

## 2015 – A Year of New Records

In 2015, the following records were found for the period 2010 to 2015:

- The wind energy production was 42% of the electricity demand, the highest ever.
- The net import was 18% of the demand, the highest for the period 2010-2015.
- The thermal electricity production was only 45% of the level in 2010.
- The spot market value of the Danish electricity demand was € 24.75 or only 46% of the level in 2010.

Are the spot markets losing ground?

### Trends 2010 to 2015

	Volumes in GWh						
	Demand	Thermal/CHP <sup>1</sup>		Renewables		Exchange	
		Central	Local	Wind	PV	Export	Import
2010	35.519	21.202	7.609	7.808	-	4.229	3.094
2011	34.561	16.980	6.511	9.751	-	3.224	4.543
2012	34.135	13.419	5.233	10.268	-	1.620	6.835
2013	33.529	16.518	4.802	11.126	-	2.967	4.048
2014	33.471	12.976	3.966	13.076	596	2.661	5.518
2015	33.535	9.206	3.687	14.127	604	1.908	7.819

Table 1 - Denmark 2015 - Electricity volumes in GWh

	Market values in €/MWh						
	Demand	Thermal/CHP		Renewables		Exchange	
		Central	Local	Wind	PV	Export	Import
2010	53,46	54,92	54,16	47,42	-	51,02	47,84
2011	50,35	52,15	52,32	45,42	-	48,17	49,00
2012	38,98	41,10	41,99	32,94	-	32,01	39,24
2013	40,56	41,13	43,16	33,79	-	30,90	45,35
2014	32,21	33,05	33,67	27,64	33,76	24,80	35,15
2015	24,75	27,99	26,77	19,99	25,30	17,91	25,98

Table 2 - Denmark 2015 - Spot market values of electricity in €/MWh

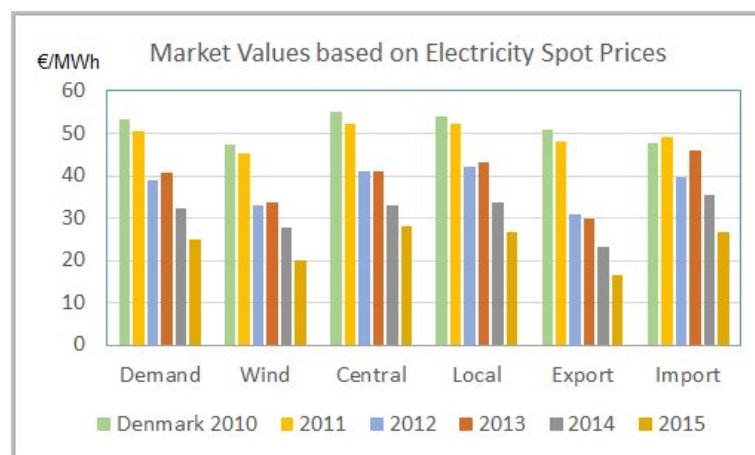


Fig. 1 - Annual market values 2010 to 2015

<sup>1</sup> CHP: Combined Heat and Power

The chart in fig. 1 was designed to demonstrate the different spot market values of the six categories, but the change over time is now more significant.

The fall to about half the level from 2010 is remarkable. Will the spot market values stabilize at a new level?

The import prices show that the trend is international. If the trend of the last five years continues henceforward, the spot markets could collapse within a few years.

### A profitable combination for Denmark

The paradox is that consumer prices are increasing in most countries while spot market prices are falling. Producers, who depend on revenues from the spot market, are winding up their activities. Renewable power sources are paid by subsidies. The necessary dispatchable capacity will probably be paid from future capacity arrangements. More and more money will flow through other channels than the spot market. The role of the spot markets seems to be fading out.<sup>2</sup>

Increasing import of electricity and falling international market prices look like a profitable combination for Denmark. An essential reason is that Denmark seems to do well without having to pay for new dispatchable power. Will the favourable conditions continue?

### Monthly characteristics 2015

Fig. 2 - Wind and solar energy as percentage of consumption in 2015

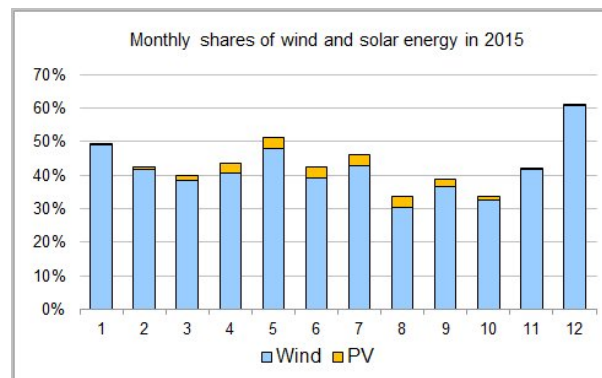
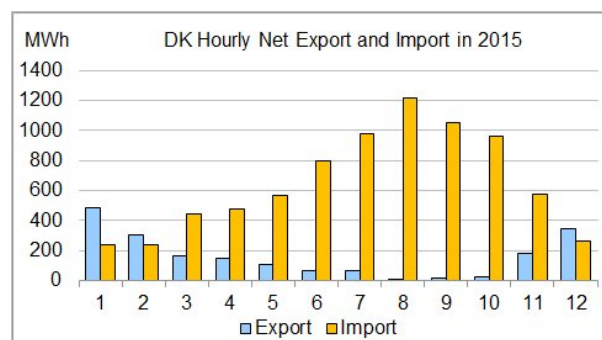


