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# **Nordpool in Spain ? Working platform in Scandinavia**

**BACELONA 2013-05-05**

Anders Heldemar Energy Manager Storaenso Sweden



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# AGENDA

- Presenter (me)
- Nordpool and its trading platform – principles
- Storaenso on the market (Sweden/Scandinavia)
- How we work on it/with it
- Could it work in Spain ?



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# My Background



- 80's working with Hydropower planning for Dalälvens river systems
- 90's Energy market director for Storaenso Power AB
- 2000-2002 Director Green market sales/Power optimization Fortum Oy
- 2003 – Energy coordinator/Energy Manager Storaenso Sweden

Planner

Producer/Seller

Consumer/  
Procurement

## CORE DUTIES:

- Contracting of electricity, natural gas, fuel oil, coal and peat
- Balance handling of electricity and gas
- Hedging strategies for energy
- Energy market and business intelligence
- Emissions trading and Green certificates management and trading
- Energy efficiency including efficiency investments
- Support to investment projects
- Stora Enso external power asset management (PVO, BasEI, VindIn)
- Price/cost estimates for energy including periodical market update to group management
- Energy lobbying in cooperation with trade associations



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<http://nordpoolspot.com>

**NORD POOL SPOT**

**EUROPE'S LEADING  
POWER MARKETS**

The logo for 'nordpool spot' is displayed in a white rectangular box. The word 'nord' is in a bold, lowercase, sans-serif font. 'pool' is in a larger, bold, lowercase, sans-serif font, with the 'o' and 'l' overlapping. 'spot' is in a smaller, lowercase, sans-serif font, positioned below 'pool'.

**nordpool  
spot**



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# What is Nord Pool Spot

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- Nord Pool Spot operates the leading markets for buying and selling power in Europe:
  - Elspot day-ahead market in the Nordic and Baltic regions
  - Elbas intraday markets in the Nordic and Baltic regions
  - N2EX market in the UK
- 370 companies from 20 countries trade on Nord Pool Spot's markets
- In 2012, 432 terawatt hours (TWh) were traded at Nord Pool Spot. This is equivalent to the power consumption of Oslo for 55 years

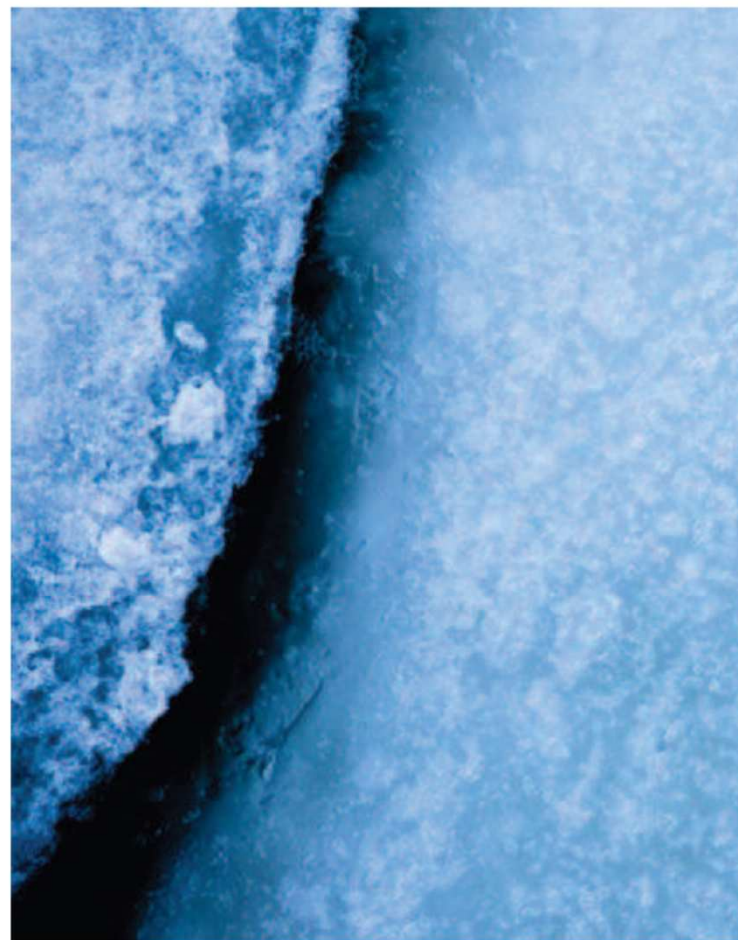




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## Nordpools funktion

- To provide liquid, secure power markets
- To provide accurate information to the whole market, ensuring transparency
- To provide equal access to market for everyone wanting to trade power
- To be the counterparty for all trades; guaranteeing settlement and delivery





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## Nordpools history

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- 1991:** Norwegian power market deregulated
- 1993:** Nord Pool Spot established by the Norwegian TSO as 'Statnett Marked'
- 1996:** Rebranded to Nord Pool when Sweden joins, this is the world's first international power market
- 1998:** Finland joins Nord Pool
- 1999:** Elbas becomes the first international intraday market
- 2000:** The Nordic market becomes fully integrated as Denmark joins
- 2001:** Market Surveillance established as an independent function of Nord Pool Spot
- 2002:** Nord Pool Spot established as a separate company for short term power trading, UMM application launched
- 2005:** The Kontek bidding area in Germany opens for both day-ahead and intraday power trading
- 2008:** Financial part of Nord Pool sold to NASDAQ OMX Commodities
- 2009:** Market coupling of 11 European countries launched through EMCC (European Market Coupling Company) by Nord Pool Spot and EPEX
- 2010:** N2EX launched by Nord Pool Spot and NASDAQ OMX Commodities. Nord Pool Spot opens bidding area in Estonia
- 2011:** Elbas licenced to APX-ENDEX as the intraday market in Belgium and the Netherlands
- 2012:** Nord Pool Spot opens bidding area in Lithuania



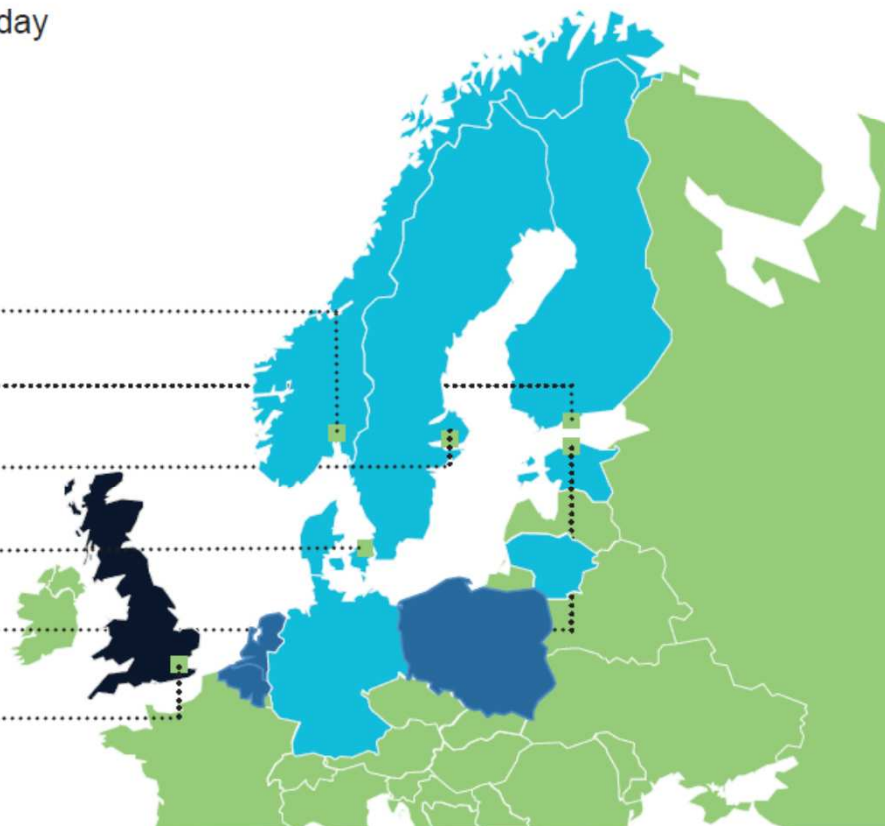
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- Owned by the Nordic and Baltic transmission system operators
- Regulated by the Norwegian Water Resources and Energy Directorate (NVE)

## Nordpools locations

- The Nordic and Baltic market: day-ahead and intraday
- The UK market N2EX: day-ahead and intraday
- System provider for day-ahead and/or intraday

Norway	Oslo, Headquarters
Finland	Helsinki
Sweden	Stockholm
Denmark	Copenhagen
Estonia	Tallinn
United Kingdom	London



