

Kraftsituationen og strategier for vind- og termisk kraft

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DONG Energy Power

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DONG Energy power production

Thermal Portfolio overview 2011



DONG Energy facts

Electricity Production 2010

<i>Thermal</i>	<i>15,3 TWh</i>
<i>Renewables</i>	<i>4,0 TWh</i>

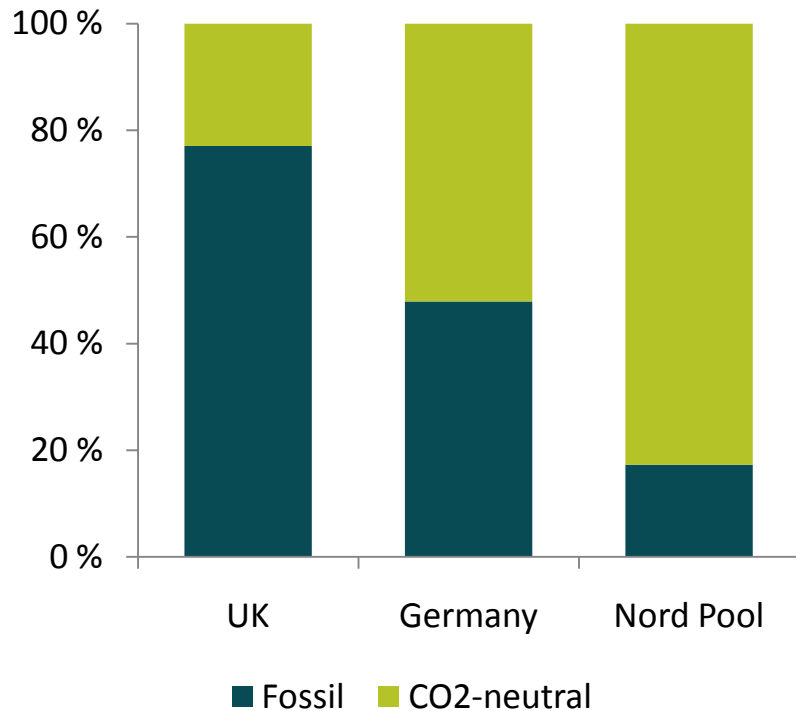
Turnover 2010

<i>Thermal</i>	<i>1,521 mEUR</i>
<i>Renewables</i>	<i>396 mEUR</i>
<i>DONG Energy</i>	<i>7,329 mEUR</i>

Long term power prices in Nordpool reflect capacity mix

Allocation of power capacity, 2010

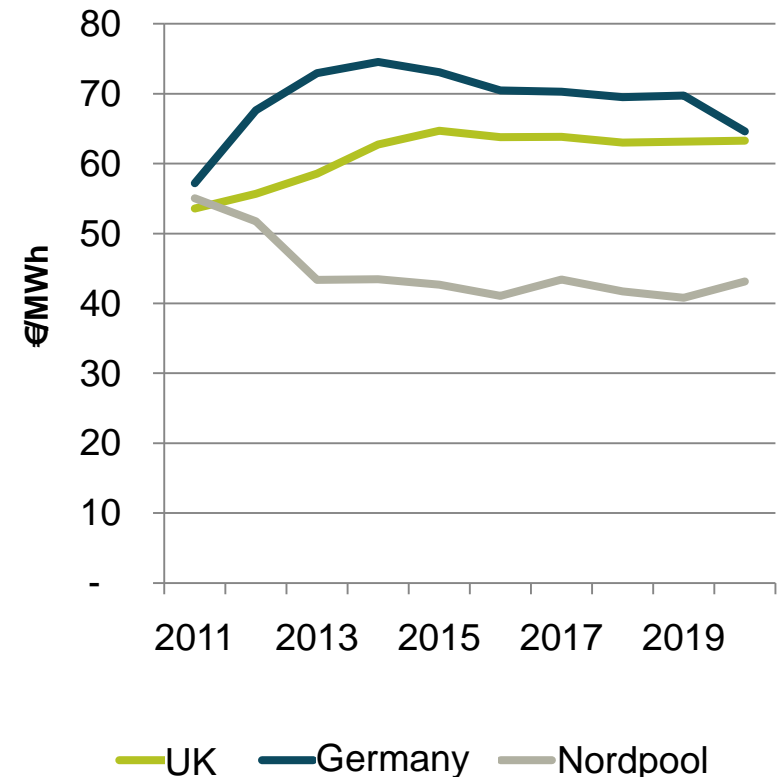
Nord Pool dominated by CO₂ neutral capacity with low marginal costs



Fossil: Oil, gas and coal fired power plants
CO₂ neutral: Nuclear, hydro, wind, biomass and solar

