

# National Report



**Norwegian Water Resources and Energy Directorate (NVE)**

The data/content refer to 31 December 2011 or  
the reporting period 2011 unless otherwise stated.

## Table of Contents

Norwegian Water Resources and Energy Directorate (NVE) .....	1
1 FOREWORD.....	3
2 MAIN DEVELOPMENTS IN THE ELECTRICITY MARKETS .....	4
3 THE ELECTRICITY MARKET.....	8
3.1 Network regulation .....	8
<b>3.1.1</b> Unbundling .....	8
<b>3.1.2</b> Technical functioning .....	9
<b>3.1.3</b> Network tariffs for connection and access.....	13
<b>3.1.4</b> Cross-border issues .....	14
<b>3.1.5</b> Dispute settlement.....	17
3.2 Promoting Competition.....	17
<b>3.2.1</b> Wholesale markets.....	17
<b>3.2.2</b> Retail markets.....	21
<b>3.2.3</b> Carry out investigations and imposing measures to promote effective competition .....	23
3.3 Consumer protection .....	24
3.4 Security of supply (if and in so far as NRA is competent authority).....	25
<b>3.4.1</b> Monitoring balance of supply and demand .....	25
<b>3.4.2</b> Monitoring investment in generation capacities in relation to SoS.....	27
<b>3.4.3</b> Measures to cover peak demand or shortfalls of suppliers.....	28
4 THE GAS MARKET .....	29

## **1 FOREWORD**

The Norwegian electricity market was formally opened up for competition when the Energy Act came into force the 1st of January 1991. The regulatory tasks are ensured by the Norwegian Water Resources and Energy Directorate (NVE). A regulatory office (department in NVE) was set up in 1990. As electricity regulator, NVE has played an active role in developing network regulation, real market access for all customers, easy procedures for customer switching, security and quality of supply and efficient regulation of system operation.

The development of the Norwegian market has been followed by similar market opening in the other Nordic countries, and today there is an open and integrated electricity market in the Nordic region with a common Nordic power exchange. The Nordic market is also interconnected with Estonia, the continental European market and Russia.

Norway is member of EFTA and a party to the European Economic Area agreement (EEA). As a consequence of this, the EEA procedures regarding adoption of new EU directives apply for Norway. The electricity directive 2003/54/EC and Regulation 1228/2003 passed through the EEA Committee in December 2005. The report is based on the reporting requirements in the directive 2003/54/EC articles 3(9), 4 and 23 (1 and 8), and directive 2005/89/EC article 7.

NVE is a member of CEER. NVE has in 2011 continued its work with the goal that NVE should be included in the new Energy Agency, ACER. This will be decided as part of the EEA process related to the third energy market package. The third package will be implemented in Norway after the EEA joint committee decision and subsequent approval by the Parliament.

This report follows the common reporting structure created by the Commission and CEER.

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## **2 MAIN DEVELOPMENTS IN THE ELECTRICITY MARKETS**

### **Introduction – about NVE**

The main statutory objectives for NVE concerning energy, and which the regulatory functions is a part of, is to promote social and economic development through efficient and environmentally sound energy production, and promote efficient and reliable transmission, distribution, trade and efficient use of energy.

For NVE, both for regulatory tasks as well as for other tasks, the responsibility and field of work are defined in law, regulations and decisions from the Parliament and Government and in the annual allocation letter from the Ministry of Petroleum and Energy.

NVE is delegated powers according to the Energy Act. NVE has powers to issue regulations on economic and technical reporting, network income, market access and network tariffs, non-discriminatory behaviour, customer information, metering, settlement and billing and the organised physical power exchange (Nord Pool Spot). As well as issuing regulations on system responsibility and quality of supply. NVE can take necessary decisions to fulfill the delegated powers according to the Energy Act.

NVE is the national independent regulatory authority for the electricity market in Norway. The Director General acts as regulator. NVE has no ownership interests in the electricity industry and is independent from the economic interests in the electricity industry. NVE is an independent legal entity with its own budget adopted by Parliament and power to act in the scope of its competences.

There is a cooperation agreement between NVE, the Competition Authority (concerning inter alia mergers, market surveillance) and the Financial Supervisory Authority of Norway (concerning the financial markets). NVE also has a cooperation agreement with The Directorate for Civil Protection and Emergency Planning (DSB). The Competition Authority will according to the Electricity Directive, prepare its own report regarding an assessment of competitive conditions in the electricity market for 2011.

### **Status implementation third package**

The third package will be implemented in Norway after the EEA joint committee decision and subsequent approval by the Parliament. The evaluation in this report is based on compliance with the second package.

### **Wholesale market**

The Norwegian wholesale market is part of the Nordic wholesale market through the common Nordic power exchange for physical power, Nord Pool Spot AS. In 2011 294 TWh (305 TWh in 2010) was traded at Nord Pool Spot. This accounts for 73% (74% in 2010) of the total power consumption in the Nordic region. The remaining volume of the Nordic market was traded bilaterally. NVE regulates Nord Pool Spot through the market place license, in accordance with the Norwegian Energy Act (1990).

The Nordic wholesale market is divided into bidding areas (elspot areas) and these may become separate price areas if the contractual flow of power between elspot areas exceeds the capacity allocated for spot

contracts by the TSOs. The Norwegian part of the wholesale market consisted of five elspot areas in 2011.

### **Retail market**

Each entity operating in the electricity market and/or in the network business is required to hold a trading license. At the end of 2011 the Norwegian Water Resources and Energy Directorate (NVE) had about 450 trading licenses under surveillance.

In Norway there is one official website for price comparison, run by the Norwegian Competition Authority. It compares the three most common contracts in the market, and about 50 % of the consumers have contracts listed on this site. The customer can easily carry out an evaluation and make the choice of supplier using a price calculator. Suppliers are required to provide information on prices and contract terms. There are no regulated prices in Norway. The first six weeks new customers who have not yet chosen a supplier (supplier of last resort) shall be served by the network company at a price that is maximal 5 øre/kWh excl. VAT (or 6.25 øre/kWh incl VAT) above spot price. After 6 weeks the network companies are obliged to settle the price so that the Customers that have not chosen a supplier are provided with an incentive to find a supplier.