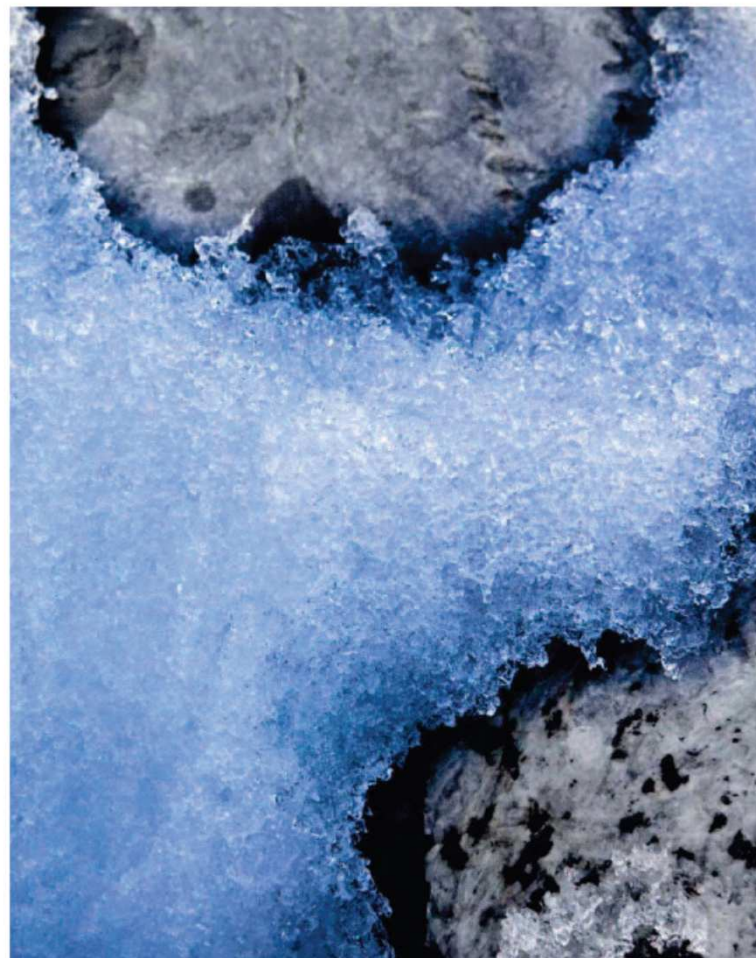




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## Nordpools members

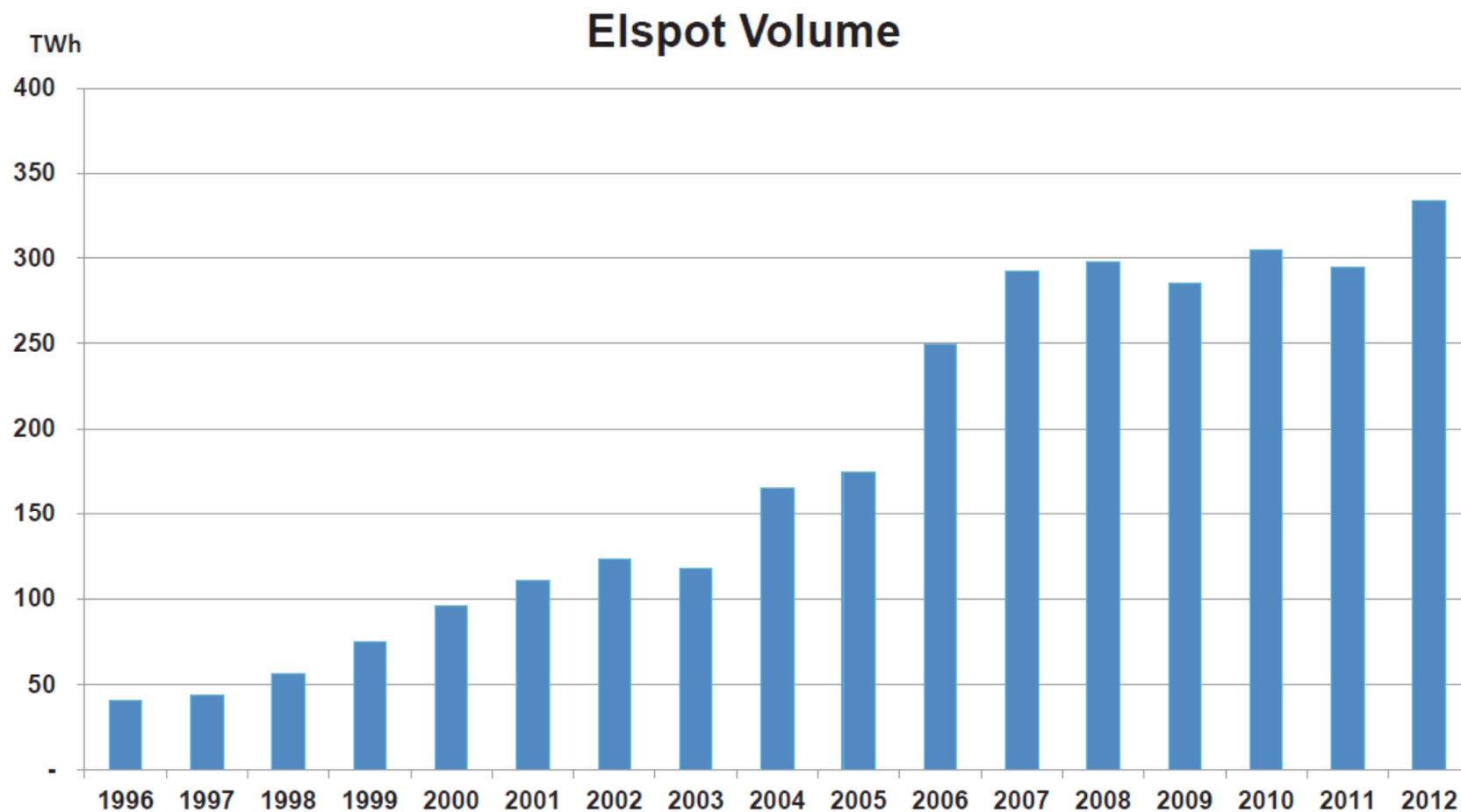
- Our members are typically power producers, suppliers and traders
- Large end-users also trade on the markets and buy power directly from Nord Pool Spot rather than through a supplier





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# Nordpools power trade growth 1996 - 2012





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# The Elspot market

- An auction of power for delivery the following day
- Prices are calculated based on supply, demand and transmission capacity (how much power can be moved from one area to another)
- 77% of Nordic power consumption is bought on Elspot
- Elspot is Europe's most liquid day-ahead market, producing a robust and credible reference price



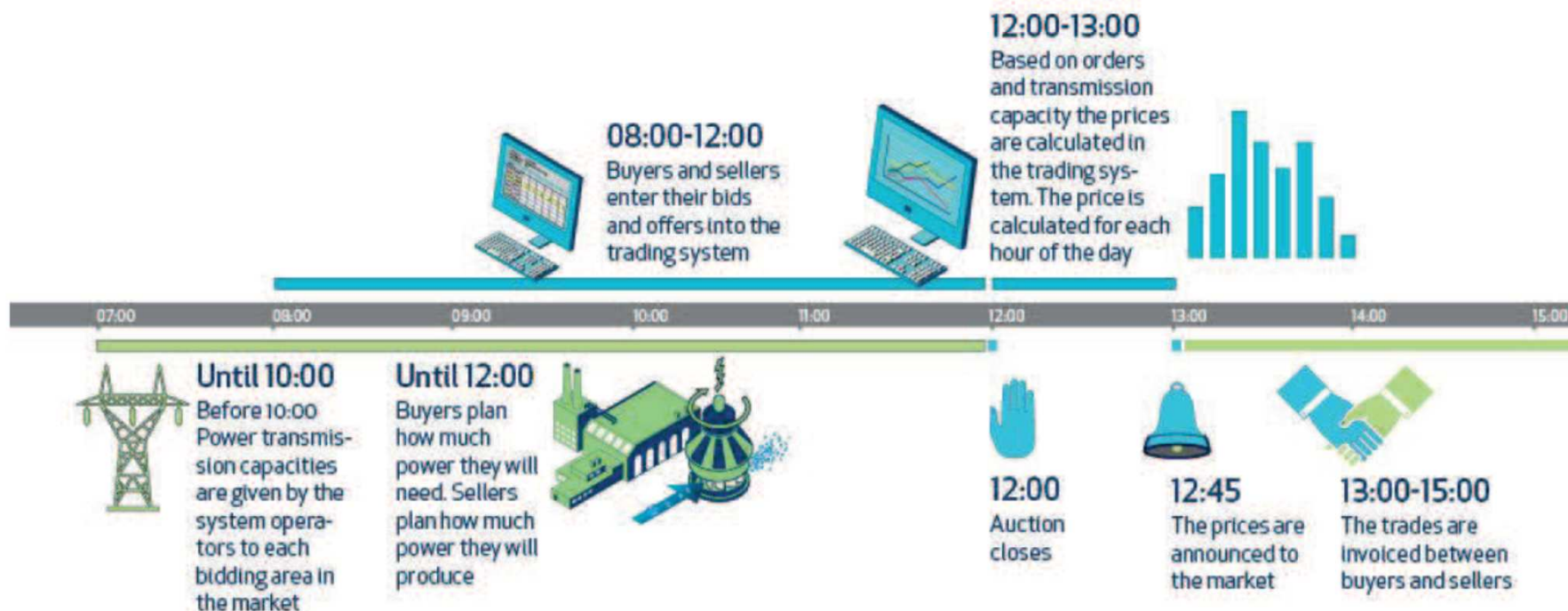
■ Elspot bidding areas in the Nordic and Baltic regions  
↔ Interconnectors to adjoining markets



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# HOW DOES IT WORK IN PRACTICE ?!

## Elspot trading – daily routines





# A liquid market feed trust in a financial market

## How the markets work together

### Financial market

Used for managing risks. Contracts can be made for up to six years. The Elspot system price is used as reference price.

### Day-ahead market - Elspot

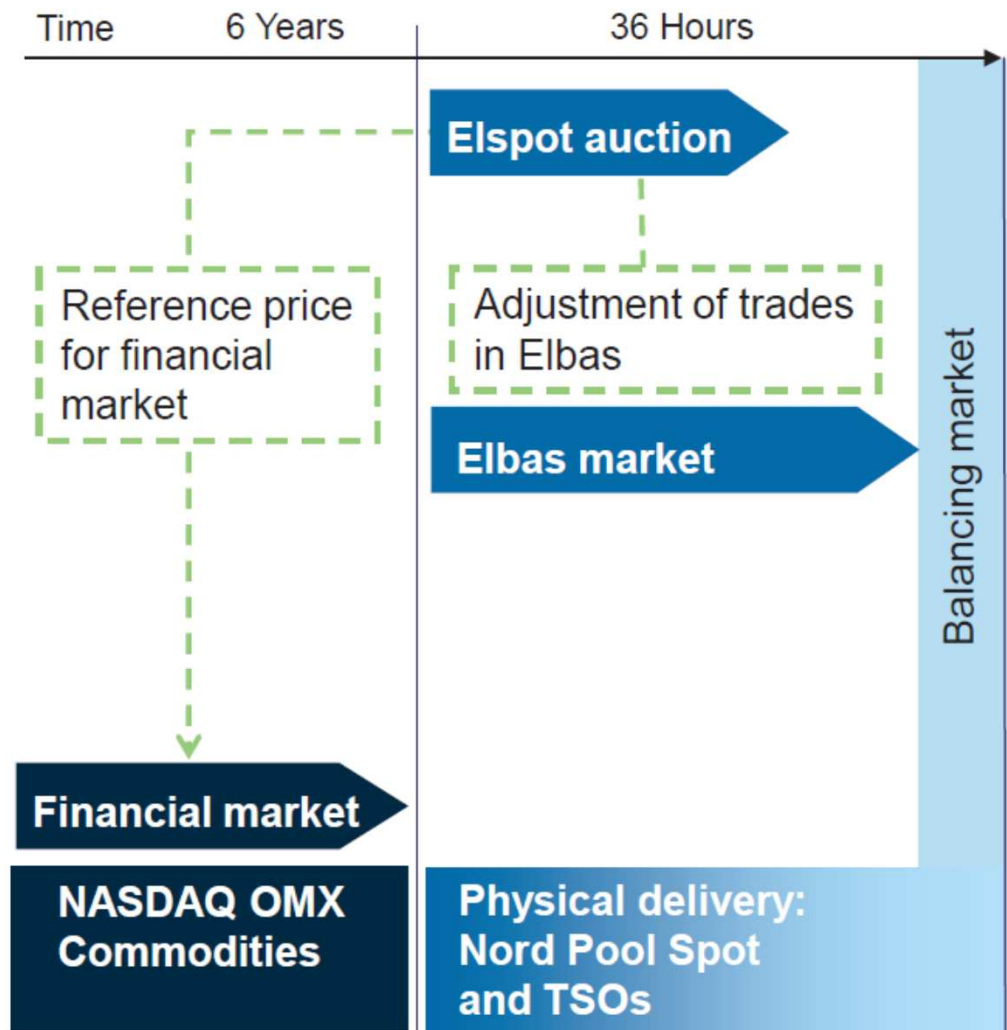
Day-ahead auction of power for delivery the next day. Nord Pool Spot calculates power prices based on supply and demand for every hour the following day.

