WG 4 "Generation" Session

Topic 1

The Vision - sharpening our insights

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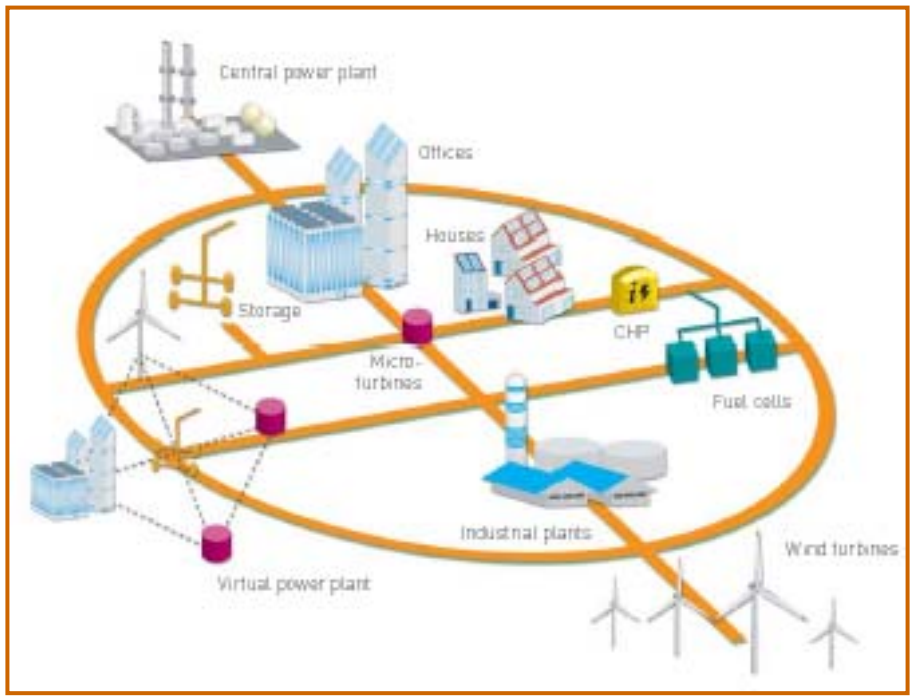

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The Vision

Europe's electricity networks will be:

- **Flexible**
  responding to changes and challenges
- **Accessible**
  granting connection access to all network users
- **Reliable**
  assuring security and quality of power supply
- **Economic**
  providing best value

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Factors calling for leaded power grid evolution

- European and national policies encouraging new and lower carbon generation, RES and more efficiency
- Progress in technology allowing improvement in operation and provision of new services
- Need to understand and manage the integration of new generation technologies and to reduce uncertainties and risk
- Need to handle grid congestions and to invest in end-of-life grid renewal
- Increasing participation of customers

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Looking to the Future

In response to new challenges and opportunity electricity networks will evolve

- **Centralised generation and HV bulk transmission network will continue to play a major role**
- **New technologies, efficiency-security-quality improvement, environment issues will support the large scale deployment of decentralised sources**
- **Many actors will be involved in generation, transmission and distribution. The customers too will take an active role.**

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Shaping up for the future

Development of:

- **Distribution grids accessible to DG and RES and facilitating interaction with end customers**
- **Distribution grids applying automatic, distributed control techniques and achieving high levels of power supply availability, security and quality**
- **Transmission grids that can comply with large and small, dispatchable and undispatchable, variable and fluctuating sources**

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New generation, new grids, ……

- Future distribution networks will provide an efficient and reliable link between local power sources and local demand
- The level of control required is much greater than in the existing networks. Functions required will be:
  - ✓management of demand, power sources and storage
  - ✓remote control of DER and load,
  - ✓control of power flows and voltage profiles,
  - ✓network reconfiguration and islanding operation
  - ✓power quality control
- Extended use of ICT, sensors and actuators

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….., new systems

Development of:

- **Microgrids**
  - distribution networks with DG power sources, storage devices and controllable loads
- **Virtual power plants**
  - decentralised energy management systems balancing required and available power in identified areas, based on off-line schedules for DER, storage, DSM capabilities and contractual power exchanges
- **Virtual utility**
  - structure with internet-like model and the relevant information and trading capabilities

Keeping it real

- Communication protocols,
- Equipment standards,
- Market rules,

have to be developed and internationally agreed

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Question

Do you share the Vision for Electricity Networks of the Future and how might the Vision be refined?

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