NordREG
Nordic Energy Regulators

Nordic Market Report 2014

Development in the Nordic Electricity Market

Report 4/2014

Preface

The Nordic Market report describes on a yearly basis status and developments in the Nordic electricity market with focus on generation, consumption, transmission, wholesale power market and retail markets. The report also focus on the ongoing work within the NordREG working groups.

This report is based on data and information for the year 2013 available in late spring 2014.

A working group with participants from the regulators in Denmark, Finland, Norway and Sweden has prepared the report. The members of the working group were Elin Larsson and Johan Leymann (Energimarknadsinspektionen), Bente Danielssen (Energitilsynet), Martin Vik (Norges vassdrags- og energidirektorat) and Markus Nora (Energiamarkkinavirasto).

Eskilstuna, June 2014

Anne Vadasz Nilsson

Chair of NordREG

Summary - Status of the Nordic Market

The Nordic electricity market is increasingly connected to the continental markets. This development is strengthened through the implementation of the third inner market package.

The Nordic energy regulators within NordREG is working towards harmonised rules and regulations in the Nordic electricity market in order to achieve a common Nordic retail market. In 2013, the retail market working group published an overview on how far the implementation of a common retail market had come in each country. During 2013, the retail market working group has analysed the need to harmonise regulation covering universal service. The conclusion is that the regulations for universal service differ in the Nordic countries, but there is no urgent need for harmonised regulation at present. During the spring of 2013 NordREG also published a note with five recommendations on transparency and customer access to metering data. Moreover, NordREG has recommended rules for a harmonised Nordic switching process.

NordREG considers a common Nordic Balance Settlement (NBS) to be a prerequisit for well-functioning Nordic retail market. The NordREG working group for transmission and wholesale has therefore published a design report on NBS that describes a new balance settlement model.

The Nordic Regulators have taken actively part in the writing of Framework Guidelines and in the drafting the Opinions of ACER on proposed Network Codes. Another NordREG working group, the Network Regulation working group collects and analyses information on network regulation in the Nordic countries.

The Nordic Market Report also focus on the development on the electricity markets. Therefore, a statistical summary of the electricity year of 2013 is incorporated in the report. This development is described by 44 figures and 13 tables.

The Nordic power system is a mixture of generation sources: Hydro, wind, nuclear and thermal power. During 2013, the total generation of electricity in the Nordic countriens was 380 TWh. During the same time period, consumption in the four Nordic countries totaled 380.5 TWh. Nordic wholesale power is traded on the Nordic electricity exchange Nord Pool Spot. The Nordic system price (Elspot) averaged to 28.10 EUR/MWh in 2013.

The Wholesale energy markets provide key price signals which affect the choices of producers and consumers, as well as investment decision in production facilities and transport infrastructure. It is therefore essential that these signals reflect the real conditions of energy supply and demand. In order to secure that the price signals is right, the Nordic NRA:s are implementing a market monitoring framework for the wholesale energy markets, REMIT.

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Wholesale Market

1.3 A Competitive and Well-Functioning Nordic Wholesale Market

The Transmission System Operators (TSOs) in Sweden, Finland and Norway initiated a common project in 2010 to facilitate a common balance settlement; the Nordic Balance Settlement (NBS) project. The project is a follow up on the Nordic energy ministries declaration to establish a common Nordic end-user market for electricity, and the Nordic energy regulators (NordREG) proposals of measures that needs to be achieved to realise the goal of a common Nordic end-user market for electricity.

NordREG considers a common balance settlement as a prerequisite for a well-functioning common Nordic end-user market.

The project group published a design report for NBS[1] in December 2011. The design report describes a new balance settlement model with business processes which comprising e.g. market participants' responsibilities and reporting structure. The report also describes one of the core issues regarding a common balance settlement, such as invoicing, models for handling revenues and costs, risk management and collaterals.

The design report review on legal considerations has required the involvement of NordREG task forces'. On this background NordREG has in the recent years coordinated the work regarding the national legal changes to facilitate NBS.

According to the update time schedule, NBS is planned to be implemented in late 2015/early 2016. The involved stakeholders, market participants, grid companies, the project group and the national energy authorities is working to achieve this common goal in due time. The legal work is ongoing, in parallel with the participants', and as well the project groups' preparation period.

The project group established a joint service company eSett Oy in December 2013. eSett Oy is owned by the TSOs with an equal share, and the company will be located in Finland. eSett Oy will handle the daily operations related to NBS on behalf of the TSOs.

NordREG considers the project groups' design of NBS is highly correlated with NordREGs vision of a common balance settlement in the report 7/2010 - *Implementation Plan for a Common Nordic Retail Market*.

NBS with harmonised rules and regulations, a common standard for electronic communication, and a common operational unit for balance settlement with platform for customer service (eSett Oy) will lower the entry barriers for retailers and balance responsible participants with an ambition of operating in all countries. The measure facilitates increased competition across the borders of the involved countries between balance responsible parties on the one hand, and retailers on the other. Increase of competition may realize a socio-economic benefit to the

[1] Nordic Balance Settlement (NBS) – Common Balance & Reconciliation Settlement, Design. This report can be retrieved from webpage; nbs.coop.

electricity market. Furthermore, a joint company eSett Oy should enable economies of scale and lower the administration cost of balance settlement.

1.3.1 Capacity Calculation

In 2010 NordREG commissioned a report to study the functioning of the Nordic electricity market after the winter 2009/2010, where there had been some incidents with severe price speaks. Gaia consulting delivered a report, where it was suggested that there might be a potential for improvements in the capacity calculation procedures in Nordic market.

Capacity calculation and congestion management are fundamental to the functioning of the electricity market.

In the Framework Guidelines on Capacity Allocation and Congestion Management of Electricity (FG CACM) published by ACER in July 2011 it is stated that : *The CACM Network Codes shall require the use of either a Flow-Based (FB) method or an Available Transfer Capacity (ATC) method for capacity calculation at each zone border for a given timeframe*.

The FG CACM further states that: *The FB method for capacity calculation makes use of locational information in the grid model ..... without arbitrary assignment of capacity per border, and thus allows an efficient utilization of the network. This method is therefore to be preferred to the ATC method for short term capacity calculation in cases where transmission networks are highly meshed and interdependencies between the interconnections are high.*

But: *Provided that it is done in a coordinated way, ATC is considered as an acceptable method for short term capacity calculation in less meshed networks, such as the Nordic power system.*

A document describing and analysing the current method for capacity calculation in the Nordic Area was approved by the NordREG Board in June 2012. Based on this document NordREG concluded that the current method works sufficiently, although there is room for improvements in some areas.

NordREG stated in 2012 that it will closely follow the developments in the CWE (Central West Europe) region, taking part of the considerable amounts of information about the Flow Based method including testing results from the CWE region, and assess its implication for the Nordic area.

NordREG is looking further into different aspects of capacity calculation methods and the general flow based methodology. A NordREG expert group within the Wholesale and Transmission WG has been established to follow up on this.

The Nordic TSOs has initiated a common project on "Flow based market coupling in the Nordic". The project road map indicates mid 2015 as a possible time for a decision to start an implementation phase on flow based in the Nordic.

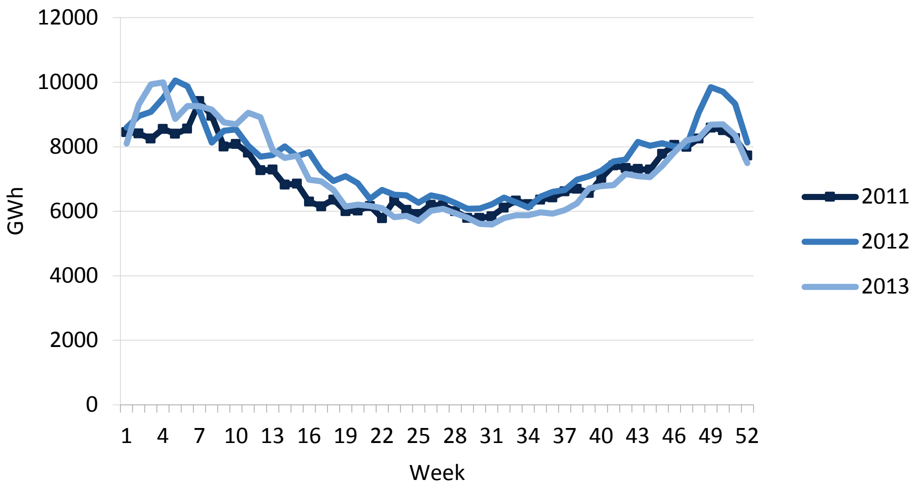
The NordREG expert group closely follows the work being done in the TSOs flow based project.

In 2014 NordREG will further follow up the TSOs to describe and analyse co-ordinated ATC and Common Grid Model. Whereas co-ordinated ATC is still an option in the Nordic, Common Grid Model is a requirement according to the current version of Network Code CACM whatever method of capacity calculation is chosen. In that respect it should be pointed out that the work has to take into account that the Network Code CACM is not yet finalized, and is not expected to be finalized before the end of 2014 at the earliest. Involvement of stakeholders through workshops on capacity calculation developments is also on the NordREG 2014 work plan.

1.3.2 Production of Electricity

The total power generation in the Nordic region in 2013 was 380 TWh – 19 TWh or 5 percent less than in 2012. The generation was at the same level with the 5-year and 10-year averages, which are both 381 TWh.

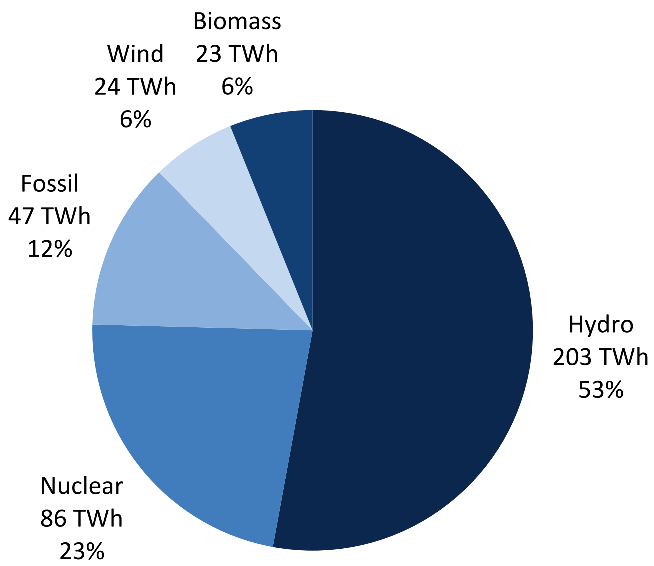
Figure 1. Total power generation in the Nordic region, 2011-2013



Source: Nord Pool Spot

The generation level was high during the first quarter, even though January and February were quite mild. Throughout the rest of the year the level of electricity generation was below average mainly due to low hydro power generation.

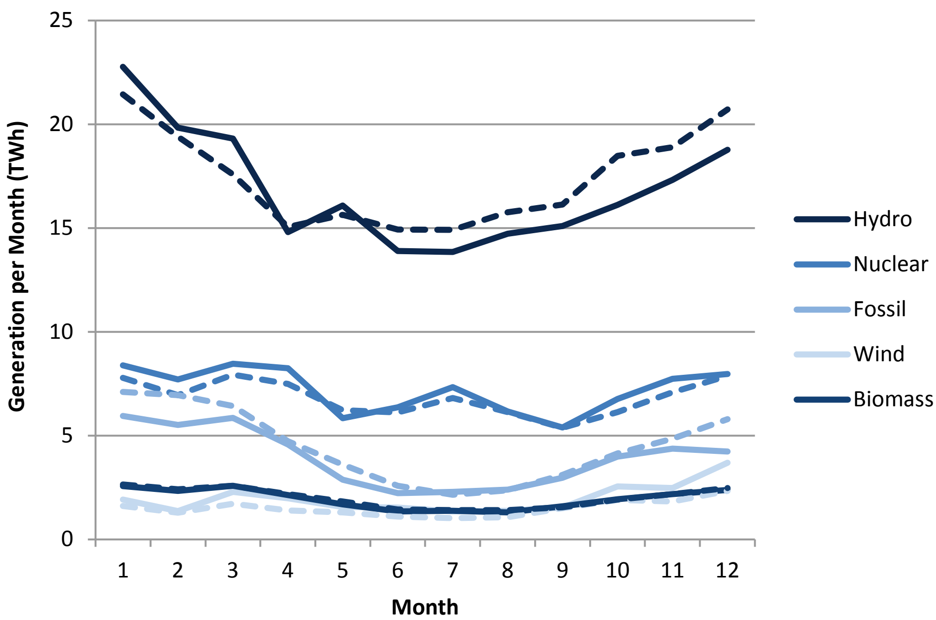
Figure 2. Power generation by power source in the Nordic region in 2013



Source: ENTSO-E

The power generation in the Nordic region is dominated by the hydro power. The amount of wind power generated electricity is increasing at the moment about 20 percent or 4 TWh per year.

Figure 3. Power generation by power source in the Nordic region in 2013. The dashed line represents the average of the past four years.



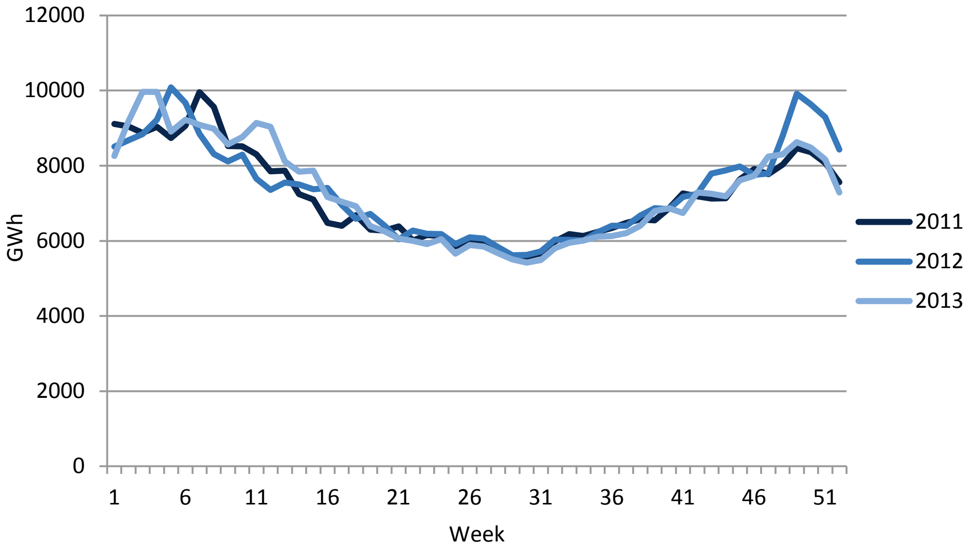
Source: ENTSO-E

1.3.3 Electricity Consumption

In the Nordic region electricity prices have historically been low due to a large share of cost-effective hydro power and nuclear power. This has resulted in abundance of energy intensive industry and a large share of electricity heated houses. Therefore the electricity consumption in the Nordic region is relatively high in comparison with other European countries. Development of overall energy consumption in the Nordic region depends on the development of the GDP and average temperatures during the year, with lower electricity demand in the summer and increased consumption in wintertime.

During 2013 the total Nordic electricity consumption was 380.5 TWh which is 6.1 TWh or 1,6 percent less than in 2012. The consumption was one percent below the 10-year average and showed a slighly decreasing trend.

Figure 4. Electricity consumption in the Nordic region (GWh/week), 2011-2013

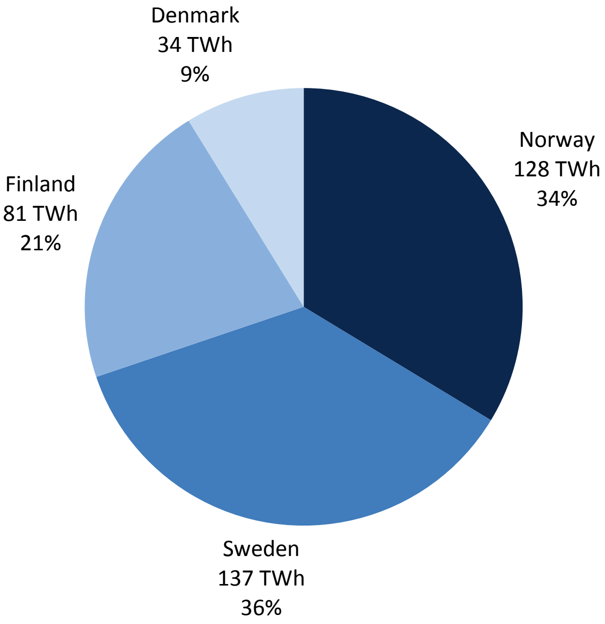


Source: Nord Pool Spot

The total consumption in Sweden was 137.5 TWh (141.7 TWh in 2012), in Norway it was 128.1 TWh (128.2 TWh in 2012), in Finland 81.4 TWh (82.9 TWh in 2012) and in Denmark 34.0 TWh (33.8 TWh in 2012). Thus the consumption decreased in each country compared to 2012 [2].

[2] The statistics in this chapter is from Nord Pool Spot and might differ from the consumption statistics from each of the NordREG members.