### Intraday market - Elbas

Continuous trading up to 30 minutes before delivery to adjust power production or consumption plans.

### Balancing market

Operated by the respective transmission system operators. Final adjustments are made to ensure the correct frequency in the grid and security of supply.

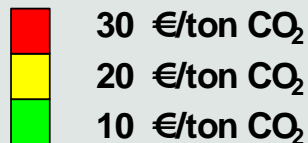




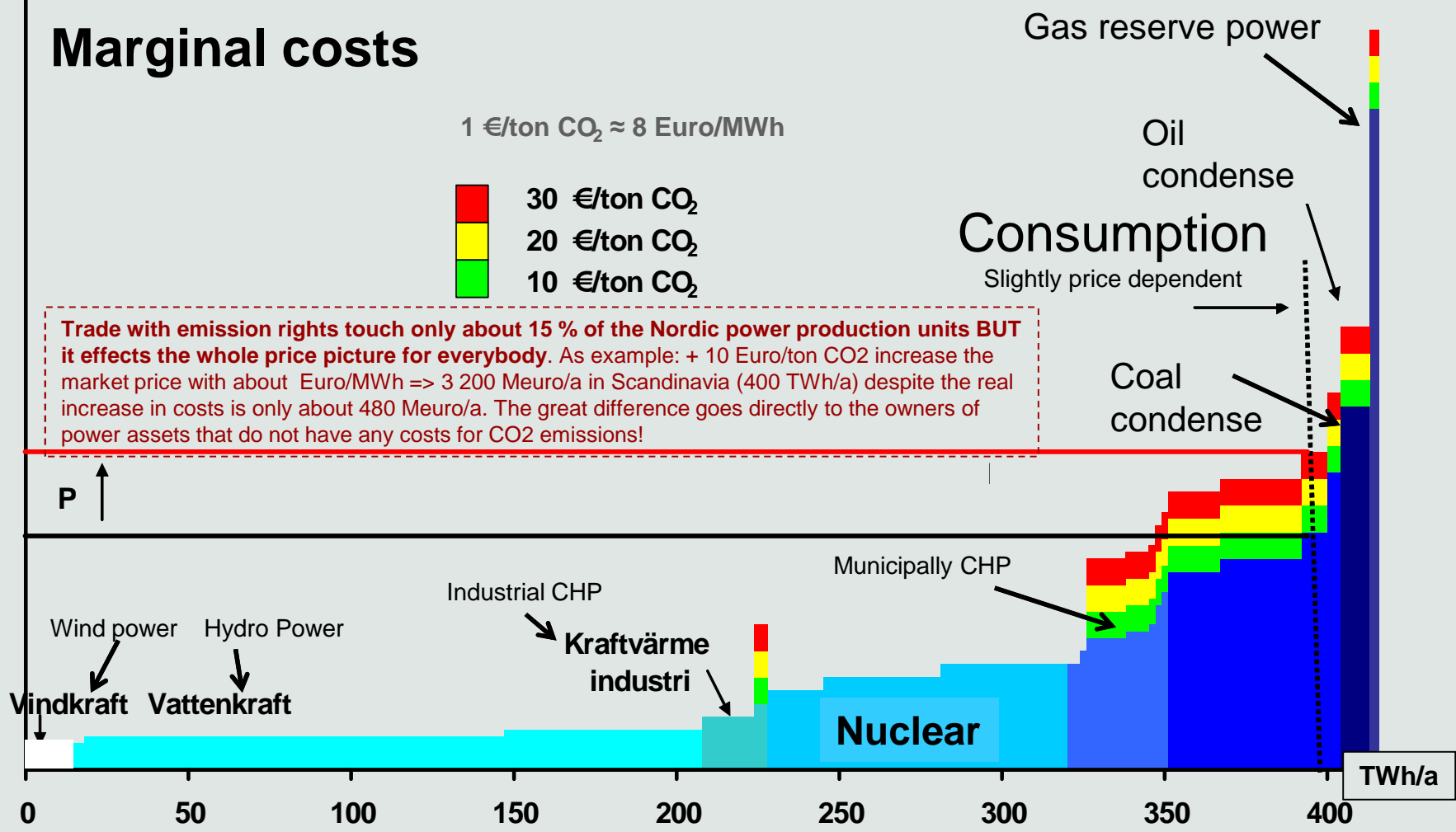
# Merit of order Scandinavia

## Marginal costs

1 €/ton CO<sub>2</sub> ≈ 8 Euro/MWh



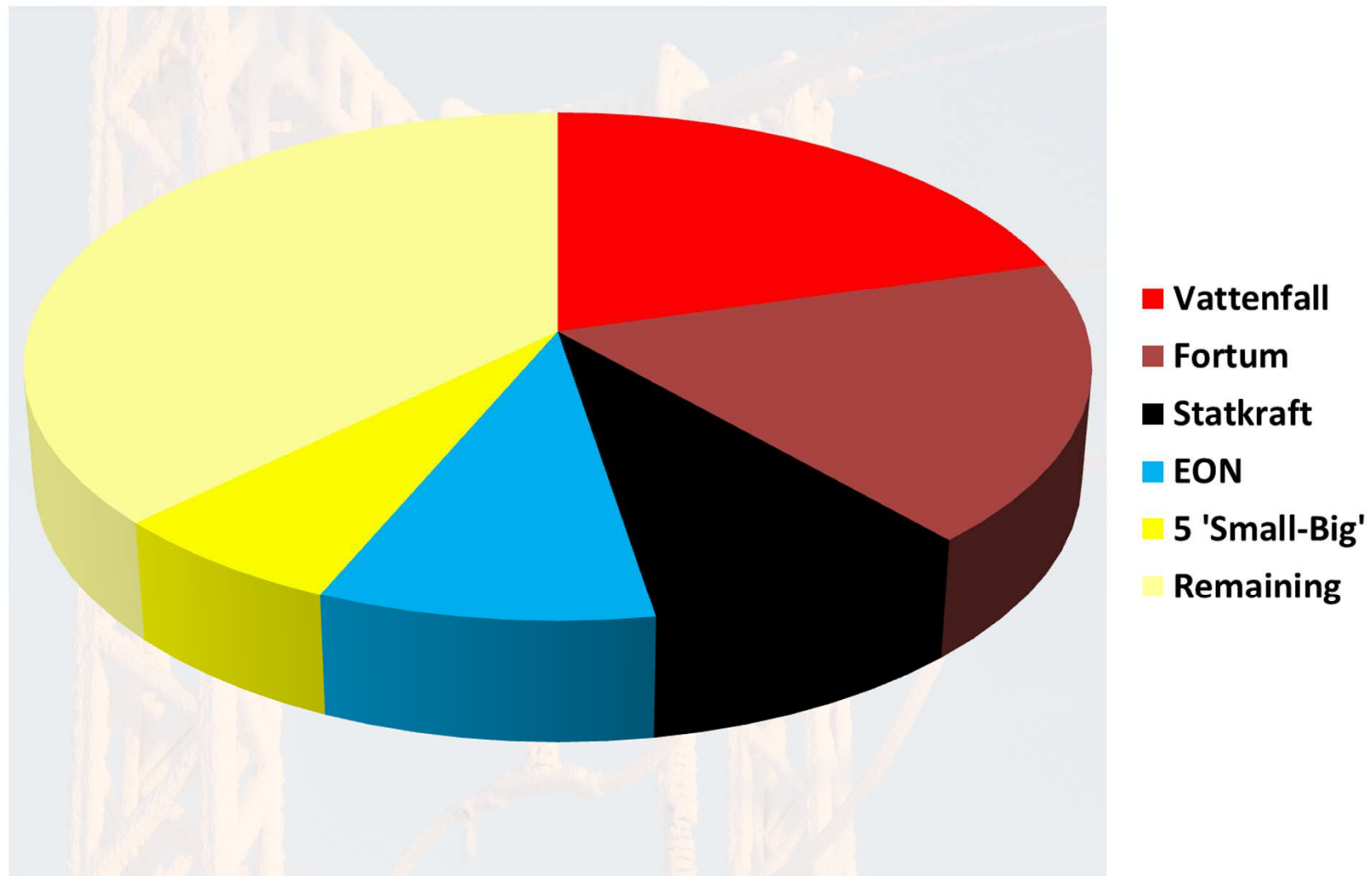
Trade with emission rights touch only about 15 % of the Nordic power production units BUT it effects the whole price picture for everybody. As example: + 10 Euro/ton CO<sub>2</sub> increase the market price with about Euro/MWh => 3 200 Meuro/a in Scandinavia (400 TWh/a) despite the real increase in costs is only about 480 Meuro/a. The great difference goes directly to the owners of power assets that do not have any costs for CO<sub>2</sub> emissions!





