



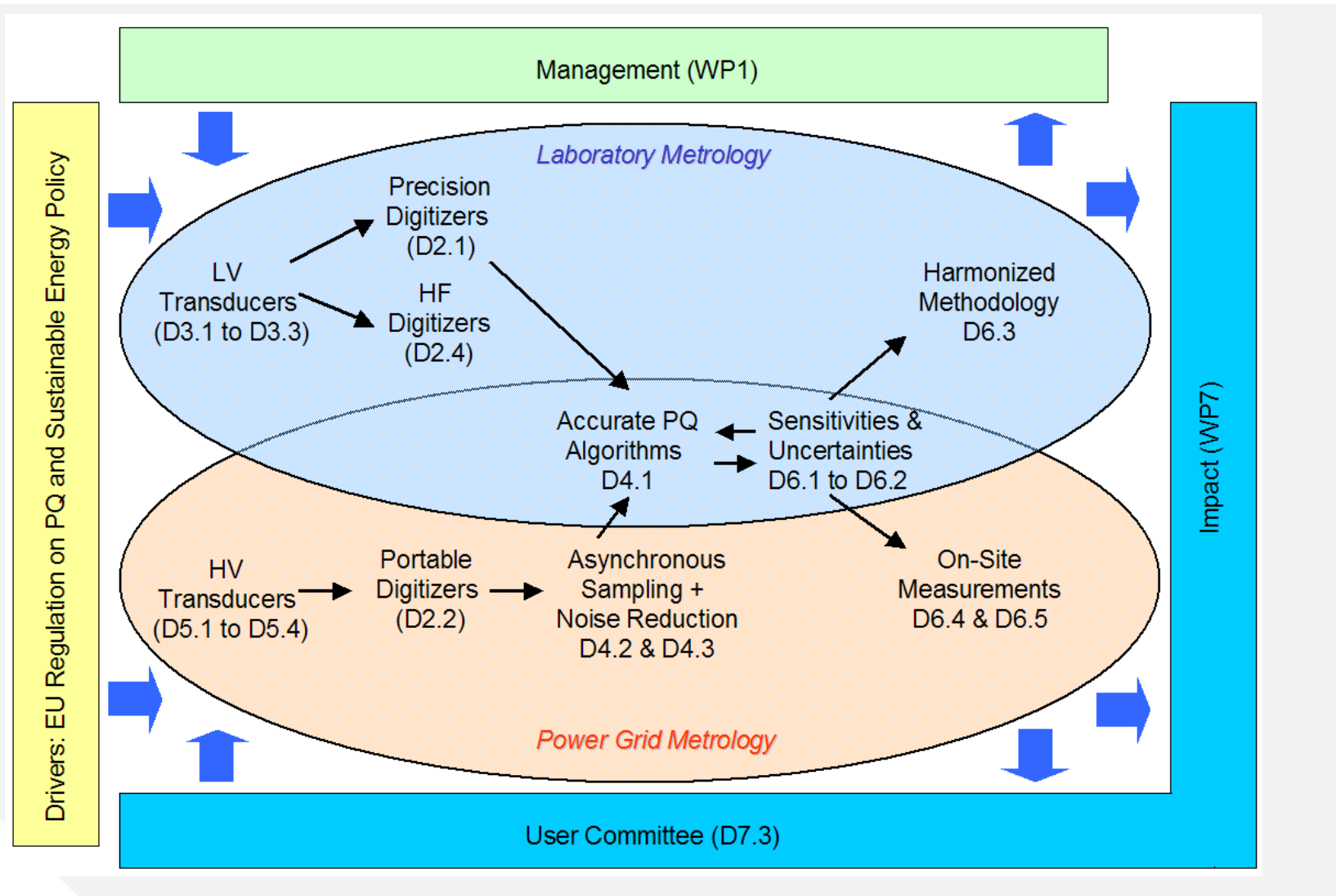
23 March 2011

Outlook of the “Power and Energy” project: Metrology for Smart Grids

Gert Rietveld



Power and Energy activities



New era of energy landscape

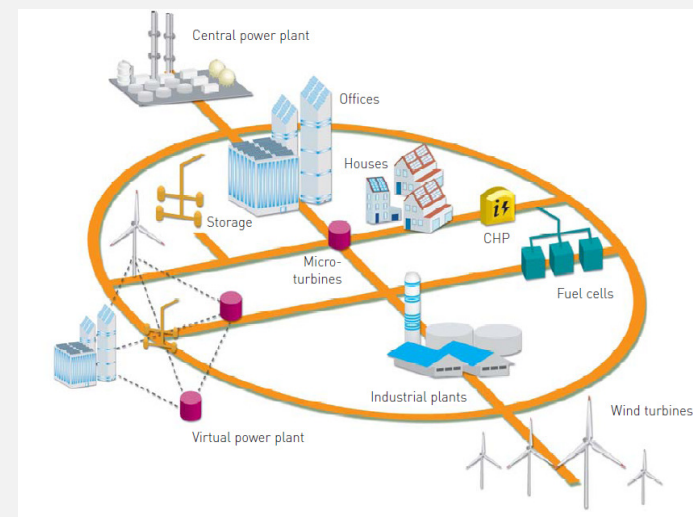
Local and large scale generation via renewable energy sources

⇒ **Challenge for the grids**: support the uptake of renewables while ensuring grid stability and quality

EU SmartGrid joint research project

⇒ **Contribute to better understanding of the MV / LV grid and provide reliable tools for controlling the grid**

- Modelling of grids
- Phasor Measurement Units
- Grid Power Quality