Expected future power prices

Average annual power price

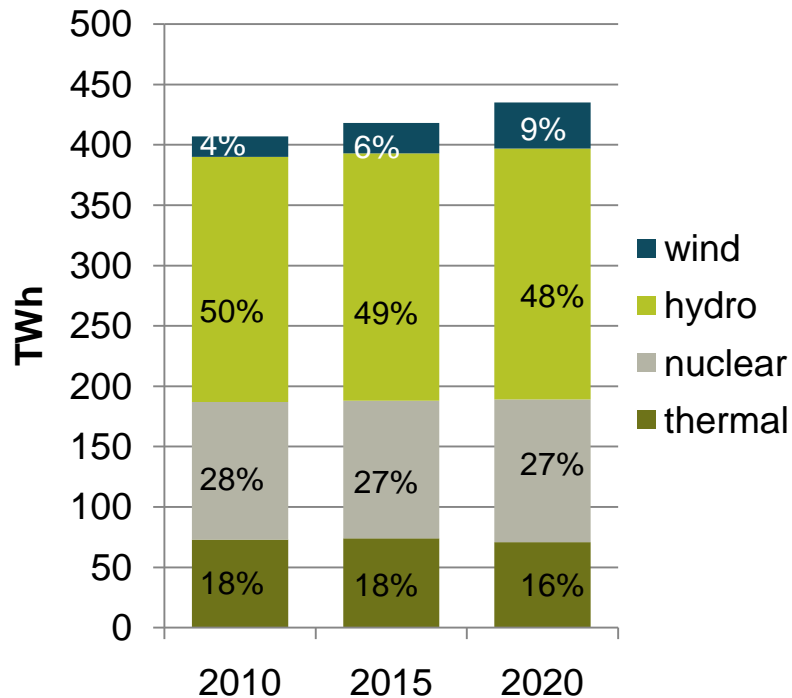


Source: Cera, 2010

Wind continues to grow in Denmark and the other Nordic countries

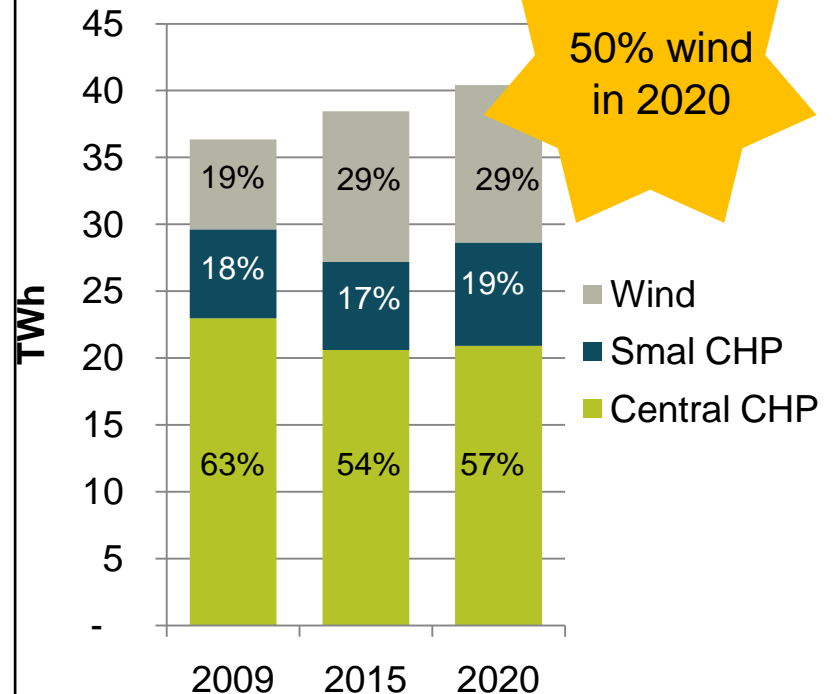
Power production in Nordic countries

Future increase in nuclear, hydro and wind



Power production in Denmark

More wind, but the central power stations are the backbone



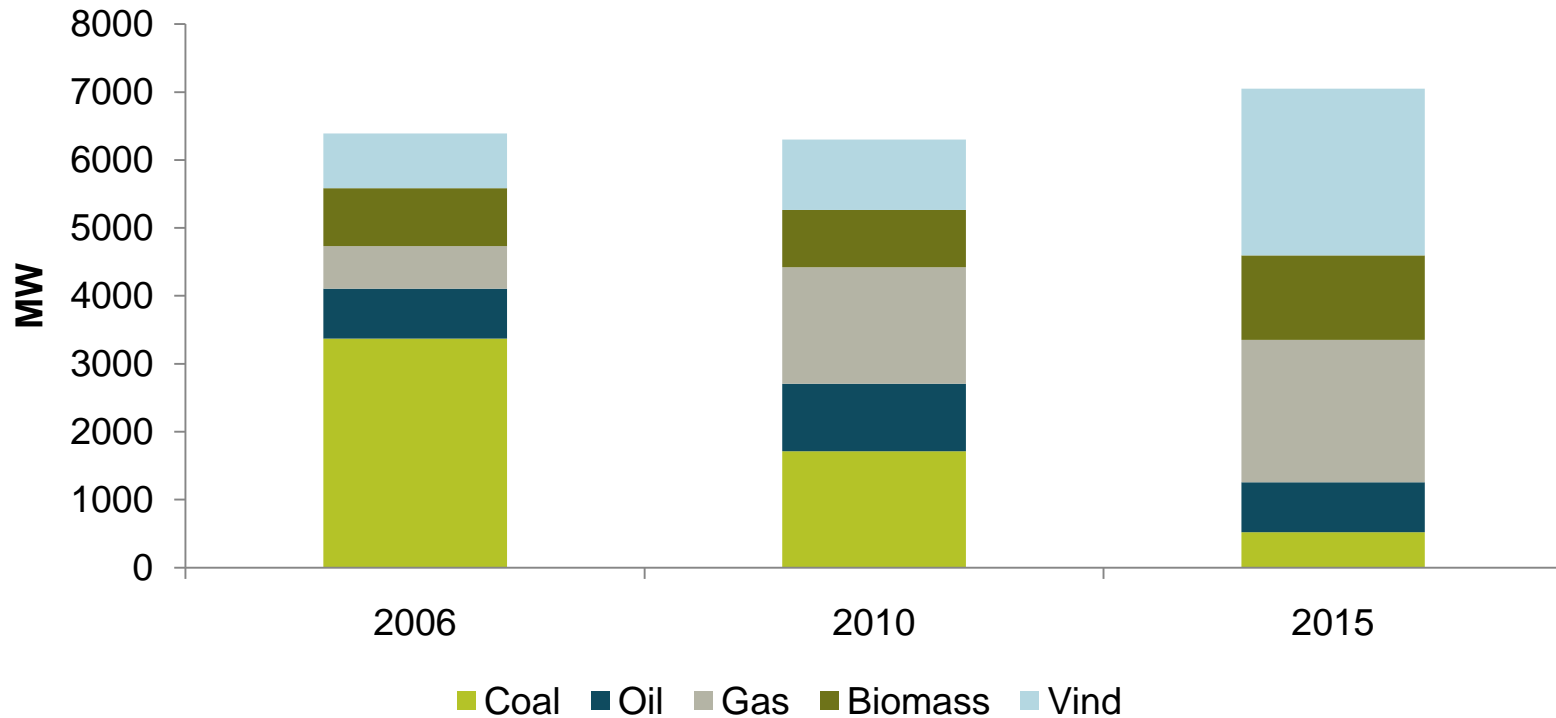