Fig. 3 - Average hourly exchanges per month in 2015



A few years ago, the typical pattern was winter export and summer import. Now, the pattern seems to be gradually changing towards import dominance all year round.

<sup>2</sup> Malcolm Keay: Electricity markets are broken – can they be fixed? The Oxford Institute for Energy Studies, 2016

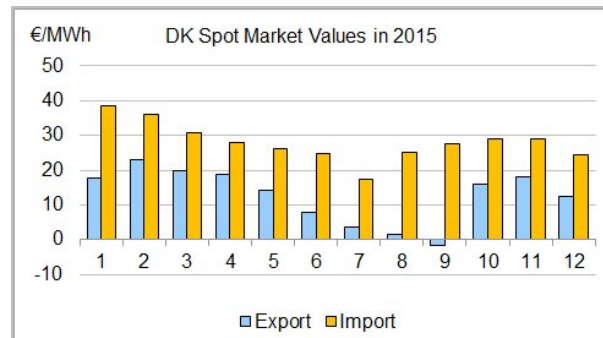


Fig. 4 - Market values of exchanges per month in 2015

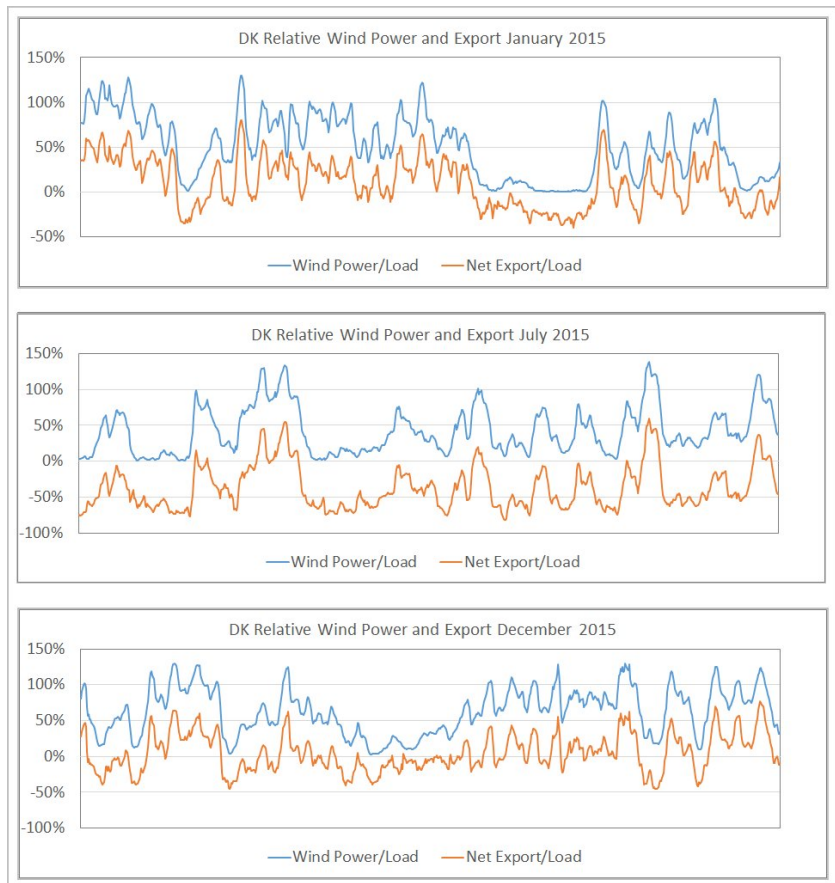
### The balancing work is still being made abroad

I showed in a recent note<sup>3</sup> that Danish wind power fluctuations in 2014 were perfectly synchronized with the power exchanges with the neighbouring countries, which means that the necessary balancing work has been made abroad.

The corresponding charts for 2015 are now available.

The charts show relative values, i.e. wind power and export divided by electricity demand.

The correlation between wind power and export is high. The monthly correlation coefficients in 2015 were between 92% and 98%. These results indicate that the balancing work for Danish fluctuating power is still being made abroad.



<sup>3</sup> [http://pfbach.dk/firma\\_pfb/pfb\\_wind\\_power\\_variations\\_still\\_exported\\_2015\\_11\\_21.pdf](http://pfbach.dk/firma_pfb/pfb_wind_power_variations_still_exported_2015_11_21.pdf)