- Energy measurement



State of the art

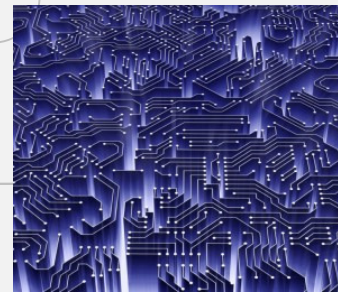
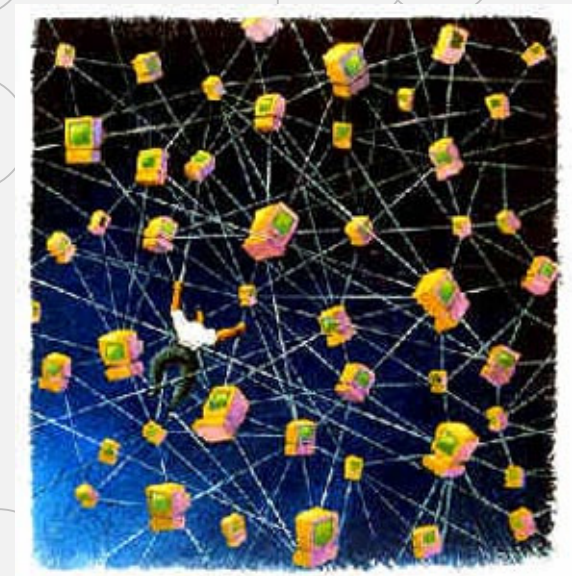
- Very marginal understanding of MV/LV grid stability
- Intermittent sources and loads of SmartGrids make them vulnerable to (local) blackouts

Aim

- Observability and controllability MV / LV grid

Tasks

- Modelling - stability
- Model tests - measurements
- Wideband CTs
- Cryptography



State of the art

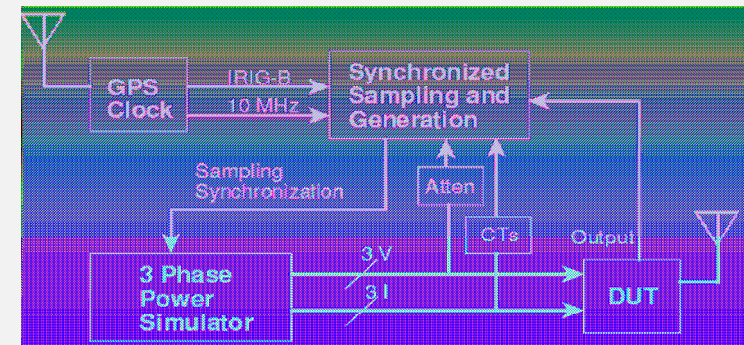
- PMUs use is extending to LV / MV smart grids
- No traceability in EU, PMUs not always meeting specs, behaviour under dynamic real life signals?