Source: Poyry, 2010

Sources: The Danish Energy Agency: Annual statistics 2009 and Danmarks Energifremskrivning 2010 (Denmark's energy projection 2010)

DONG Energy strategy to diversify on geography and fuels

DONG Energy generation capacity development 2006-2015

<i>DK</i>	91%	73%	53%
<i>International</i>	9%	27%	47%



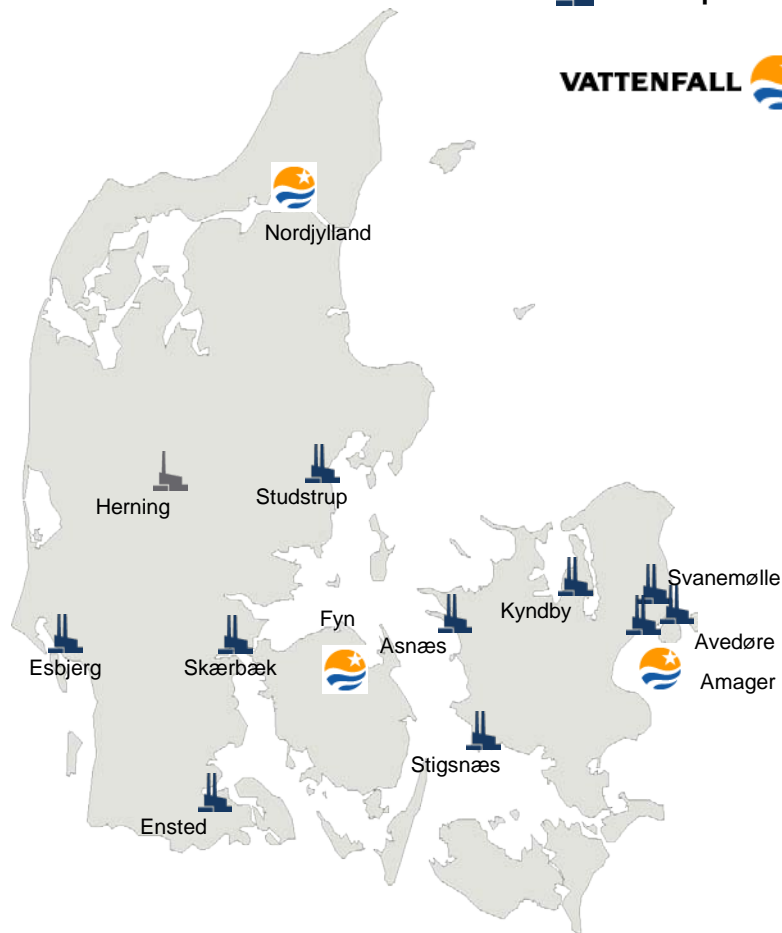
Reduced DONG energy thermal power capacity since 2006

