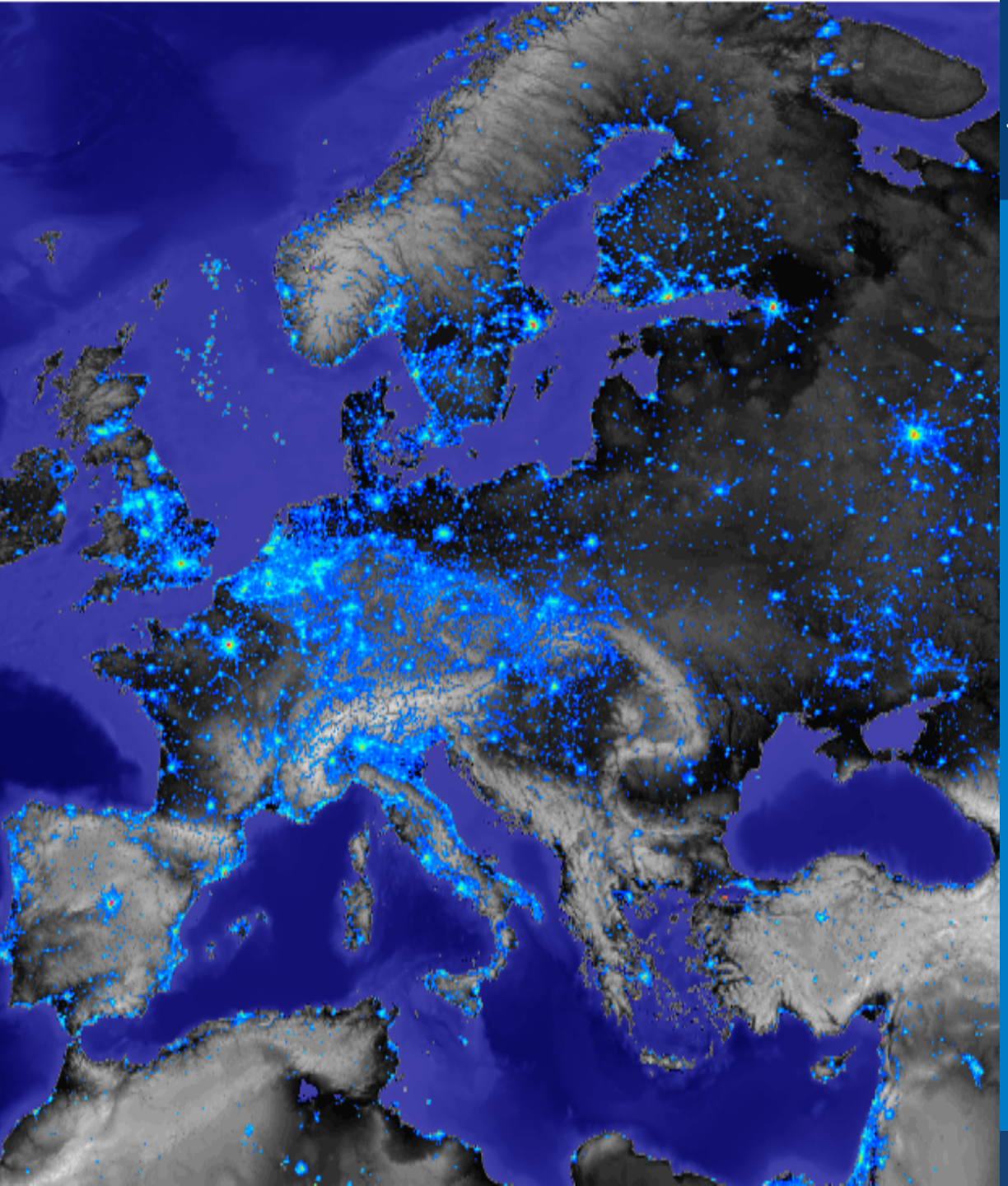


Ministry of Economic Affairs
and Climate Policy

Digitalization and Energy

Benefits and Challenges

Bert Roukens
Energy Envoy

Ministry of
Economic Affairs and Climate Policy
The Netherlands

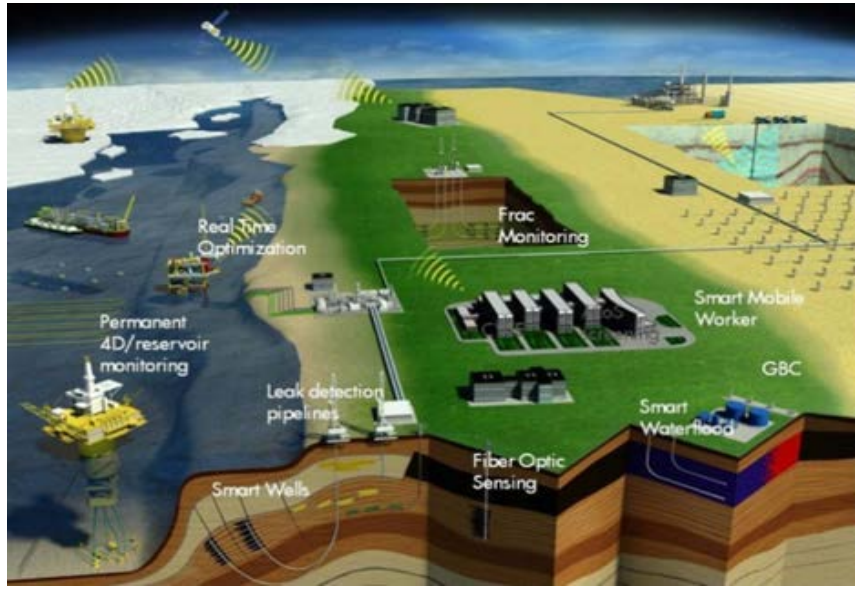
Digitalized energy systems

Energy systems around the world are becoming more **connected, intelligent, efficient, reliable** and **sustainable**.

In the future, digitalized energy systems will be able to quickly and efficiently balance supply and demand, to deliver energy where it is needed while optimising utilisation of the grid and production capacity.

Digitalization is being implemented to improve efficiency, productivity and sustainability of the energy system, including smart grids and decentralised sustainable energy production.

These are key opportunities for the energy transition. Electricity has a pivoting role.



Benefits

Digitalization holds the potential to build new architectures of interconnected energy systems, including breaking down traditional boundaries between demand and supply.

The electricity grid is physically connected on a European scale, and digitally interconnected with telecom networks, smart grids and sensors, and Internet of Things-devices. This enables the most efficient use of grid infrastructure, keeps the cost of the energy transition down, and enables new markets

Balancing supply and demand by managing demand side:

- Increasing grid-flexibility and enabling integration across entire systems
- Mitigating the volatility of renewable energy
- Matching energy demand to supply of renewable energy
- Shift charging to periods (home batteries, EV's, etc) when electricity demand is low and supply abundant

Internet of Things, smart appliances and industries connected to grid systems allow for demand side management. This requires:

- Gathering and sharing lots of data