### **Congestion management**

Through the national regulation of 7<sup>th</sup> May 2002 N<sup>o</sup> 448 on the system responsibility in the power system, the TSO is granted duties and responsibilities regarding congestion management. The TSO shall establish bidding zones in order to handle large and long lasting congestions in the transmission grid. Further, the TSO shall establish bidding zones if expected scarcity of energy within a specific geographical area. Congestions within the bidding zones shall also be handled by the TSO, normally by using the balancing market reserves. There are currently five bidding zones in Norway.

Svenska Kraftnät has subdivided the Swedish electricity market into four bidding areas from 1 November 2011. This is expected to reduce congestions and increase the efficiency and trade between the Nordic countries.

### **Network tariffs**

The tariff requirements and methodology are laid down in regulation of 3<sup>rd</sup> November 1999 No 301.

All tariffs are based on the costs referring to the consumer's point of connection. An agreement with the network company at the point of connection shall provide access to the entire network system and the power market.

All network companies are responsible for framing tariffs within their income cap pursuant to the regulation on tariff structure. Since 2010, all houses, apartments and vacation homes shall be metered and settled individually.

According to the regulation on tariff structure, tariffs shall consist of a usage- dependent energy component set on the basis of marginal network losses, and a fixed annual amount per customer to cover customer-specific costs and costs that are not covered by the usage-dependent tariff components.

The methodology and procedures for the economic regulation of transmission and distribution companies have been unchanged in 2011.

## **Unbundling**

There were no major changes in the unbundling requirements on the network companies in 2011.

There is only one TSO in Norway, namely Statnett SF. The TSO has been legally unbundled in a separate company since 1992, and has to comply with the ordinary functional provisions.

On DSO-level, the 8 companies with more than 100 000 residential customers in Norway are legally unbundled. These companies cover around 60 % of the total mass of household customers. These 8 companies are also obliged to participate in the compliance program, in accordance with the electricity directive. The compliance program serves NVE in its monitoring of the DSOs fulfillment of the provisions regarding legal and functional unbundling. Besides the 8 DSOs with over 100 000 residential customers, there are additional 34 legally unbundled DSOs. There is a total of 157 DSOs in Norway, and the majority are publicly owned.

## **Security of Supply**

In 2011 the total Nordic net generation was 373.7 TWh, which is 5.3 TWh less than registered in 2010. The decline was basically due to lower thermal generation. The weak hydrological situation at the start of 2011 was the main reason for a Nordic net import in the first half of the year. However as the hydrological situation got stronger, there was net export in the second half of 2011. For the year as a whole there was a Nordic net import of 4.8 TWh.

The Norwegian net generation was 128.1 TWh in 2011 (124.5 TWh in 2010). The share of the hydro plant generation accounted for around 95 % of the total Norwegian net generation in 2011. This percentage shows the importance that the weather conditions have on the net generation capacity. The inflow to the hydro reservoirs in Norway in 2011 was considerably higher than the normal inflow level.

Norway was a net exporter of electricity in 2011 of 3.0 TWh. In 2010 Norway had a net import of 7.6 TWh. Norway was a net exporter of 0.2 TWh to Sweden in 2011, and a net import from Sweden of 3.9 TWh in 2010.

## **NVE - competences security of supply**

### *Contingency planning and preparedness*

Norway has detailed regulations and means for handling critical energy situations and energy rationing. This is due to the large share of hydro based electricity production and the fact that Norway has an inflow sensitive power system.

The individual grid and production companies are responsible for routines regarding resources, material and equipment, but there are common arrangements to ensure that the individual companies cooperate on these issues.

### *Market information and monitoring*

Several analyses are prepared by the Norwegian TSO, Statnett, and by NVE on possible development in energy and power balance. When it comes to monitoring the market development NVE publish regular reports describing the development.

#### *In normal operation strained situations or during operational disturbances*

Through the national regulation of 7<sup>th</sup> May 2002 N<sup>o</sup> 448 on the system responsibility in the power system, the TSO is granted duties and responsibilities to require mandatory participation in the balancing market, require regulation of power production (even when not part of the balancing market), and to require load shedding. Load shedding may be ordered manually, however, load shedding also occurs due to use of automatic system protection schemes. System protection schemes in the transmission grid can only be installed and operated based on decisions by the TSO.

#### *Norway's special regulations for highly critical power situations*

Statnett is responsible for the operation, also during extreme occurrences. In Norway, though, NVE is head of the power supply preparedness organisation and also works as the rationing authority.

Regulations relating to power system operation regarding handling of extreme situations came into force on 01.01.2005. This regulation aims to secure extreme situations and is not relevant for normal operation. Through this regulation, Statnett is given an extended responsibility to continuously investigate and develop necessary measures to ensure that there is momentary balance at all times and to ensure the energy balance during the winter season. Statnett shall inform NVE of its different findings. NVE shall approve, with terms, the different measures before they are put into force. Permanent- and operations cost for the different measures shall be handled within Statnetts income cap. Statnett have to develop the means within the following set of premises:

- Not to completely eliminate the probability for electricity rationing, but to reduce the risk.
- Must be effective for handling of extreme situation, and yet not influence the electricity market or investment decisions within the production or the network.
- Not to change or move the TSO (Statnett) neutral and independent position in the power market.
- Contribute to a socio-economic handling of extreme situation and not to reduce the efficiency of the physical power market
- Take into consideration the all ready existing flexibility in production, transmission and consumption.

The different measures that are approved by NVE are:

- Mobile gas turbines which can be used for production back-up.
- Energy options, contract with different consumers to reduce the consumption.

The measures can only be activated after decision from NVE. The measures will only be accepted in a situation where rationing is considered likely.

#### **Infrastructure**

A new 140 km 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 commission in 2014. There is also construction license applications for a DC cable to Germany with capacity of 1400 MW sent in 2009/2010. The project is being developed by the Norwegian TSO (Statnett) in cooperation with the

German TSO (Tennet) and the German national bank (KfW) and is expected to be commissioned in 2018. Further, the Norwegian TSO (Statnett) and National Grid in UK have signed a cooperation agreement with the aim of commissioning a new DC cable between Norway and UK within 2020. A license application is planned to be sent in 2013. Excepted capacity is 1400 MW.