DONG Energy positions in DK from 2006 to 2015

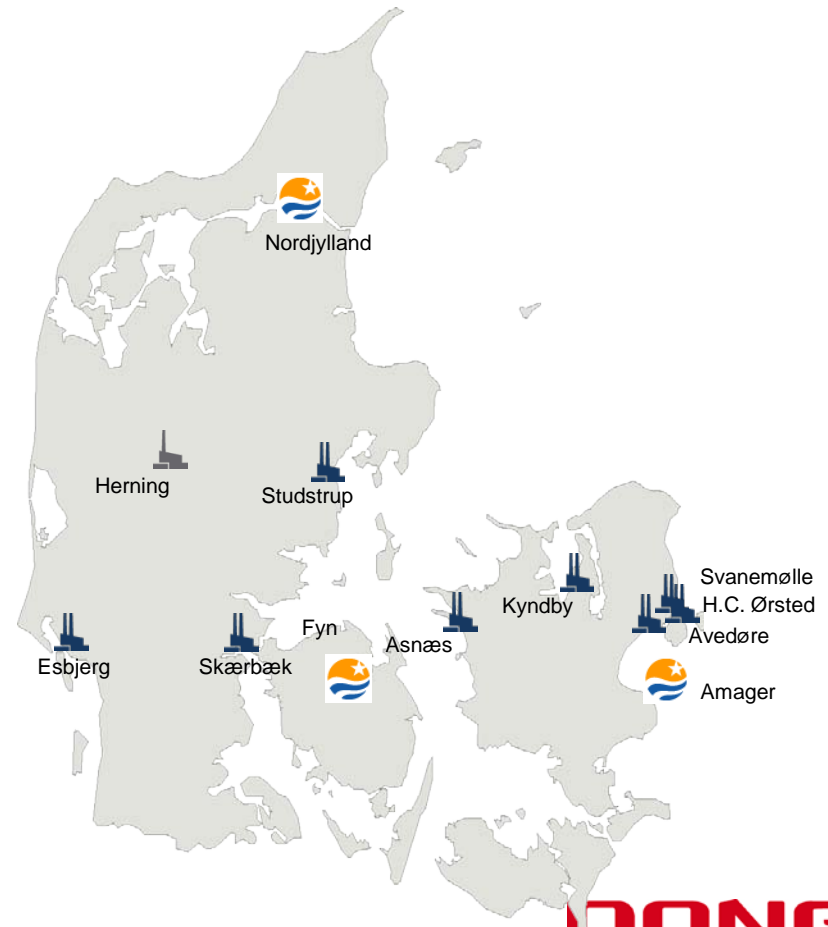
2006 (5,263 MW*)

DONG
energy
Central power plants

VATTENFALL



2015** (2,978 MW*)



* DONG Energy central thermal capacity

**Already decided actions to adapt portfolio

Flexible capacity in volatile Nordic power market

Flexible capacity in DONG Energy

ASV5 (DK2):

- 640 MW and 150 MJ heat
- Possible to increase capacity by 503 MW by replacing ASV2 (from 147 MW to 650 MW)



