

Innovative approaches for the grid integration of variable renewable energy

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*Peter Jørgensen,
Vice President, International Relations
Energinet.dk, Denmark*



What are the challenges ?

Variability

- Real-time harvesting of renewable resources as they come

Location

- From large scale offshore wind power far away from consumption centers to household connected photo voltaic

Cost structure

- Large upfront investments and almost zero marginal energy costs

How to develop the energy systems to maximize the value of the variable RES generation as it comes?



What are the means ?

Grid

- Strong transmission grids to balance RES in a large area
- Competitive electricity markets to ensure optimal utilization of transmission grid

Flexibility

- Grid codes to ensure capability for flexibility in both generation and demand
- Price signals reflecting system balance to incentivize dynamic response
- From SmartGrids to SmartEnergy to optimize RES utilization across sectors and support price flexibility
- New operational procedures and forecasting tools to ensure efficient system balancing and security of supply



What does it take ?

Political commitment and regulatory framework

- Binding mid-term goals and long-term visions to set direction and milestones
- Stable regulatory framework to incentivize timely investments and optimal operation

Long term grid planning and coherent energy systems

- Grid planning process to ensure international coordination and timely realization
- Cross sector energy planning to ensure optimal utilization of RES in all sectors

Innovative system operation

- Pricing mechanisms to incentivize flexibility in generation and demand
- New procedures and tools to ensure efficient system balancing and security of supply

→ maximize value of variable renewable energy generation and ensure security of supply