The 92 km, 420 kV OH line from Sima to Samnanger is under construction and is expected to be commissioned in 2013/2014. 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.

The 285 km, 420 kV OH line from Sogndal to Ørskog was granted license in 2011. This line will improve the security of supply in the Mid-Norway area. It will also improve RES integration and net transfer capacity. It is expected to be commissioned in 2015.

The 160 km 420 kV OH line for Ofoten to Balsfjord was granted license in 2012. This line will improve the security of supply in the North of Norway. Expected load growth and RES integration will benefit from this investment. It is expected to be commissioned in 2016.

The 360 km 420 OH line for Balsfjord to Hammerfest was granted license in 2012. This line will improve the security of supply in the North of Norway. This line will improve the security of supply in the North of Norway. Expected load growth and RES integration will benefit from this investment. It is expected to be commissioned in 2018.

### **3 THE ELECTRICITY MARKET**

#### **3.1 Network regulation**

##### *3.1.1 Unbundling*

There were no major changes in the unbundling requirements on the network companies in 2011. In the following, the main issues regarding the implementation of unbundling in Norway are described.

The Norwegian practice of legal unbundling is stricter than the requirement in the electricity directive 2003/54/EC. While the directive enables undertakings performing functions of generation or supply to own undertakings performing activities of transmission or distribution, the Norwegian Energy Act requires that the undertakings performing functions subjected to free competition, such as generation or supply, can not own undertakings performing the activity of transmission or distribution, and vice versa.

There is only one TSO in Norway, namely Statnett SF. The TSO has been legally unbundled in a separate company since 1992, and has to comply with the ordinary functional provisions. Statnett is state owned and does not form part of any integrated undertaking. The TSO Statnett SF and the state owned generator, Statkraft SF, are moreover since 2002 owned by two different ministries, complying with requirements for ownership unbundling. Statnett's offices are not located together with any production or supply company.

The 8 DSOs with more than 100 000 residential customers in Norway are legally unbundled. These companies count around 60 % of the total mass of residential customers. The 8 companies are also obliged to participate in the compliance program, in accordance with the directive. The compliance



program serves NVE in its monitoring of the DSOs fulfillment of the provisions regarding legal and functional unbundling. Besides the 8 DSOs with over 100 000 residential customers, there are 34 more legally unbundled DSOs. There is a total of 157 DSOs in Norway, and they are mainly in public ownership.

As noted above the nature of the Norwegian retail market implies that the majority of the DSOs are exempted from the provisions regarded legally unbundling. NVE can require vertically integrated companies to separate into unbundled legally entities in the event of mergers and acquisitions, as long as these trigger the obligation to acquire a trading license. In any case, all 157 DSOs are under regulations concerning neutral and non-discriminatory behaviour in relation to information to customers (including websites), customer switching, handling of new connections, measurement data and billing, and these regulations are subject to supervision by NVE.

### *3.1.2 Technical functioning*

#### *Quality of electricity supply*

NVE has a wide legal power as regards quality of electricity supply regulation. This includes setting requirements for all parties connected to the Norwegian power system including network companies, the TSO, power producers and end-users regardless of whether they hold a license according to the Energy Act or not.

#### *Voltage Quality*

The Norwegian Quality of Supply Regulation includes minimum requirements for the voltage frequency, slow supply voltage variations, voltage dips, voltage swells, rapid voltage changes, flicker, voltage unbalance, and harmonic voltages. NVE has the legal power to set minimum requirements for other voltage disturbances as well, if and when considered necessary.

#### *Interruptions*

NVE publishes annually statistical report on interruptions providing continuity of supply levels at country level, county level, company level and end-user level.

The TSO, Statnett SF, publishes annually operational disturbance statistic report providing reliability levels for the system.

In Norway, network companies have been obliged to report specific data on interruptions since 1995. From the start, the data were reported with reference to so-called *reporting points* in the network. A *reporting point* is a distribution transformer or an end-user connected above 1 kV. NVE used the energy not supplied as input to the incentive based regulation on continuity of supply from 2001. For energy not supplied the exact number of customers is not important, but more separating for various end-user and customer groups.

From 2005, the interruption data are also referred to end-users. This was important to introduce due to two main reasons (1) easier to understand for non-technical customers and (2) better possibility to compare with other countries.

Only incidents at voltage levels above 1 kV are reported, and the reported data can be summarised as follows for *long and short interruptions starting from 1995 and 2006 respectively*.

- Number (ref reporting point + ref end user from 2005)
- Duration (ref reporting point + ref end user from 2005)
- Interrupted power (from 2006)
- Energy not supplied (ENS)
- SAIDI, SAIFI, CAIDI, CTAIDI, CAIFI (from 2005)
- Notified and non-notified

Common indices with reference to customers are presented in the table as regards short (tab 1) and long (tab 2) interruptions. The indices have the following description:

- SAIFI: System average interruption frequency index (average number of interruptions per end user)
- CAIFI: Customer average interruption frequency index (average number of interruptions per affected end user)
- SAIDI: System average interruption duration index (average duration per end user)
- CAIDI: Customer average interruption duration index (average duration per interruption)
- CTAIDI: Customer total average interruption duration index. (average duration per affected end user)

	<b>SAIDI</b> [hours]	<b>SAIFI</b>	<b>CTAIDI</b> [hours]	<b>CAIDI</b> [hours]	<b>CAIFI</b>
<b>2005</b>	<b>2.3</b>	<b>1.9</b>	<b>2.9</b>	<b>1.2</b>	<b>2.4</b>
<b>2006</b>	<b>2.6</b>	<b>2.1</b>	<b>4.6</b>	<b>1.3</b>	<b>3.4</b>
<b>2007</b>	<b>2.4</b>	<b>2.0</b>	<b>3.6</b>	<b>1.2</b>	<b>3.1</b>
<b>2008</b>	<b>2.5</b>	<b>2.1</b>	<b>3.9</b>	<b>1.2</b>	<b>3.3</b>
<b>2009</b>	<b>2.0</b>	<b>1.8</b>	<b>3.2</b>	<b>1.1</b>	<b>2.9</b>
<b>2010</b>	<b>1.7</b>	<b>1.6</b>	<b>2.8</b>	<b>1.1</b>	<b>2.6</b>
<b>2011</b>	<b>4.3</b>	<b>2.7</b>	<b>6.5</b>	<b>1.6</b>	<b>4.1</b>