Aim

- PMUs metrology infrastructure

Tasks

- PMU simulation platform
- Reference PMU (lab / on-site)
- PMU calibrator
- Calibration methods
- Lab & on-site tests



G.N. Stenbakken, 2008

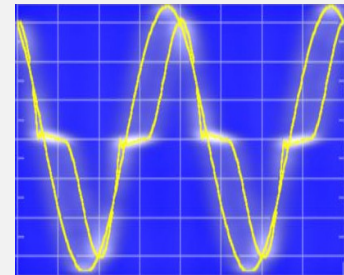


State of the art

- PQ traceability in lab ensured, equipment for on-site developed
- Limited experience in on-site PQ measurements

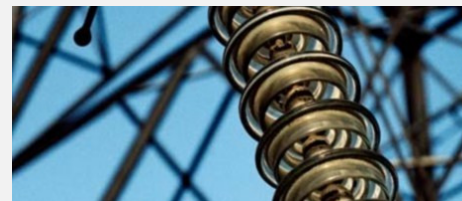
Aim

- On-site PQ measurements on renewable generation equipment and in transmission / distribution grids



Tasks

- PQ system configuration
- On-site campaigns
 - wind turbines, smart grids, substations
- “Best practice guide”



State of the art

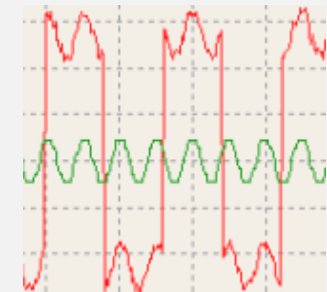
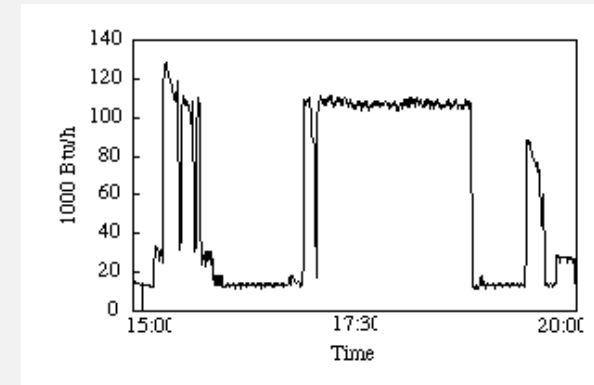
- Smart meters are not really 'smart'
- Increased energy flow through grid...
- ...with more parties involved (liberalisation)

Aim

- Improve revenue metering in smart grids

Tasks

- NIALM for Smart meters
- AMR – monitoring calibration status via AMR on nodes of tree-grid
- On-site revenue metering (MV, HV)





SmartGrids project data

European Metrology Research Programme
<http://www.euramet.org/> → documents

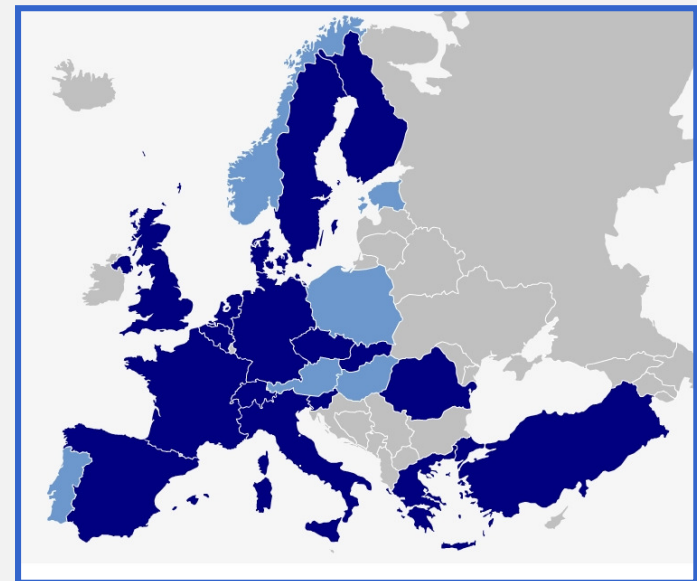


“Join resources to tackle metrology challenges in coming 7 years”