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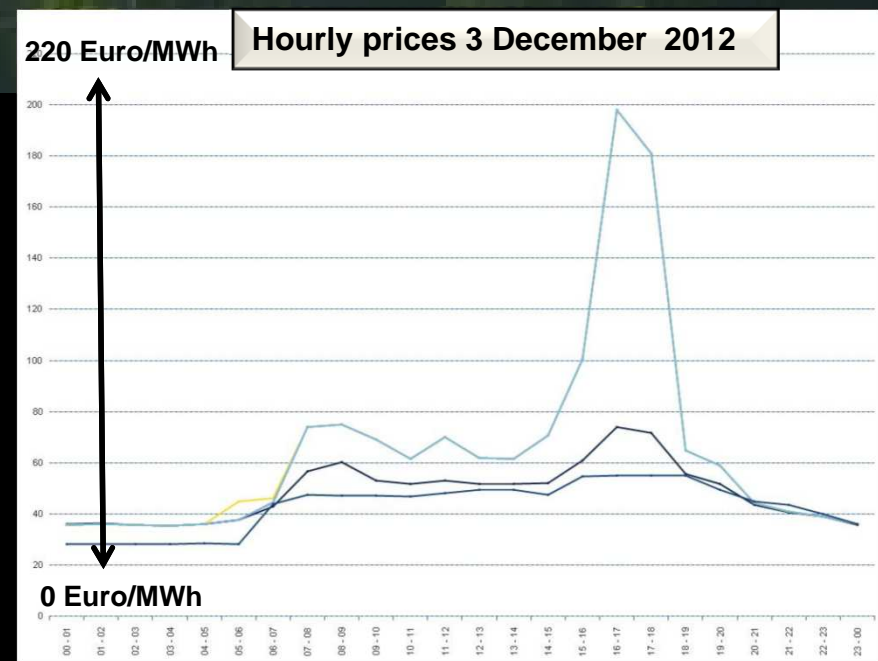
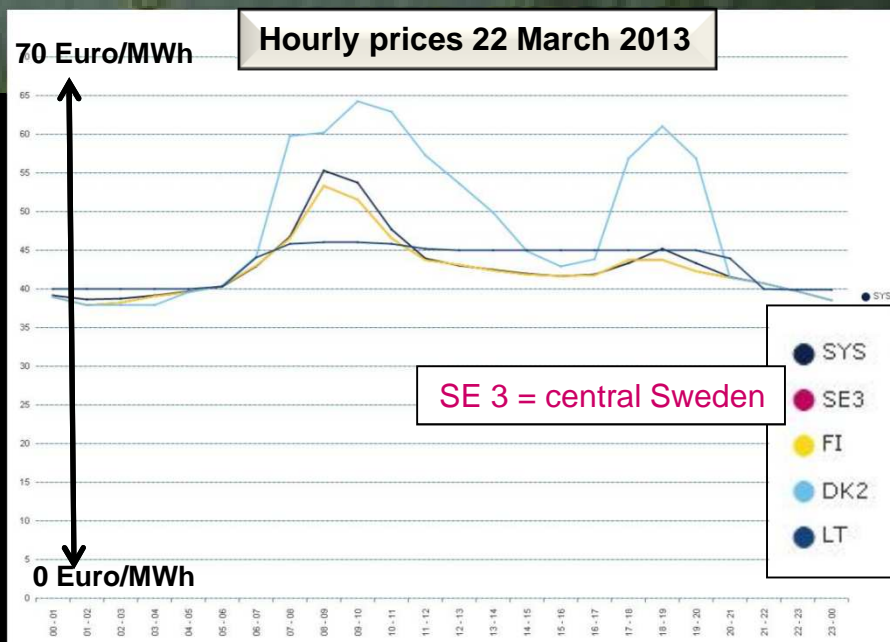
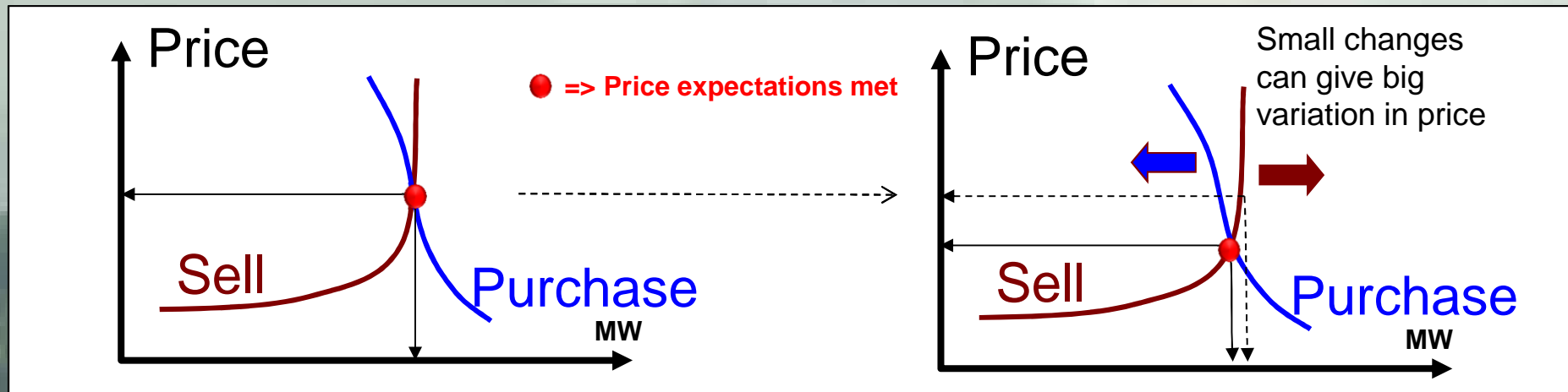
## Producers in Scandinavia (ruff), close to 60 % operated by 4 actors => Oligopoly market





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# Hourly auction => Hourly prices

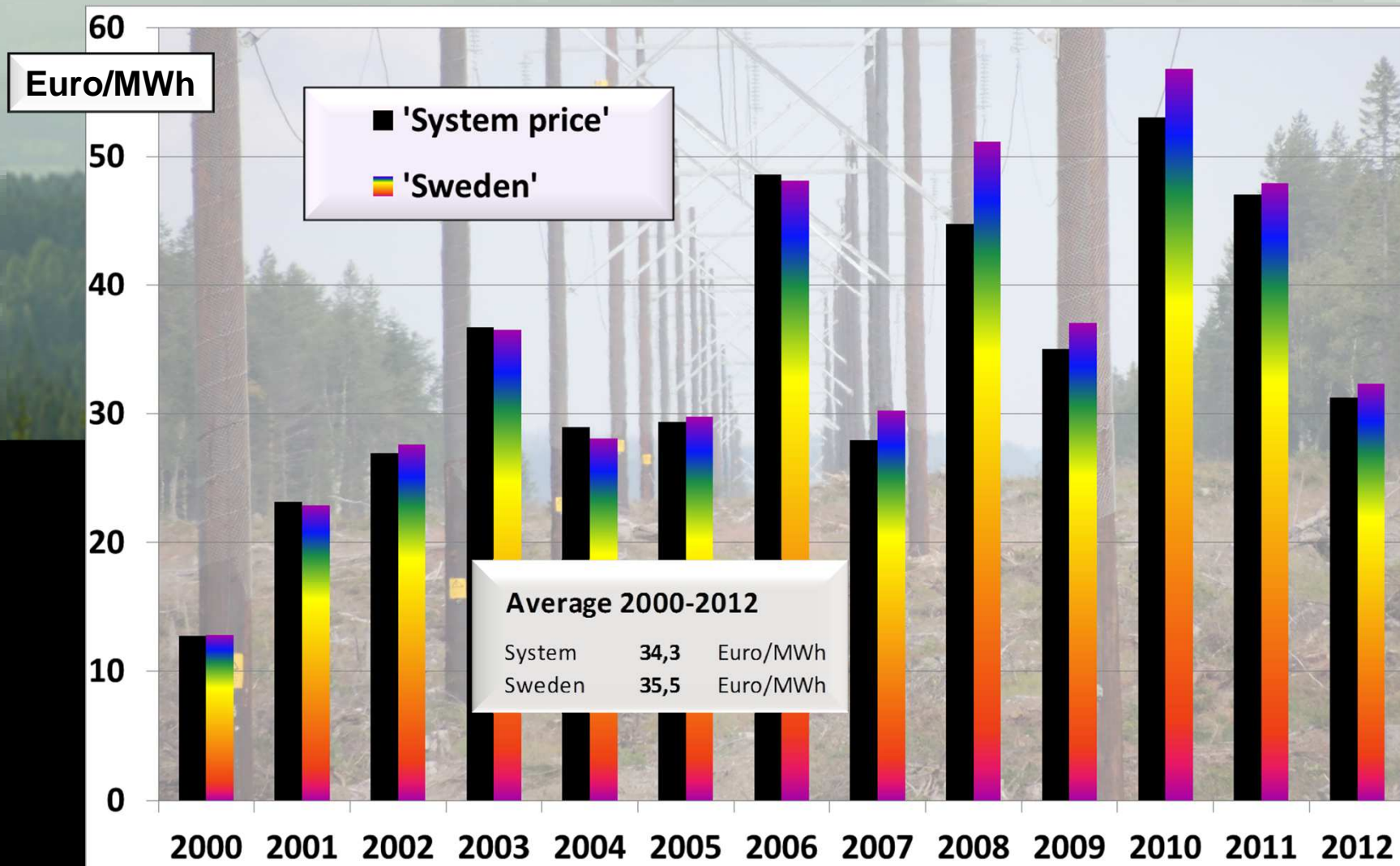






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# Price development Nordpool



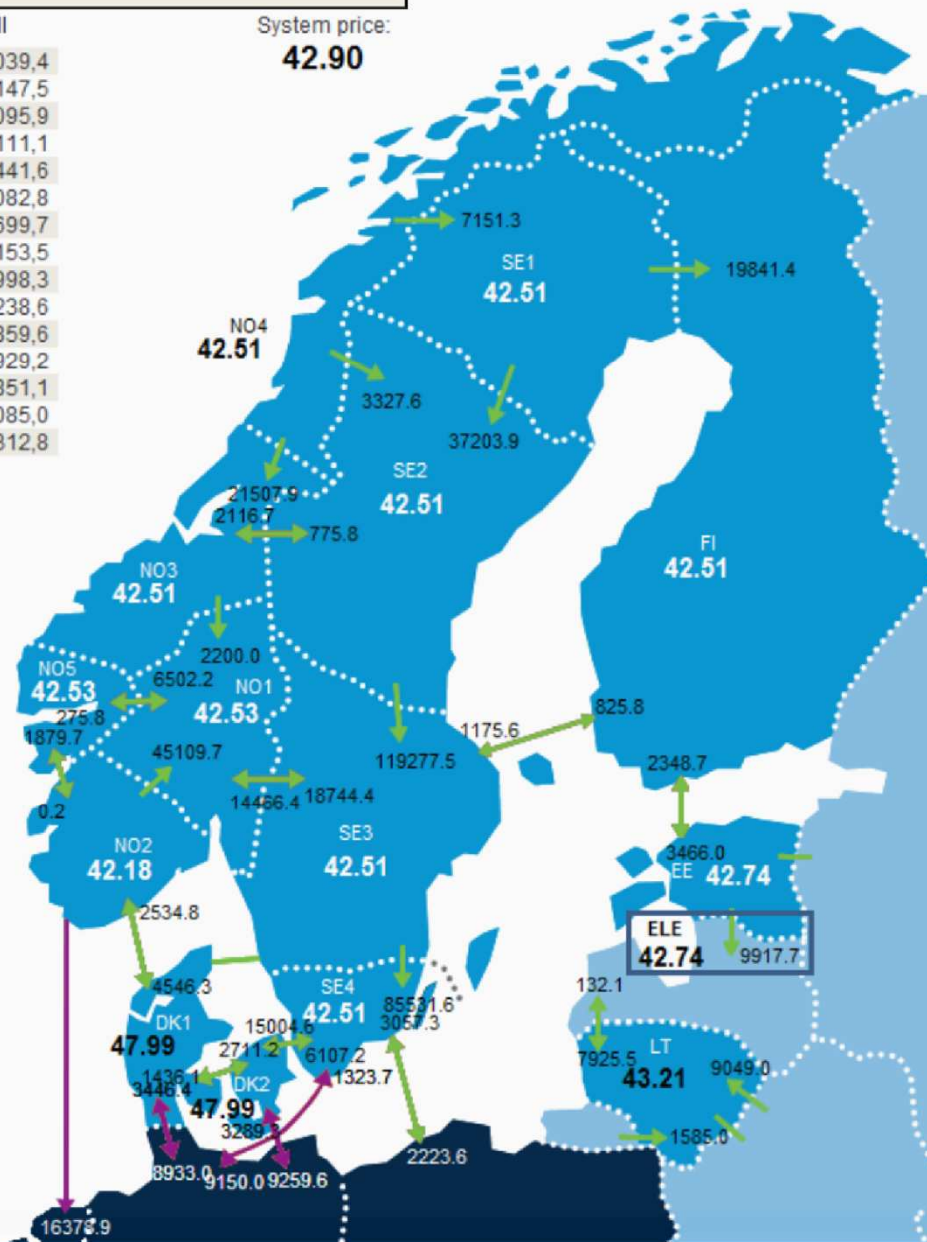


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## Elspot volumes, MWh 22/2-13