**Table 1, Continuity of supply indices with reference to the end users as regards long interruptions in Norway**

	<b>SAIDI</b> [minutes]	<b>SAIFI</b>	<b>CTAIDI</b> [minutes]	<b>CAIDI</b> [minutes]	<b>CAIFI</b>
<b>2006</b>	<b>1.4</b>	<b>1.8</b>	<b>3.0</b>	<b>0.8</b>	<b>3.8</b>
<b>2007</b>	<b>1.4</b>	<b>1.9</b>	<b>3.0</b>	<b>0.8</b>	<b>3.9</b>
<b>2008</b>	<b>1.7</b>	<b>2.1</b>	<b>3.3</b>	<b>0.8</b>	<b>4.3</b>
<b>2009</b>	<b>1.2</b>	<b>1.8</b>	<b>2.6</b>	<b>0.7</b>	<b>3.8</b>
<b>2010</b>	<b>1.0</b>	<b>1.4</b>	<b>2.4</b>	<b>0.7</b>	<b>3.4</b>
<b>2011</b>	<b>1.8</b>	<b>2.6</b>	<b>3.3</b>	<b>0.7</b>	<b>4.8</b>

**Table 2, Continuity of supply indices with reference to the end users as regards short interruptions in Norway**

Reported “Energy not supplied”, is up to 2008 divided into 27 end user groups. From 2009 the number of end-user groups has been extended to 36. Energy not supplied was a direct input to our financial incentive based scheme on continuity of supply (the CENS arrangement) up to and including 2008. From 2009 customers’ costs are calculated using the interrupted power on a given reference point in time (typically worst case), and then adjusted for the time occurrence of the interruption. The regulation includes specific interruption costs (kr/kW) as a function of the duration of the interruption for six different customer groups. The interruption costs are reduced by given factors if the interruptions are notified in advance.

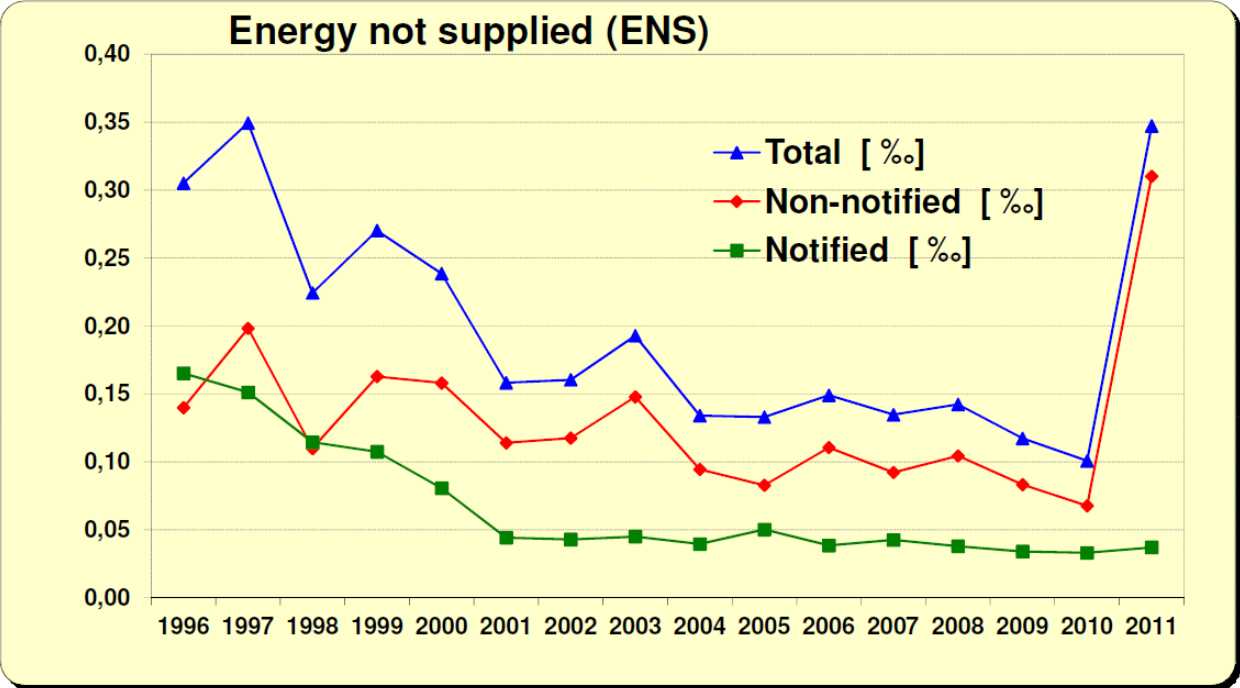
All collecting of data, reporting and calculation of indices are standardized. A standardized system is important in order to get the large amount of network companies to collect and report and calculate the different indices in the same unique way. Energy not supplied is calculated taking into account a lot of factors and by using customers’ load profiles. Hence, energy not supplied is the energy that would have been supplied during the interruption if it hadn’t occurred in the first place. The development in the energy not supplied relative to the energy supplied gives a good indication of the development of the continuity of supply level in the power system.

The main objective of the CENS arrangement is to give the network owners incentives to operate and maintain their networks in a socio-economic optimal way and thereby provide an acceptable level of continuity of supply. The companies are forced to internalize the customers’ costs related to interruption.

