



Dutch
Metrology
Institute

EMN Smart Grids

European Metrology Network in Smart Electrical Grids

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VSL Rationale: Supporting the Energy Transition



- Electrical grids are a core element of the **Grand Challenge Energy**
 - Backbone of our society; our most important infrastructure
 - Increasing importance of electrical energy as medium for energy transport and utilisation (“electrification”)
 - Key enabler for realisation of CO₂ reduction aims
- **Major changes** in the electrical grid:
 - Addition of renewable energy sources, with variable output
 - Localised generation and storage
 - Bi-directional transport
 - Liberalisation of energy market, across national borders
- Grid stability and quality need to be guaranteed; need for a **smart grid**

The (smart) electricity grid depends on **reliable test & measurements** ⇒ **key contribution from metrology**



VSL Activities and Actors: strong NMI community & many stakeholders



10 NMIs committed so far: VSL (NL), INRIM (IT), LCOE (ES), LNE (FR), METAS (CH), NPL (UK), PTB (DE), RISE (SE), SIQ (SI), VTT (FI)

Linked to > 13 JRP's: SmartGrid 1 & 2, HVDC, GridSens, FutureGrid 1 & 2, ELPOW, TrafoLoss, TracePQM, MyRails, MeterEMI, ROCOF, ...

Very extensive stakeholder interaction

Utilities, Standardisation bodies (Cenelec, IEC),
Manufacturers (grid components, measuring instrumentation),
Service providers, R&D (universities, knowledge institutes),
Market Surveillance Authorities, Governments

Activities

- Regular roadmapping activities with stakeholders
- Development of a website and promotional material
- Promoting grid metrology
- Exchange of researchers, access to large facilities
- Creation of training materials



VSL Outputs: Coordination in R&D and stakeholder interaction

- Coordinated **research agenda**
 - Roadmap allowing long-term planning
 - Better incorporation of stakeholder needs
 - Avoid unnecessary duplication of effort (specialisation)
 - Use of complementary competences
 - Complete and EU-coherent approach
- Platform for coordinated **stakeholders interaction**
 - Increased visibility in stakeholder community
 - Uniform presentation of EMRP/EMPIR research to stakeholders
 - Central single access point for stakeholders to NMI community

Examples of research topics:

- Ensuring grid stability using synchrophasor technology
- Developing new sensors for grid monitoring
- Providing metrological basis for industrial testing of grid components
- Managing the grid quality via advanced power quality measurements
- Promoting fair trade by reliable, accurate grid energy metering
- Measurement of losses in grid components to advance design
- Support of low-loss electricity transmission
- ...



VSL Impact: Coherent metrology support for energy transition

- **Joint road map for European R&D program in electrical grid metrology**
 - Joint identification and prioritisation of key challenges with stakeholders (industry, SDOs, governments, ...)

- **Realisation of critical mass and smart specialisation in R&D**
 - Solve challenges that no NMI can solve on its own
 - Use *complementary* competences for complex science, encourage further specialisation
 - Ensure complete and EU-coherent approach to grid problems
 - Share NMI efforts in supporting actions like training and promotion

- **Enhanced visibility** of electrical grid metrology with industry and key stakeholders
- **Increased stakeholder interaction** via central EU access point to NMI knowledge (& services)

➔ Fit-for-purpose European grid metrology infrastructure