	Buy	Sell
NO1	153 297,5	104 039,4
NO2	116 146,8	165 147,5
NO3	61 744,7	41 095,9
NO4	50 124,3	82 111,1
NO5	40 094,7	44 441,6
DK1	61 336,9	56 082,8
DK2	48 872,2	38 699,7
SE1	32 259,5	82 153,5
SE2	44 911,4	124 998,3
SE3	299 094,6	265 238,6
SE4	99 493,8	22 859,6
FI	161 303,5	142 929,2
EE	28 050,7	36 851,1
ELE	13 002,7	3 085,0
LT	23 312,8	23 312,8

System price:  
**42.90**



Prices in different price areas and flows between trading areas are public



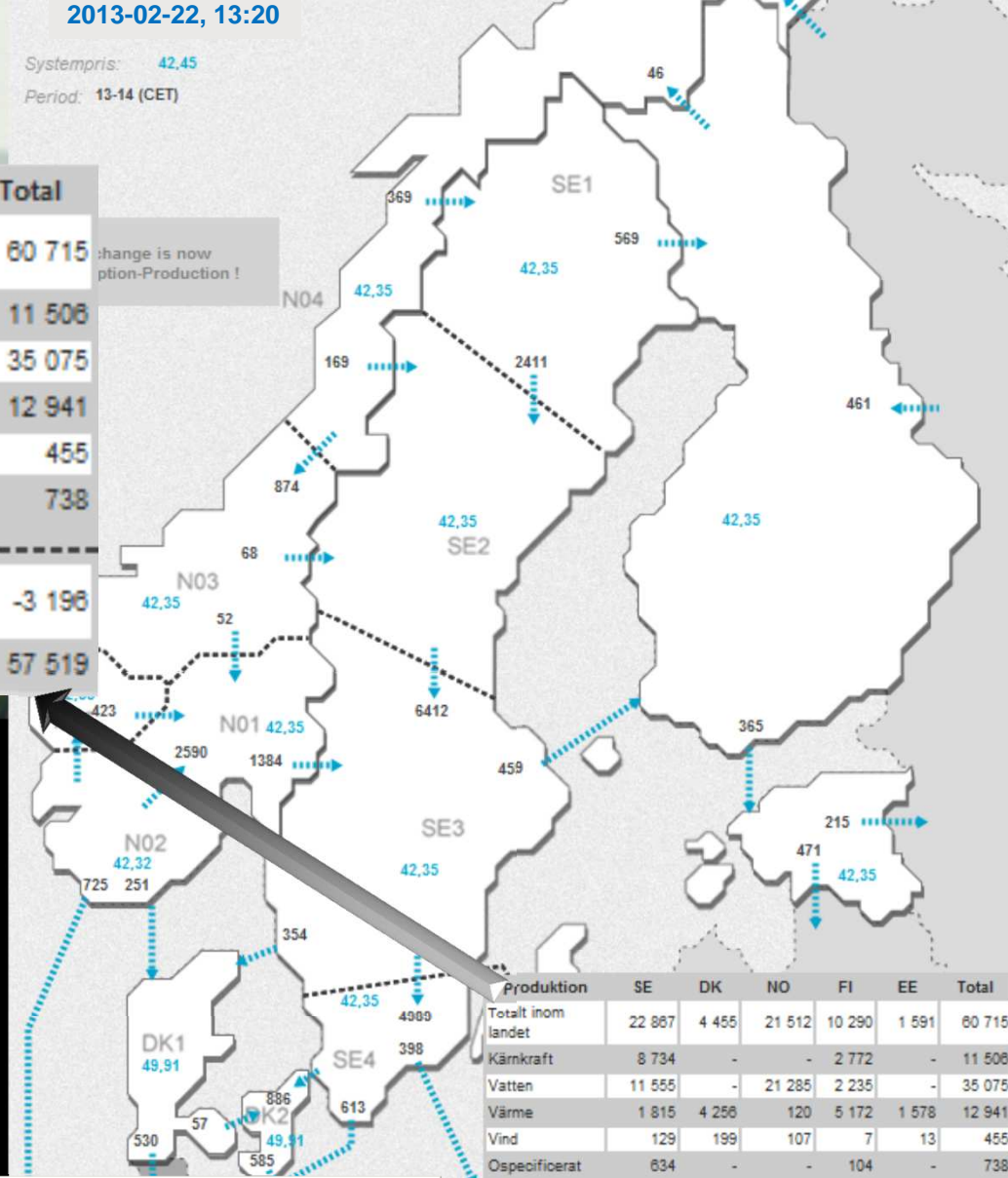
Sweden, Denmark, Norway, Finland, Estonia

Production (MW)	SE	DK	NO	FI	EE	Total
<b>Total</b>	22 867	4 455	21 512	10 290	1 591	60 715
<b>Nuclear</b>	8 734	-	-	2 772	-	11 506
<b>Hydro</b>	11 555	-	21 285	2 235	-	35 075
<b>CHP</b>	1 815	4 256	120	5 172	1 578	12 941
<b>Wind</b>	129	199	107	7	13	455
<b>Others</b>	634	-	-	104	-	738
<b>Nettoexport(-) /import</b>	-1 340	380	-2 967	1 067	-336	-3 196
<b>Förbrukning</b>	21 527	4 835	18 545	11 357	1 255	57 519

andra nationella driftkartor, på grund av exempelvis energiförluster i nätet och bristande synkronisering mellan kartor vid uppdateringar.

2013-02-22, 13:20

Systempris: 42,45  
Period: 13-14 (CET)



Produktion	SE	DK	NO	FI	EE	Total
<b>Totalt inom landet</b>	22 867	4 455	21 512	10 290	1 591	60 715
<b>Kärnkraft</b>	8 734	-	-	2 772	-	11 506
<b>Vatten</b>	11 555	-	21 285	2 235	-	35 075
<b>Värme</b>	1 815	4 256	120	5 172	1 578	12 941
<b>Vind</b>	129	199	107	7	13	455
<b>Ospecificerat</b>	634	-	-	104	-	738
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<b>Förbrukning</b>	21 527	4 835	18 545	11 357	1 255	57 519

<http://svk.se/Energimarknaden/EI/Aktuell-situation/Kraftsystemet/>

**Plenty of real time planned production information available, open for everybody...**

**Max capacity in-/out Sweden ~10 000 MW**



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Market integration

Home > Electricity market > Power system

- ▶ State of the Nordic Power System
- ▶ Different states of the power system - traffic lights
- ▶ Consumption and production in Finland
- ▶ Management of power shortage

## State of the power system

<http://www.fingrid.fi/en/electricity-market/power-system/Pages/default.aspx>



● Normal power balance  
 Temperatures:  
 Helsinki -2 °C, Jyväskylä 2 °C,  
 Oulu -4 °C, Rovaniemi -10 °C  
 Latest update 2/22/2013 2:45 PM

### Consumption and production in Finland Info

Consumption	11,374 MW
Production	10,261 MW
- Hydro power	2,215 MW
- Nuclear power	2,772 MW
- Condensing power	1,370 MW
- Cogeneration district heating	2,100 MW
- Cogeneration industry	1,700 MW
- Other production (estimate)	104 MW
- Peak load power	0 MW
Net import/export	1,113 MW

### Power balance Info

Production surplus/deficit in Finland	-29 MW
Surplus/deficit, cumulative	26 MWh
Instantaneous freq. measurement	50.02 Hz
Time deviation	5.49 s

### Electricity price in Finland Info

Elsport area price	42.35 EUR/MWh
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Also information from countries outside Sweden

Indicates short term balance situation also on our national grid

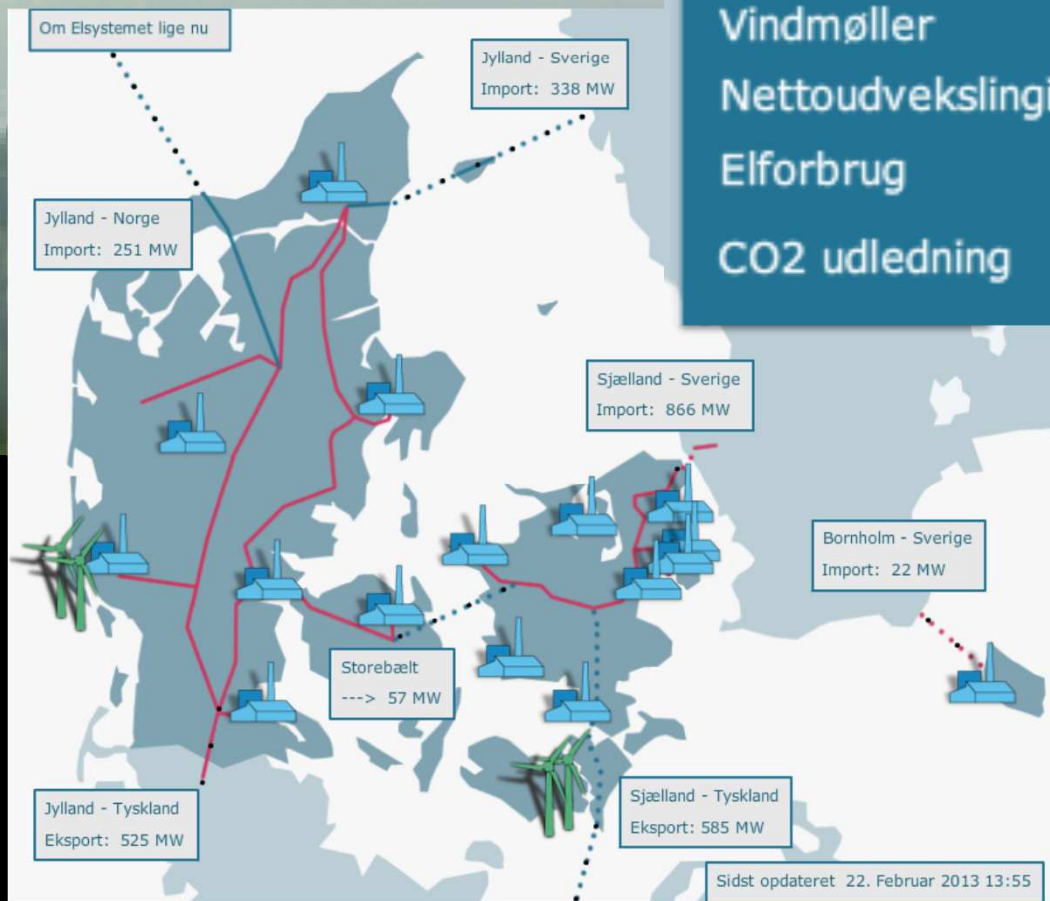


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## Elsystemet lige nu

Målt i MW:

Centrale kraftværker	2.995
Decentrale kraftværker	1.249
Vindmøller	208
Nettoudvekslingimport	367
Elforbrug	4.819
CO2 udledning	494 g/kWh



**Real time information  
from Denmark**

<http://energinet.dk/Flash/Forside/index.html>

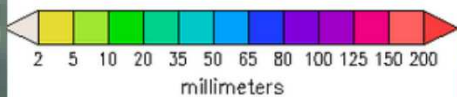
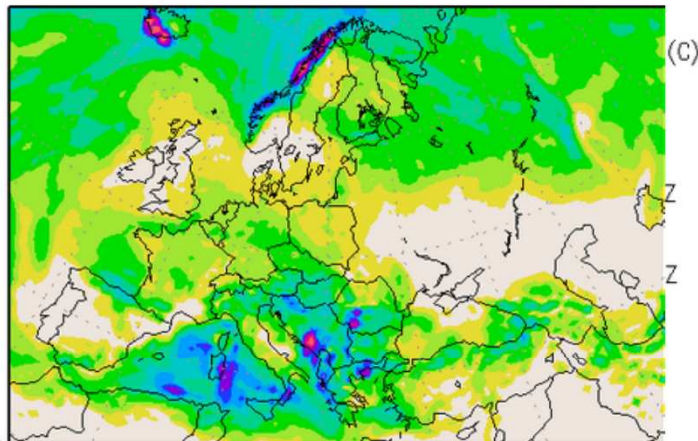


# Weather FC, snow and reservoirs

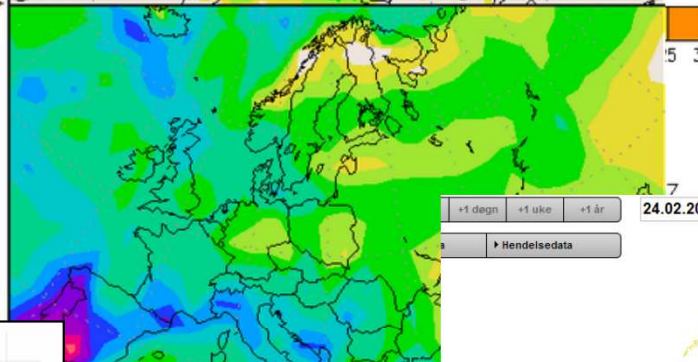
### Precipitation Forecast

Precipitation (mm)  
during the period:

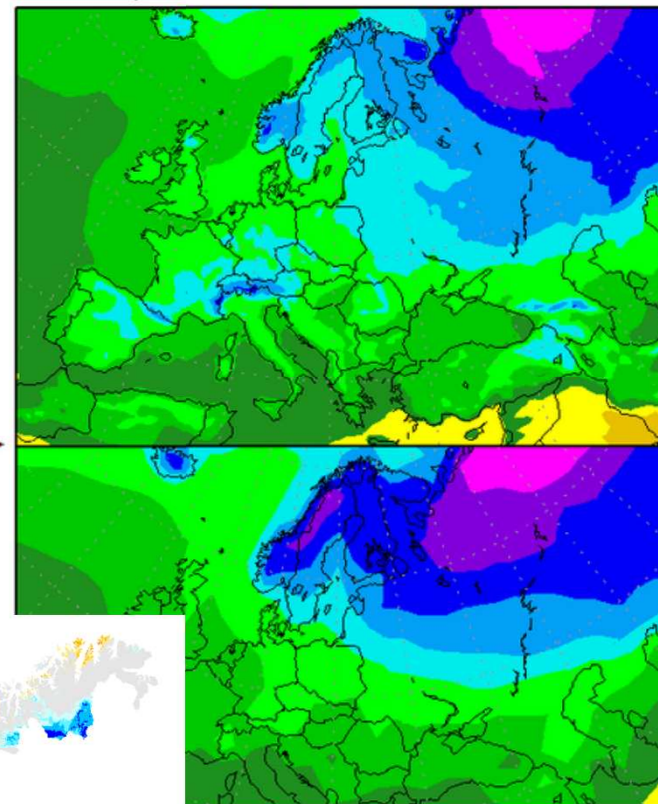
Sun, 24 FEB 2013 at 00Z  
-to-  
Sun, 03 MAR 2013 at 12Z



Mon, 04 MAR 2013 at 00Z  
-to-  
Tue, 12 MAR 2013 at 00Z

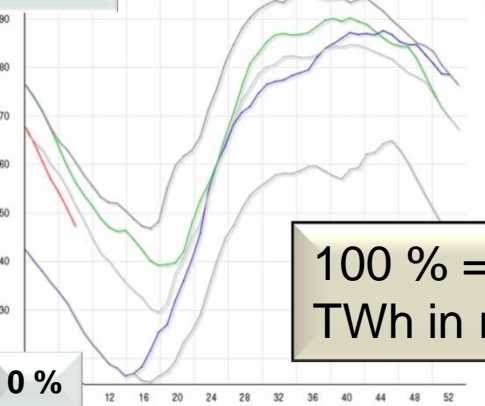


### Temperature Forecast



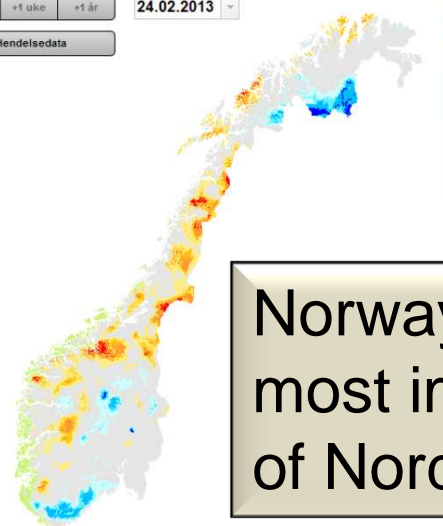
+1 dagn +1 uke +1 år 24.02.2013  
Hendelsedata

100 %



100 % => 110 TWh in reservoirs

0 %



Norway's reservoirs most important (75 % of Nordic capacity)



## Fundamentals that drives the market are mainly:

### Short term:

- Temperature (+- 1 C => +/- 500 MW)
- Hydro balance (+/- 30 TWh between years) and hydro flows
- Status in Nuclear reactors
- Temporary shut downs in production/consumption
- Status in power lines for exchange in-/out market
- Wind power (In Germany also wind + photo voltage)

### Middle term/Long term:

- Economical outlooks for national and global Industry/business
- Developments in demands
- Swap rates /SEK <-> Euro, SEK <-> Dollar
- The future of ETS
- New and/or change taxes and fees
- Costs for new production
- Coming Green house effects ?
- Rumors.....



# The 'never sleeping' market

**MONTEL** News Power Gas Coal Oil Green markets Financial Weather Analysis Mv pages Support Contact Log out

You are here: Power - Nordic - Nordic overview

Headlines

Search news here

**Rumors/News**

Friday, 22 February 2013

- 14:36 Lithuanian regulator approves EUR 880m power grid plan
- 14:24 Vardar kjøper svensk vindkraft av Fred. Olsen
- 14:19 Stadtwerke München puts all renewables projects on ice
- 14:17 Policy changes threaten EU renewables target - Erec
- 13:50 Statoil cuts gas flows from Norwegian fields by 9.4mcm/day
- 13:13 Denmark gives conditional support to backloading

Precipitation and Temperature

Day GWh Chg No access Dev N % °Celsius Chg Dev N

**Different trends**

**Power forwards**

NOMXCE Nordic Power €/MWh

Delayed. For real-time, use support link

Product	Bid	Vol	Ask	Vol	Open	High	Low	Last	Chg	%	VL	VA	Close	Time
<b>DAY DEPTH</b>														
D2302-13	39.10	30	39.15	15	39.10	39.10	39.10	39.10	-1.40	-3.46	50	150	40.50	11:56
D2402-13	-	0	-	0	-	-	-	-	-	-	0	0	40.50	00:15
<b>WEEK DEPTH</b>														
W09-13	39.10	5	39.75	25	39.25	39.25	39.25	39.25	0.15	0.38	20	45	39.10	14:40
W10-13	40.30	50	40.85	5	39.75	40.50	39.75	40.50	1.10	2.79	100	390	39.40	14:27
W11-13	39.00	20	40.00	10	-	-	-	-	-	-	0	0	38.75	14:13
W12-13	38.50	10	39.70	10	-	-	-	-	-	-	0	0	38.58	14:13
W13-13	37.00	20	37.70	25	-	-	-	-	-	-	0	0	36.50	14:33
W14-13	37.75	25	38.50	25	-	-	-	-	-	-	0	0	37.00	14:33
<b>MONTH DEPTH</b>														
MAR-13	38.60	10	38.70	10	38.30	38.70	38.30	38.70	0.55	1.44	5	324	38.15	14:39
APR-13	37.65	10	37.80	5	37.60	37.75	37.50	37.70	0.17	0.45	1	28	37.53	14:28
MAY-13	35.70	10	36.00	5	35.90	35.90	35.60	35.60	0.05	0.14	1	12	35.55	14:34
JUN-13	35.85	10	36.25	10	35.80	35.80	35.80	35.80	0.12	0.34	8	10	35.68	14:41
JUL-13	33.25	10	34.25	10	-	-	-	-	-	-	0	0	33.35	13:53
AUG-13	34.50	10	36.50	10	-	-	-	-	-	-	0	0	36.08	14:06
<b>QUARTER NOK SEK DKK USD EUR DEPTH</b>														
Q2-13	36.45	5	36.55	9	36.45	36.55	36.24	36.50	0.20	0.55	1	454	36.30	14:31
Q3-13	35.75	2	35.85	1	36.00	36.00	35.70	35.70	-0.05	-0.14	4	38	35.75	14:21
Q4-13	40.60	2	40.75	1	40.70	40.70	40.70	40.70	0.05	0.12	1	36	40.65	14:25
Q1-14	42.55	5	42.65	1	42.55	42.55	42.50	42.55	0.10	0.24	4	8	42.45	14:36
Q2-14	34.95	1	35.05	3	-	-	-	-	-	-	0	0	34.95	14:37
Q3-14	33.00	5	33.19	5	33.10	33.10	33.10	33.10	0.14	0.42	1	9	32.96	13:40
Q4-14	38.50	5	39.05	2	38.90	38.90	38.90	38.90	0.10	0.26	2	2	38.80	13:11
Q1-15	41.15	1	41.20	5	41.10	41.10	41.10	41.10	0.10	0.24	2	5	41.00	14:39
Q2-15	33.75	3	35.00	5	-	-	-	-	-	-	0	0	34.28	14:22
Q3-15	32.20	10	33.50	5	-	-	-	-	-	-	0	0	32.10	14:32
Q4-15	38.40	5	39.25	5	-	-	-	-	-	-	0	0	38.40	14:40
<b>YEAR NOK SEK DKK USD EUR DEPTH</b>														
YR-14	37.30	1	37.35	2	37.40	37.40	37.30	37.38	0.08	0.21	5	34	37.30	14:29
YR-15	36.45	1	36.55	1	36.40	36.53	36.35	36.53	0.18	0.50	5	19	36.35	14:38
YR-16	36.00	1	36.10	1	-	-	-	-	-	-	0	0	35.95	14:36
YR-17	37.30	1	37.40	3	-	-	-	-	-	-	0	0	37.18	14:15
YR-18	38.40	1	38.80	1	-	-	-	-	-	-	0	0	-	-