- Digital remote control of systems and appliances
- Autonomous operating systems (eliminating the human factor?)

The challenge is to keep IT safe and secure. There is work to be done!

Digitalization brings added risk

Smarter connection and integration of energy technologies. But also:

Increased vulnerability of energy systems due to digitalization

- Cyber attacks, cyber incidents
- Growing interconnectedness

Cyber security poses a problem for all sectors, but energy is particular:
Energy is a basic provision and can not be simply shut down (enormous social consequences)

Examples from recent history show increase of incidents

- Targeted malware specifically written to disrupt energy grids or power plants and generic (various ransomware attacks)
- Ukraine incidents show what is possible when a sophisticated attacker attempts to shut down a grid.

So far damage is small in scale compared to other disruptions (geopolitical, natural disasters)

But attack range is larger and executing attacks is becoming cheaper, needs less sophistication.

Disruptions anywhere in the EU grid can have consequences across Europe

Digitalization Strategy for the Energy Transition

Smart grids to enable millions of prosumers and EV's.

- New challenges in balancing policy goals: reliability, sustainability, affordability
- Changing role of the grid operator and the energy company.
- New parties and market models require adjusting regulations.

Open access to data

- Data generated by a smart grid will enable new market models and increasing efficiency, leading to lower costs for consumers.
- Data should be available on an open platform for those who need it to operate in the markets.
- Access rights to the data should be fair, and prevent monopolization.
- Privacy of the consumer needs to be ensured.

Digitalization is a precondition for energy transition

Thank you for your attention