Electrical Energy Systems -

transforming electricity grids towards a future-proof, sustainable energy supply.

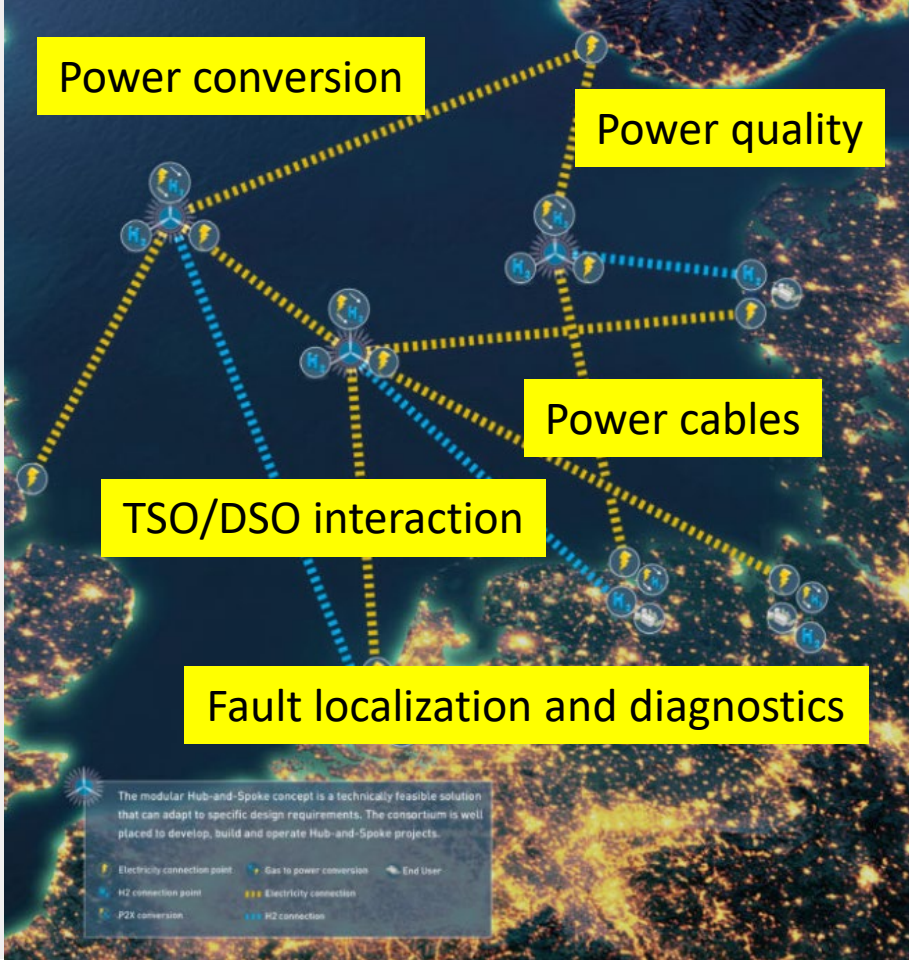
A *sustainable* society is an *electrical* society

- **Increase role of electrical energy in society** – Electricity is *the* sustainable energy carrier.
- **Electrify our economy** - Transport, homes (heat pumps), industry
- **Use energy more efficient** - Advanced (linear) drives and power electronics, robotics, smart appliances, electro-technologies.

More internationalization

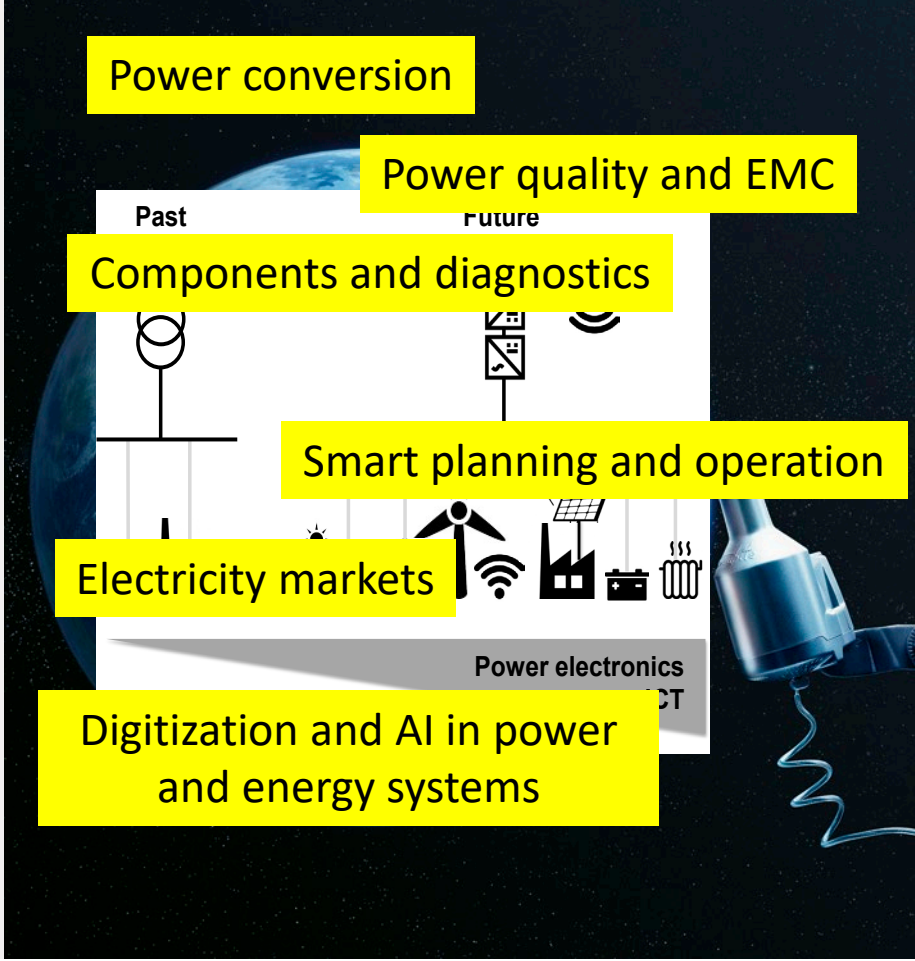
- Large power plants at “sun” or “wind” locations (e.g. North-sea wind);
- More exchange of energy across national borders.