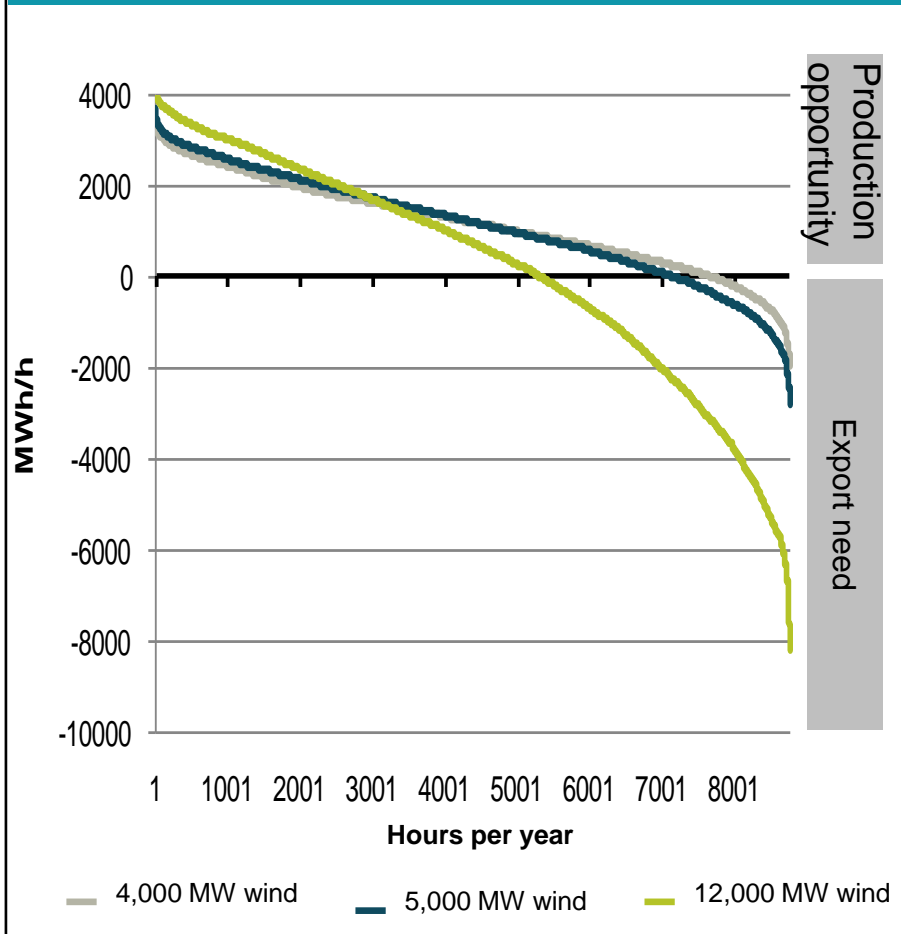
SSV4 (DK1):

- 357 MW and 485 MJ heat
- Possibility to start unit on short notice with use of personnel from SSV3

