Smart Grid i Danmark
- satsning med muligheter

- Rammevilkår – hvilken retning går Danmark
- Smartgrid – nettutvikling og forretningsutvikling for DONG Energy
- IKT-bransjen og nettselskab – felles muligheter?

Knud Pedersen, Vice President, DONG Energy og formand for det danske branchefællesskab iEnergi (Intelligent Energi)
DONG Energy

Our business is based on procuring, producing, distributing and trading in energy and related products in Northern Europe.

DONG Energy has 6,500 employees and is headquartered in Denmark.

- Exploration & Production
- Wind Power
- Thermal Power
- Customers & Markets
The Danish Intelligent Energy Alliance –
Platform for companies contributing to the intelligent energy system

BRANCHEFÆLLESSKAB FOR INTELLIGENT ENERGI FAVNER I DAG ET STORT ANTAL VIRKSOMHEDER, ENERGISELSkABER OG INSTITUTIONER
Ambitious political goals towards 2020

Danish Energy Agreement of March 2012 with broad political backing

Sets a number of ambitious goals for Danish energy supply towards 2020

<table>
<thead>
<tr>
<th>Goals set by the Government</th>
<th>Status 2012</th>
<th>Expected effect in 2020*</th>
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<tbody>
<tr>
<td>CO₂-emissions (compared to 1990)</td>
<td>↓ 40 % (2020)</td>
<td>↓ 25.2 %</td>
</tr>
<tr>
<td>Renewable energy (share of energy consumption)</td>
<td>100 % (2050)</td>
<td>25.6 %</td>
</tr>
<tr>
<td>Wind power (share of Danish electricity consumption)</td>
<td>50 % (2020)</td>
<td>33.0 % (H1,2014: 41.2 %**)</td>
</tr>
<tr>
<td>Coal use</td>
<td>No coal (2030)</td>
<td>6.1 mill. tonnes</td>
</tr>
</tbody>
</table>

Source: Statistics from the Danish Energy Agency (2012)
*) Effect of known initiatives incl. of energy agreement based on Danish Energy Agency's Energy Forecast (2012)
**) According to Energinet.dk's first half year report, wind power delivered 41.2 % of the Danish electricity consumption.
Smart Grid fundamentals in Denmark: Developing at accelerating pace

Policy decisions
- Datahub
- Supplier Centric Model
- Smart Energy plan
- RPM and hourly billing

Implementing new market model
- Supplier Centric Model
- New model for hourly based billing and time of use tariffs
- New regulation for network companies

Price signals
- All customers in Denmark have remotely read smart meters
- All customers are hourly billed
- Time of use tariffs
- Lower bids on the reserve markets?
International involvement needed to maximize value of wind power. Connecting markets through stepwise development of the North Sea super grid.

Smart grid to integrate off-shore wind power and Smart Energy to secure interaction of electricity, district heating and natural gas systems

National strategy needed to increase coming value streams. From Smart Grid to Smart Energy – integrating district heating and natural gas

"However, development of the energy system will not stop with the electricity grid. The next step is to utilise and store wind energy in other energy sectors and thus render the entire energy system smart."

Source: Ministerial Smart Grid Strategy
What smart grid is from the perspective of a Distribution company

1. Asset management
2. IT investments - monitoring and automation
3. Price signals and flexible products

Baseline

Smart Grid benefits

Price 1 Price 2 Price 3
The traditional and the emerging value chain
Roles are changing and new players enter the markets

Emerging value chain

Traditional value chain

Generation ➔ Transmission ➔ Distribution ➔ Consumption

Emerging business opportunity

Optimisation and trading

Orchestration and control infrastructure

Flexibility providers

Trading and settlement platform

Flexibility utilizers

DONG energy
The virtual power plant – Power Hub
Providing the link between distributed energy resources and system operators

- DSO market?
- Energy and reserve markets

- IT system
- Infrastructure
- Organisation
- Biz processes

Create value from trading flexibility
Enable new business
Orchestrate operations of assets
Denmark lacks behind in implementation (according to Smart Energy Demand Coalition Europe)
The major barrier to the rapid development of smart grid is weak price incentives due to:

- slow progress in the electrification of the transportation and heating sectors
- strong grids with surplus capacity
- strong interconnectors
- sufficient conventional resources to provide balancing services.