DANISH NATIONAL TRANSMISSION SYSTEM OPERATOR PERSPECTIVE

THE ROLE OF LONG-DISTANCE TRANSMISSION AND CROSS-BORDER ENERGY FLOWS IN MID-CENTURY DECARBONIZATION

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Ambitious targets and development in Denmark’s total electricity and energy consumption

**2018**
- Electricity: 70 % RES of 34 TWh

**2030**
- Electricity: 100 % RES of 45 TWh

**2050**
- Energy: 100 % RES of 85 TWh
FLEXIBILITY IN THE ELECTRICITY SYSTEM CONDITION FOR HIGH SHARE OF RENEWABLES

- Hourly dispatch in a autumn week in 2018
THE ELECTRICITY BACKBONE

Strong national transmission grid and interconnectors as backbone of the Danish electricity system

Expected development of capacity and peak load consumption in Denmark

- Thermal electricity generation capacity
- RE capacity
- Exchange capacity
- Maximum power consumption

2019 | 2025 | 2030
---|---|---
6 | 8 | 10
4 | 6 | 8
2 | 4 | 6
0 | 2 | 4

GW

ELECTRICITY TRANSMISSION GRID
GAS TRANSMISSION GRID
MARKET BASED INTEGRATION OF RENEWABLES

Integration of the next 50% of renewables requires new market measures.

Reduce costs of electricity
- International electricity markets
- Flexible production from thermal power plants
- Traditional market participants

Increase value of electricity
- Local markets with flexibility from RE and demand
- Sector coupling (heat, power to x)
- International balancing markets
- New market participants and business models
Average market value for wind power and PV reduced from 0.04 €/kWh to 0.02 €/kWh

Source: Ten year national development plan, TYNDP, scenarios
ALL SOLUTIONS NEEDED – AND FRAMEWORK FOR EFFICIENT EXECUTION

THE ENERGY TRILEMMA

SECURITY OF SUPPLY

GREEN ENERGY

AFFORDABILITY

TECHNICAL SOLUTIONS

Grid/ exchange

Storage

Power-to-x

Flexible consumption

FRAMEWORK CONDITIONS

International markets

Forecasts

Operational cooperation

International regulation
BACK UP
ENERGINET

We own and operate the overall electricity and natural gas transmission system in Denmark.

Our tasks are to integrate renewable energy and ensure security of supply in Denmark

• Independent public enterprise owned by the Danish Ministry of Energy, Utilities and Climate
• ~1.300 employees – 8 locations and headquarter in Fredericia
• Mission to ensure reliable energy for society
• Vision to create balance in a renewable energy system
OTHER SOLUTIONS TO INCREASE FLEXIBILITY AND INCREASE VALUE OF RENEWABLES

DK West spot price duration curves GCA 2040

Source: Ten year national development plan, TYNDP, scenarios and Energinet calculations