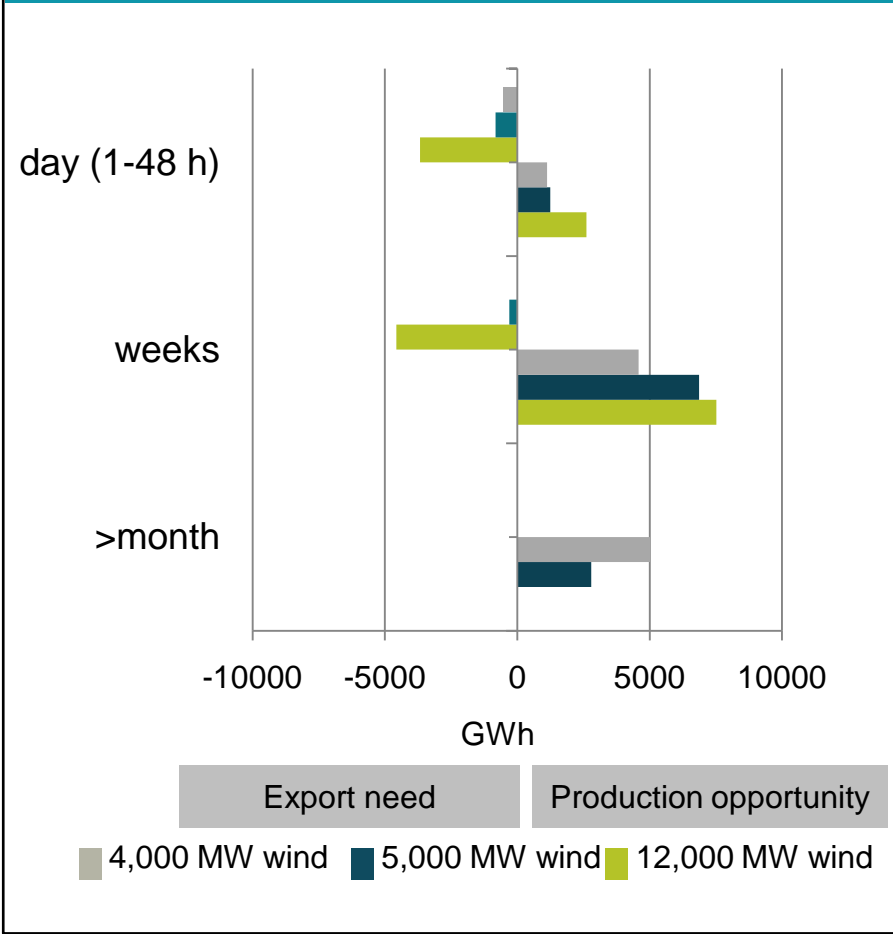


Future need for balancing the Danish energy system – a ceteris paribus example

Residual electricity demand duration curve*



Residual electricity demand by chronological duration*

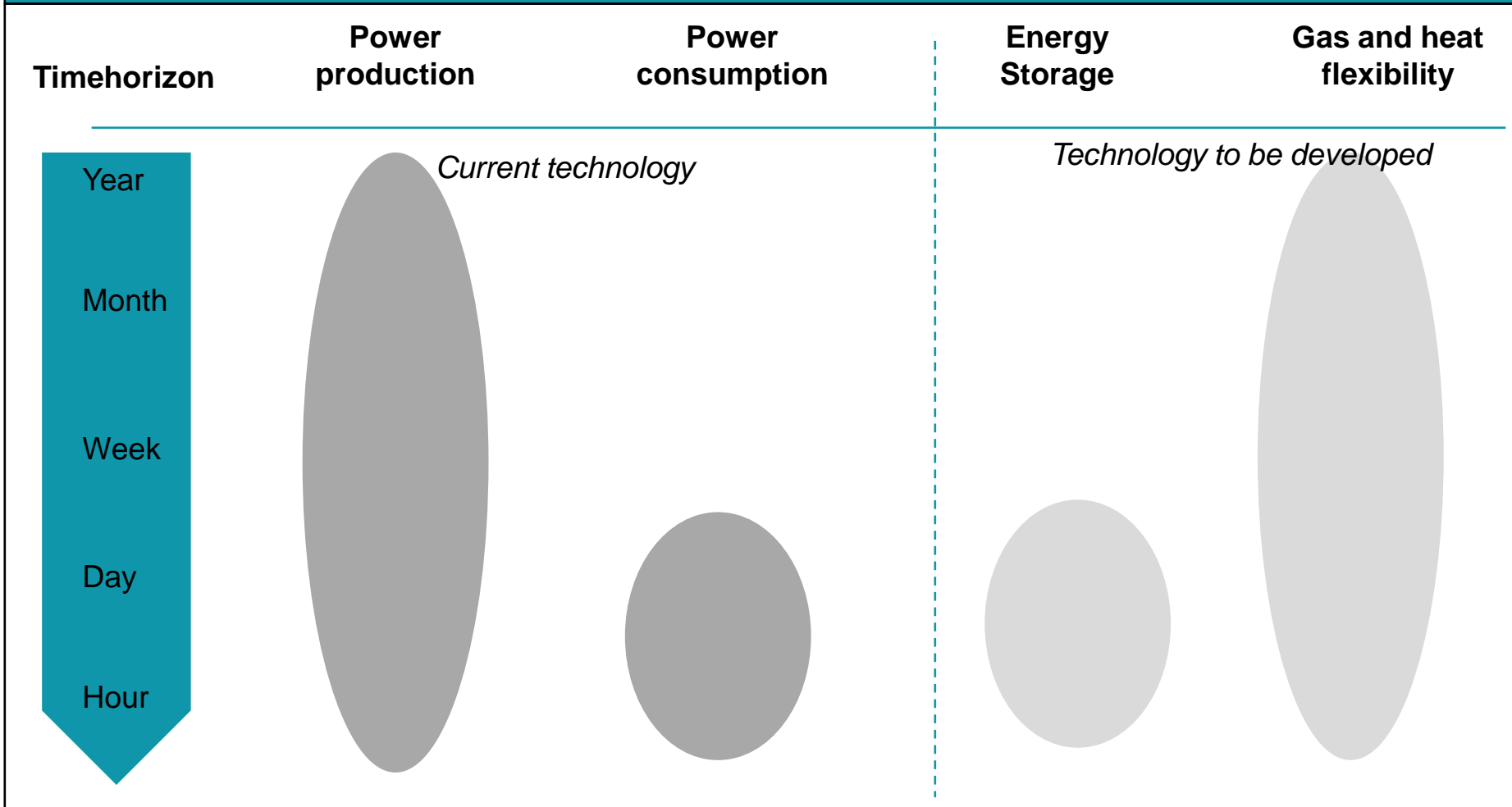



*Compared to 2010

**Residual demand defined as demand minus electricity production from wind and heat-bound electricity production

New incentives or technologies to be developed to supply future flexibility demand

Potential actions to increase reliability in unreliable energy system

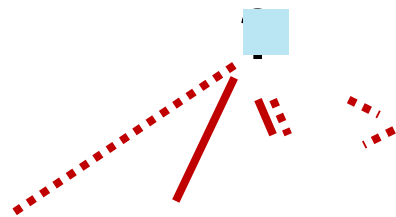


 time range supply potential

The starting of a "Super Grid"?