Figure 5. Electricity consumption in the Nordic countries in 2013



Source: Nord Pool Spot

1.3.4 Peak Load

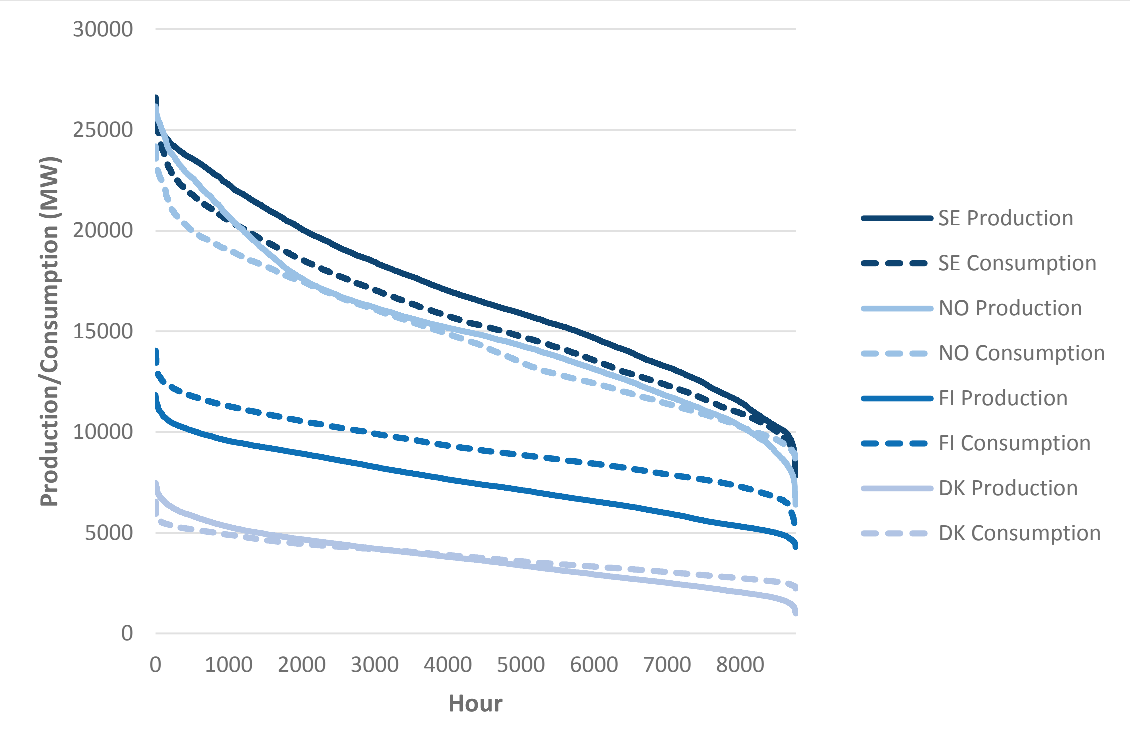
The load decreases significantly during night-time and peaks during the morning and late afternoon (when people start to work/uses domestic services at home). Usually peak load occur during winter when temperatures drop below zero Cº (December-February).

In 2013, the peak load in the Nordic region took place in week 4 on Friday (January 25) in the morning (hour 9). The peak load was 68,743 GW (68,837 GW in 2012). During this hour the import from neighbouring countries was 1,234 GWh.

In Denmark, demand peaked at 6,041 GW during the evening (17:00) on January 16 (6,124 GW in 2012). The national production was 5,106 GW during that hour. Swedish demand peaked at 26,612 GW in the morning (08:00) on January 25 (26517 GW in 2012). The national production was 25,919 GW. Finnish peak load occurred at 14,043 GW in the morning (8:00) on January 18 (14,304 GW in 2012). The national production was 11,843 GW. In Norway the demand peaked at 24,180 GW in the morning (08:00) on January 23 (23,443 GW in 2012). The national production was 25,716 GW.

The peak load production levels in 2013 were in each country approximately 30 percent below the nominal generation capacities.

Figure 6. Consumption and production duration curves in 2013

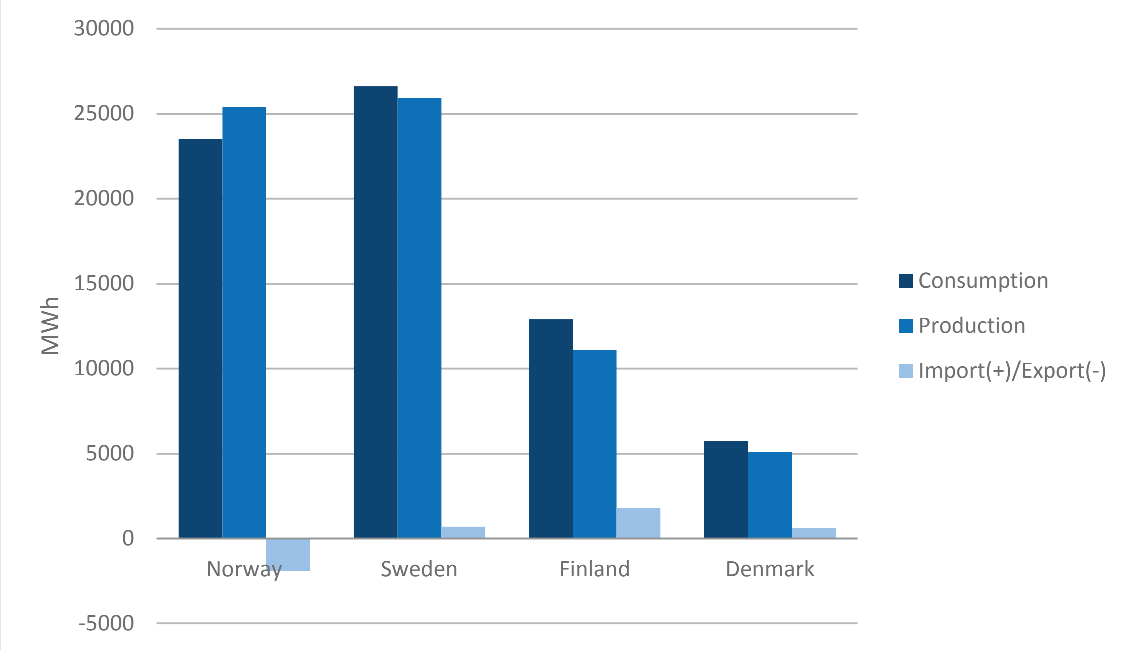


Source: Nord Pool Spot

There are several differences in the duration curves of the Nordic countries. The ratio of maximum and minimum consumption varies from 2.8 in Finland to 3.2 in Sweden, whereas the ratio of maximum and minimum production varies from 2.8 in Finland to 7.5 in Denmark. In Norway the surplus production is concentrated on hours where the production levels, and typically the demand levels as well, are high. In Sweden the production exceeds consumption consistently whereas in Finland the situation is the opposite.

In relative terms, i.e. when the curves are scaled by their average values, the flat consumption curve in Finland, the sloped production curve in Denmark and the biased production curve in Norway somewhat stand out from the others which have very uniform shape. This reflects the differences in the national generation capacities and how different types of sources can be adjusted. Hydro power can be stored and used when optimal, and the output of wind power can change significantly during the year. The structure of industry, residential heating systems and weather conditions for one contribute to the variations in consumption.

Figure 7. Consumption, generation and exchange in the Nordic region, January 25th, hour 9



Source: Nord Pool Spot

1.3.5 Regulating Volumes

Up or down regulating power is used when the consumption exceeds production or vice versa. It enables the TSO to ensure stable frequency in the transmission grid.

During the maximum up regulating hour which occurred on 5.12.2013 at 23:00, the volume of the regulating power was 4,292 MW. At that time up regulating power was produced especially in South-West Norway and West Denmark. The maximum down regulating hour occurred on 2.4.2013 at 19:00. The down regulating power was 3,189 MW and was mainly located in Southern Norway and Northern Sweden. The highest use of regulating power was recorded in the SE1, NO2 and NO5 price areas (1,258 MW in NO5), while annually most regulating power was produced annually in SE1 and SE2 (849 GWh during 80% of all hours in SE2).

Figure 8. Annual up/down regulating power (left axis) and percentage of up/down regulating hours (right axis) in 2013

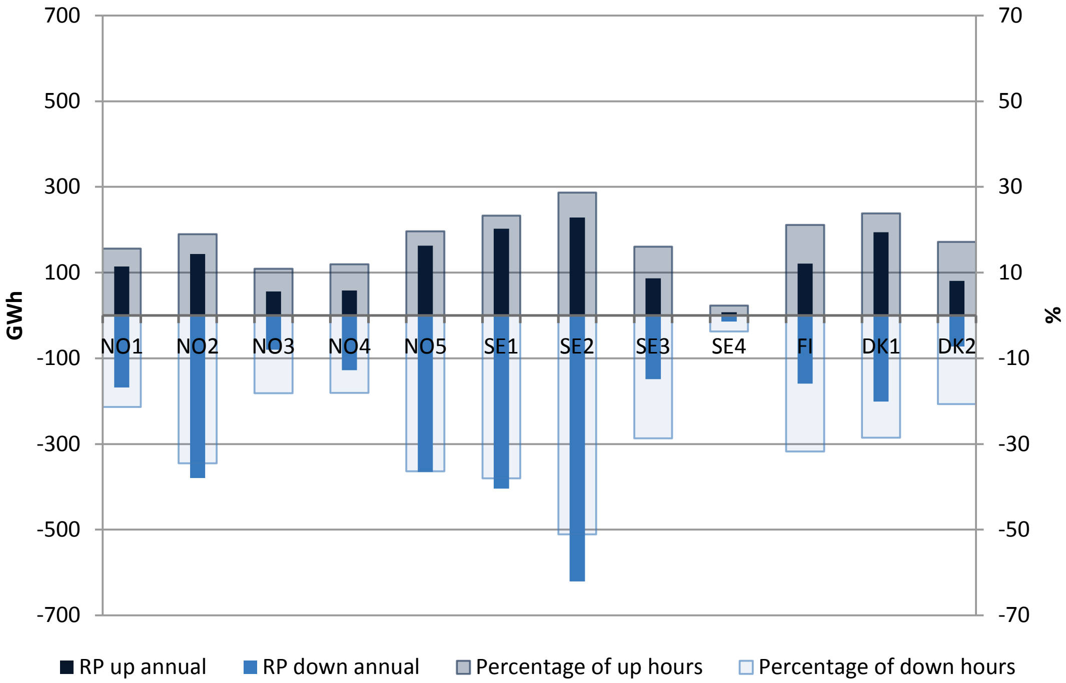
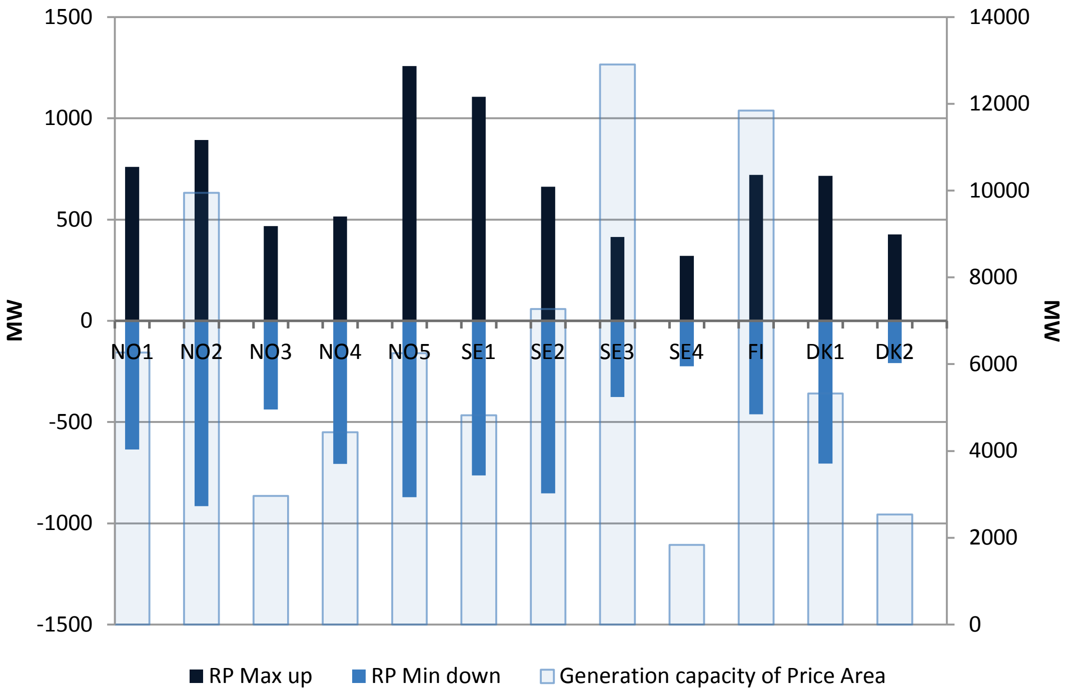


Figure 9. Maximum up/down regulating power (left axis) and the generation capacity of the respective Elspot area (right axis) in 2013

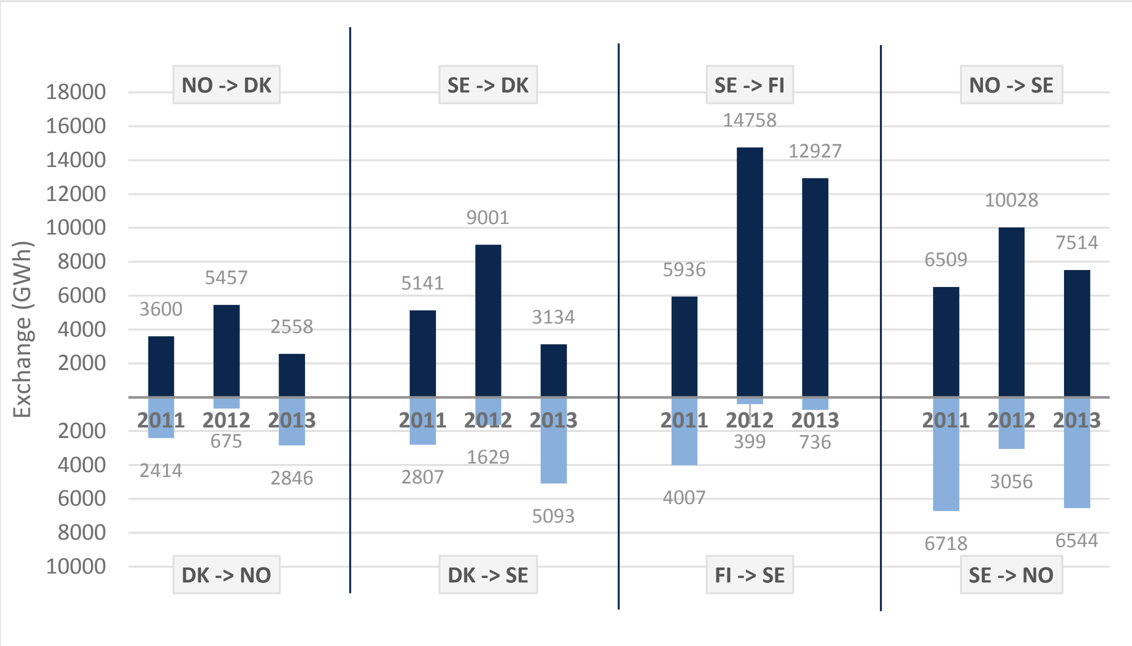


1.4 Cross-Border Power Flow

1.4.1 Between Nordic countries

Apart from the exchange between Finland and Sweden the flows between Nordic countries returned to more balanced levels compared to previous year. Finland net imported 12.2 TWh of electricity from Sweden (14.3 TWh in 2012), which was the highest value in 2013. The highest combined flows between two countries were those between Norway and Sweden which reached 14 TWh. The flow from Denmark to Norway and Sweden increased from 2.3 TWh in 2012 to 7.9 TWh in 2013.

Figure 10. Nordic power exchange 2011-2013

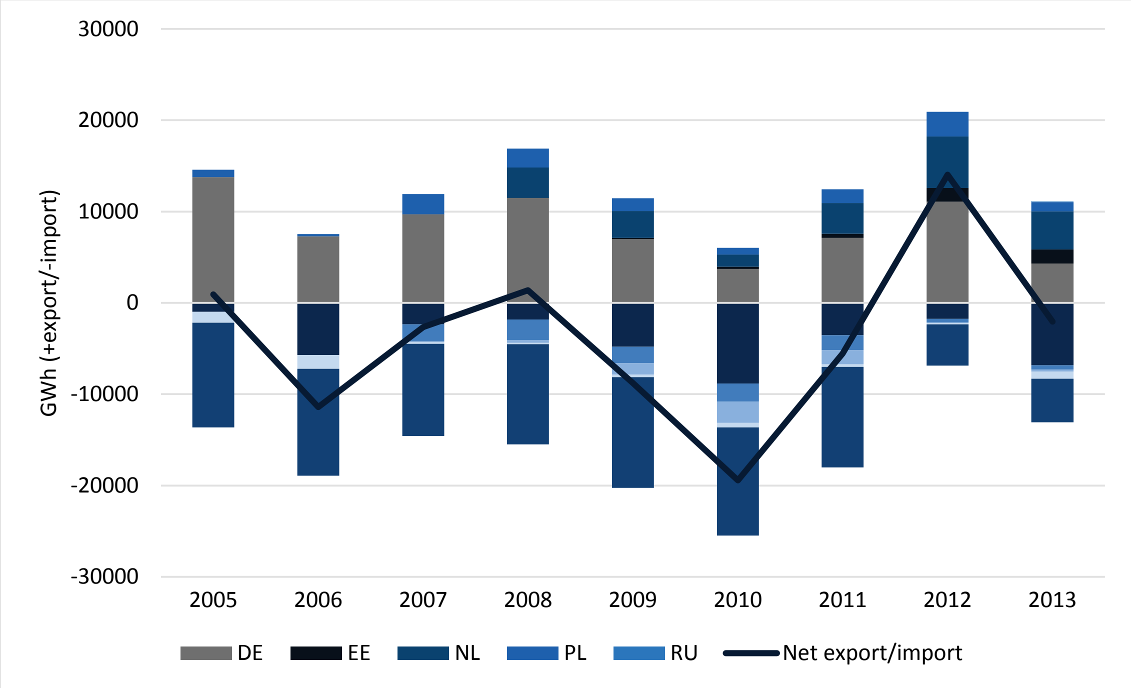


Source: ENTSO-E

1.4.2 Between Nordic Region and Northern Europe

In 2013 the net exchange between the Nordic region and its neighbouring countries was 2.1 TWh on the import side (export of 12 TWh in 2012). The import flow was 13.1 TWh and the export flow 11 TWh. The total volume of flows in and out of the Nordic region, 24,1 TWh, was on its lowest level within the period of 2005-2013. The direction of the flow between the Nordic region and Germany changed notably from the previous year as the export halved and the increased import surpassed the export. Netherlands remained a large export target and the import from Russia remaind relatively low.

