

CHP PROVIDING DEMAND AND SUPPLY FLEXIBILITY IN ELECTRICITY AND HEAT

**COGEN Europe – European Parliamentary
debate**

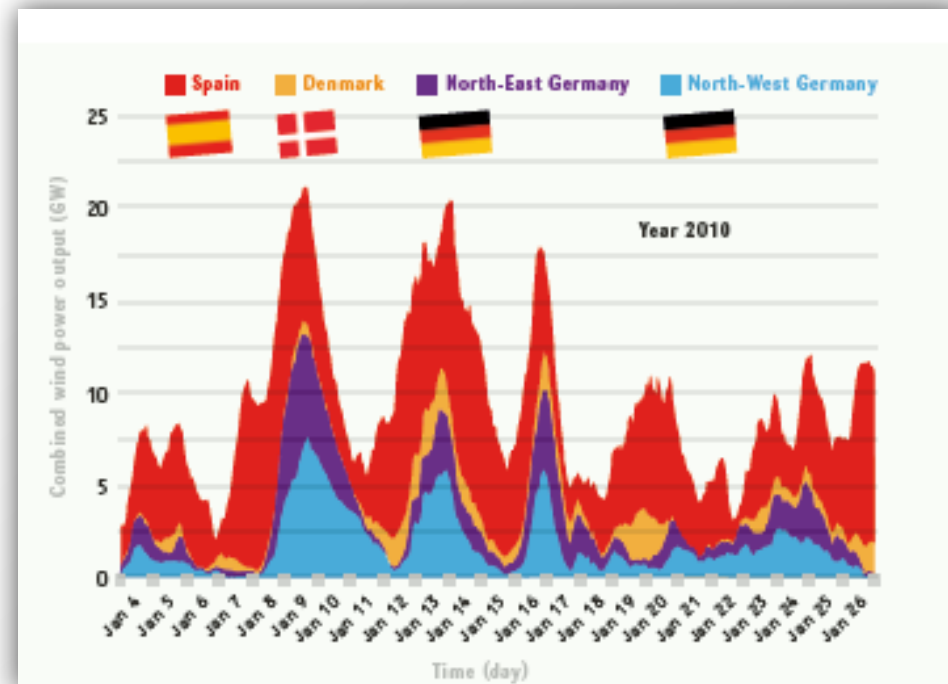
December the 19th, 2011

By

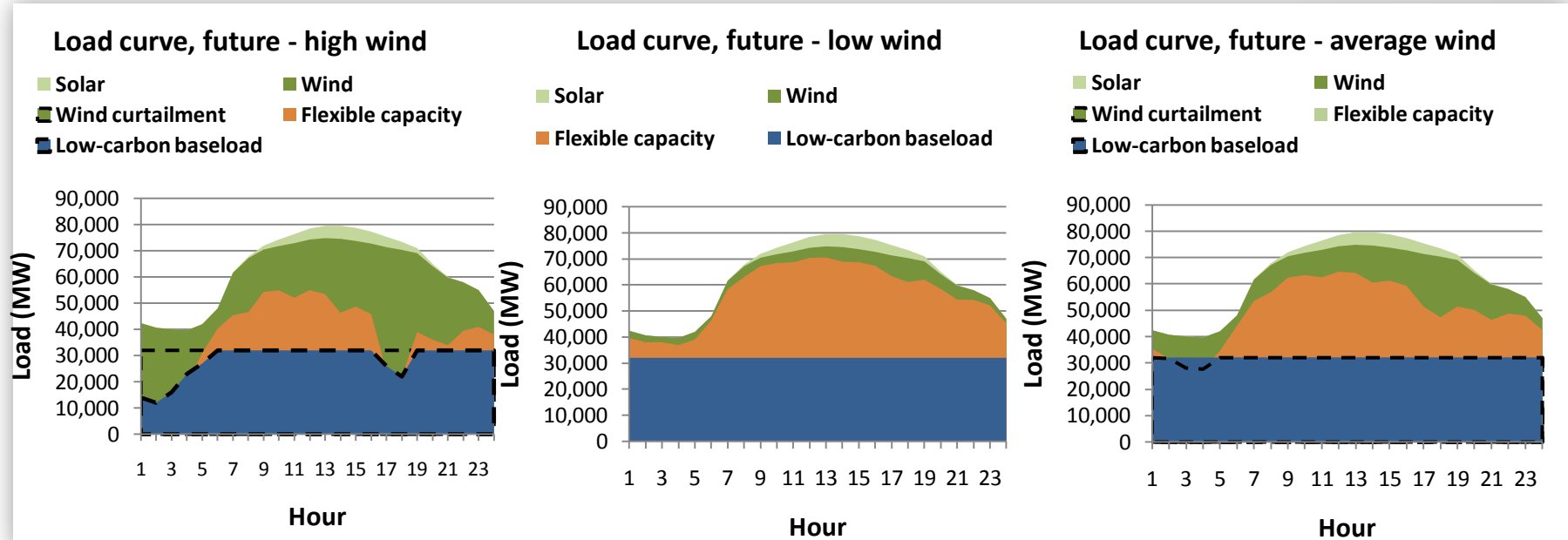
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Cyclic operation - challenges