Year	Energy supplied GWh	Energy not supplied - notified interruptions GWh	Energy not supplied - non-notified interruptions GWh	Energy not supplied in total GWh
1996	98 571	16.8	15.8	32.6
1997	101 987	16.5	24.0	40.5
1998	106 228	13.9	13.6	27.6
1999	106 525	11.8	19.0	30.8
2000	104 193	8.9	18.1	27.0
2001	108 361	5.1	14.2	19.3
2002	107 656	4.9	15.0	19.9
2003	105 145	4.9	16.9	21.8
2004	109 306	4.4	11.6	16.0
2005	111 804	5.7	9.9	15.6
2006	106 380	4.1	11.7	15.8
2007	109 712	4.7	10.1	14.8
2008	109 570	4.2	11.4	15.6
2009	107 052	3.6	8.9	12.6
2010	111 041	3.7	7.5	11.2
2011	107 055	4.0	33.2	37.2

**Table 3, Energy supplied and some continuity indicators in Norway, as regards long interruptions.**

Three major incidents occurred in 2003, 2006 and 2011, caused by hurricane, resulting in a high amount of energy not supplied even when energy supplied had a normal level. The hurricane in December 2011 affected a large number of grid-customers in Norway, 421 000 customers lost their power supply for more than one hour, 35 000 for more than 24 hours and 10 000 more than 48 hours., Figure 1 shows the development of energy not supplied in per thousand of energy supplied for the last 16 years in Norway.



**Fig 1, Energy not supplied (ENS) in per thousand of the energy supplied (ES) to end users in Norway since 1996**

*Balancing*

Norway participates in the common Nordic balancing market, known as “the Nordic regulation power market”. It is based on a TSO-TSO model with a common merit order. The market is for manually activated reserves, where both generators and large consumers can submit bids to meet the TSOs need for regulating power to balance the system. In 2009, the four Nordic countries implemented a common model for settlement of imbalances, a so-called one-and-a-half price settlement. This refers to that consumption units are faced with a-one-price-settlement, whereas producers are faced with two different prices in the settlement, depending on whether their imbalance is “with” or “against” the system balance.

The regulation power price varies around the spot price (day ahead) for electricity. In periods with up-regulation the regulation price will typically be above the spot price, and vice versa in periods with down regulation the regulation price will typically be below the spot price. In spring and summer there are usually several hours during which the regulation price is zero or very close to zero.

It is the Norwegian TSO, Statnett who performs the balance settlement, and for this holds a license from NVE. In 2009 this license was renewed and slightly altered with an increased focus on risk management in the settlement business. Statnett’s settlement business is a separate cost centre with separate books, and

one of the new requirements in the license was that a dedicated risk capital be set aside for the settlement business.

The Norwegian part of the Nordic regulation power market has about 20-30 active participants, of which about 15 are active on a daily basis. The regulation power market is relatively un-concentrated with a fair framework for competition. There have not been any causes for action against dominant market players in the regulation power market. NVE has close collaboration with the Norwegian Competition Authority in following the wholesale market, including the regulation power market. NVE has recently audited the TSO regarding the balancing market, but the conclusions are not yet final.

Through the national regulation of 7<sup>th</sup> May 2002 N° 448 on the system responsibility in the power system, the TSO has the duty to at all times administer sufficiently reserves in the power system. In order to deal with this, the Norwegian TSO has established an option market (RKOM) to make sure there are enough bidders in the balancing market. The option market is valid during winter time, typically October to April. The option market applies on a weekly basis and on a seasonal basis. Participants in the option market are paid to oblige themselves to make bids in the balancing market.

### *3.1.3 Network tariffs for connection and access*

For regulatory purposes, in particular connected to the setting of revenue caps and tariffs, the electricity network is divided into three levels; the central grid (transmission system), the regional grid and the distribution network. Statnett SF is the TSO, and is responsible for the Central Grid (Transmission) tariffs and is the system responsible entity according to the regulations. Statnett SF owns 91 pct. of the components in the Central Grid (measured by its share of the revenue cap). The rest is owned by 20 different companies.

The general principles for the tariff structure are the same for all network levels. In addition to the current tariff, network companies may charge an investment contribution to cover the costs of new network connections. The tariff structure consists of different components such as a usage-dependent energy component and a fixed component.

For feeding into the network the fixed component of the tariff is independent of the grid level of connection. The procedure for setting network tariffs has principally remained unchanged in the price strategy of the Central Grid (Transmission) for the period 2010 to 2013 compared to the period 2007 to 2009. The annual national G was 1 €/MWh in 2011 (NOK 8, exchange rate € 1 = NOK 8).

Within the framework of regulations of tariff structure given by the NVE, the network companies are responsible for the actual tariff levels in their network, given their expected revenue cap and CENS (cost of energy not supplied) for the coming year. Complaints and disputes regarding the regulation, including the tariffs are handled and settled by NVE.

On January 1st of 2007 a revision of the revenue cap (RC) regulation based on a yardstick formula was introduced. The RC yardstick formula is based on 40 pct. cost recovery and 60 pct. of the norm cost resulting from benchmarking exercises, with a two year lag.

The network companies set the tariffs based on their allowed revenue. The allowed revenue is based on the revenue cap, with addition for costs related to property tax, tariffs paid to other regulated grids and costs related to time lag on inclusion of capital costs in the revenue cap.

The revenue compliance is subject to regulatory control. Excess or deficit revenue for a given year is calculated as the difference between actual collected revenues in a year and allowed revenue for the same year. Actual collected revenues include tariff income from customers, bottleneck income (congestion revenues) and income from system operations. As revenue generated from bottlenecks is considered to be a part of Statnett's actual collected revenue, these revenues thereby reduces the base for tariffs that can be collected from Norwegian customers. However, costs related to removing bottlenecks are also part of the tariff base, which implies that the bottleneck income is also used to finance investments to eliminate bottlenecks.

NVE decides an excess/deficit revenue balance every year. The balance is to be adjusted towards zero over time, through tariff changes. Excess revenues must be reimbursed to the customers, while deficit revenues may be recovered.

The methodology and procedures for the regulation of transmission and distribution companies have been unchanged in 2011.

#### *3.1.4 Cross-border issues*

According to regulations and concessions pursuant to the Energy Act, cross border electricity exchange shall be set out by implicit auctioning. Congestion management concerning Norwegian interconnectors to Sweden, Denmark and Finland are fully integrated with the functioning of the wholesale market and are handled by implicit auctioning through the power exchange (Nord Pool Spot).