Figure 11. Nordic power exchange 2005-2013



Source: Nord Pool Spot

Table 1. Import from neighbouring countries, TWh

	Russia (RU)	Poland (PL)	Netherland (NL)	Estonia (EE)	Germany (DE)	Total
2005	11,5	1,2			1,0	13,6
2006	11,7	1,5			5,7	18,9
2007	10,1	0,2		1,9	2,3	14,6
2008	11,0	0,1	0,3	2,3	1,8	15,5
2009	12,1	0,3	1,3	1,8	4,8	20,3
2010	11,8	0,5	2,3	2,0	8,8	25,5
2011	11,0	0,3	1,6	1,7	3,5	18,0
2012	4,5	0,1	0,1	0,4	1,7	6,9
2013	4,8	0,8	0,2	0,5	6,8	13,1

Source: Nord Pool Spot

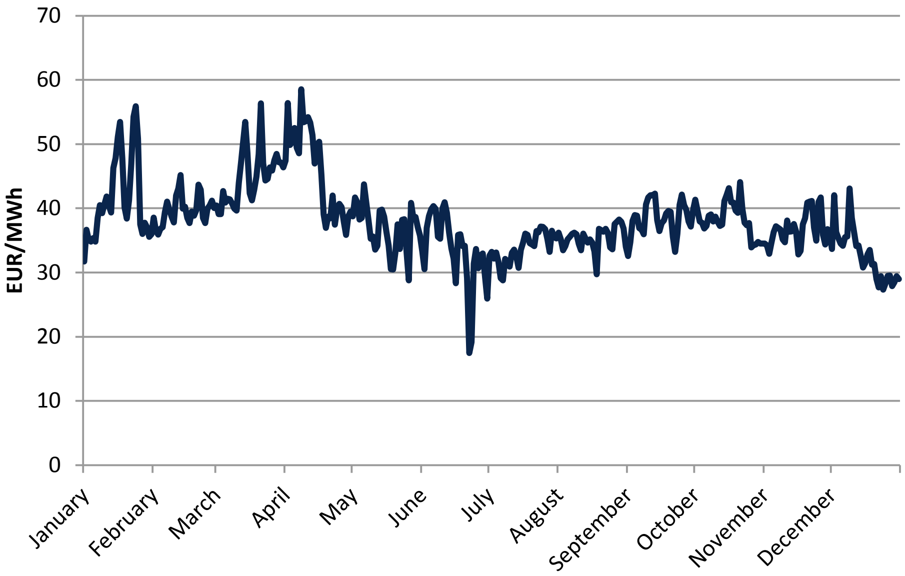
Table 2. Export to neighbouring countries, TWh

	Russia (RU)	Poland (PL)	Nether-lands (NL)	Estonia (EE)	Germany (DE)	Total	Net exchange	Total flow
2005	0,0	0,8			13,8	14,6	0,9	28,2
2006	0,0	0,3			7,3	7,5	-11,4	26,5
2007	0,0	2,2		0,0	9,7	11,9	-2,7	26,5
2008	0,0	2,1	3,3	0,0	11,5	16,9	1,4	32,4
2009	0,0	1,4	3,0	0,1	7,0	11,5	-8,8	31,7
2010	0,0	0,8	1,3	0,2	3,7	6,0	-19,4	31,5
2011	0,0	1,5	3,4	0,5	7,1	12,5	-5,5	30,5
2012	0,0	2,7	5,6	1,5	11,1	20,9	14,1	27,8
2013	0,0	1,0	4,2	1,5	4,3	11,0	-2,1	24,1

1.5 Day-Ahead Market

The yearly average system price[3] in the Nordic region increased by 22 percent from 2012 to 38.10 euro/MWh in 2013. The increase is mainly due to a worse hydrological situation. The highest monthly price of 45.62 euro/MWh occurred in April, when cold weather was the cause of high consumption and delayed snow melting to the hydro reservoirs. Prices dropped with the arrival of warmer weather and the spring thaw. From May and throughout the year prices remained stable at around 35.69 euro/MWh. December 2013 was particularly mild, which contributed to a monthly average of 32.66 euro/MWh. That is 24 percent less than in December 2012, and the lowest monthly price of 2013. There was less overall variability in the system price in 2013, than the year before.

Figure 12. Systemprice 2013, EUR/ MWh



Source: Nord Pool Spot

1.5.1 Price Differences between Nordic Areas

Price differences occur in the Nordic power system when there is not enough transmission capacity available between two different bidding areas to equate prices. For example, there can be maintenance work or failure in the transmission network that temporarily reduces capacity. It could also be fundamental difference in the scarcity of power between two bidding areas so that the normal available transmission capacity would lead to price differences.

There were less price differences between the Elspot areas in 2013 than 2012. The Elspot areas where hydro power is the dominant production technology experienced the largest change in power prices. Norway and Northern Sweden (SE1 and SE2) had yearly relative change of 23-27 percent increase in prices, whereas Denmark (DK1 and DK2) and Finland with mainly thermal power had an increase in the yearly power price of 5-12 percent.

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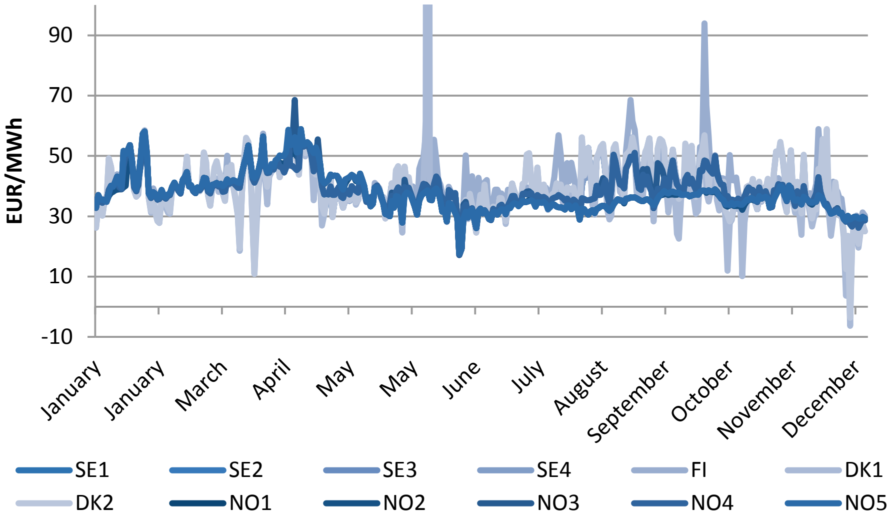
[3] The system price is calculated as the price that would be realized if there were no congestions between the Elspot areas.

Figure 13. Area prices for the Nordic bidding areas 2013



Source: Nord Pool Spot

The difference between the highest and lowest average annual price was 3.82 euro/MWh in 2013. This price spread was 8.61 euro/MWh in 2012. Finland had the highest average power price among the Nordic Elspot areas in 2013, where DK2 had the highest in 2012. The Elspot area with lowest average price changed to NO2 in 2013, from NO5 in 2012. Finland had a tighter power balance in 2013. fault on the Norned- interconnector and installation of new cables across the Oslo fjord contributed to a lock-in effect of power in NO2.

Table 3. Average price in the different Nord Pool spot areas, 2013

Spot prices €/MWh	2013	Change from 2012
East Norway (NO1)	37.56	27 %
South West NorwayNO2)	37.33	28 %
Mid Norway (NO3)	38.96	24 %
North Norway (NO4)	38.60	24 %
West Norway (NO5)	37.60	30 %
Sweden Luleå (SE1)	39.19	24 %
Sweden Sundsvall (SE2)	39.19	23 %
Sweden Stockholm (SE3)	39.45	22 %
Sweden Malmö (SE4)	39.93	17 %
Finland (FI)	41.16	12 %
West Denmark (DK1)	38.98	7 %
East Denmark (DK2)	39.61	5 %

Source: Nord Pool Spot and EEX

The Danish Elspot area, DK1 and DK2, had negative prices for 39 and 30 hours respectively in 2013, due to high wind power production. For two hours on June 7th, DK1 reached the technical maximum curtailment price on Nord Pool Spot of 2000 euro/MWh. This was due to revisions on thermal power plants coinciding with grid maintenance, at the same time as low wind power production. Wind production is further discussed in section 1.6.3.

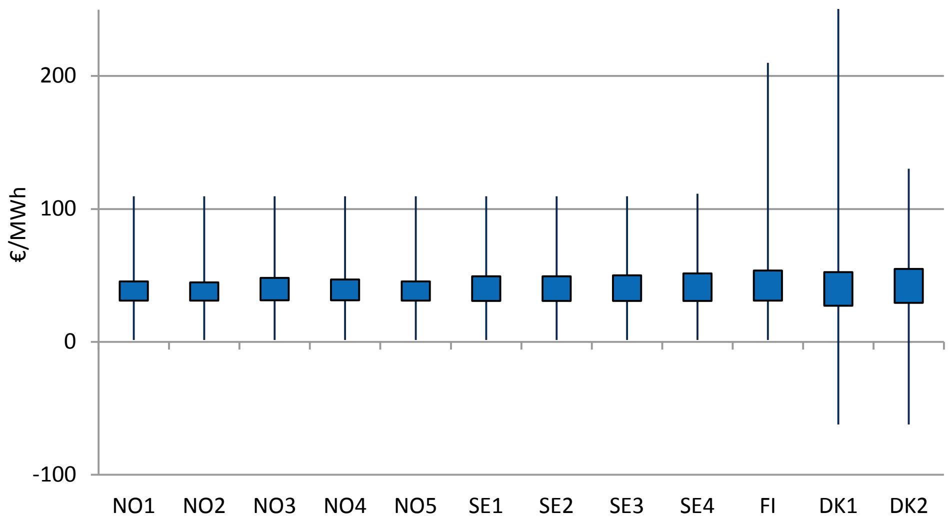
Table 4. Price differences in percentage of all hours in between Nordic spot areas, 2013

		NO1	NO2	NO3	NO4	NO5	SE1	SE2	SE3	SE4	FI	DK1	DK2
2013		Less than											
NO1	Higher than		10 %	17 %	19 %	3 %	18 %	18 %	18 %	18 %	18 %	33 %	21 %
NO2		0 %		17 %	19 %	3 %	18 %	18 %	18 %	17 %	17 %	31 %	21 %
NO3		37 %	42 %		6 %	38 %	7 %	7 %	7 %	7 %	7 %	36 %	16 %
NO4		35 %	40 %	0 %		36 %	5 %	5 %	5 %	5 %	5 %	34 %	14 %
NO5		4 %	13 %	18 %	20 %		20 %	20 %	19 %	19 %	19 %	35 %	23 %
SE1		35 %	39 %	9 %	11 %	35 %		0 %	0 %	0 %	0 %	31 %	10 %
SE2		35 %	39 %	8 %	11 %	35 %	0 %		0 %	0 %	0 %	31 %	10 %
SE3		35 %	39 %	11 %	13 %	35 %	3 %	3 %		0 %	0 %	32 %	10 %
SE4		36 %	40 %	15 %	17 %	37 %	7 %	8 %	5 %		5 %	34 %	10 %
FI		42 %	45 %	24 %	27 %	42 %	19 %	19 %	17 %	16 %		43 %	25 %
DK1		28 %	30 %	17 %	19 %	29 %	13 %	13 %	11 %	10 %	10 %		2 %
DK2		37 %	41 %	20 %	22 %	38 %	14 %	15 %	13 %	10 %	11 %	26 %	

Source: Nord Pool Spot

Table 3 shows price differences in 2013 between the Elspot areas. For example, Southern Sweden (SE4) had prices that were higher than SE3 in 5 per cent of the time in 2013. Further, SE3 was at no point in 2013 higher priced than SE4, so prices between these Elspot areas were equal in 95 percent of last year.

Figure 14. Area prices: highest, 90 % to 10 % (blue box) and lowest



Source: Nord Pool Spot

Figure 11 shows the distribution of prices in the Nordic price areas. 80 percent of the power prices are contained within the blue box. The Danish Elspot areas were the only areas in the Nordic power system that observed negative prices. High wind power production in hours with low demand, may have been the cause.

1.5.2 Common Price

There was a common Nordic price for 23.4 percent of the hours in 2013. This share has fallen from 25.1 percent in 2012 and 26.2 percent in 2011. More than 50 percent of the hours in 2013, there was only two different prices in the Nordic electricity market.

Figure 15. Number of Nordic price areas

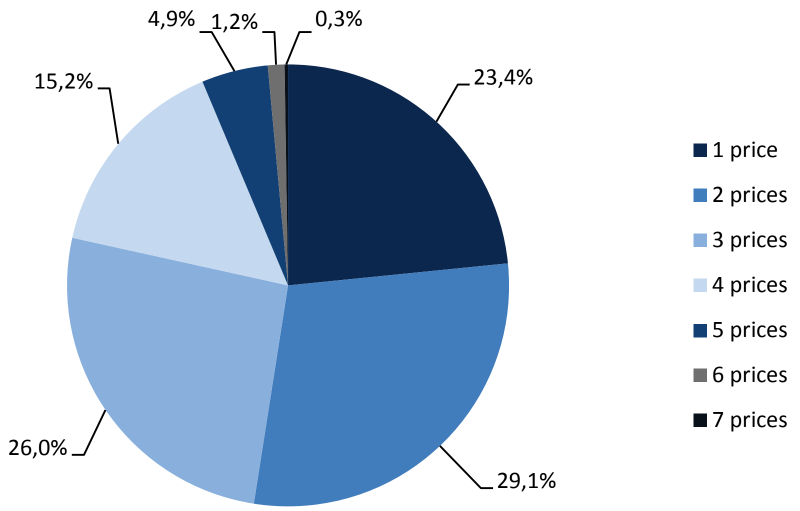
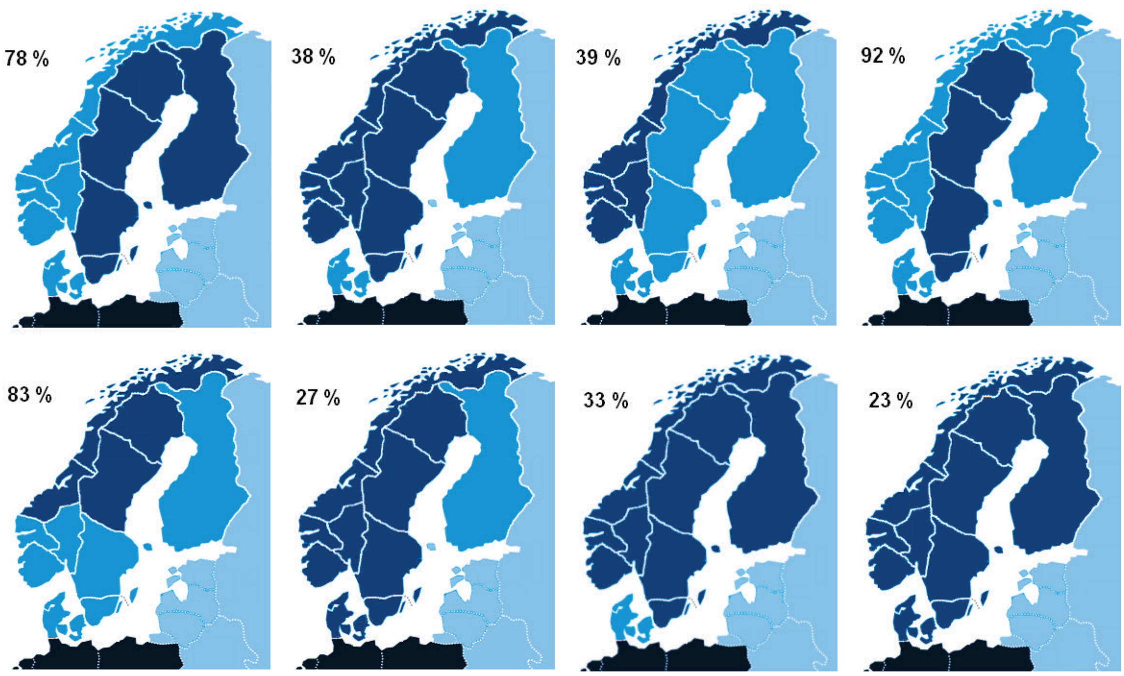


Figure 16. Percentage shares (dark blue) of the number of hours with equal prices in 2013



