EMPIR Energy Metrology: meeting the needs from industry and society

EURAMET General Assembly

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VSL

Outline

- The Energy Transition
- TG Energy
- Energy Metrology SRA
- EMPIR 2016 Energy Call
- Summary

Strategic Research Agenda
for Metrology in Europe

Version 1.0 (03/2016)

EMPIR Calls

The Energy Transition

20/20/20 aims EU for 2020:

- 20 % reduction CO_2 emission
- 20 % renewable energy
- 20 % less energy (efficiency)

Energy 'trilemma' (World Energy Council)

- Reduce carbon emissions
- Maintain affordable energy
- Secure energy supply

Solving the Energy Trilemma

Realise a sustainable, affordable, secure energy infrastructure

- Diversification of fuel mix
- Low-carbon energy generation (electricity)
- Smart electricity grids
- Electrification of energy supply and use
- Better energy performance of buildings
- Improved energy efficiency

EU-27 Energy Mix (2011)	
Oil	35%
Gas	24%
Coal and other solid fuels	17%
Nuclear	14%
Renewables	10%

DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 21 October 2009
establishing a framework for the setting of ecodesign requirements for energy-related products

⇒ **"Energy Transition"**

EURAMET TG Energy

EURAMET Task Group Energy (as per GA, May 2014)

"*to stimulate and organize the scientific & technical collaboration among EURAMET members and associates, in order to form a coherent and effective response to the industry and society needs for energy metrology*"

Tasks:

- develop a Strategic Research Agenda for energy metrology;
- update and elaborate roadmaps and to facilitate joint research projects tackling challenges in these roadmaps;
- support and complement work of Euramet TCs in metrology for energy;

8 Members with different technical background, from 8 different institutes (VSL, SP, VTT, PTB, NPL, LNE, UTorino, ENAGAS)

EURAMET TG Energy: activities

Main activities since start:

- Kick-off meeting (Sept 2014)
- Development of Strategic Research Agenda in energy metrology (Oct 2014 – July 2015)
- EMPIR 2016 Energy call text (Sept 2015)
- Energy session at the 2105 Métrologie conference (Sept 2015)
- EMPIR 2016 Energy networking meeting (Nov 2015)

Presentations at Euramet TC-MC, TC-EM, GA, TCC, and 2 STAIR-EMPIR meetings

Energy Metrology SRA

Key Question: how can metrology research support the Energy Transition and make a crucial difference?

⇒ Cooperation required

⇒ EMRP / EMPIR programme

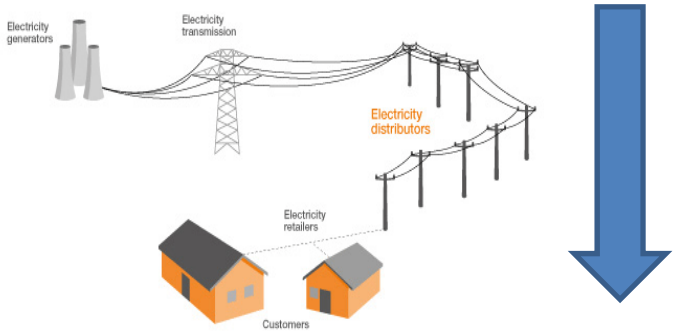
⇒ Strategic Research Agenda to indicate major challenges

Strategic Research Agenda for Metrology in Europe

Version 1.0 (03/2016)

http://www.euramet.org/research-innovation/strategic-research-agenda/

Energy Supply Chain



Energy metrology challenges

- Energy production & conversion
- Energy transport and storage
- Energy use
- Efficiency & cross-cutting themes

The gateway to Europe's integrated metrology community.

EURAMET

SI Unit

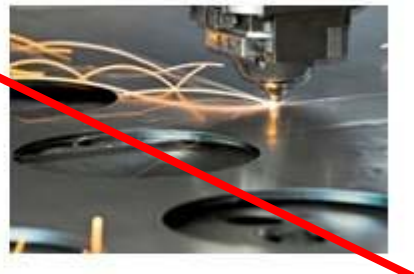
Environment

Energy

Fundamental

Health

Industry



EMRP: 22 projects, each 3.5 M€

- Smart Grids (4x)
- HVDC
- Energy Harvesting
- Power plants (3x)
- Solid State Lighting (2x)
- PV (2x)
- Biofuels, biogas
- Multiphase flow, viscosity fluids
- LNG (2x)
- Materials: thin films, composites