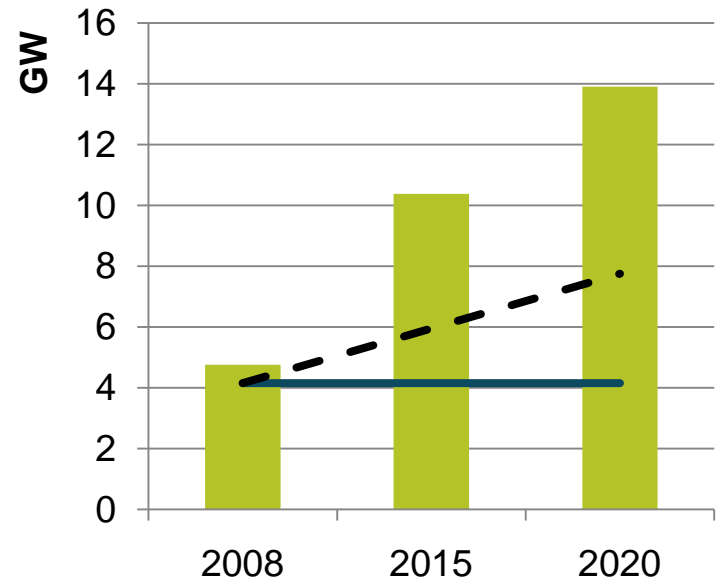
Extension of interconnectors from DK to continent to secure efficient Nordic market