- System balancing becomes more and more challenging due to cyclic demand and increasing share of variable renewable capacity
- The current system capacity mix does not enable optimum and reliable system operation
 - Existing generation capacity is mainly based on inflexible power plants which are not capable of required dynamic flexibility
 - The capacity mix has to accommodate more flexible generation and the following needs to be considered:
 - Dynamic and flexible capacity for system balancing, which can be either hydro or natural gas based generation
 - Two way demand response to reduce or increase the momentary load
 - Strengthening the grid where applicable



Daily system **load curve** and capacity dispatch



System dispatching challenges

- 49 GW wind capacity > more than system night load!
- **Wind speed change 7 → 9 m/s** leads to a wind power output change of **13,5 GW!**
- Dynamic thermal capacity will have to stretch tens of GWs up and down within less than 30 minutes
- **System balancing** will be a major challenge

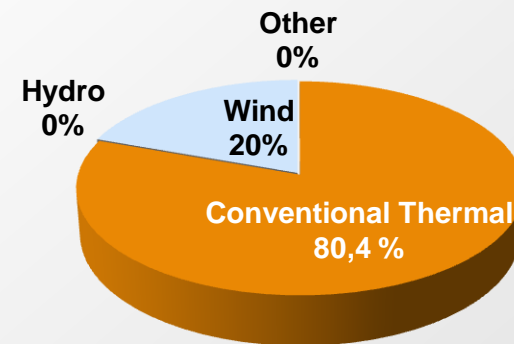
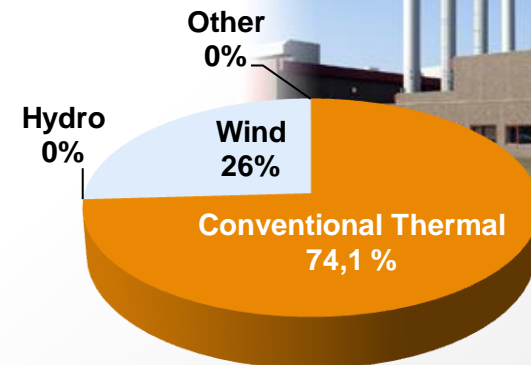
CHP in Denmark