Rules governing information from the Transmissions System Operator (TSO) in the context of congestion management is regulated in the regulations given for the System Operator (Regulations relating to power system responsibility). The relevant information is published at Nord Pool Spot.

For "long and stable" bottlenecks (congested areas), Statnett is, according to the regulation, in principle obliged to establish separate bidding areas, elspot areas.

In March 2010 Statnett announced a fifth elspot area in Norway, and through 2010 and 2011 Norway was divided into five elspot areas. These were NO1 Eastern Norway including Oslo, NO2 Southern Norway, NO3 Northern Norway, NO4 Middle Norway including Trondheim and Molde, and NO5 Western Norway including Bergen. Congestions within an elspot area are mainly to be handled by counter trade.

The TSO shall, according to the regulation, determine the maximum permitted limits for transmission capacity between the elspot areas (trading limits) on an hourly basis. The system operator shall publish trading limits for each interconnector for the next day two hours before gate closure of the elspot market of the Nordic power exchange. I.e. trading limits are published on the web pages of the Nordic power exchange, Nord Pool Spot in the morning before the day ahead market closes at noon.

Svenska Kraftnät has subdivided the Swedish electricity market into four bidding areas from 1 November 2011. This is expected to reduce congestions and increase the efficiency and trade between the Nordic countries.

As part of the market coupling project in North West Europe, the Nordic and Dutch day ahead markets were coupled on 11 January 2011 through the so-called interim tight volume coupling (ITVC) on the NorNed interconnector. Since then the capacity on NorNed has been traded through implicit auctions. A trading mechanism for intraday trade was launched in March 2012.

Due to fluctuations in the hydro situation and variations in trading capacity between elspot areas, the extent of congestions in Norway fluctuates over time. Figure 2 below shows the average capacity that has been available to the market on different Nordic interconnectors compared to maximum capacity, in 2011.

The transmission capacity available for the market has been reduced on all the Nordic interconnectors in several hours. The largest reductions were on the connections between East Norway (NO1) and Sweden, and between Zealand (DK2) and Sweden. However, the average available transfer capacity was higher in 2011 than in 2010 for all the selected connections, with the exception of the connection between Zealand and Sweden.

How much of the physical available transfer capacity that is available for the market varies a lot, dependent on the system safety in the respective market areas. That more capacity was available for the market in 2011 than in 2010 reflects that the system safety increased as a result of increased hydrological balance in the last part of 2011.

The Fenno-Skan 2 cable between Finland and Sweden was available for the market from November 15. One month later was the cable in full commercial mode, after a test period with a varying degree of available trading capacity. The cable increased the transfer capacity between Sweden and Finland with 800 MW in both directions.

In November 2011 was Sweden divided into four elspot areas to better handle congestions in the national Swedish grid. Earlier was these congestions mainly handled by counter trading and by reducing the trading capacity to the surrounding countries. The main Swedish congestions are now to a larger degree handled by the market itself. This reduces, to a certain degree, the need to lower the trading capacity to the surrounding countries in order to handle the internal congestion restrictions.

**Average capacity that has been available to the market:**

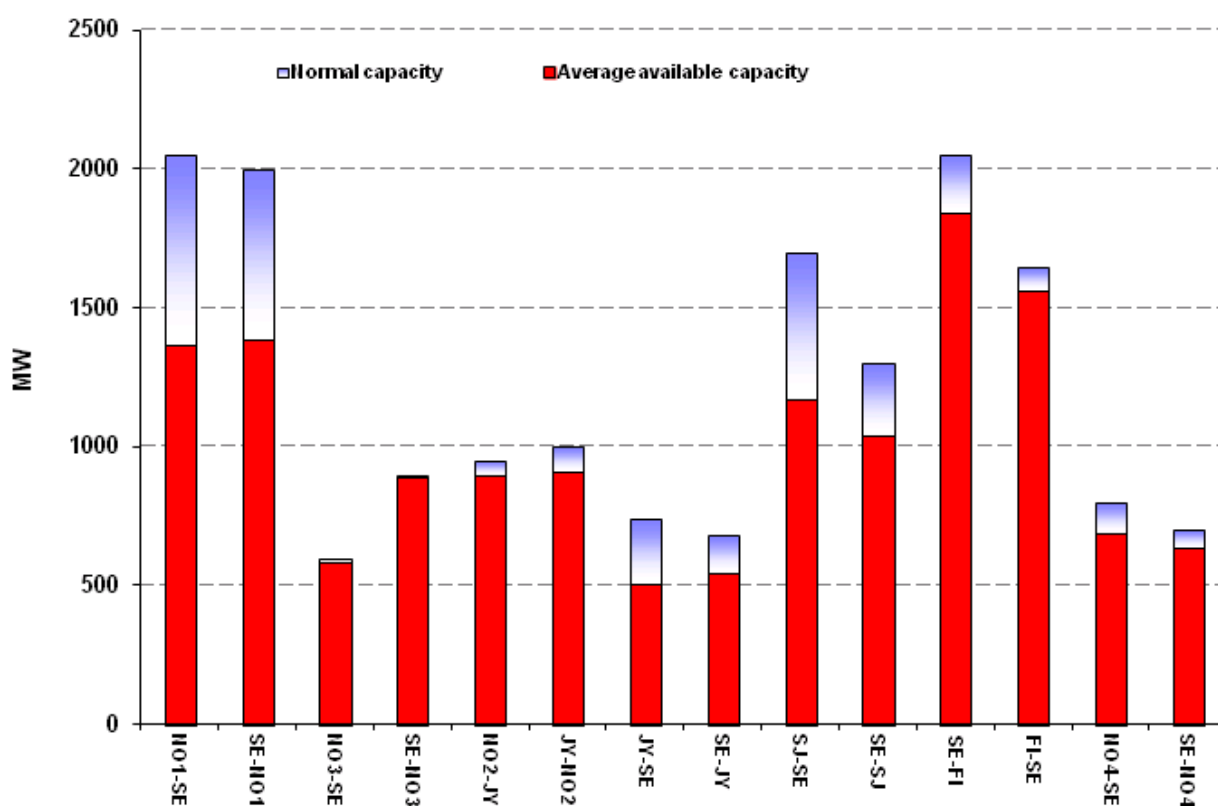


Fig 2, average available capacity

**Price differences in percentage of all hours in 2011. Sweden has been left out due to the introduction of four Swedish price areas November 1.**