- Increase of interconnection capacity and of cross border trading;
- Emerging HVDC technologies;
- Offshore grid deployment.



More localization

- **Distributed generation; renewables, local storage, new companies, often small and local;**
- **Electrification; electric vehicles, heating;**
- **New forms of cooperation, participation of end users – prosumers;**
- **Local energy; new initiatives from small companies, citizens and municipalities; innovative business models.**



Electrical Energy Systems (EES)

"Transforming electricity grids towards a future-proof, sustainable energy supply".

Increase role of electrical energy in society –
Electricity is *the* sustainable energy carrier.

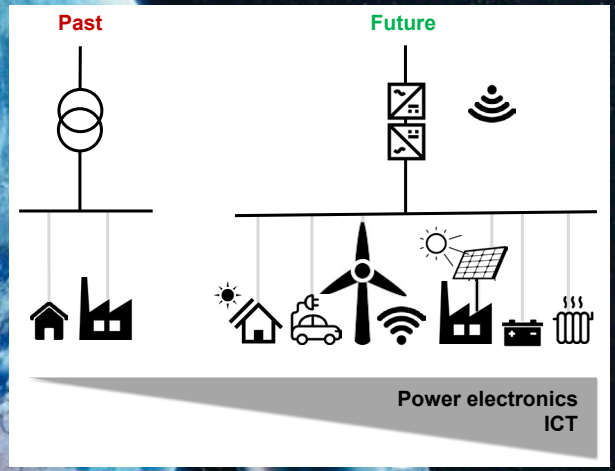
Electrify our economy -
Mobility, homes (heat pumps), industry

Decentralization

Electrification

New markets

Digitization



Intelligent energy systems

- Digital power and energy systems (DigiPES)
- AI in power and energy systems
- Smart planning and operation
- Electricity markets and power system optimization (EMPSO lab)
- Monitoring and diagnostics of components

Power conversion

- (MV) Power electronics
- Pulsed power and transient plasma
- Power quality and electromagnetic compatibility
- High-voltage technology

TU/e

Complexity in smart power systems. Transactive energy
Prof. dr. Koen Kok

Digital power and energy systems (DigiPES-lab)
Dr. Phuong Nguyen

Intelligent power systems
Dr. Christina Papadimitriou

Pulsed power technology
Dr. Tom Huiskamp

Pulsed power and plasma driven electrification
Dr. Wilfred Hoeben

Electromagnetic compatibility (EMC)
Dr. Anne Roc'he

Account and valorization management
Erik Matien

Monitoring and diagnostics of components
High-voltage technology
Dr. Peter Wouters

AI in power & energy systems
Optimization and electricity markets (EMPSO-lab)
Dr. Nikos Paterakis

(MV) Power electronics
Dr. Dongsheng Yang

Pulsed power technology
Transient plasma
Group chair
Prof. dr. Guus Pemen

Power quality
Dr. Vladimir Cuk

Electromagnetic compatibility (EMC)
Dr. Ramiro Serra

Education
Ing. Rene van Hoppe

Part-time

Smart grids. Smart planning and operation
Prof. dr. Han Slootweg (Enexis)

Smart planning and operation. Protection
Dr. Johan Morren (Enexis)

Reliability and diagnostics of grid components
Prof. dr. Peter van der Wielen (DNV)

Smart planning and operation
Ir. Wouter van den Akker (Alliander)

Smart planning and operation
Ir. Anne van der Molen (Stedin)

Power quality
Prof. dr. Sjef Cobben (Alliander)

Power quality in transmission systems
Dr. Jeroen van Waes (TenneT)

Power electronics dominated grids
Dr. Erik de Jong (Kema)

Power electronics
Prof. Korneel Wijnands (Prodrive)

Power electronics dominated grids
Dr. Yin Sun (Shell

Project manager
Lisa Seravalle

Technician
Marcel Hoogerman

Technician
Eloy Maxam Martinez

Secretariat
Annemarie van de Moosdijk

Lab management
Dr. Tiago Castelo de Oliveira

Key figures (2019):

- 41 PhD-candidates and postdocs
- 29 scientists, engineers and staff
- 35 MSc students

Intelligent energy systems

Power conversion