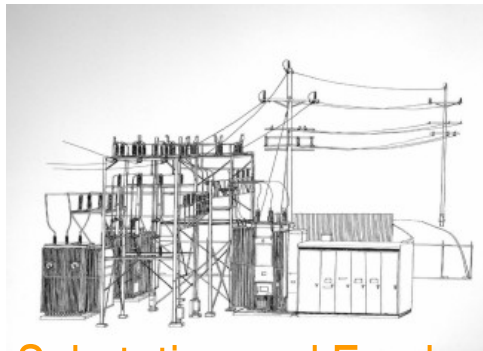




Frankfurt (Germany), 6-9 June 2011

Benefits

- ❑ Number of customer trouble calls reduced
- ❑ Faster fault repairing and shorter interruptions
- ❑ Reduced amount of trouble shooting and unnecessary customer visits
- ❑ Security: real-time information of zero conductor faults and voltage level
- ❑ Accurate and extended reporting and statistics



Substation and Feeder
Automation



KAVA
SCADA SYSTEM

XpowerDMS
Distribution Management System

AMR



AMR meter

AMM functionality



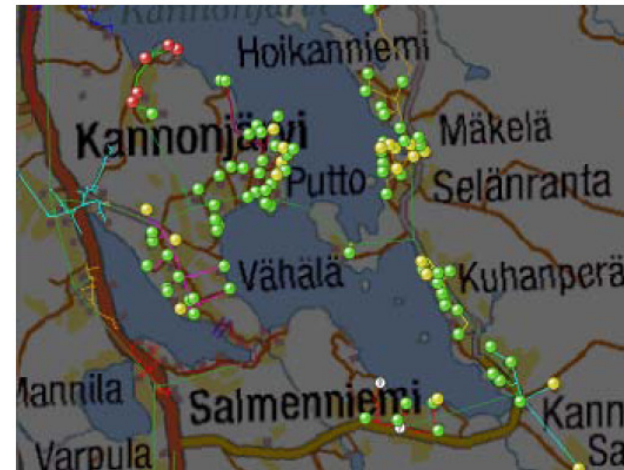
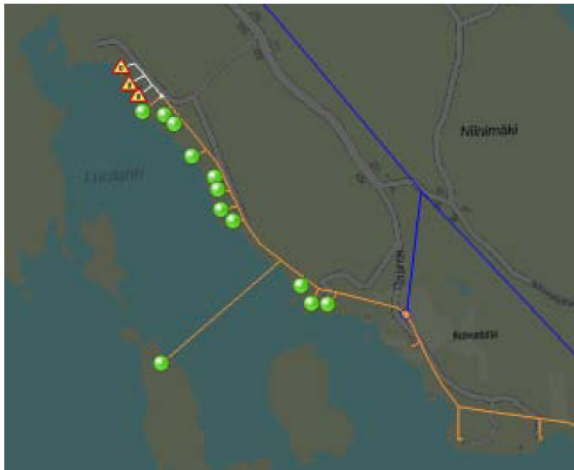
Alarms

