Panel Session #1
Standards for Smart Grids
Your Panelists

- **Lars Nordström, KTH, Sweden**
  - is associate professor in Power System Management at KTH – The Royal Institute of Technology, Stockholm, Sweden, Since 2006 Director of the Swedish centre of Excellence in electric power engineering and active in IEC’s SMB Strategic group on Smartgrids and EU DG Energy taskforce on Smartgrids.

- **Mathias Uslar, OFFIS, Germany**
  - Dr. Uslar is head of the CISE, the Centre for IT Standards in the Energy Sector. He is member of German GI, IEEE, ACM and IEC german mirror commitee member DKE K 952, 952.0.10, 952.0.17 and international member of IE TC 57 WG 14 and 16

- **Karlheinz Schwarz, Nettedautomation, Germany**

- **Arshad Saleem, DTU, Denmark**
  - is currently pursuing a Ph.D. degree from the Department of Electrical Engineering of DTU, Denmark. He received his bachelor degree in Computer Science and an M.Sc degree in Intelligent Systems from BTH, Sweden. His research interests are application of intelligent systems and autonomous agents to power system control, communication in power systems and distributed control.
Definitions of Smartgrids

“Smart Grid is an electricity network that can intelligently integrate the behaviour and actions of all users connected to it – generators, consumers and those that do both – in order to ensure economically efficient, sustainable power system with low losses and high levels of quality and security of supply and safety.”

European Technology Platform

M. Jimenez-Sanchez, DG ENERGY

Wit n. intellect; reason; cleverness; sharpness; one who is sharp

kWit

L. Nordström, KTH
Smartgrids = ICT + Power
New Business Models – New Actors

TOMORROW
Demand Side and Demand Response Management enabled by friendly, end user oriented ICT solutions with embedded DSO load control and customer decision support system to save energy

TODAY
Limited awareness, ICT tools and services leading to easy, “automatic”, natural and freely decided customer participation to save energy – Limited Customer empowerment

Source: SAP.
Two strong drivers for change

• Widespread adaption of Information and Communication technologies throughout the power system, from generation via Transmission & distribution to end-use.

• Creation of new business models in the energy industry, through de-, and re-regulation strengthened by the dynamics of industrial development in other sectors.
Standards – Solution & Challenge

• Smartgrid covers many application domains
• Several industries are involved

Many standards are “relevant”

• Coordination and guidance is needed
## Standardisation Domains

### Mapping Groups vs. Business Sectors

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Source: GridWise Standards Mapping Overview by M.L. Bosquet, March, 2004
What is needed for the Smartgrid?

- A reliable, secure and high-performing communications infrastructure
- Semantic inter-operability across all management domains.

All requiring Standardisation to enable communication between all actors and domains
Ongoing coordination

- IEC SMB Strategic group #3 ”Smartgrids”
  - CENELEC/ETSI JWG on Smartgrids
  - Mandate 441 – Smart Meetering Coordination Group
- NIST SGIP – Smartgrids Interoperability Panel
  - EU DG Energy TF on Smartgrids
IEC SMB Strategic Group 3

• **Strategy:**
  – Make the most of existing standards
  – Make the TCs manage themselves their activities in a sustainable way
  – Address the new sector of «Connecting the Consumer applications »
  – Standards worth only if compliance can be assessed
  – Strategy worth only if followed by action

• **Roadmap published at**
  [http://www.iec.ch/smartgrid](http://www.iec.ch/smartgrid)
Core Standards identified

IEC 62357  Reference Architecture – SOA Energy Management Systems; Distribution Management Systems
IEC 61970  CIM (Common Information Model)
IEC 61850  Substation Automation
IEC 61968  Distribution Management
IEC 61970  Energy Management
IEC 62351  Security
IEC 62056  Data exchange for meter reading, tariff and load control
IEC 61508  Functional safety of electrical/electronic/programmable
NIST mandate for Smartgrids

• Founded in 1901, NIST is a non-regulatory federal agency within the U.S. Department of Commerce. NIST's mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.

• "primary responsibility to coordinate development of a framework that includes protocols and model standards for information management to achieve interoperability of smart grid devices and systems..."
NIST Smartgrids Interoperability panel

Smart Grid Interoperability Panel and Governing Board

One Organization, One Vote

- Stakeholder Category Members (22)
- At large Members (3)
- Ex Officio (non-voting) Members

SGITCC
SGAC
CSWG
SGIPGB

Priority Action Plans
- PAP1
- PAP2
- PAP3
- PAP4
- PAP5
- PAP...
- H2G
- TnD
- B2G
- I2G
- PEV2G
- BnP

Domain Expert Working Groups
Permanent Working Groups

NIST Oversight

Products (IKB)

Use Cases
Requirements
Standards Descriptions
Conceptual Model
NIST Core Standards

• IEC 61970 and IEC 61968: Providing a Common Information Model (CIM) necessary for exchanges of data between devices and networks, primarily in the transmission (IEC 61970) and distribution (IEC 61968) domains.
• IEC 61850: Facilitating substation automation and communication as well as interoperability through a common data format.
• IEC 60870-6: Facilitating exchanges of information between control centers.
• IEC 62351: Addressing the cyber security of the communication protocols defined by the preceding IEC standards.
IEC 62357
TC57 Reference Architecture
IEC TC57 Reference Architecture
• Simplified overview of TC57 standards