– efficient, flexible & economical

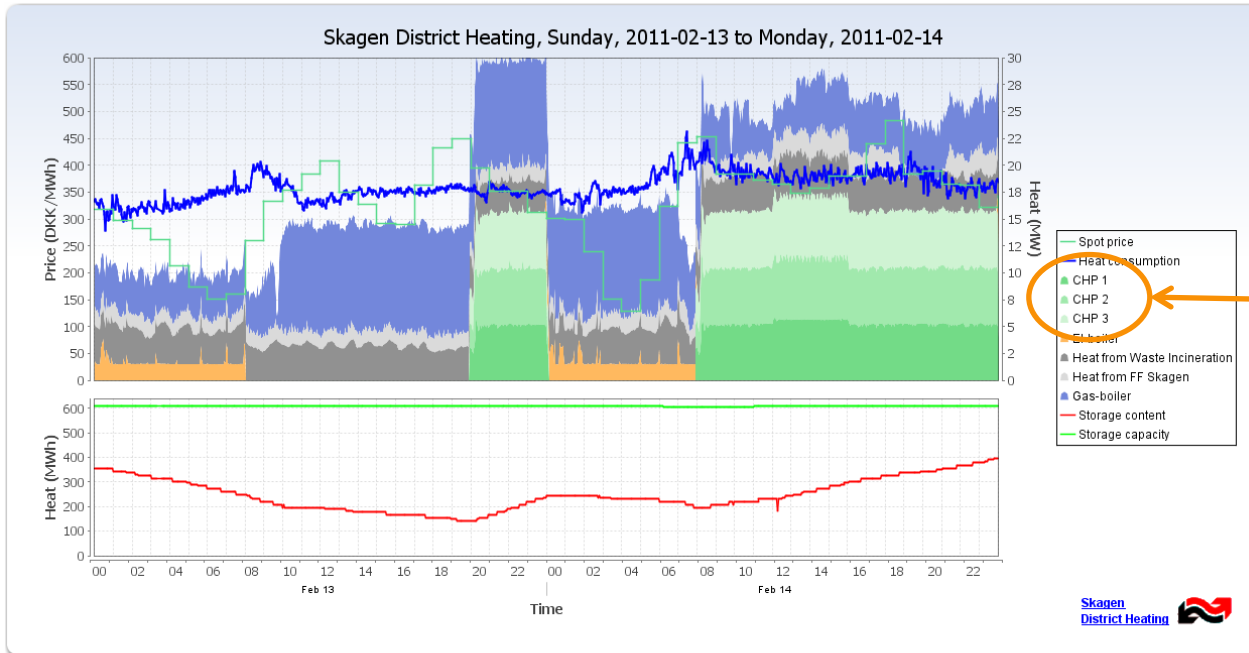
Danish Power Production in year 2009

Type of production	Power Generation Capacities		Yearly net Production GWh/a	Share of production %	Degree of Utilisation %
	GW	%			
Conventional Thermal	9,14	74,1	27 708	80,4	34,6
Nuclear	-	-	-	-	-
Hydro	0,01	0,1	19	0,1	19,7
Wind	3,18	25,8	6 721	19,5	24,1
Other - incl. Solar, bio.,etc.	0,00	0,0	3	0,0	22,8
Total	12,34	100,0	34 451	100,0	31,9

Challenge in electricity market already today



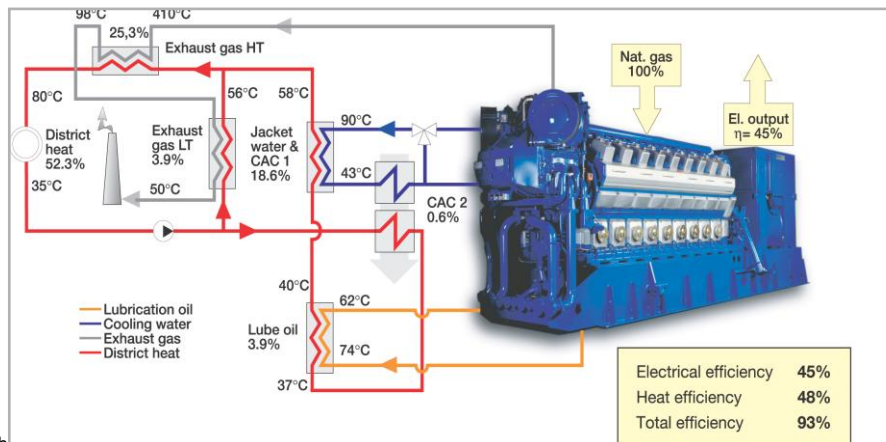
CHP in Denmark – efficient, flexible & economical



Skagen, Denmark

CHP-plant (District Heating)
3 x Wärtsilä 18V28SG
12.9 MWe / ~17-18 MWth
Commissioned 1998

Source: EMD international A/S





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Thank you for your attention!

Anders Ahnger