2011		Lower elspot price than:									
		NO1	NO2	NO3	NO4	NO5	Sverige	Finland	Jylland	Sjælland	EEX
Higher elspot price than:	NO1		11.1 %	19.7 %	16.7 %	16.0 %	-	20.0 %	26.4 %	23.8 %	36.9 %
	NO2	0.3 %		18.6 %	16.1 %	15.5 %	-	19.0 %	24.3 %	22.9 %	36.6 %
	NO3	25.5 %	33.5 %		6.6 %	33.5 %	-	10.9 %	23.7 %	20.1 %	36.4 %
	NO4	38.1 %	41.5 %	16.1 %		45.7 %	-	20.1 %	26.9 %	24.6 %	36.5 %
	NO5	2.0 %	11.8 %	20.0 %	16.6 %		-	20.7 %	26.6 %	24.3 %	36.6 %
	Sverige	-	-	-	-	-		-	-	-	88.3 %
	Finland	30.2 %	37.5 %	21.9 %	25.0 %	36.9 %	-		29.4 %	24.8 %	39.1 %
	Jylland	34.1 %	34.6 %	29.2 %	31.5 %	38.8 %	-	25.2 %		1.2 %	37.3 %
	Sjælland	37.2 %	38.9 %	32.7 %	34.4 %	40.8 %	-	30.8 %	14.0 %		39.1 %
	EEX	63.0 %	63.3 %	63.5 %	63.4 %	63.3 %	-	60.8 %	62.4 %	60.5 %	

Table 4

- NO1: East-Norway (Oslo)
- NO2: Southwest-Norway (Kristiansand)
- NO3: Middle-Norway (Trondheim)
- NO4: North-Norway (Tromsø)
- NO5: West-Norway (Bergen)



SE: Sweden  
DK1: Denmark (Jutland)  
DK2: Denmark (Zealand)  
FI: Finland  
EEX: European Energy Exchange in Germany

### **3.1.5** *Dispute settlement*

NVE is authorised to monitor compliance with, and take decisions according to the Energy Act and regulations laid down in accordance with the Act.

NVE handles complaints regarding: network regulation and tariffs, quality of supply, metering and settlement, billing, supplier switching, neutrality and non-discrimination, system operation and the obligations and powers of the transmission system operator (Statnett SF).

Elklagenemnda is a tribunal created through an agreement between the associations of the Norwegian electricity industry and the Office of the Consumer Ombudsman, and approved by the Cabinet of Norway.

The tribunal deals with complaints arising from the contractual relationship between distribution system operators and/or energy suppliers and consumers. The associations of the Norwegian electricity industry and the Office of the Consumer Ombudsman have negotiated standard agreements which set up a balanced set of conditions. There are separate agreements for connection and use of the grid system, and electricity supply. Some utilities practices may be at variance with these agreements. All companies that have received a trading license from NVE under the Energy Act are included in the scheme.

## **3.2 Promoting Competition**

### **3.2.1** *Wholesale markets*

The Norwegian wholesale market is part of the Nordic wholesale market through the common Nordic power exchange for physical power, Nord Pool Spot AS. In 2010 305.2 TWh was traded over Nord Pool Spot (285.5 TWh in 2009) at Nord Pool Spot. This accounts for 74 % (72 % in 2009) of the power consumption in the Nordic region. The remaining volume of the Nordic market was traded bilaterally. NVE regulates Nord Pool Spot through the market place license, in accordance with the Energy Act (1990).

Nord Pool Spot organizes a central market place where producers, distributors, traders, energy companies, large consumers and TSOs can buy or sell physical power for delivery the next day. The price calculation is based on the balance between bids and offers from all market participants – finding the intersection point between the market's supply curve and demand curve. This trading method is referred to as equilibrium point trading, auction trading, or simultaneous price setting.

The total Nordic market is divided into bidding areas, elspot areas; these may become separate price areas if the contractual flow of power between elspot areas exceeds the capacity allocated for spot contracts by the transmission system operators. If no such congestion occurs between the Nordic elspot areas, the equilibrium price (the system price), will be the common price in all Nordic elspot areas. When grid congestion develops, however two or more elspot area prices are created in the Nordic areas.

The generation mix in the Nordic area consists of hydro, nuclear, wind and various conventional thermal sources. The actual generation mix and import/export situation will vary according to the hydrological situation. In a seasonal context this determines the value of the water which is the opportunity cost of production in the future. In some cases the hydropower flexibility is large enough to level out price differences over the day. In winter peak periods, however, prices may be set by peak thermal capacity.

It is possible for participants in the Nordic market to manage their risk through the forward market facilitated by NASDAQ OMX Oslo ASA. NASDAQ OMX is a commodity derivatives exchange authorised by the Norwegian Ministry of Finance and supervised by the Norwegian Financial Supervisory Authority, providing a wide range of derivative power products; Futures - day/week, Forwards - month/quarter/year and Contracts for difference (CfD). NASDAQ OMX has more than 350 members from 18 countries covering a wide range of energy producers, consumers and financial institutions.

### *Generation*

In 2011 the total Nordic net generation was 373.7 TWh, which is 1.9 TWh lower than registered in 2010. The decrease was basically due to lower thermal generation. More inflow to hydro reservoirs, higher nuclear production and lower consumption led to decrease in prices in 2011 compared to 2010. Lower prices made thermal generation less profitable. Lower prices also explain the large decrease in Nordic net import Nordic from 2010 to 2011. Nordic region was a net importer in 2010 with a total net import of 4.8 TWh (18.8 TWh in 2010)

The Norwegian net generation was 128.1 TWh in 2011 (124.4 TWh in 2010). The share of the hydro plant generation accounted for around 95.3 % of the total Norwegian net generation in 2011. This percentage shows the importance that the weather conditions have on the net generation capacity. The inflow to the hydro reservoirs in Norway in 2011 was the highest registered since 1989 and 1990. The Norwegian net exchange of power changed from 7.6 TWh net import in 2010 to 3.0 TWh net export in 2011.