High prices



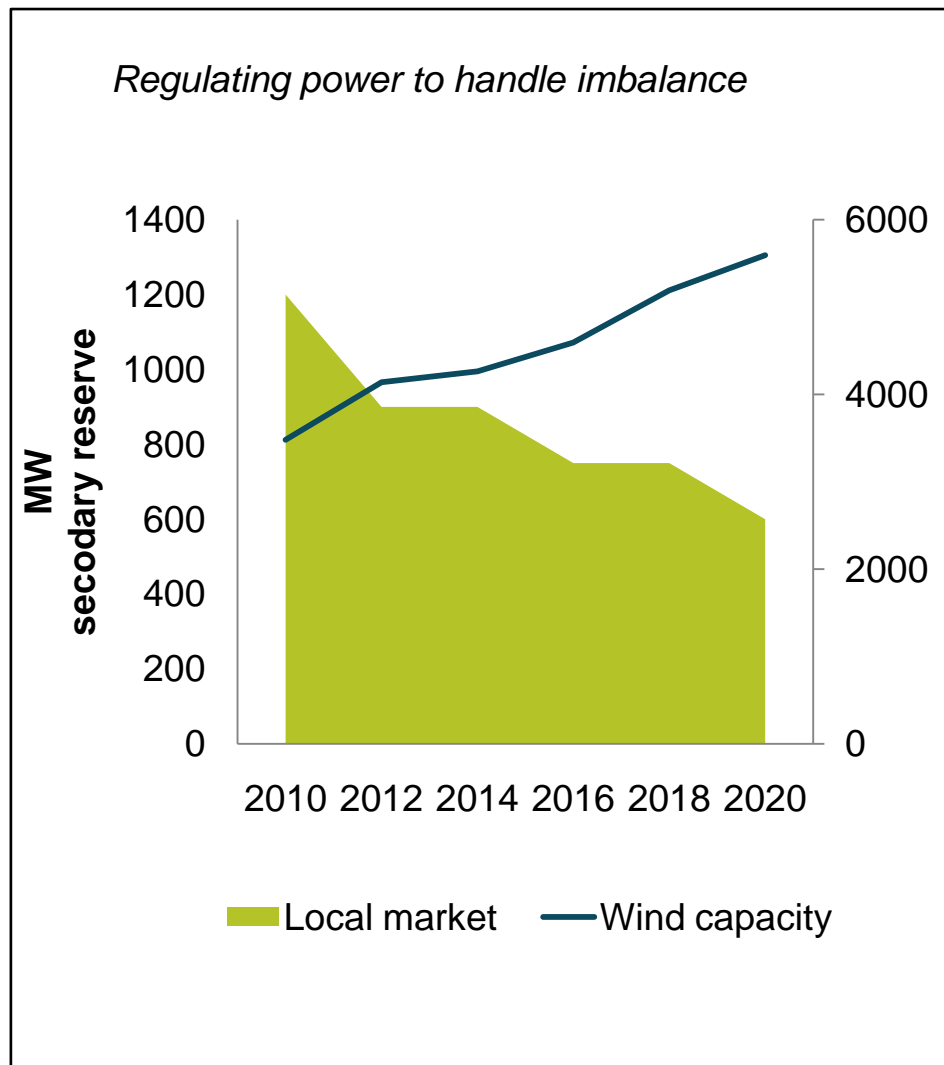
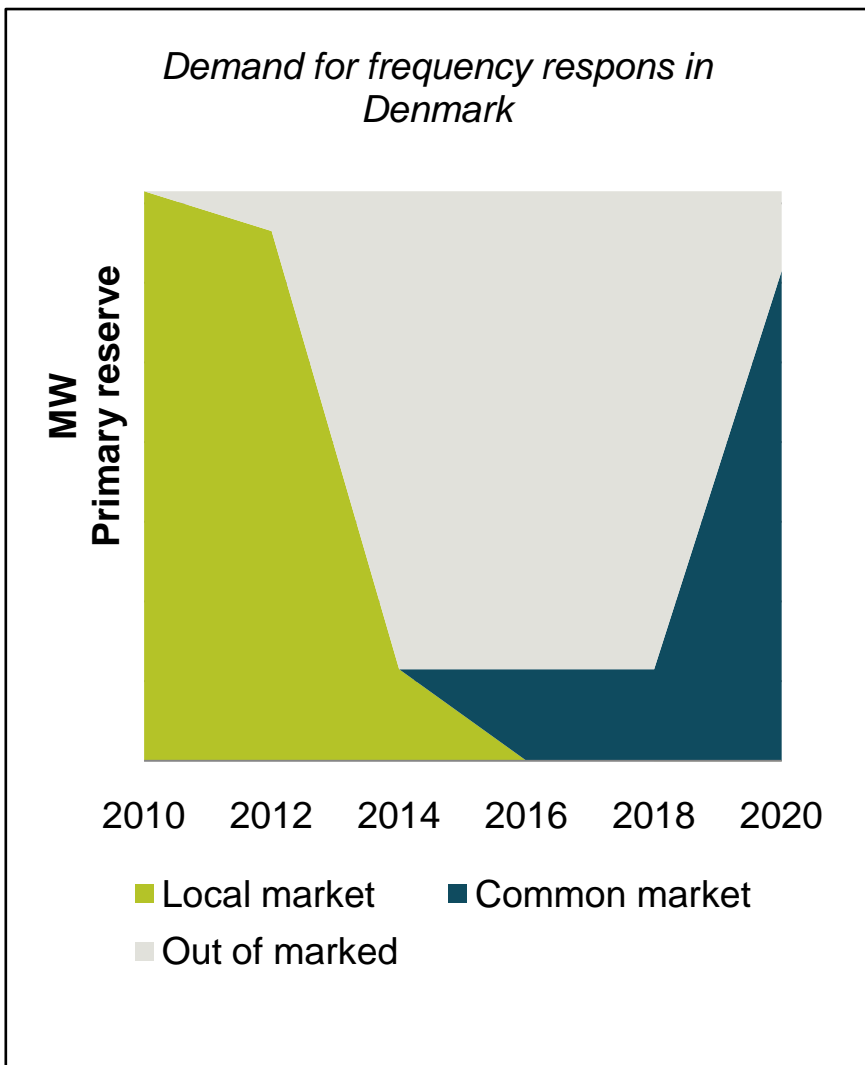
- Potential new capacity
- Expected new capacity

Transmission capacity to continent expected to double until 2020



- Wind power capacity
- Current transmission capacity to Continent
- - Expected interconnector extensions

Energinet.dk ancillary service strategy to increase reliability on neighbouring countries



Source: Examples from ancillary service strategy from Energinet.dk, 2011

Ancillary services through interconnectors

Criteria for successful use of interconnectors to deliver ancillary services

- Reliability on volumes to be supplied
 - Nordic system mainly based on hydropower and excess capacity dependent on precipitation and temperature
- Limited simultaneity in demand for ancillary services
 - e.g. simultaneity on wind and solar power across borders
- Allocation of capacity between different products
 - Day a head market
 - Intraday market
 - Ancillary services

Conclusions

- Pressure on earnings on thermal capacity in Nordic power market
- Challenge to secure flexible capacity as back up for wind and variations in precipitation
- Increased interconnector capacity to continent gives socioeconomic benefits
- Importance of harmonization of market regulation and ancillary services to ensure common playing field and transparency