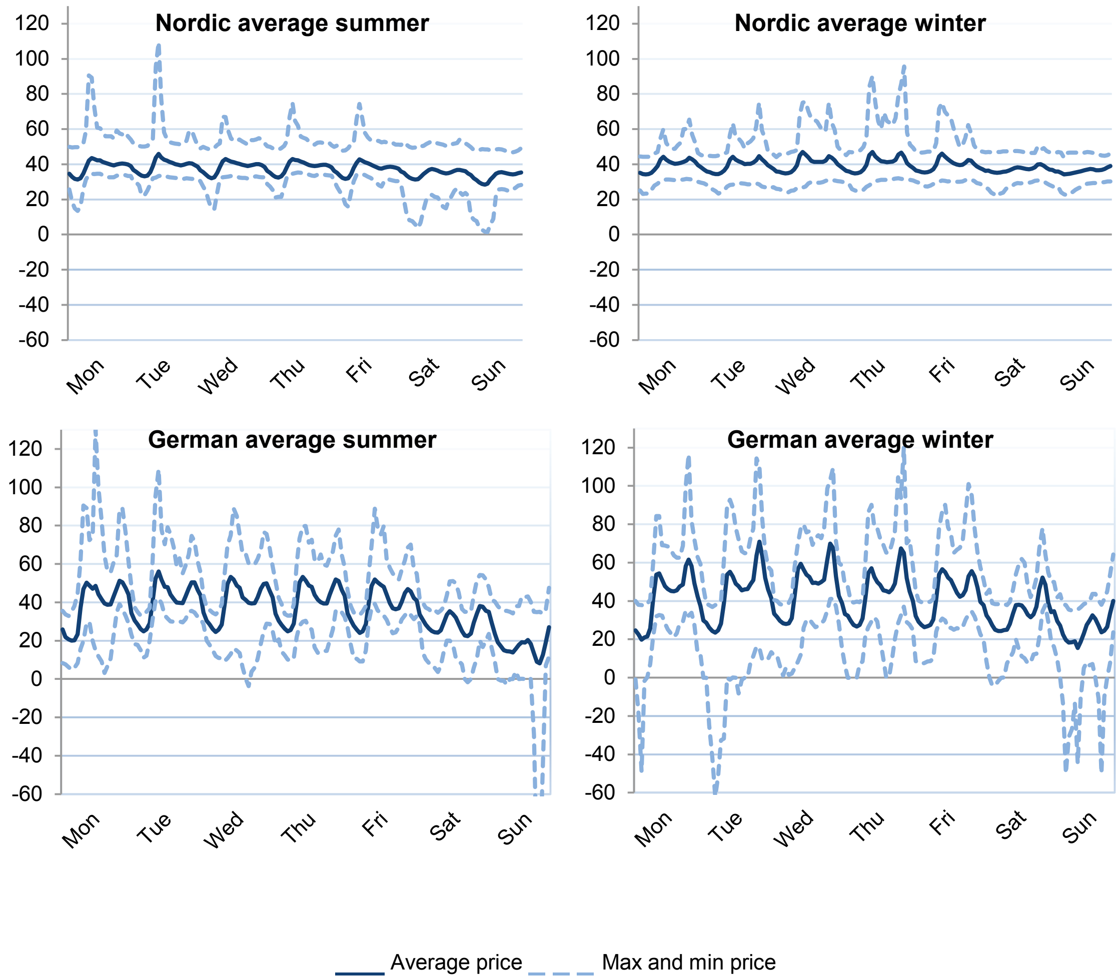
The dark blue colored areas denote which areas who had the equal prices in 2013. In the top left corner it is shown that Finland and the four Swedish price areas were price coupled in 78 percent of the time last year. Mid and North Norway was coupled with SE1 and SE2 in 83 percent of the year. Norway and Sweden is considered had equal prices in 38 percent of the time.

1.5.3 The Nordic System Price Compared to European Prices

The price differences between Nord Pool Spot (system price 38.10 euro/MWh) and the European Power Exchange (EPEX DE 37.78 euro/MWh) was less than in the previous year (NPS 31.20 euro/MWh and EPEX 42.60 euro/MWh in 2012). The direction of the price spread changed as the prices in the Nordic countries increased (22 %), while the German power prices went down (-11.3 %). Figure 14 shows that the German price structure is more variable than the Nordic. This contributes to power exchange between the Nordic and German power system. The high share of wind power contributes to the price volatility in Germany. High wind power production in weekends or at night, when the demand for power is low can for example lead to negative price as seen in figures 16 and 17.

Figure 17. Nordic system price and German wholesale price - average, maximum and minimum hourly prices during the summer weeks (14-39, 2013), Eur/MWh

Figure 18. Nordic system price and German wholesale price– average, maximum and minimum hourly prices during the winter weeks (40-13, 2013), EUR/MWh



Source: Nord Pool Spot and EEX

1.6 Intraday Market

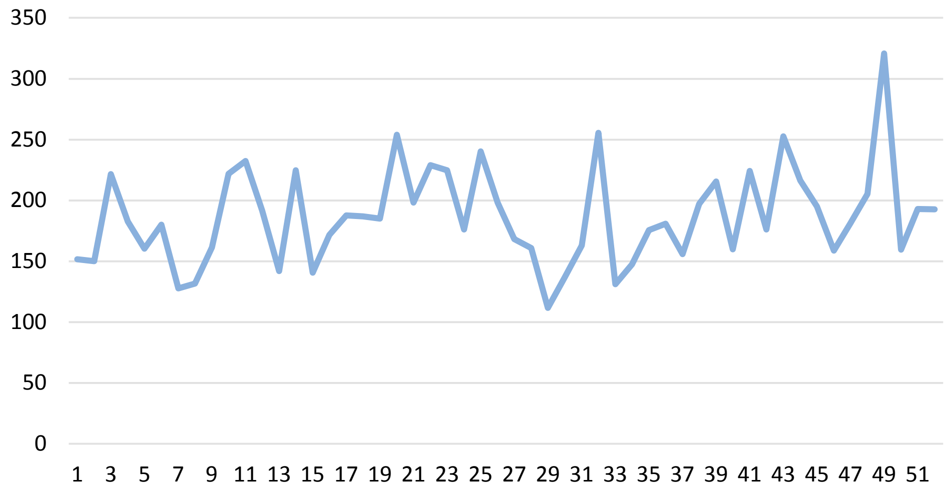
Due to the time span of up to 36 hours between Elspot price-fixing and delivery, participants need market access in the intervening hours to improve their physical electricity balance. The Elbas Market enables continuous trading with contracts that lead to physical delivery for the hours traded on the Elspot market and are more than one hour from delivery. The Elbas market is open around the clock until one hour before delivery. The participants are power producers, distributors, industries and brokers.

The volume of the day-ahead market totalled 6139.2 GWh 2013.

Table 5. Volume of the Nordic intraday market Elbas in 2013 (GWh)

NO1	NO2	NO3	NO4	NO5	SE1	SE2	SE3	SE4	FI	DK1	DK2	Total
115.0	160.8	56.4	79.5	44.2	490.1	968.0	1344.2	228.6	1389.1	866.9	396.4	6139.2

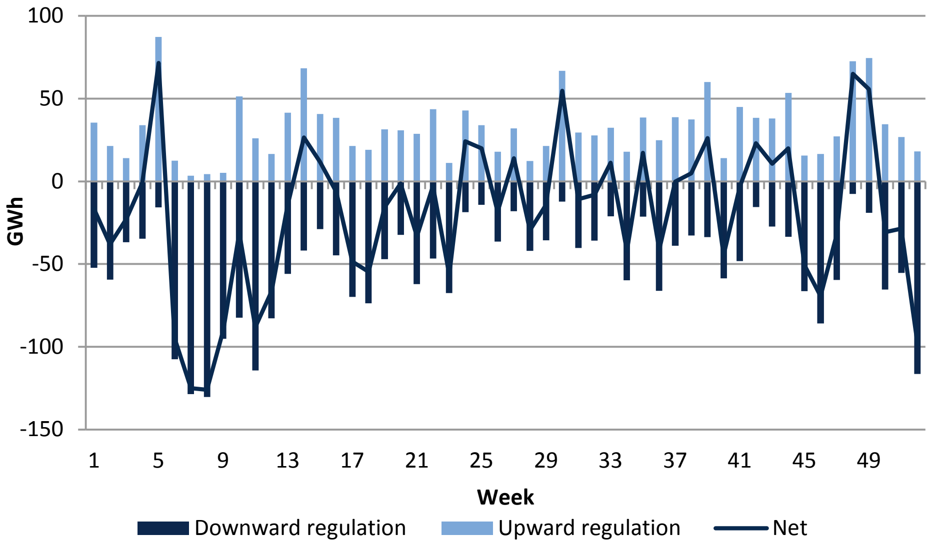
Figure 19. Weekly intraday volumes for the whole of Nordic 2013 (GWh)



1.7 Balancing Markets

The purpose of the balance settlement system is to settle imbalances from deliveries between consumers and producers of electricity. In the Nordic system, a supplier with imbalances are required to settle these with the TSO. The weekly balancing quantities are illustrated in figure 16.

Figure 20. Weekly regulating volumes for the whole of Nordic area 2013



Source: Nord Pool Spot

The total volume of the Nordic balancing market was 4197.2 GWh in 2013 which is less than the previous year, 2012 which totalled 4416.8 GWh.

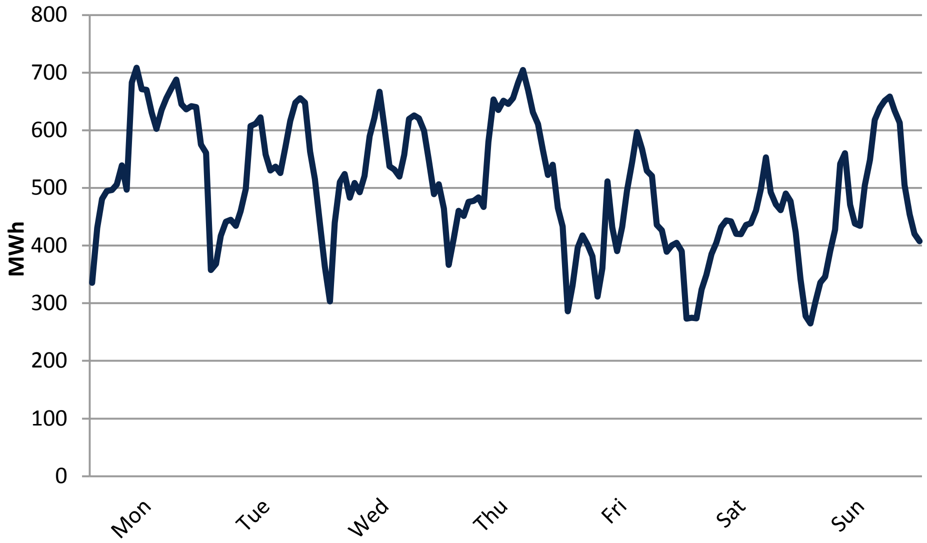
Table 6. Volume of the Nordic balancing market 2013 (GWh)

2013	NO1	NO2	NO3	NO4	NO5	SE1	SE2	SE3	SE4	FI	DK1	DK2	Total
GWh	282.1	523.4	136.2	186.3	527.7	606.6	849.2	235.3	21.7	280.0	395.4	153.2	4197.2

Source: Nord Pool Spot

Figure 17 illustrates the regulating volumes during an average week. Balancing power is typically used more often during daytime and hours of peak consumption than hours with low consumption.

Figure 21. Hourly regulating volumes for the Nordic area for an average week in 2013



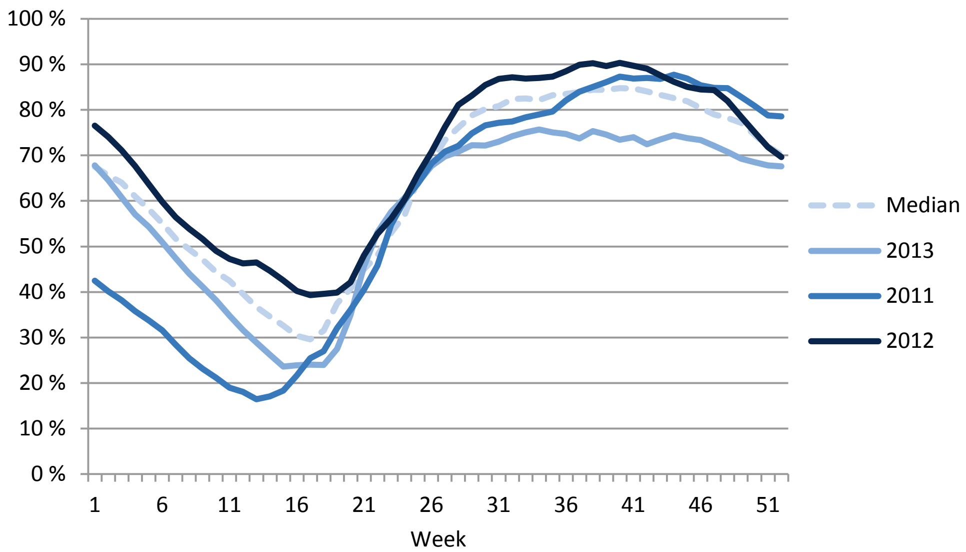
Source: Nord Pool Spot

1.8 Price Drivers

1.8.1 Hydrology – reservoir levels and inflow

The ability of the Nordic power system to store energy in hydro reservoirs has a cushioning effect on prices. Inflow during summer and in periods with low demand can be used in the winter. This could explain why there is less variation in the Nordic price structure, than that of Germany, as illustrated in and 15. Hydrologic forecasts have an impact on prices since more or less energy than normal (expected) will influence the price level down or up.

Figure 22. Reservoir levels in the Nordic region, 2010 – 2013



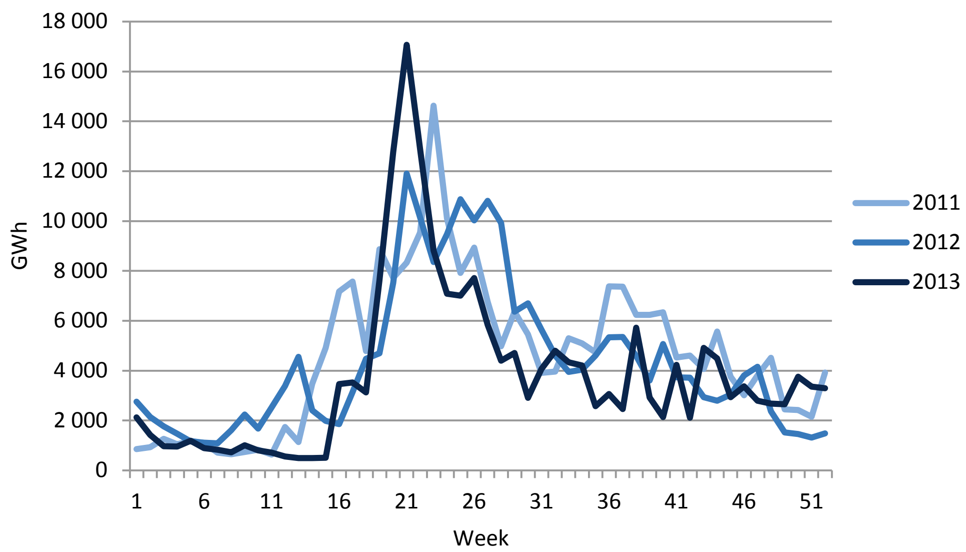
Source: Nord Pool Spot

2013 started with normal reservoir levels. This is 9 percentage points lower than the record high levels of 2012. This indicates more scarcity of energy in 2013 in comparison to 2012, and is a contributing factor to higher prices. Nordic reservoir levels reached the low point in week 16 at 26 per cent, and did not start to rise before week 18. Cold weather delayed the snow melting season and increased consumption, which in turn increased prices.

The reservoir levels in the Nordics reached a maximum of 76 percent in week 34, which is 7 percentage points less than normal. Lower precipitation than normal in the summer and less energy stored as snow from contributed to this. The dry summer of 2013, and less precipitation during the autumn than normal caused the reservoir levels to 72 percent 12 percent less normal levels in week 42. Because of the development in hydro resources becoming less available compared to normal, prices were increasing, because energy from rain fell short of the expected outcome.

For the remainder of 2013 however, the reservoir levels did not drawn than as fast normal, or compared to 2012. The result at the end of 2013 was normal reservoir levels at 68 percent, the same as in week 1. One reason for this was that precipitation in the fourth quarter was higher than normal, which also led to more inflow than expected.

Figure 23. Effective inflows to the Nordic water reservoirs, 2011 – 2013



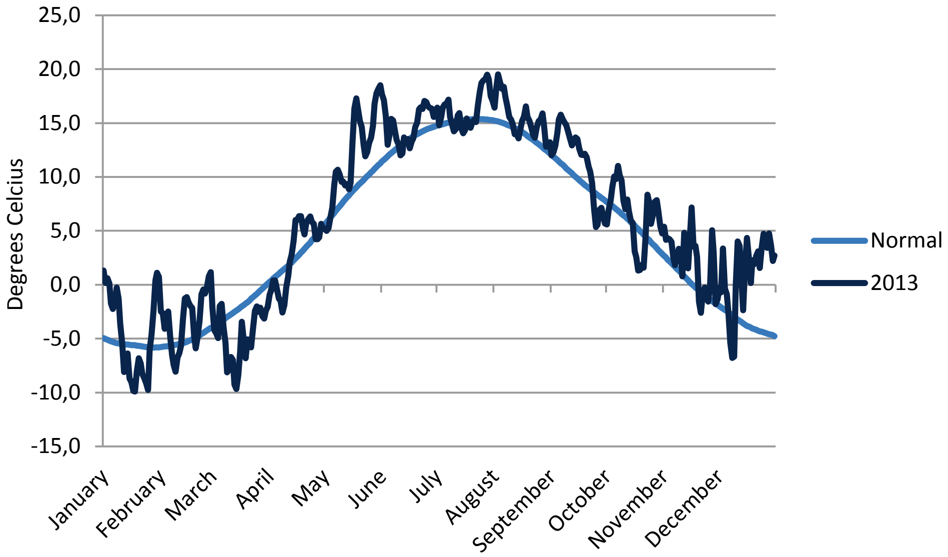
Source: Nord Pool Spot

The inflow to the Nordic hydro reservoirs represented about 199 TWh of energy in 2013. That is 6 percent less than 2012, and 17 percent less than 2011. This had an increasing effect on the prices. The inflow peaked in week 21, with 17 TWh. Because of lower hydro reservoirs, the ability to store inflow was better in 2013, than in 2012. The potential for inflow to contribute to lower prices was lower in 2013, compared to 2012.