⇒ JRPs are mix of improved existing technology & new technology

EMRP
European Metrology Research Programme
Programme of EURAMET

The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union

EMPIR EURAMET

The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States

http://www.euramet.org/research-innovation/emrp/emrp-calls-and-projects/

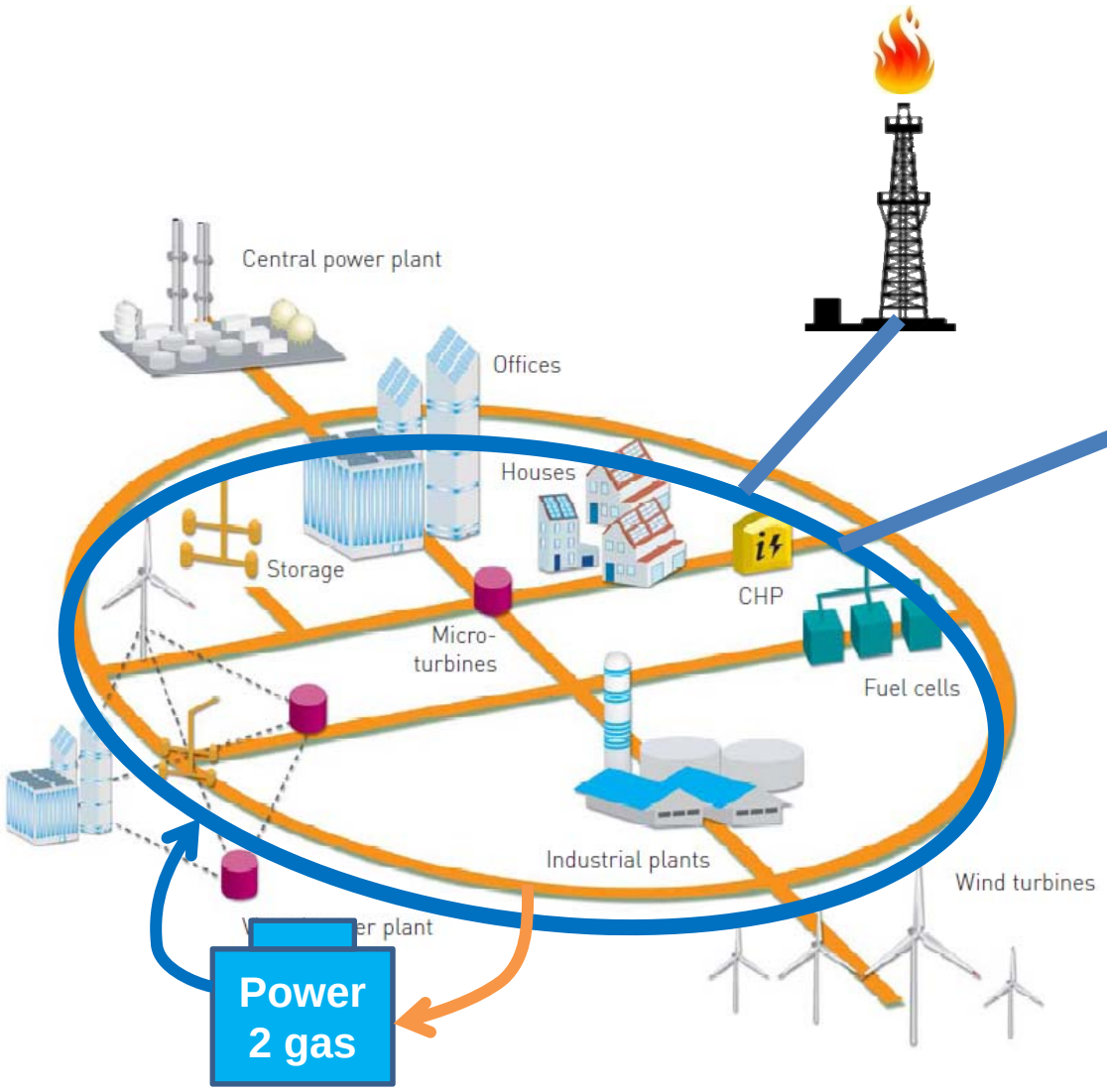
Generation: the new energy mix

Combination of existing and new technologies

Metrology challenges:

- Conventional - efficiency
- Renewable - characterisation
- Energy content (trade)
- Storage
- Fuel cells

Transport: grids, energy carriers



<u>Metrology challenges</u>:

- Grid monitoring & control
- Conversion of energy carriers

(security & quality of supply)

Energy use

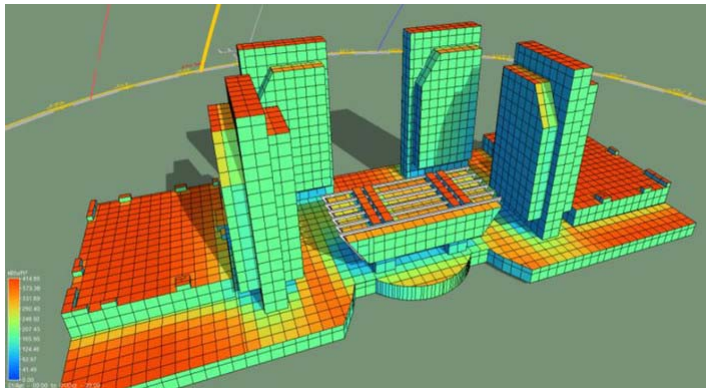
Metrology challenges:

- Transport – electrification
- H or LNG as a fuel
- Buildings
- SSL
- Low losses (Ecodesign)

Cross-cutting issues

Metrology challenges:

- Improve and verify efficiency
- New materials characterisation
- Modelling



EMPIR 2016 Energy Call: Networking meeting (30 Nov 2015)

EMPIR Energy 2016 Call - Networking Meeting

"Explore themes in energy research where metrology can make a significant contribution"

- Background and broad context
- Industry perspective (4 high-level keynote speakers)
- Breakout sessions
  - Generation - conventional
  - Generation - renewable
  - Storage and conversion
  - Transmission and distribution
  - Materials and modelling
  - Efficiency

⇒ Meeting report available http://www.npl.co.uk/carbon-measurement/news/npl-hosts-partnering-event-for-2016-empir-energy-call

Summary

An Energy Transition is needed to solve the Energy 'Trilemma' and ensure a sustainable, afforable, and secure energy supply

The Energy Metrology SRA identifies research areas where metrology can support this transition

⇒ Energy chain: generation, transmission / distribution, use

⇒ Storage and conversion

⇒ Cross-cutting: efficiency, materials, modeling

TG Energy to *encourage energy metrology research*, and to *stimulate interactions* between technical disciplines (interdisciplinary research)