- Phase missing
- Voltage level
- Voltage unbalance
- Zero conductor fault



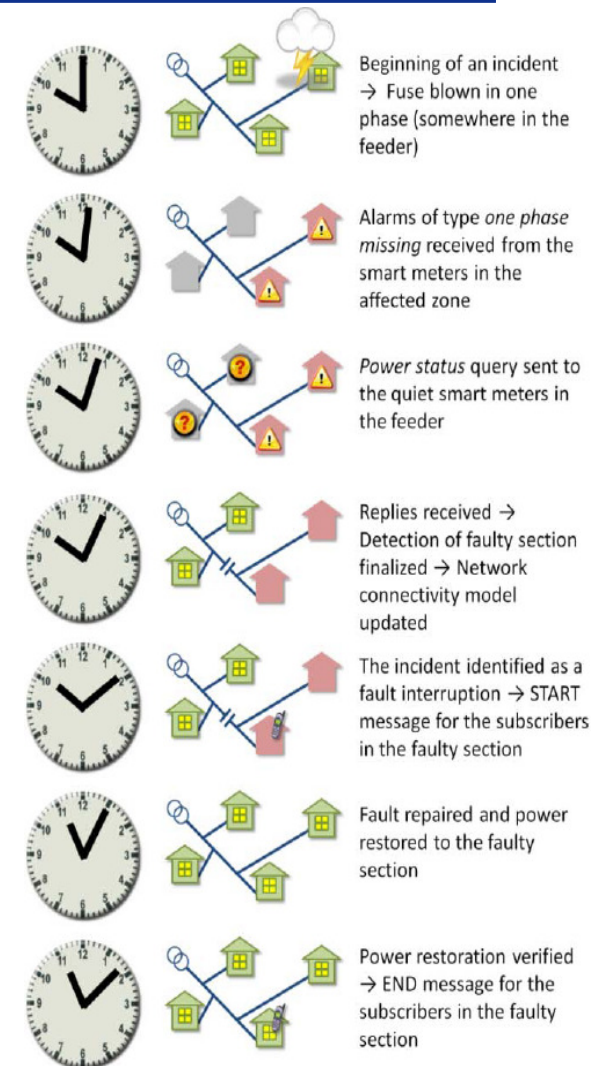
Queries

- Device responding - no alarms
- Device responding - active alarms
- Device not reached
- Device unknown
- Device switched off



DMS functionality

- Fully integrated part of outage management process
 - automatic fault location
 - interruption registration
 - outage communication
- Detection of faulty section is based on
 - smart meters' ability to send spontaneous alarms about incidents, for example blown fuses, that cannot be detected by traditional distribution automation
 - DMS's ability to send power status queries to smart meters of interest



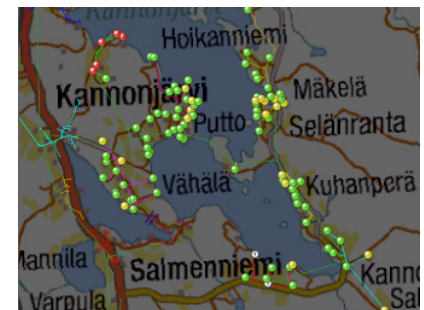
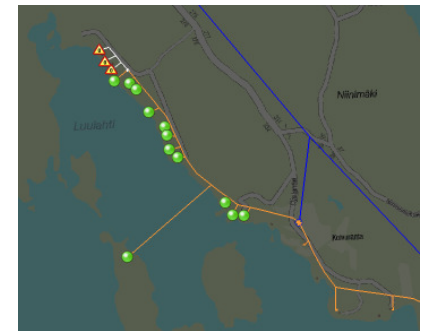
green fill = consumption site having power
red fill = interrupted consumption site
grey fill = status not known at given moment



Frankfurt (Germany), 6-9 June 2011

Experiences

- Enables 24/7 monitoring of the whole network
 - Moved into production on Feb 1, 2010
 - Over 91 000 AMR queries in 2010
 - Over 12 500 AMR queries in snow loads in 1/2011
- Many benefits in medium and low voltage faults
 - Verification of power supply at customer premises
 - Recognition of zero conductor faults, phase faults and faults in customer network
 - Location of broken MV conductors
- Experiences are very positive
 - Shortens outage duration and improves efficiency
 - Improves customer service
 - Reduces unnecessary visits to customer sites
 - Improves safety at customer sites





Frankfurt (Germany), 6-9 June 2011

Smart Grid evolution

2002

2004

2006

2008

2010

2012

Smart Control



Centralized and standardized outage management:

Smart automation



Faster fault location and isolation, reduction of affected customers

Smart metering

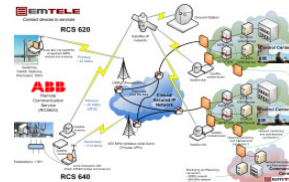


AMR roll-out



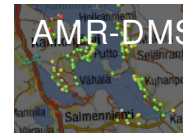
More AMR benefits

Smart communication



FieldCommunication

Smart Functionalities for processes



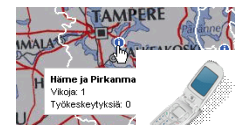
Utilization of AMR alarms and queries In Outage Management



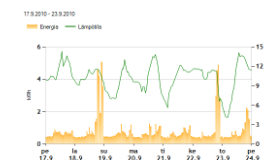
Automated Fault Location, Isolation and Restoration

Smart Functionalities for Customers

Web, SMS



Real-time services to customers



Web hourly consumption reports and energy efficiency



Smart Functionalities for Partners

Constructors – essential part of process

ANTILA – FI – RT.6c –0893



Frankfurt (Germany), 6-9 June 2011

Thank you!

Vattenfall Distribution, Networks Finland
Sauli Antila
E-mail: sauli.antila@vattenfall.com
Phone: +358 40 526 5809