1.8.2 Temperature

Temperature is a main price driver in the Nordic countries. Cold temperatures raises heat demand, since electricity is extensively used for heating in the Nordic countries, especially in Norway and Sweden. Colder temperatures than normal will typically increase prices because of raised power demand. However, in special cases, combined heat and power plants where heat is the primary product, the heat demand could spark secondary electricity production and have a decreasing effect on prices.

Figure 24. Mean temperature in the Nordic region[4] in 2013 compared to a normal year



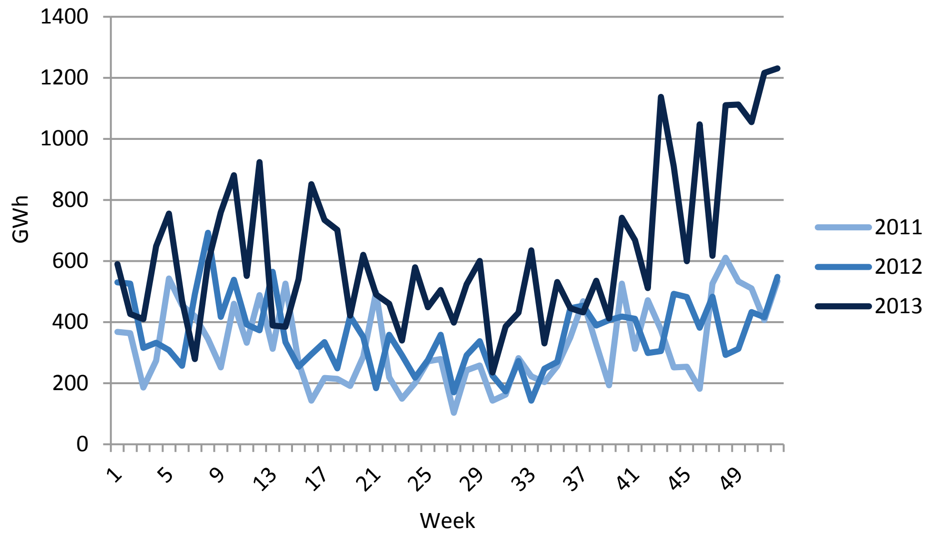
Source: SKM SYSPower

It was generally warmer in 2013 than normal. Average temperatures were about 1.4 degrees above normal. Note that temperatures at the end of March and early April were lower than normal. This impacted prices both by increasing consumption, and by delaying snow melting. The temperatures were 4.7 degrees higher than normal in December. This led to less consumption that would be expected if the Nordic countries received normal temperatures. This was a major reason why the hydro reservoir regained a normal level at the end of 2013, despite being lower than normal for the majority of 2013.

[4] Temperature measured daily in 13 Nordic cities (Oslo, Bergen, Trondheim, Tromsø, Helsinki, Sodankyla, Vasa, Tampere, Stockholm, Gothenburg, Östersund, Luleå and Copenhagen).

1.8.3 Wind

Figure 25. Nordic weekly wind production

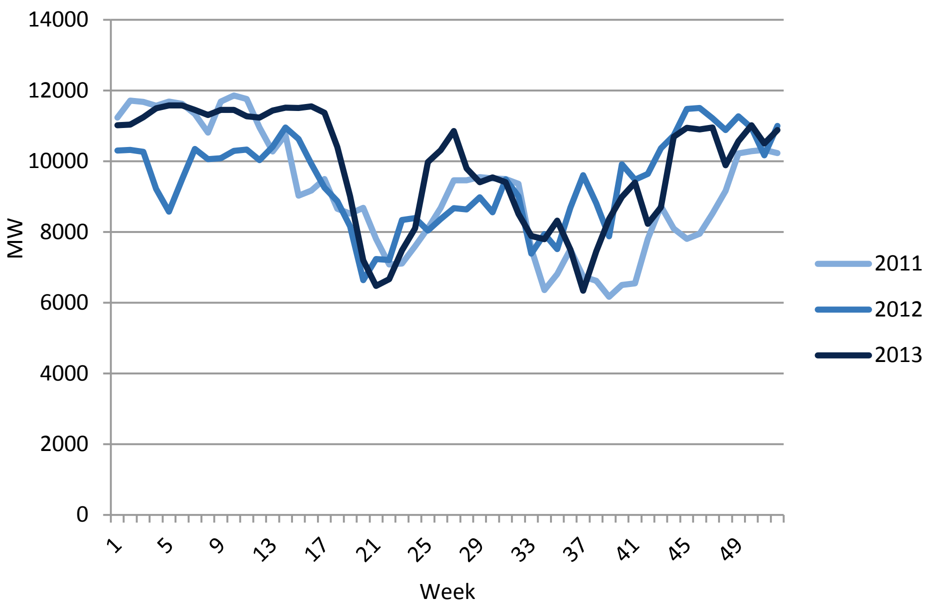


Source: SKM Syspower

In 2013, the Nordic countries produced about 34.6 TWh of wind energy, which is 66 percent higher than 2012. The fourth quarter of 2013 was particularly windy. Wind energy has a negative effect on prices as there is no fuel cost connected to production. Wind energy may in some cases cause negative prices in hours with low demand. On the other hand, when wind production fall short of expected values, it may be a contributing factor to high prices, both in the Day-Ahead and Intra-day markets.

1.8.4 Nuclear Availability

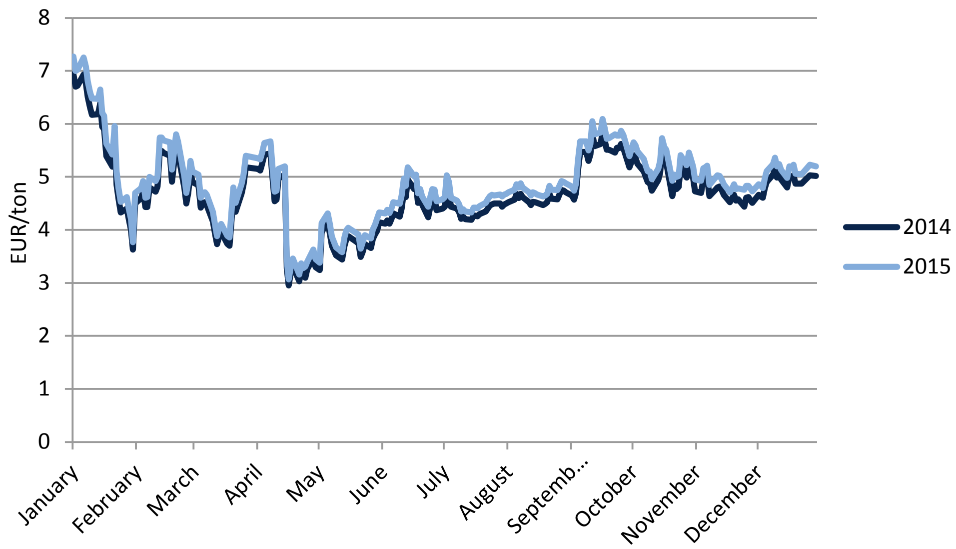
Figure 26. Nordic weekly nuclear production



The nuclear capacity in the Nordic power system is location mainly in SE3 (9.531 MW) while the rest is located in Finland (2.752 MW). The nuclear power production was about 86 TWh, which is an increase of percent 4 percent, compared to 2012. Like wind, nuclear power has negligible fuel cost, but the more stable production profile of the power plants make them suitable for base load production. The prices will be lower the higher the availability of nuclear power and vice versa. Since the nuclear power plants stands for such a high share of the total power balance, unexpected failures may have large price effects. The average nuclear availability rose from 77 percent in 2012 to 80 percent in 2013. The increase in availability had a dampening effect on prices. Note that in the spring weeks 14-16 of 2013, the nuclear availability was high compared to 2011 and 2010. This can have prevented high prices since the snow melting was delayed and hydro power production was low at the time.

1.8.5 Co2 Allowances and Fuel Prices

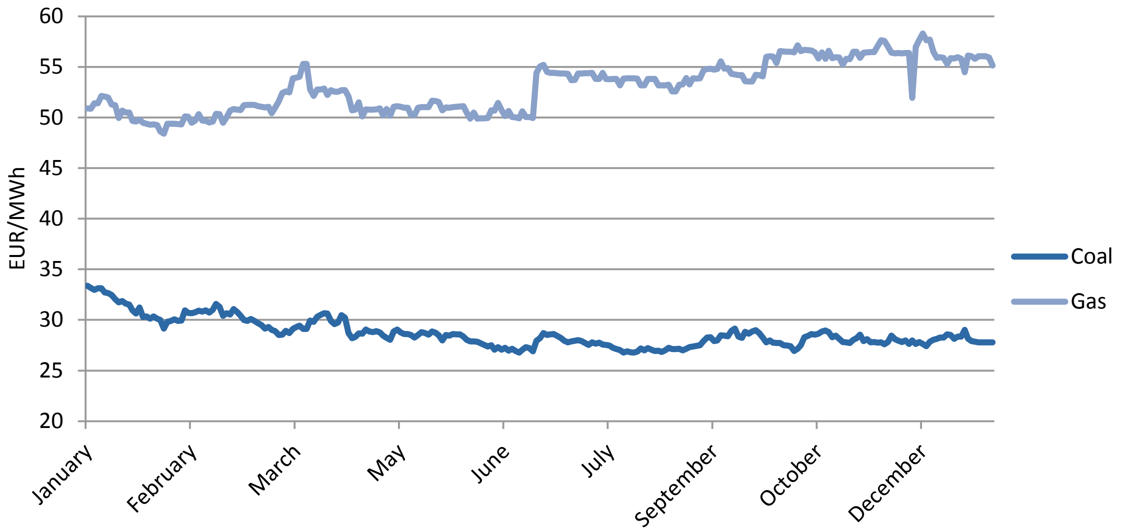
Figure 27. Price on CO2 emission allowances



Source: Nasdaq OMX Commodities

The average CO_2 price for emissions in 2014 fell by 44 percent last year in comparison to 2012. At the end of 2013, the cost of emissions was 5 euro/ton CO_2 in 2014. The fall in emission prices promoted thermal production of fossil fuel sources. Since thermal power is the opportunity cost of flexible hydro power with a reservoir, this also affected the value of water negatively. The decline in the price of CO_2 thus drove the price of power down in the Nordic countries.

Figure 28. Estimated short run marginal costs for electricity production



Source: SKM Syspower

The estimated marginal cost of coal averaged 28.7 EUR/MWh in 2013, in a power plant with 40 percent efficiency. Coal production was approximately 19 percent cheaper in 2013 than the year before. This is due to cheaper coal prices, but also because of cheaper CO_2 prices. The decline in CO_2 prices had a larger effect on the marginal cost of coal as this is more carbon intensive than gas and oil. Since coal often is the marginal production technology in the Nordic power system, this had a negative effect on prices. Gas powered turbines with an estimated 54 percent efficiency saw an increase in 4 percent from 2012 to an average of 53 Eur/MWh in 2013, since prices on natural gas increased more than the corresponding savings of a lower CO_2 price.

1.8.6 Congestion

Figure 29. Maximum transmission capacities and interconnections congested over 50% of the time (red) in 2013

Congestion in the interconnectors is a price driver since it creates lock-in-effects. During 2013 the following interconnections were notably congested, time of congestion is showed within brackets; NO2-DK1 (62.5%). NO1-NO3 (54.5%) and NO1-SE3 (52.1%). In previous year only NO2-DK1 (55.4%) was above the level of 50 percent. Otherwise the interconnections were less congested than in 2012.

The interconnections where the average flow was high with respect to the maximum capacity were. NO4->NO3 (average flow 68.9% of the maximum capacity). SE1->FI (60.1%). DK1->DK2 (54.6%) and NO4->SE2 (49.3%). From these interconnescions only DK1->DK2 was moderately congested (28.6%).

Estlink between was congested 25.6 percent of the time while the average flow was 59.5 percent of the maximum capacity. The ITVC connections were congested 50-70 percent of the time and the utilisation rates were between 50-75 percent. The connection between Norway and Netherlands (NO2-NL) was the most congested. There the maximum capacity was used 66.4 percent of the time. The most effiently utilised connection was the one between Germany and Denmark (DE-DK2) where the average flow was 77.1 percent of the maximum capacity.

1.9 Concentration in Wholesale Markets

NordREG has incorporated a component that illustrates the characteristics of the wholesale market. The key argument for this is that without a well-functioning wholesale market the development of competitive retail market is not feasible. If the wholesale market is not competitive, the actors in the wholesale market can discriminate between actors in the retail market, thus constraining the competition not only in the wholesale market but also in the retail market.

1.9.1 Market Concentration

As seen in table 7. Concentration index (HHI) for the Nordic wholesale markets per bidding area, 2013, market concentration is highest in Swedish SE1 and Danish DK2 and lowest in Norwegian NO3 and Danish DK1. The market concentration index (HHI) is calculated as sum of squared market shares based on installed capacity, and give an indication of the likelihood of market power being used.

Table 7. Concentration index (HHI) for the Nordic wholesale markets per bidding area, 2013

2013	NO1	NO2	NO3	NO4	NO5	SE1	SE2	SE3	SE4	FI	DK1	DK2
	1529	1462	810	2787	1034	5671	1721	2060	1595	1382	893	3552

When analysing market concentration in the Nordic electricity market, neither national borders nor bidding areas give a complete picture of market concentration. The reason for this is that during large periods of time, many bidding areas form a single price area. For instance, during 81.9 percent of the time, SE1, SE2, NO3, NO4 and FI were a single price area meaning that the relevant market for that time-frame really is all five bidding areas. Other common price formations in the Nordic market are SE4 + DK2 (75.7%), SE1-4 (86.4%) and SE3+SE4+FI (67.6%).

Table 8. Common price formations in the Nordic electricity market

Price area	HHI 2013	Percent of time
SE1+SE2	2652	99.0
SE1+SE2+SE3	2208	95.2
SE3+SE4	1692	90.2
SE1+SE2+NO3+NO4	1429	81.9
SE2+SE3+SE4	1661	87.3
SE	1914	86.4
SE4+DK2	1439	75.7
SE3+SE4+FI	1073	67.6
SE3+SE4+DK2	1315	68.6
SE3+SE4+DK2+FI	911	53.6
SE3+SE4+DK2+FI+NO1	695	26.5
SE1+SE2+NO3+NO4+FI	823	81.9

1.9.2 Producers

The shares of the largest producers were close to the values of previous year. Vattenfall maintained its position as the largest electricity generator in the Nordic region with 18.8 percent of the total generation followed by Statkraft (13.6 %), Fortum (12.1 %) and E.ON (7.0 %).

Figure 30. Largest producers by generation capacity

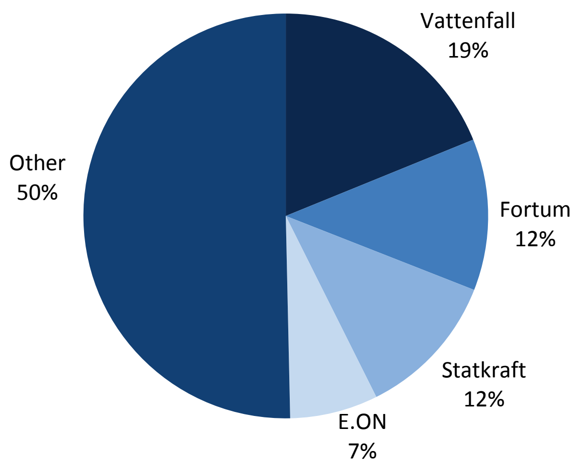


Table 9. Generation capacity by producers, 2013

		Capacity (MW)	Share (%)
Denmark	- Dong Energy	5,445	5.4%
	- Vattenfall	1,578	1.6%
Finland	- Fortum	4,528	4.5%
	- PVO	3,197	3.2%
	- Helsingin Energia	1,567	1.6%
Norway	- Statkraft	13,399	13.4%
	- E-CO Energi	2,800	2.8%
	- Hydro	2,000	2.0%
Sweden	- Vattenfall	13,879	13.8%
	- E.ON Sweden	6,736	6.7%
	- Fortum	5,825	5.8%
Other generators		38,306	38.2%
Total Nordic region		100,313	100.0%

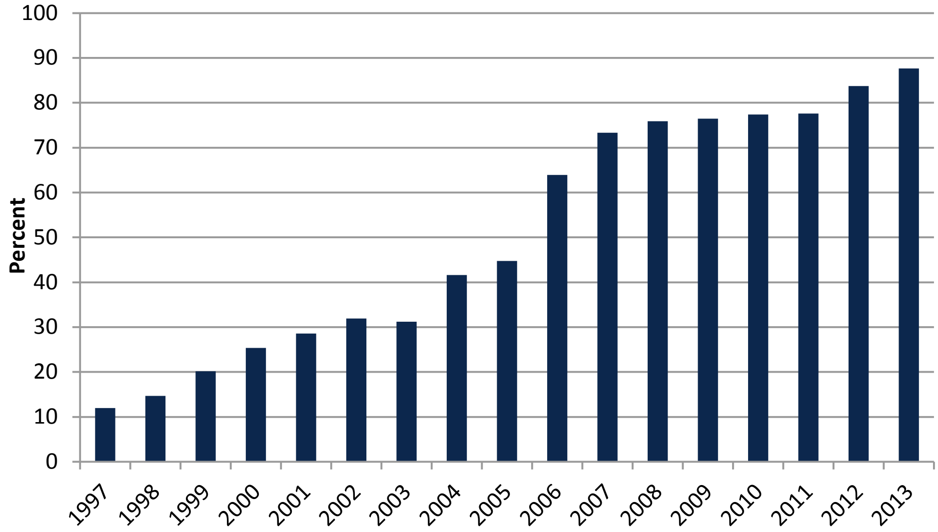
Source: Swedenergy, NVE, DERA, Ei

1.10 Liquidity in the Wholesale Market

Trade volumes at Nord Pool is a measure of liquidity in the spot market.