**Oil**

Delayed. For real-time, use support link

Product	Bid	Ask	Last	Close
WTI Front Month	93.16	93.18	93.16	92.84
WTI May13	93.59	93.62	93.54	93.27
Brent Front Month	114.47	114.48	114.48	113.53
Brent May13	-	-	113.61	112.68

**CO2**

ICE EUA €/t

Delayed. For real-time, use support link

Product	Bid	Ask	Last	Close
Dec13	5.20	5.22	5.22	5.30
Dec14	5.44	5.48	5.39	5.55
Dec15	5.67	5.70	5.64	5.77

**Coal**

ICAP Coal API2 USD/t

Delayed. For real-time, use support link

Product	Bid	Ask	Last	Close
Feb-13	-	-	-	87.25
Q2-13	88.75	90.40	90.00	90.10
2014	98.65	99.25	99.05	98.90
2015	-	-	-	105.75

**Gas**

ICAP UK NBP Gas pence/wh

Delayed. For real-time, use support link

Product	Bid	Ask	Last	Close
Within Day	75.10	77.00	78.25	68.95
Weekend	70.25	72.00	71.00	68.70
Mar-13	67.10	67.75	67.45	66.90
Q213	-	-	-	64.45
Sum 13	64.45	64.70	64.55	64.20
Win 13	71.25	71.70	71.65	71.35

**Power Germany**

NOMXCE Nordic Power OTC €/MWh

Delayed. For real-time, use support link

Product	Bid	Vol	Ask	Vol	Open	High	Low	Last	Chg	%	VL	VA	Close	Time
<b>DAY</b>														





# What the consumer pay for the power today

Can vary between 20 – 80 Euro/MWh, spot purchase or secured

	Big Industry	House hold
Power	40,0	40,0
Grid	5,0	15,0
Balancing	0,5	1,0
Tax	-	33,0
Green certificates	-	6,0
VAT	-	23,8
<b>TOTAL</b>	<b>45,5</b>	<b>118,8</b>

Euro/MWh

Can be bought or secured from Nordpool

Grid = Monopoly

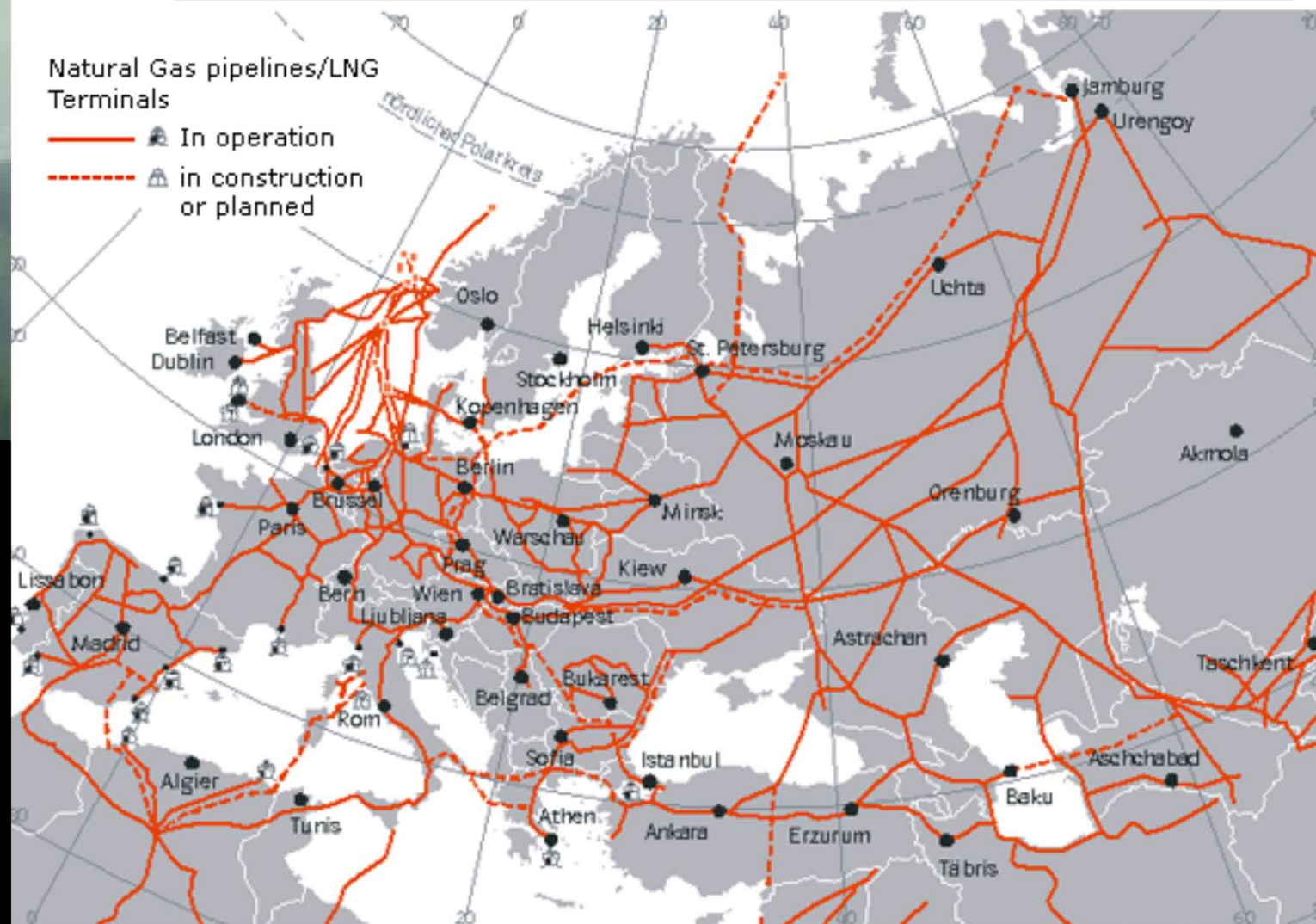


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# No gas network in Sweden

Stockholm and Tirana (Albania) the only capital Cities in Europe without gas network

Natural Gas distribution system in Europe including the CIS states





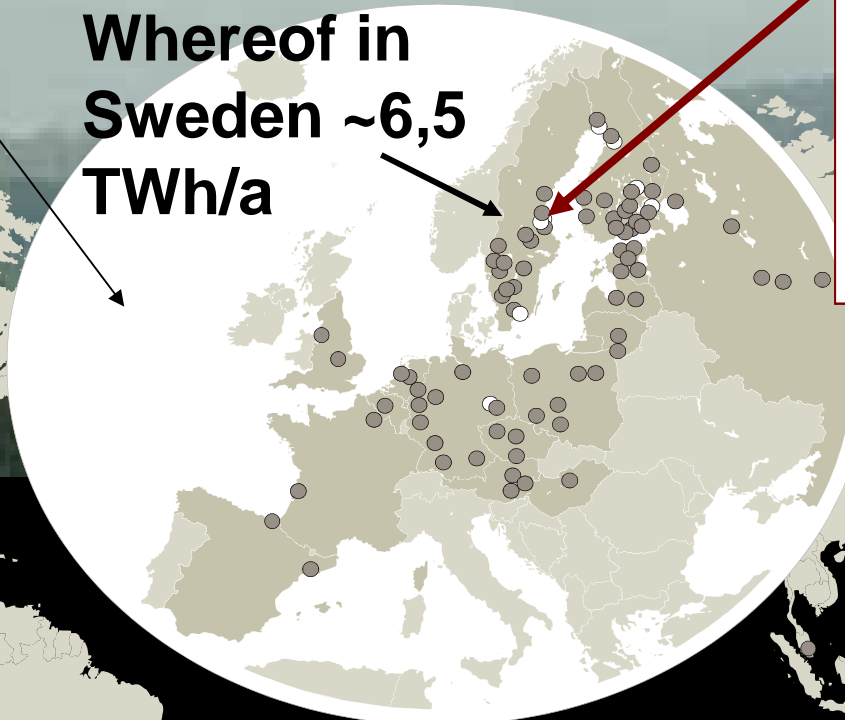
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# Stora Enso in Europe

Need of power in Europe ~16 TWh/a

Whereof in  
Sweden ~6,5  
TWh/a

Whereof ~  
5,3 TWh/a is  
bought from  
the market



- Production plants
- Pulp in bales

**Year 2012**  
28 000 employees  
Turnover sales: 10 800 MEuro



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## **“Minimize sourcing cost and risk“ is our company main strategy**

***We have a rather 'long' hedge strategy – we hedge a number of different agreements in our portfolio. But at different times, different prices and different length. Always depending on our belief in the market outlook (for own business and on the power market).***

***In the daily operation we make our daily biddings towards the market (via Vattenfall acting, as our balance responsible actor).***

- ***We use price bidding curves for avoiding buying too much power if spot prices turn very high (than we resell to market already bought contracts)***
- ***We continue to watch the development on the short term balancing market for avoiding high balancing costs or reselling to balancing market if possible without jeopardize our ongoing paper production.***



