Electricity Network of Today

Today’s electricity grid
Central generation, unidirectional distribution

1. Coal or gas-fired or nuclear power plant, all in the Netherlands
2. Substation, 20 per powerplant
3. Distribution station on city level, 40 per substation
4. Distribution station on neighbourhood level, 180 per distribution station
5. Transformer vault, 250-500 per neighbourhood
6. Consumers, 50-100 connections per transformer
Future Electricity Network
Research Groups

Research Topics and Facilities
Photovoltaic Materials and Devices

Expertise/ knowledge / focus

- Complete thin-film Si solar cell process technology
- Nanostructure engineering of Si based films
- Light management in solar cells
- Modelling of solar cells
Intelligent Electrical Power Grids

Expertise/ knowledge / focus

• Integration of large-scale wind and solar energy plants
• Transient phenomena in power systems
• Reliability and optimization of transmission and distribution systems
• Wide-area monitoring and intelligent protection for power systems
Electrical Power Processing

Expertise/ knowledge / focus

• Power semiconductors converters design for sustainable energy
• Thermal management, converter integration and packaging
• Electric mobility, contactless energy
• Electro-mechanic conversion
• Electronic power interfaces for intelligent grids
DC Systems & Storage

Expertise/ knowledge / focus

- Characterization and synthesis of insulating materials
- Design of HV components and HV asset management
- Monitoring and diagnostics for (smart) grid applications
- Medium Voltage and Low voltage DC systems
- Smart cities and Electric mobility
- Optimization of renewables and storage for distribution systems

(TU Delft)