The total volume traded at Nord Pool Spot in 2013 was about 88 percent of the total Nordic electricity consumption – about six percentage points more than the year before. The total volume traded at Nord Pool Spot in 2012 was 348.9 TWh, compared to approximately 323.6 TWh in 2012. As seen in Figure 26, the share of Nord Pool Spot has increased gradually since 1997.

Figure 31. Volumes traded at Nord Pool Spot market as a percentage of total Nordic consumption, 1997 – 2013



Source: Nord Pool Spot

Retail Market

1.11 A Common Nordic Retail Market

NordREG has analysed the need and possibility to harmonise regulation covering universal service (default supplier and supplier of last resort). The conclusion is that the regulations for universal service differ in the Nordic countries, but there is no urgent need for harmonised regulation at present. NordREG do however recommend that universal service obligations should be developed towards a model where all customers are encouraged to actively choose and make a contract with a supplier. NordREG also made recommendations on DSO neutrality when contacted by customers. The NordREG report "Nordic harmonisation of universal service supply obligations" Report 3/2013, was published in March 2013.

During the spring of 2013 NordREG published a note with five recommendations on transparency and customer access to metering data. The recommendations include principles that require full transparency of metering data from the customer perspective. This means that the customer should be able to know what information that is being collected through the customers' meter, receive information on the explicit data and also decide on the way that this data is being used (apart from data that is necessary for the supplier and DSO to perform regulated duties, such as billing etc.). Three of the five recommendations are suggested to be implemented by 2015. The NordREG note "NordREG recommendations for customers and market actors' access to metering data and transparency" was published in May 2013.

In the first months of 2013 NordREG commissioned GAIA Consulting Oy to make an analysis of payment methods and ways to deal with risks in a Nordic market with mandatory combined billing. The analysis showed clearly that a model where the customer is invoiced the total claim by the supplier and where the customer is in debt only to the supplier is the preferred choice. NordREG considered the results and recommendations of the consultancy report together with stakeholder input and presented some high level recommendations in a separate note in June 2013. The note contains recommendations on monthly forwarding of grid payments to the DSO along with recommendations on further harmonisation of procedures for exclusion of misbehaving suppliers from the market. The consultant report "Payment requirements with combined billing" was published in April 2013.

NordREG has recommend rules for a harmonised Nordic switching process. The work is a continuation of the work made in 2008, harmonised supplier switching model Report 2/2008. The recommendations forms a framework model but there are still some open issues that have to be solved before we can say that we have a fully harmonised switching model. The national regulators have made different assessments on the need for online access to a database containing contract information for the electricity retail customers. It is also a central issue whether a data hub is a part of the foundation of a harmonised market or not. The NordREG report "Harmonised model for supplier switching" Report 4/2013, was published in June 2013.

Once a year, the Retail market WG updates the road map toward a common harmonised Nordic retail market. The update for 2013 included an overview of issued recommendations. The overview showed how far the implementation of issued recommendations had come in each country in 2013. The report showed that there are some differences in harmonization in the different countries. The NordREG report "Road Map towards a common harmonised Nordic end-user market" was published in June 2013.

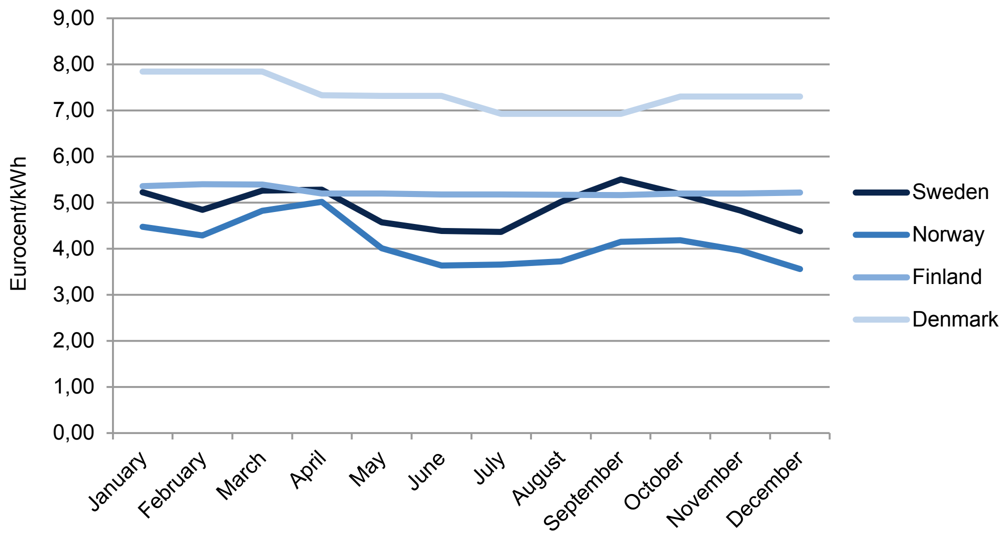
In June 2013 NordREG has commissioned Edisys Consulting for technical support. The consultant shall in cooperation with Nordic TSOs, regulators and relevant industry representatives deliver recommendations for harmonised technical requirements related to data exchange format, including content, communication platform and data security measures to be used in a harmonised Nordic end-user market. This is a major part of the work needed to achieve harmonised business processes in the electricity retail market. Final report was delivered to NordREG in March 2014. A public consultation and hearing has been arranged. The retail market group will prepare a NordREG note to the report which should state NordREGs view on the report.

The consultant report “Business requirements for a harmonised Nordic retail market” will be published on NordREG homepage together with received comments from the public consultation and hearing. NordREG will also publish a statement in the form of a note accompanying the report. The work on harmonisation of the business process “customer move” started the spring 2013 and is at a final stage. The report is expected to be published by May 2014. The work on harmonising metering methods started in 2011 and are at a final stage. The report is expected to be published by June 2014.

1.12 Retail Prices

Retail prices for each NordREG conuntry is shown in figure 30. The retail price level in Denmark turned out to be the highest price level in the Nordic area in 2013. Apart from the autumn season in Sweden, retail prices in Norway and Sweden were the lowest prices during 2013.

Figure 32. Retail prices in the Nordic region, 2013 (excl. VAT, taxes, distribution tariffs etc.) [5 6]



Source: Regulatory authorities

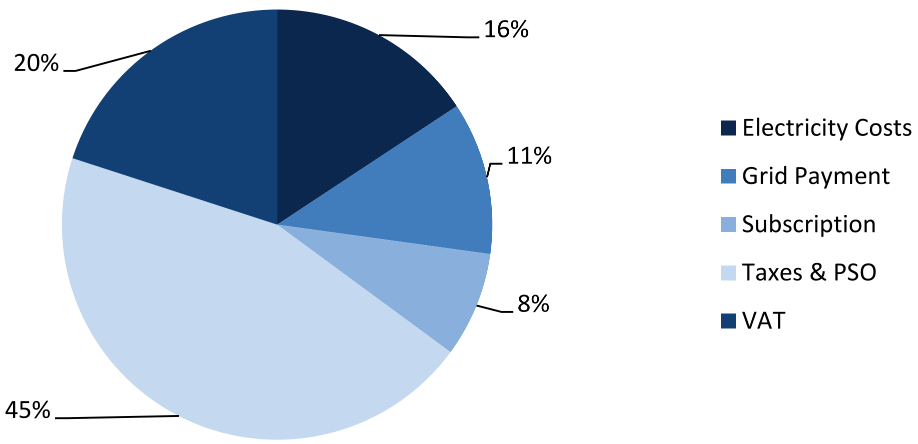
[5] Most common contract in each country for a household with 20,000 kWh/y
[6] Danish prices are for a household with 4000 kWh/y and therefore not fully comparable with the prices in Sweden, Norway and Finland.

1.12.1 Denmark

The elements of the Danish retail price

The price of electricity facing the retail customer in Denmark consists of several elements shown in Figure 33. The energy price, that is the price of electricity excluding taxes, transmission, delivery and subscription, constitutes about 4.67 eurocent/kWh or 16 percent of the price of electricity. Taxes and VAT constitute approx. 19.25 eurocent/kWh or about 65 percent of the price. The remaining 20 percent goes toward grid payments and subscription, which together amount to 5.75 eurocent/KWh or about 19 percent of the electricity price.

Figure 33. Composition of the Danish price of electricity

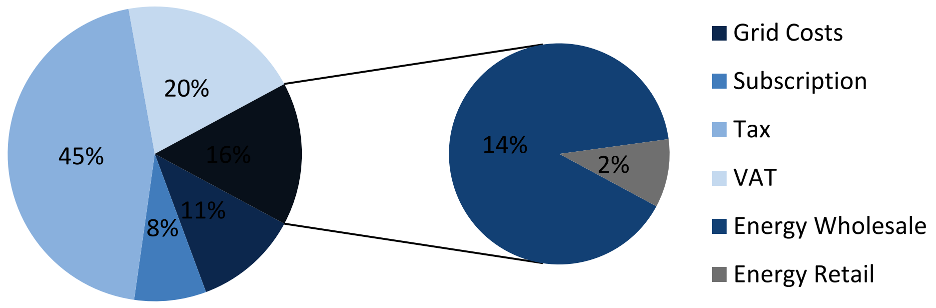


Source: DERA electricity price statistics for supply obligation electricity

Note: Public Service Obligations (PSO) are taxes to finance subsidies for renewable energy and energy research.

The price of electricity - the energy price - is made up of a wholesale and a retail element, se Figure 34.

Figure 34. Composition of the Danish price of electricity wholesale - retail 2013



Source: DERA/own calculations

Approx. 90 percent of the energy price recovers cost at the wholesale stage; that is set on the Nordic Electricity Exchange. The final 10 percent of the energy price allows for competition between retail companies. According to DERA's price statistics, the average energy price in 2013 was 4.67 eurocent/kWh or approx. 16 percent of the electricity price. Thus, companies at the retail stage compete on 0.47 eurocent/kWh out of a total average consumer price of electricity of 29.63 eurocent/kWh in 2013. In other words, retail companies have relatively modest revenues from sales to retail market customers.

Change of Danish retail regulation

According to a parliament decision late 2012, the Danish Electricity Supply Act was changed leading to a new regulatory regime of retail prices regulation, coming into force 1. May 2013.

A main feature of the amendments of the Electricity Supply Act meant tendering of the licences of the supply obligated companies and by the end of 2013, 26 of the 39 licences had been tendered.

Up until 1 May 2013, the regulatory set up implied determining the maximum retail price allowed of the supply obligated supplier in Denmark. In areas not yet tendered, the supply obligated companies are still obliged to report the prices to DERA which performs a price control.

The main methodology of the price control is overseeing that the profit of the supply obligation product is not exceeding the profit of a corresponding product in the unregulated market. The regulation of the suppliers operating in a tendered supply obligation area implies overseeing that the price of the offered basic product does not exceed the price on which the tender was won.

Monitoring of the price of the basic product

Technically, supervision of the price of the basic product in each of the 26 licence areas is the biggest innovation within the supervision of prices by DERA.

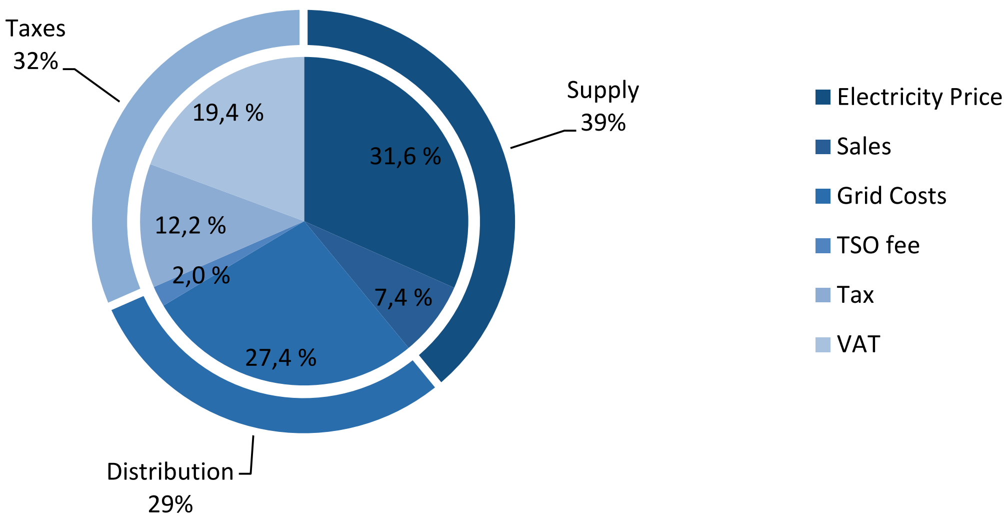
The method used for the supervision involves two steps. Firstly, DERA calculates a maximum price for the supply obligation product which would have been offered to customers if there had not been a tendering procedure. The calculation has three cost elements that together constitute the calculated price: 1) the spot price onNord Pool, 2) a maximum reasonable gross profit, as set by DERA and 3) a supplement if electricity consumption (and price) is different from the predicted consumption profile.

1.12.2 Finland

In Finland the shares of permanent contracts (variable price), fixed term (fixed price) contracts and permanent spot-contracts are 80, 16 and 4 percent respectively. Consumer prices are much more stable than the prices on the wholesale market, and the changes in the retail prices occur usually after some delay. The shares of supply, transmission and taxes in the total price of electricity are quite equal.

In the end of 2013 the average price of electricity for a small household living in an apartment (5,000kWh/y) was 7.44 eurocent/kWh. The distribution fees were 7.81eurocent/kWh. For a household living in an electrically heated detached house (20,000 kWh/y) the average prices were 6.46 eurocent/kWh and 5.31 eurocent/kWh respectively. The prices of permanent contracts were practically on the same level as a year ago. The prices of temporary contracts for one year decreased almost by 10 percent.

Figure 35. Shares of supply, transmission and taxes

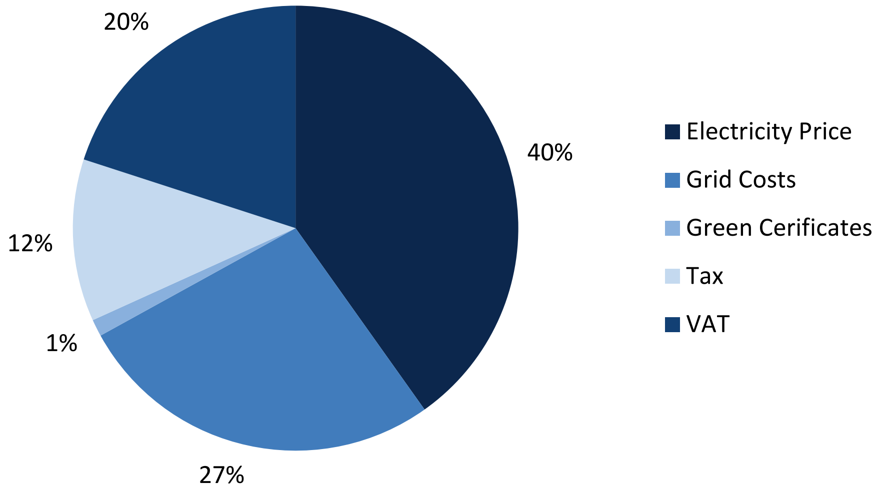


1.12.3 Norway

Spot-contracts, fixed-priced contracts and standard variable contracts are also offered in Norway. The standard variable contract is a mix between the fixed-price and the spot-contracts, where subscribers are notified in advanced of price changes. The majority of Norwegian end-user subscribe to contracts that have an add-on fee on the Day-Ahead spot market.

In the first quarter, retail prices (excl. VAT) averaged 4.53 eurocent/kWh across the Norwegian prices areas. The highest monthly average retail price of 5.02 was reached in April. The average monthly retail price in Norway was it at it's lowest in December at 3.56 eurocent/kWh, due to mild weather. NVE's best estimate of the average price spread between the Day-ahead and retail price was 0.32 eurocent/kWh. This constitutes a price spread of 8.6 percent over the wholesale price level of 2013.