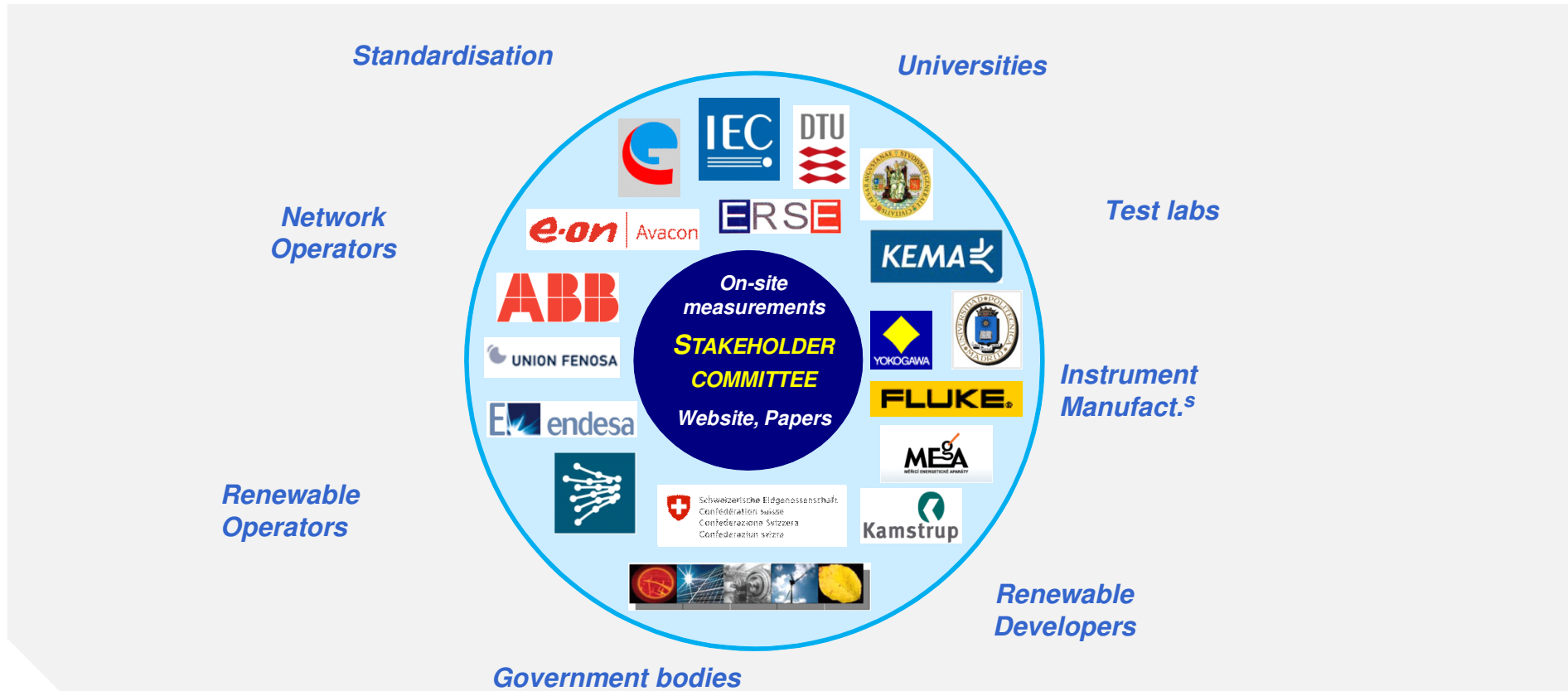
Smart Grids joint research project

- 22 Partners – 18 NMIs + 4 universities
- 4 technical WPs
- 4 M€
- Sept 2010 – 2013

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Stakeholder committee

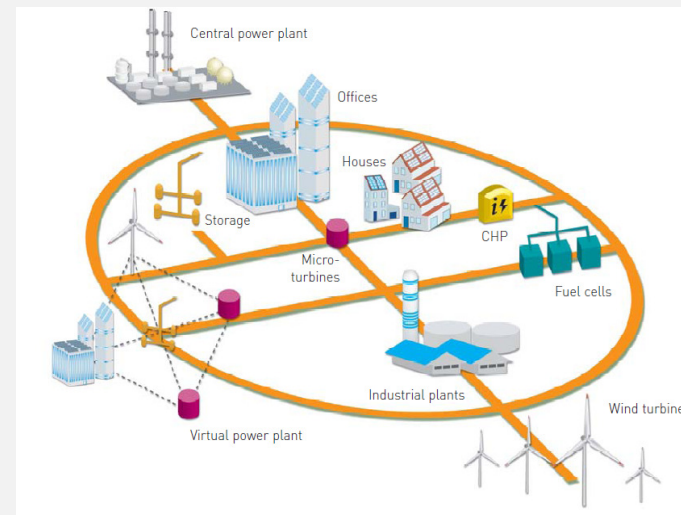


Crucial role in commenting and steering project activities and feeding with market information

Reflections on present activities?

**Contribute to better understanding of the MV / LV grid
and provide reliable tools for controlling the grid**

- **Modelling of grids**
- **Phasor Measurement Units**
- **Grid Power Quality**
- **Energy measurement**



Next project meeting: 17 – 18 May 2011, NPL, Teddington