# Using price depended bidding

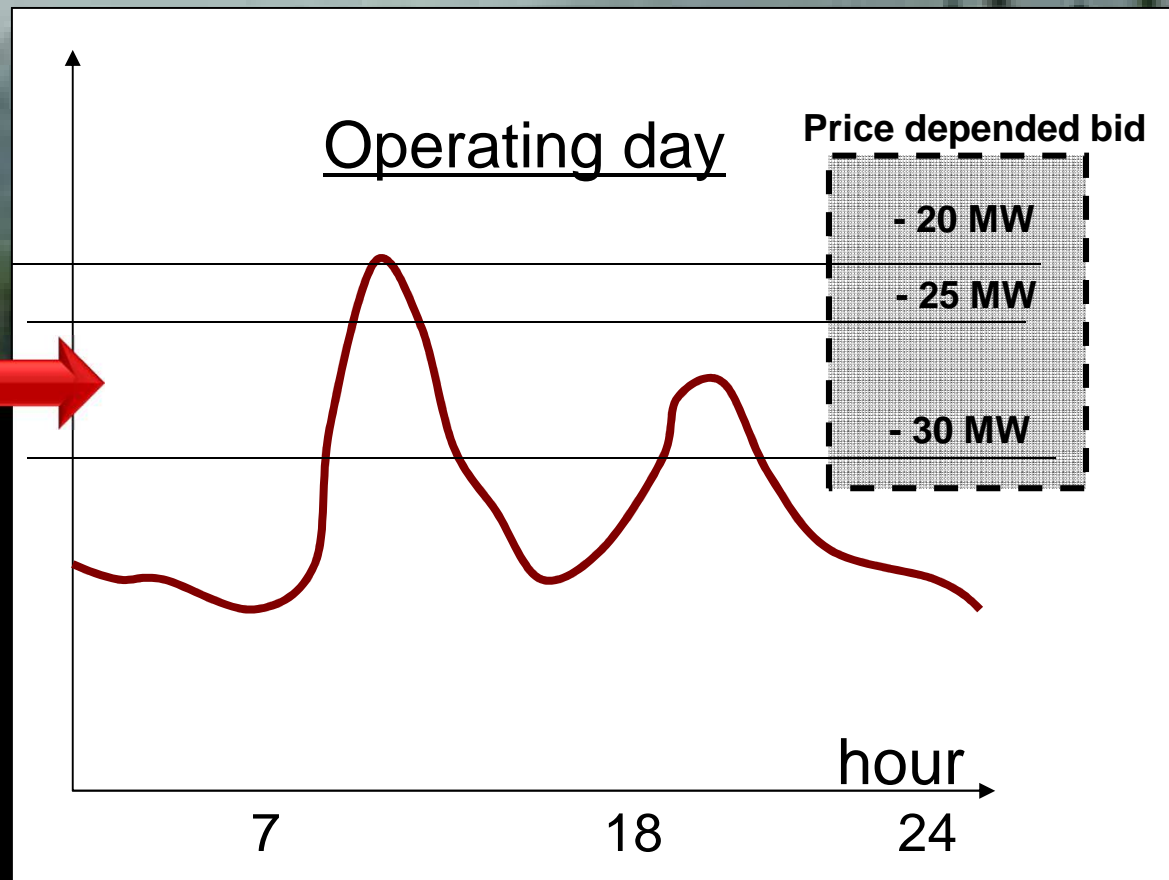
STORDENSO

Based on operating-/market situation we can order less from spot market if spot price become 'to high' some hours

Day before operating day

Bid left latest 11.00 day before operating day.  
Outcome known latest 14.00 (= gives minimum 10 hour before you have to reduce planned consumption)

**Used mainly in TMP-mills**





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## Questions asked in for this presentation

1. Countries in Nordpool. History
2. How does Nordpool work within the Nordpool countries. Is Nordpool only related to electricity or there are also gas flows?
3. Types of energy in each of the Nordpool countries
4. Flows of energy in and out of Nordpool, when?
5. What capacity of energy import/export does Nordpool have....what do you think it should have?
6. **Do Nordpool contributes to lower energy cost?**
7. **Capacity of import/export needed between Iberia and France?**
8. **Is Nordpool a concept that could apply to Spain and Portugal ?**



## Have Nordpool contributed to lower prices for power ?

- Now one can tell how the situation have been otherwise!!
- My personal belief: **Yes!!**
  - Market is fully liberated on the selling side but it is still hard to get permission for big new projects
  - New Wind-/Bio power = fairly OK to erect
  - New Hydro protected
  - New nuclear almost banned
  - No gas in Sweden
  - Coal only used for minor heat production



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## Exchange of power last week – In-/out Scandinavia

Exchange in [MWh] IN-OUT Scandinavia, Veek 9 - 2013

	01-03- 2013	28-02- 2013	27-02- 2013	26-02- 2013	25-02- 2013	24-02- 2013	23-02- 2013	22-02- 2013
00 - 01	-364	-24	38	411	1363	1569	934	1513
01 - 02	-77	-12	1209	793	1409	1593	2041	2010
02 - 03	269	254	1038	1471	1401	1826	2666	1900
03 - 04	414	-254	590	940	1030	1874	2566	1588
04 - 05	-40	-354	62	497	1030	1803	2468	1270
05 - 06	-336	-967	-1182	-611	450	1930	2584	514
06 - 07	-1 812	-1439	-1608	-1653	-1505	1923	2640	-2099
07 - 08	-2 126	-1716	-1710	-1657	-1907	1827	2503	-2118
08 - 09	-2 570	-2349	-1711	-1842	-2279	2139	2064	-1727
09 - 10	-2 891	-2408	-1833	-2083	-2287	1204	1935	-1743
10 - 11	-2 853	-2503	-1802	-2062	-2311	-35	1248	-1922
11 - 12	-2 919	-2370	-1777	-1833	-2211	-853	810	-2133
12 - 13	-2 852	-2366	-1857	-2045	-2374	-851	946	-2269
13 - 14	-2 810	-2349	-1902	-2072	-2422	-10	1869	-2667
14 - 15	-3 027	-2649	-2069	-2221	-2503	399	1655	-3048
15 - 16	-3 045	-2507	-2171	-2302	-2628	600	1591	-3025
16 - 17	-3 017	-2461	-2220	-2310	-2489	907	1852	-2899
17 - 18	-3 161	-2627	-2065	-2123	-2378	-347	90	-2371
18 - 19	-2 713	-2153	-1506	-1453	-2265	-1368	-1634	-2258
19 - 20	-2 351	-1810	-1133	-1276	-2078	-1597	-1497	-2912
20 - 21	-2 521	-2097	-1143	-1301	-1859	-1241	184	-2514
21 - 22	-1 948	-1351	-895	-760	-1127	-863	522	-750
22 - 23	-1 913	-1150	-747	-594	-529	-1056	600	545
23 - 00	-1 189	-52	-421	74	87	-134	1500	2044
Average	- 1 911	- 1 571	- 1 117	- 1 084	- 1 183	468	1 339	- 1 045

Exchange of power : ~ +/- 0 – 5 % of market need



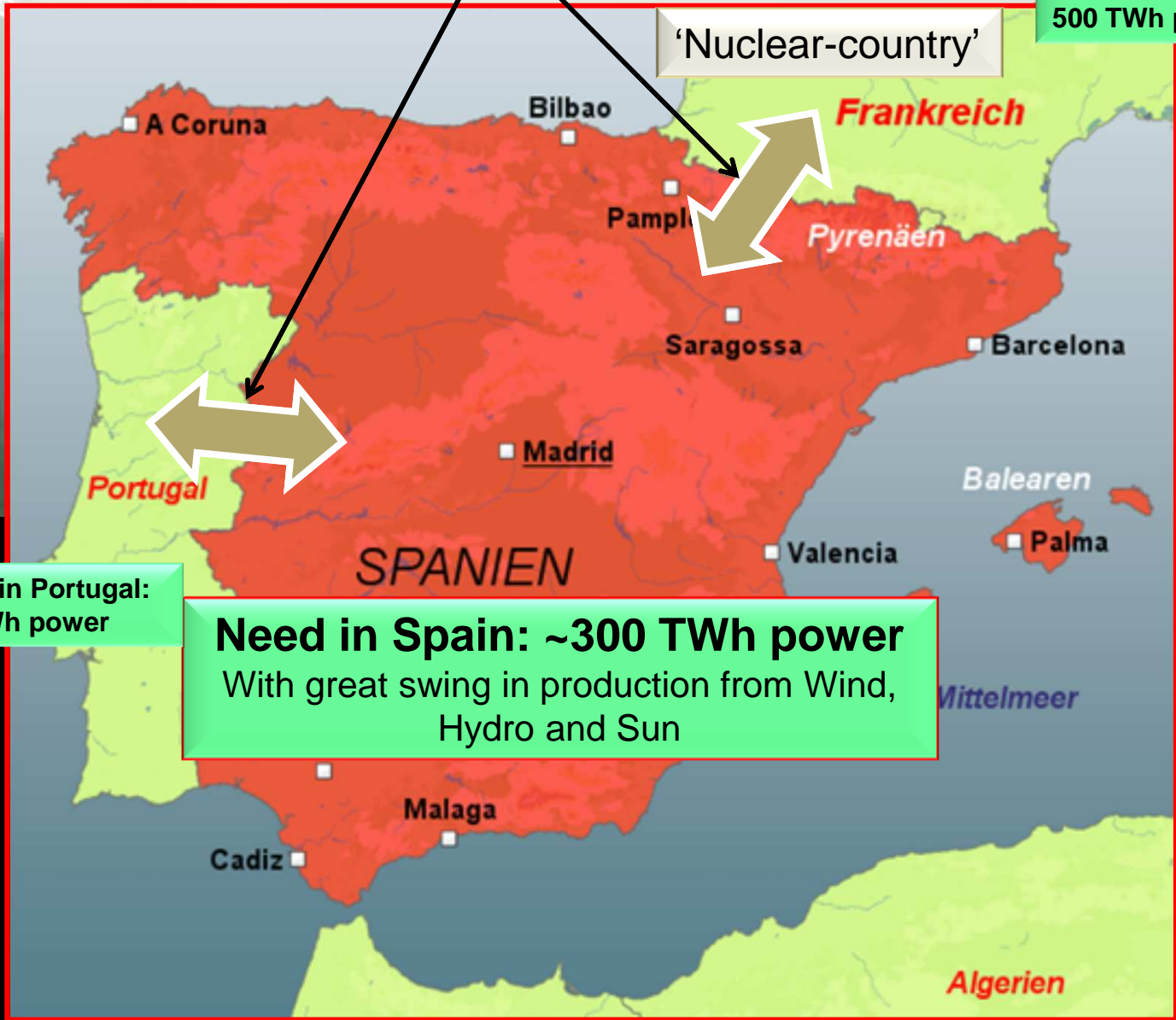


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# Needed exchange capacity ? (> 5-10 GW ?)

Need in France:  
500 TWh power

'Nuclear-country'



Need in Portugal:  
55 TWh power

**Need in Spain: ~300 TWh power**  
With great swing in production from Wind,  
Hydro and Sun

Algerien



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# So can Nordpool work in Spain?

*In theory a free market can work anywhere, but it must rely on political platform that allow fully free competition for all potential sellers and at the same time not to high thresholds to build new production units (even bigger ones)*



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*Thanks for your  
attention*





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