Figure 36 Total electricity costs in Norway, 2013



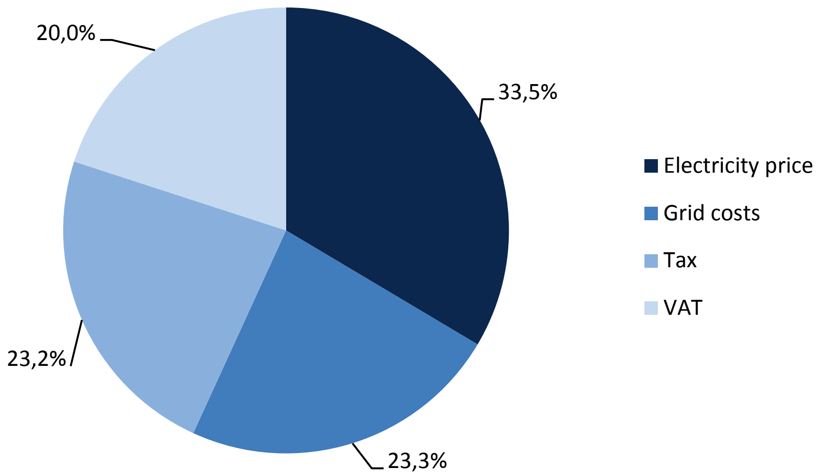
For a representative consumer with 20000 kWh of consumption on a spot-based contract, the total power cost is estimated to 12.64 eurocent/kWh. This estimate takes into account the profile of consumption, such that more power is consumed in the periods with high prices.
The supplier switching rate in Norway 2013 is estimated to 15 percent based on the number of consumers in 2012.

1.12.4 Sweden

There is no price regulation in the Swedish retail market for electricity. In 2013, 43.2 percent of the electricity price[7] is tax and VAT while 33.5 percent is the cost for the electricity and 23.3 percent constitute the cost for distribution. In December 2011 the respective share of the costs where: 41 percent tax and VAT, 39 percent electricity, 20 percent distribution.

[7] For a customer with a consumption of 20 000 kWh/year

Figure 37. Total electricity costs in Sweden, 2013



The most common contract for household's customers in Sweden is flexible price contracts. In 2013, 36.3 percent of the customers had a flexible price contract and 16.4 percent respectively 16.8 percent had a fixed 1 year or 3 year contract. Non-active customers in Sweden get default contracts. The share of customers with default contacts have seen a gradual decline and in 2013, 16.8 percent of the customers had default contracts. Another long-term trend is more and more customers favour flexible price contracts over other contract forms.

Table 10. Most common contracts among household customers

	2011	2012	2013
Default contract	22.6%	19.8%	17.6%
Flexible price	28.6%	30.2%	36.3%
Fixed price 1 year	16.8%	18.1%	16.4%
Fixed price 3 years	6.1%	6.8%	5.9%
Default contract	19.6%	18.7%	16.8%
Other	6.3%	6.4%	7.0%

Source: Statistics Sweden

1.13 Supplier Switching

The final customer's choice to shop around between different suppliers is an import indicator of the level of retail competition in a given country. However, using supplier switching as an indicator of the level of competition rest on the assumption of economic incentive to change supplier as well as easy accessible market transparency. Furthermore, the final customers preference for given products as well as time line of contracts are also important drivers of the retail customers propensity to change supplier.

Supplier switching in the Nordic countries increased from 2012 to 2013 in 3 of the Nordic countries, Denmark being the exception. However, the switching rates in Denmark is unreliable due to the introduction of a data hub in Denmark. Because of that, switching data for hourly metered consumers is not accounted for in the switching rates.

Table 11. Supplier switching on Nordic electricity markets 2009 – 2013[8]

	2011	2012	2013
Denmark	3.5%	6.7%	1,7%
Finland	7.6%	7.7%	10,1%
Norway	11.3%	13.0%	15%
Sweden	11.2%	9.4%	10,7%

Source: Regulatory authorities

1.14 Suppliers

In Norway there were some 30 suppliers operating nation-wide, in Sweden the number is estimated to approximately 100, in Finland 28 and in Denmark approximately 25 in 2013. An increase in the share of suppliers offering contracts to the whole national market can be observed over the past 3 years.

Table 12. Share of suppliers covering the whole market

	2011	2012	2013
Denmark	42%	55%	58%
Finland	32%	37%	43%
Norway	29%	25%	28%
Sweden	50%	80%	81%

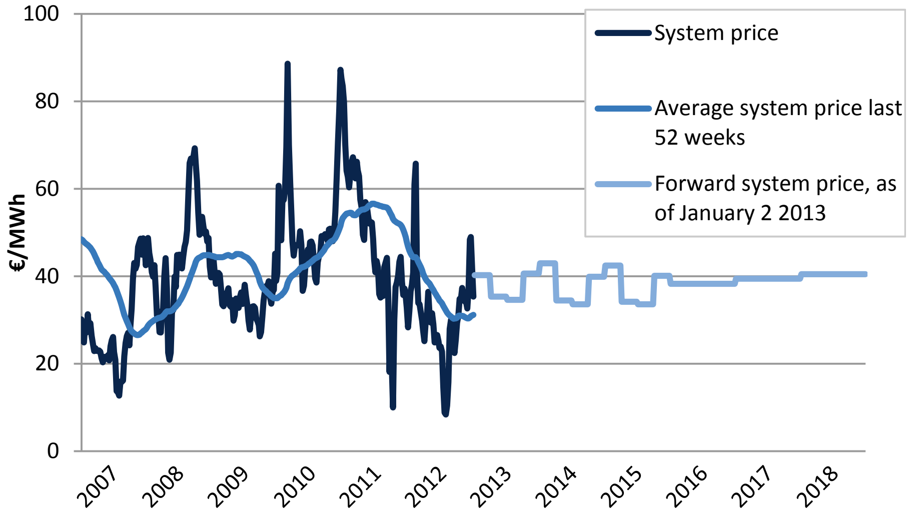
[8] Switcing rate for the Danish market refers to profile customers only.
Switching rate for Norway- 15,5% - relates to retail customers and 14% relates to industrial customers

Financial Market

In the Nordic market, electricity is traded financially on Nasdaq OMX. In the financial market participants can secure prices for future purchases or sales of electricity. The Nordic power market is often ranked highest in Europe regarding transparency and efficiency. The market also has the highest turnover in exchange trading in relation to consumption in the area.

The financial energy market is closely related to the wholesale market – good liquidity and reliable prices on the spot market contribute to liquidity in the financial market. Good possibilities for the market participants to hedge their positions contribute on the other hand to a willingness of players to trade on the spot market instead of taking long term physical positions bilaterally. The financial market gives important price signals to hydro power producers on how to dispose the energy stored in their reservoirs.

Figure 38. Development of weekly system price and forward price at Nord Pool Spot, 2009-2015

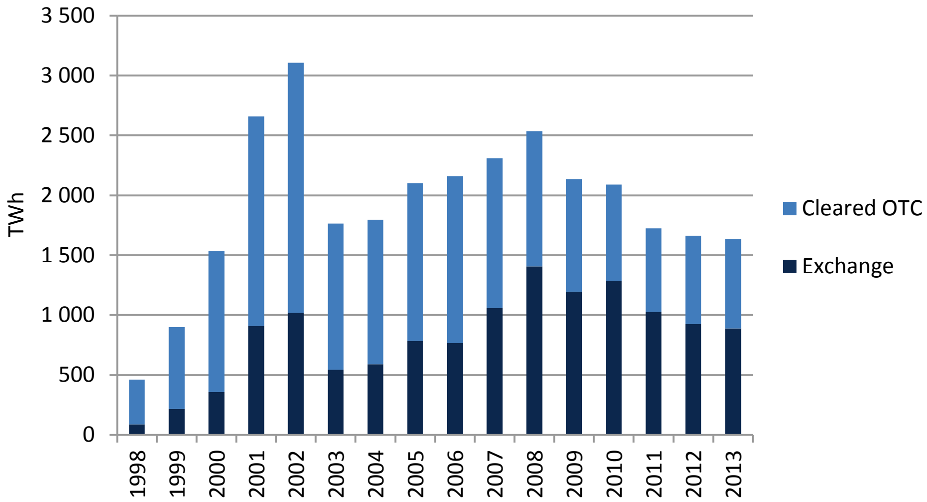


Source: Nord Pool Spot

1.15 Development of the Financial Market

The Nordic financial electricity market decreased for the fourth year in a row in terms of the volume and the value turnovers and the number of transactions. The volume turnover was 1,637 TWh (1,663 TWh in 2012), which is 1,5 percent less than in 2012.

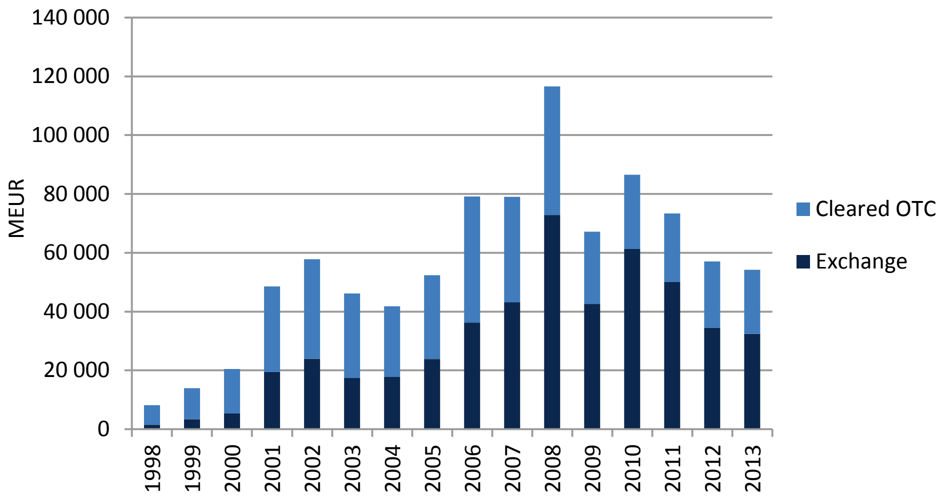
Figure 39. Volume turnover in the Nordic financial electricity market 1998 – 2013



Source: Nasdaq OMX

The value turnover also accounted for a small decrease and fell by 4.8 percent down to 54,266 M€ (57,030 M€ in 2012).

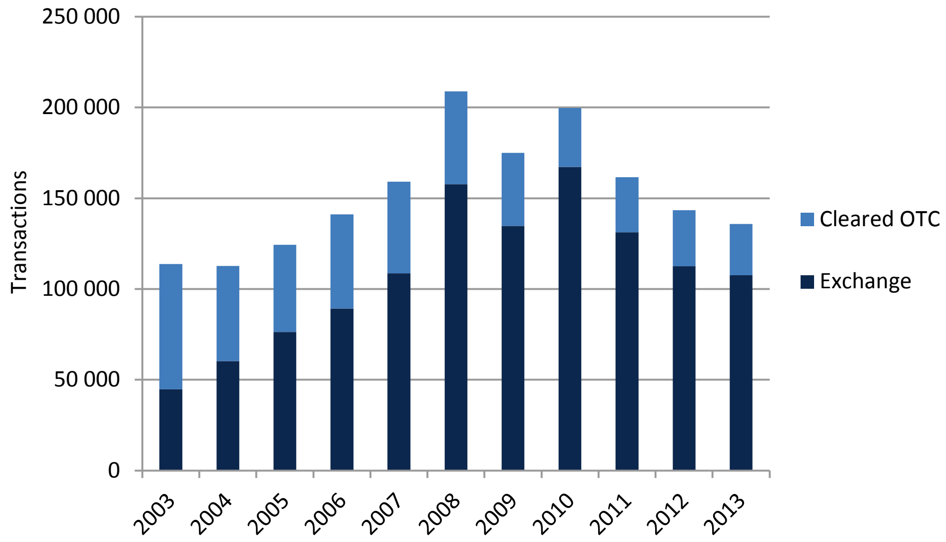
Figure 40. Value turnover in the Nordic financial electricity market 1998 – 2013



Source: Nasdaq OMX

The number of transactions was 143,375 (161,589 in 2011) which corresponds to a decreased of 11 percent.

Figure 41. Number of transactions in the Nordic financial electricity market 1998 – 2013



Source: Nasdaq OMX

High hydropower reservoir levels, low wholesale prices and moderate expectations for the economic growth slightly decreased the need for and the cost of hedging during 2013. Although the level of activity on the financial market was somewhat lower than previous years, the volume turnover on the financial market was still 4.7 times the volume of the physical market.

Integration between Nordic and European Energy Markets

The Nordic electricity market is increasingly connected to the continental markets. This development is strengthened through the implementation of the third inner market package.

Important projects with relevance for the Nordic electricity market are going on in cooperation between the EU Commission, ACER, CEER and system operators (ENTSO-E). The top priority in this work is to develop day ahead market coupling across Europe.

The target model for the day-ahead time frame is a European Price Coupling (EPC) which simultaneously determines volumes and prices in all relevant zones, based on the marginal pricing principle.

Among the different elements of the EPC, the choice of a single algorithm that meets the TSOs' requirements in terms of efficient allocation of production, consumption and capacity and can be approved by every Member State, is one of the most important.

There are different types of market coupling models in the EU member states and Norway. However, they all have the integration of cross-border transmission capacity allocation in energy markets as a common feature. In practice, this means that market participants do not actually receive cross-border capacity allocations, but instead offer energy bids in their areas for production or consumption.

The Nordic market has adopted a model known as Market Splitting or zonal pricing. The model was first applied in Norway and Sweden in 1996. Finland and Denmark joined in 1998 and 2000.

The Nordic Regulators have taken actively part in the effort to create the target model for the day-ahead timeframe. This solution requires TSOs and PXs to develop common arrangements for each stage of the process, including pre-coupling aspects (such as determining available transmission capacity to the day-ahead market), the coupling solution (the development and implementation of the algorithm) and post-coupling aspects (such as the financial settlement between PXs and between PXs and TSOs). The implementation of a single European price market coupling model follows a step-wise approach focusing first on the implementation of the North-West Europe (NWE) price coupling which, once in place, will be joined by other markets or regions as soon as ready.

The implementation of the Intraday European target model follows a phased approach starting with implicit continuous trading covering at least the NWE (plus Austria and Switzerland) region which will evolve to meet the requirements of the target model while being implemented at European level. The Nordic Regulators have taken actively part in the effort to achieve the implementation of the Intraday Target Model on all borders in Europe by the end of 2014. Due to several issues, the project has been delayed.

The Nordic Regulators have taken actively part in the writing of Framework Guidelines and in the drafting the Opinions of ACER on proposed Network Codes. Nordic collaboration to stand up for the Nordic Market Design has been especially pertinent in regard to CACM NC and FCA NC. In which the latter, the Nordic Regulators have put forward criteria to be used in determining whether or not the existing financial market is sufficient for the purpose of risk management. This is an ongoing discussion within the European Commission and ACER.

Market Surveillance in the Nordic Market

1.15.1 A Framework for Market Transparency in an Interconnected Electricity Market

Wholesale energy markets provide key price signals which affect the choices of producers and consumers, as well as investment decision in production facilities and transport infrastructure. It is therefore essential that these signals reflect the real conditions of energy supply and demand. Greater transparency in wholesale energy markets reduces the risk that markets are manipulated and the price signals distorted.

Transparency in wholesale energy markets is thus also crucial in ensuring that consumers pay the fair price for their gas and electricity. It also helps creating a level-playing field for all market participants.

The wholesale energy markets are increasingly pan-European and energy markets in Europe are more and more interlinked. A market abuse in one Member State will also affect the price of energy in other Member States. Only a few Member States have so far succeeded in organising the monitoring of the wholesale energy markets within their own borders. Important trading venues have no clear prohibition of market abuse. Most of the transactions are not reported and fundamental data is not accessible to regulators.

Therefore the European Union has judged it essential to set up a dedicated market integrity and transparency framework for the gas and electricity wholesale markets with an EU-wide monitoring scheme introduced in Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (REMIT)

REMIT introduces a sector-specific legal framework for the monitoring of wholesale energy markets. The objective is to detect and to deter market manipulation. For the first time, energy trading will be screened at EU level to uncover abuses. Market integrity and transparency are essential for well-functioning energy markets and for promoting the confidence of market participants and final consumers.

1.15.2 New Legaslation Calls for Increased Regulatory Cooperation

National authorities in Member States will have to carry out investigations and put in place penalties to help to stop and to prevent market manipulation. In this context cooperation amongst NRAs is crucial. Market monitoring experts from the Nordic NRAs and Nord Pool Spot have establihed a group[9] for such cooperation with the aim of functioning as a platform for exchanging experiences and discussing current issues and new developments of mutual interest with respect to wholesale energy market monitoring under REMIT. Topics of particular interest for such meetings include matters such as developments in trading conducts and market practices, experiences from concluded disciplinary matters, developments in market rules etc.

[9] Nord Pool Spot Regulatory Council

Swedish, Danish, Norgweian and Finnish NRAs have also signed an mulitlateral memorandum of understanding with Nord Pool Spot in order to faciltate upcoming cooperation under the REMIT legaslation.

Today, Nord Pool Spot is regulated by the Norwegian regulator, Norwegian Water Resources and Energy Directorate (NVE) and has been granted a market place licence from them. There is a requirement in the market place licence to have a market surveillance unit in place. Market Surveillance reports to NVE, and have meetings with them on a regular basis. Nord Pool Spot is obliged to report any possible breaches of legaslation affecting Nord Pool Spot's market.

According to article 15 of REMIT, the market surveillance of Nord Pool Spot is obliged to inform the national regulators (NRAs) should there be any suspected breach of the prohibition against market manipulation or the prohibition of insider trading as set out in REMIT.

Nasdaq OMX is required under the Norwegian Exchange Act § 27 to establish and maintain a market surveillance function. More detailed regulations regarding the market surveillance has been issued by the Norwegian Ministry of Finance (Børsforskriften, chapter 4).

Market Structure in the Nordic Markets

1.16 Nordic Generation Capacity

The Nordic region has a total of 103.313MW installed capacity for power generation in 2013. The Nordic power system is a mixture of generation sources such as wind, hydro, nuclear and other thermal power[10]. Hydropower, which accounts for about 50 per cent of the total Nordic generation capacity, is the major source of electricity generation in. It represents virtually all of the Norwegian and nearly half of the Swedish generation capacity.

CHP (Combined Heat and Power) is the second largest generation source accounting for 30 per cent of the total Nordic power generation capacity. The thermal power generation (Finland and Denmark) in the Nordic region act as "swing-production", i.e. balances the total production during seasons when the level of hydropower generation in Norway and Sweden is low relative to demand. The third largest power source, with a share of 12 per cent of the total Nordic generation capacity, is nuclear power, only located in Sweden and Finland. Wind power accounts for about 9 percent and its notable increase continued from previous year.

Table 13. Nordic Generation capacity (MW) by power source, 2013

	Denmark	Finland	Norway	Sweden	Nordic region
Installed capacity (total)	14,861	17,300	32,879	38,273	103 313
Nuclear power	-	2,752	-	9,531	12 283
Other thermal power	6,989	11,135	1,040	8,079	27 243
- Condensing power	-	2,465	-	1,375	3 840
- CHP, district heating	1,929	4,375	-	3,631	9 935
- CHP, industry	562	3,180	-	1,498	5 240
- Gas turbines etc.	-	1,115	-	1,575	2 690
Hydro power	9	3,125	30,900	16,150	50 184
Wind power	4,809	288	811	3,745	9 653
Sun power	563	0	N/A	43	606

Source: Swedenergy, NVE, DERA, EMI

Danish generation capacity rose by 841 MW - from 14,020 MW in 2012 to 14,481 MW in 2013. The increase was made mainly due to increased wind capacity which increased with 646 MW.

[10] Based on for example coal, gas and biofuels.

In Finland the generation capacity increased by 286 MW from 2012 and the capacity in 2013 was 17,300 MW. While the CHP capacity decreased by 156 MW, wind power and condensing power increased by 89 MW and 332 MW respectively.

In Norway, about 95 % of the installed capacity is hydro based, thus production is highly dependent on weather conditions. Installed Norwegian power production capacity was 32,879 MW at the turn of 2013-2014, an increase of 367 MW from the year before. The thermal capacity was reduced because of closure of industrial CHP capacity by 68 MW. In addition, Norway has two reserve gas power turbines in Middle Norway with a total capacity of 300 MW.

The generation capacity of Swedish power stations net increased with 920 MW (2.5%) in between 2012 and 2013. The additional 1,034 MW came primarily from wind power (725 MW) and increased capacity in existing nuclear plants (168 MW). Installed capacity in solar power is slowly growing from last years 24 MW to 43 MW in 2013.

1.16.1 Planned Generation Capacity

1.16.1.1 Denmark

Conventional generation capacity was not planned to be increased in 2013 but to decrease. However, 2 for now mothballed units (Nordjylland unit 2 and Enstedværket were taken into account in the TSO planning.

1.16.1.2 Finland

New waste-to-energy power plant in Vantaa which produces 78 MW of electricity and 120 MW of heat is to be commissioned in 2014. The nominal output of wind power in Finland will increase by over 300 MW by 2015.

The start of the commercial operation of the 1,600 MW Olkiluoto 3 Nuclear reactor is estimated to occur in 2016. A 142 MW (electricity)/244 MW (heat) bio-fuel power plant is being built near Naatali. The estimated date of commissioning is in fall 2017. The environmental impact assessment of a 200 MW (electricity)/350 MW (heat) bio-fuel power plant in Helsinki is under evaluation. If the project plan is approved, the plant should be operational around 2020.

1.16.1.3 Norway

In Norway, 646 MW of hydro power was under construction by 31.12.2013, 162 MW of this is expected to be completed during 2014. 45 MW of wind power was under construction at the end 2014, and is expected to be added to the generation mix.

1,116 MW of hydro power have been given license, but have not begun construction. 3,064 MW of wind power and 1,380 MW of thermal power have also been given permits, without beginning construction by 2013.

1.16.1.4 Sweden

In Sweden most projects for new generation capacity are related to wind power and planned power increases in nuclear power plants. There is a great deal of uncertainty about these projects and how much new generation capacity it eventually will be.

1.16.2 Power Reserves

1.16.2.1 Denmark

In Denmark there are no loads generally classified as special peak load reserves and operational Reserves are used to cope with disturbances.

1.16.2.2 Finland

System reserve for situations where the market supply does not meet the consumption consists of two oil-fired power plants whose combined output power is 365 MW. The fast disturbance reserve includes 15 power plants with 1,229 MW output which is not used for commercial electricity production and detachable industrial load of 405MW.

1.16.2.3 Norway

The dimensioning failure in the Norwegian power system is 1,200 MW, but TSO Statnett secures an additional 800 MW capacity for congestion management and regulating power. The regulating power option market (RKOM) is used to secure the capacity. Statnett also keeps 300 MW of mobile gas turbines as emergency capacity in Mid Norway (NO3).

1.16.2.4 Sweden

Swedish power reserve is formed by Svenska Kraftnät. The reduction part of the power reserve is available for trading on the electricity spot market. The power reserve should gradually transition into a market solution. The power reserve was 1,726 MW in winter 2012/2013 and 1,719 MW in winter 2013/2014.

1.17 Efficiant Regulation of TSOs and DSOs

Network regulation forms a crucial part of regulatory activities. The task of the NordREG Network regulation WG is to work with issues related to network regulation. The WG collects and analyses information on network regulation in the Nordic countries. These activities promote deeper understanding as well as development of electricity network regulation in our countries.

During 2011 the group worked with a report which provides an overview of the regulation of DSO in Denmark, Finland, Norway and Sweden. The report has focus on the applied methods of economic regulation in the Nordic countries and the regulators' tool-kits to calculate the revenue cap for each electricity distribution company.

During 2012 the network regulation WG produced a report describing economic regulation of transmission system operators in Denmark, Finland, Norway and Sweden. The report describes the economic regulation of both network and system operations, and in brief the roles and responsibilities of the TSOs.

Both reports are descriptive and do not give recommendations related to development of the regulatory methods. The reports are published on NordREGs website.

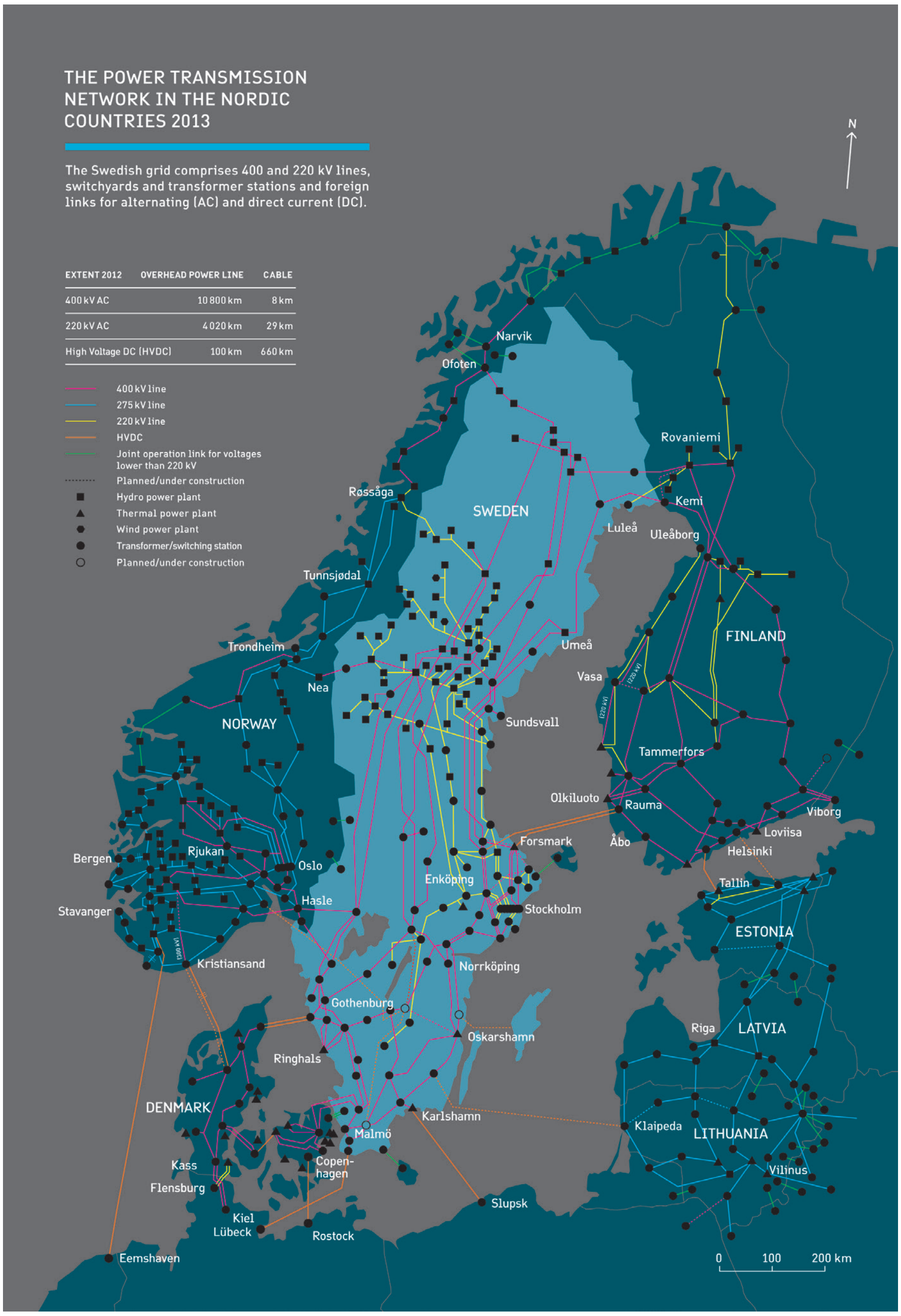
In 2013 the Network Regulation WG arranged a workshop on economic regulatory issues of Nordic cross-border investments. The purpose was to find out if there are any difficulties related to cross border cost allocation (CBCA) and cost and benefit analysis (CBA) of cross-border investments in Nordic countries with regard to the economic regulation of power networks. The workshop concluded that no major obstacles were found in the Nordic economic regulations. A memorandum on the workshop was published on NordREGs website. In addition the working group discussed the results for the Nordic countries of the Pan-European TSO benchmarking project e3grid organized by CEER in 2012 – 2013.

The group is going to discuss the work for 2015. One possibility is to focus on the design of distribution tariffs – how is the tariffs constructed in the Nordic countries and what kind of tariffs can be expected in the light of the Energy efficiency directive and smart grid technology? Is there any benefits of harmonization of distribution tariffs?

1.18 Electricity Network

The Nordic transmission grid is part of the transmission network in north-western Europe and it combines practically the whole Nordic region to one synchronous power system. Interconnectors also link the Nordic market to Germany, Poland, Estonia, Russia and the Netherlands. Eastern Denmark is synchronous with the Nordic grid while western Denmark is synchronous with the continental Europe.

Figure 42. Transmission network in north-western Europe



Source: Svenska Kraftnät

1.18.1 Expansion of National Grids

1.18.1.1 Between countries

National grid improvements between SE3-SE4 was decided in 2013 and in the Western Norway during 2013-2014. Next interconnector improvements will be Estlink 2 between FI-EE and Skagerrak 4 between NO5-DK1, both high-voltage direct current links are expected to be commissioned in 2014.

1.18.1.2 Denmark

The plan to reinforce the grids (both transmission and distribution) according to the national Danish cable action plan was still going on 2013.

In 2013 it was planned to:

- upgrade 137 system-km of the 400 kV transmission line spanning Kassø and Tjele in DK 1 in order to increase cross border capacity and accommodate increasing wind generation.
- build a new 400 kV transmission line (39 km) across Sealand in DK2 to increase cross border capacity and use generation more efficiently.
- build a new transmission line between Amager værket and Barsebäck, including a transmission line from Amagerværket a precondition of the use of the existing interconnector to Sweden.
- build 2 new 164 km 400 kV cablesystem from the Danisk DK 1/Germany border to Endrup
- build 27 km 400 kV line from Landerup to Revsing in DK 1 to make the cross border more efficient.

Finally, an interconnector spanning Denmark and England is in its very first planning fase.

1.18.1.3 Finland

Fingrid strengthened the Finnish transmission network by number of small enhancements in 2013. Two 400 kV lines were upgraded, one between Ylikkälä-Huutokoski in South-East Finland and another between Hyvinkää-Hikiä in Southern Finland. In addition Huutokoski power station (sähköasema) and Ylikkälä switch station (kytkinlaitos) were renewed in order to improve security of supply. Estlink 2 was being built and tested in 2013, this second HVDC connection between Finland and Estonia was comissioned in 4.2.2014

Currently 11 line construction projects are ongoing and 10 power station are under construction or being upgraded. From the larger end of the improvements, the fourth North-South aligned line should be ready in 2016. The construction of a third AC connection between Northern Finland and Sweden is at the moment scheduled to take place between 2020-2025.

1.18.1.4 Norway

The line from Sima to Samnanger was commissioned in December 2013. The line will improve the security of supply to the region of Hordaland/Bergen area with Norway's second largest city, and also integrate new hydro power. This had consequences for congestion management which was the reason for a border change between Elspot areas NO1 and NO5.

A new DC cable between Norway and Denmark, Skagerak IV, was granted license June 2010. The transmission capacity will be 700 MW. The cable is expected to be in operation in 2014.

The total trading capacity with neighboring countries was to 5385 MW at the end of 2013. There are currently 1400 MW HVDC cable projects to UK and Germany awaiting licensing decision at the Ministry of Petroleum and Energy.

1.18.1.5 Sweden

In Sweden there are 15,000 kilometres of power lines in the national grid and the expansion continues in order to meet the demand for a secure and flexible national grid with high capacity, well in compliance with environmental requirements.

One of the largest projects is the South-West Link which is planned to reduce the existing transmission restrictions in Southern Sweden. In april 2013 Svenska kraftnät agreed with Statnett not to proceed with the part of the project that was to extend the south-west link with a connection between Sweden and Norway. The reason is that new estimates showed that the utility had declined significantly compared with the original analyzes.

1.19 Nordic Regulatory Authorities

1.19.1 Denmark

The Danish Energy Regulatory Authority (Energitilsynet, DERA) The Danish Energy Regulatory Authority (DERA) is independent of the government. The tasks of DERA are stipulated in the supply acts for electricity, natural gas and heat.

The Energy Acts are to a large extent framework legislation, meaning that in many cases DERA has wide powers to interpret implementation of the Energy Acts in cases where DERA is the authority. DERA sets specific levels for a number of areas, e.g. efficiency requirements for grid companies within electricity and natural gas, price caps for waste incineration plants, interest rates on subscribed capital in district heating plants, etc.

DERA approves methods applied by grid companies in the electricity and natural gas markets to set prices and terms of access for customers, and DERA ensures that a specific price for heat from a district heating plant is reasonable and that reports from municipalities on receipts of charges from energy enterprises are correct.

DERA monitors a number of areas such as the wholesale market for electricity and natural gas, management of storage capacity on the natural gas market, certain prices of electricity and natural gas, sector guidelines and various reports from energy enterprises to DERA. DERA also makes analyses of the performance of the regulated enterprises etc.

DERA works to ensure transparency for customers on the energy markets, for example by publishing prices of energy, taking part in work groups on operation of the electricity price indicator and gas price guide, etc.

1.19.2 Finland

The Finnish Energy Authority promotes and monitors the energy market as well as promotes the reduction of emissions, energy efficiency and the use of renewable energy. Operating under the administrative sector of the Ministry of Employment and the Economy, the Energy Authority verifies the functionality of the converging electricity and gas markets, and the reasonableness of network service pricing. Functional emissions trading, the use of renewable energy and energy efficiency promote the fulfilment of climate targets in a cost-efficient manner.

The Energy Authority consists of 65 employees working in five substance groups and administration. Competition and Consumer Authority works also on issues which are related to energy markets but which fall under the competition and consumer protection legislation.

1.19.3 Norway

The Norwegian Water Resources and Energy Directorate (Norges vassdrags- og energidirektorat, NVE)

NVE is a directorate under the Ministry of Petroleum and Energy. NVE's mandate is to ensure an integrated and environmentally sound management of the country's water resources, promote efficient energy markets and cost-effective energy systems and contribute to efficient energy use.

The directorate plays a central role in the national flood contingency planning and bears overall responsibility for maintaining national power supplies. From 2009 NVE is assigned greater responsibility for the prevention of damage caused by landslides.

NVE is involved in research and development in its fields and is the national center of expertise for hydrology in Norway.

1.19.4 Sweden

The Energy Markets Inspectorate (Energimarknadsinspektionen, Ei) is a supervisory authority for the energy markets, which means that Ei is working for Sweden to have safe and efficient access to electricity, natural gas and district heating. Ei:s role involves both regulating monopoly operations in the electricity and natural gas networks, and monitoring the competitive energy markets. Ei:s work is intended to contribute to a reliable supply network, well-functioning energy markets and consumer awareness.

Ei monitor the complieance of companies with laws and regulations on behalf of the government and parliament. The inspectorate also provide suggestions regarding how the energy markets can be developed.

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