#### *3.2.1.1 Price monitoring*

NVE issues weekly reports that analyse the previous week's developments in the Norwegian and Nordic electricity markets. The report is distributed electronically every Wednesday between 1 and 2 pm, and published on NVE's website.

NVE also issues a quarterly report on developments in the Norwegian and Nordic electricity market. The reports analyse the previous quarter. The fourth quarter report also contains an analysis of the whole year.

Both the weekly and quarterly reports contain a detailed description of all relevant price development factors in the markets.

As regards price monitoring in the wholesale market, NVE supports the Norwegian Competition Authority in monitoring Norwegian generators' bidding behavior at NPS. NVE has developed a model for this purpose. The model stipulates a market price given efficient utilization of reservoir-water (estimation of water values), and compares this estimated price to the actual price in the market. Price differences that can not be explained as price-taker behavior, should be investigated by looking at the different participants' bidding in the market place. As a part of this process, NVE has the full mandate to collect information about the bidding from NPS.

### *3.2.1.2 Monitoring the level of transparency, including compliance with transparency obligations, and the level and effectiveness of market opening and competition*

#### *Rules governing market conduct and competition in the wholesale market*

Nord Pool Spot is issued with a Market place license from NVE, where it is required that the holder of the license operates an efficient market for the exchange of physical power. Nord Pool Spot regulates market conduct through the Nord Pool Spot Rulebook. All market participants are required adhere to the standard terms for participation in the NPS Rulebook:

- Bidding behaviour:
  - The standard terms for trading in the physical markets include rules for bidding.
- Market surveillance:
  - Both NPS and NASDAQ OMX are obliged to provide an internal market surveillance.
  - Increase in volume of trade and the degree of specialization in the two markets lead to a decision to physically separate the market surveillances of NPS and NASDAQ OMX in 2011. The monitoring of possible abuse of the interaction between the two markets are taken care of by regular meetings and rules for exchange of information between the two market surveillances.
  - NPS Market surveillance must ensure that market participants play by the rules to maintain the markets confidence in the exchange. The Rulebook for trading at NPS regulates market conduct in the physical market with regards to disclosure of price relevant information, misuse of insider information and market manipulation.

Furthermore, regulations given in the Norwegian Competition Act regarding misuse of dominant position apply. These regulations are under the formal competence of the Norwegian Competition Authority. NVE and the Competition Authority cooperate as described under the chapter about price monitoring. Furthermore, if there is suspicion of misuse of dominant position, NVE has a mandate to collect information about market participants' bidding behavior from NPS for the purposes of analysis, and forward it to the Competition Authority for a formal decision.

#### *Transparency in the wholesale market*

According to Nord Pool Spot's Rulebook, participants and clearing customers shall disclose any information regarding business or facilities owned or controlled or claimed balance responsibility for in whole or in part by the participant or clearing customer, in particular information relevant to facilities for production, consumption or transmission of electricity, regarding:

- any planned outage, limitation, expansion or dismantling of capacity in the next 6-weeks period of more than 100 MW for one generator, consumption or transmission facility, or more than 200 MW for one production station, including changes of such plans;
- any planned outage, limitation, expansion or dismantling of capacity of more than 400 MW for one production station, consumption or transmission facility for the current calendar year and three calendar years forward, including changes of such plans

- any unplanned outage or failure relating to more than 100 MW for one generator, consumption or transmission facility, and more than 200 MW for one production station, including updates on such outages or failures.
- Any other information that is likely to have a significant effect on the prices of one or more Instruments if made public.

This information is published on NPS' website under Urgent Market Messages (UMMs).

Nord Pool Spot publishes a range of market data per market time unit (per hour):

- Elspot (day ahead market)
  - System price
  - Prices per elspot area
  - Volumes – buy and sell volumes per area
  - Available transmission capacities between elspot areas within the exchange area, and on interconnectors to continental Europe
  - Flow between elspot areas and on interconnectors to continental Europe
- Elbas (intraday market)
  - Prices
  - Flows
  - Available transmission capacities
- Regulating power (balancing market)
  - Volumes for up or down regulation per elspot area
  - Prices per elspot area
  - Special regulation volume (congestion management)
  - Automatically activated reserves
- Power system data
  - Production
  - Consumption
  - Exchange
  - Hydro reservoirs

### *3.2.2 Retail markets*

Each entity operating in the electricity market and/or in the network business is required to hold a trading license. At the end of 2011 the Norwegian Water Resources and Energy Directorate (NVE) had about 450 trading concessions under surveillance. At the end of 2010 there were around 30 suppliers with offers in all grid areas in Norway and a total of 112 suppliers in the whole country.

In 2011 there were 157 DSOs in Norway. Of these, there were only eight DSOs with more than 100.000 customers.

On average most end users are still customers of the incumbent supplier. The number of residential customers with suppliers other than their local supplier has steadily increased over time. About 720 000 customers in the household market was registered with another supplier than the incumbent supplier at the beginning of 2012. This is about 30 percent of all metering points in the household market.

The dominant supplier within a network area is most often a vertically integrated supplier or a supplier within the same corporation as the DSO. The market shares of the dominant suppliers within each grid area measured in numbers of metering points vary from 19 to 97 percent within the household market. On average, the dominant supplier had 70 percent of the household customers in their grid area.

#### *3.2.2.1 Price monitoring*

In Norway there is one official website for price comparison, run by the Norwegian Competition Authority. It compares the three most common contracts of the market, and about 50 percent of the household customers have contracts which are presented on that site. The customers can easily carry out an evaluation and make the choice of supplier using a price calculator. Suppliers are required to provide information on prices and contract terms. There are no regulated prices in Norway. The first six weeks new customers who have not yet chosen a supplier (supplier of last resort) shall be served by the network company at a price that is maximal 5 øre/kWh excl. VAT (or 6.25 øre/kWh incl VAT) above spot price. After 6 weeks the network companies are obliged to set the price so that the Customers that have not chosen a supplier should be provided with an incentive to find a supplier.

### Average price development for the spot contract in the five Norwegian bidding areas:

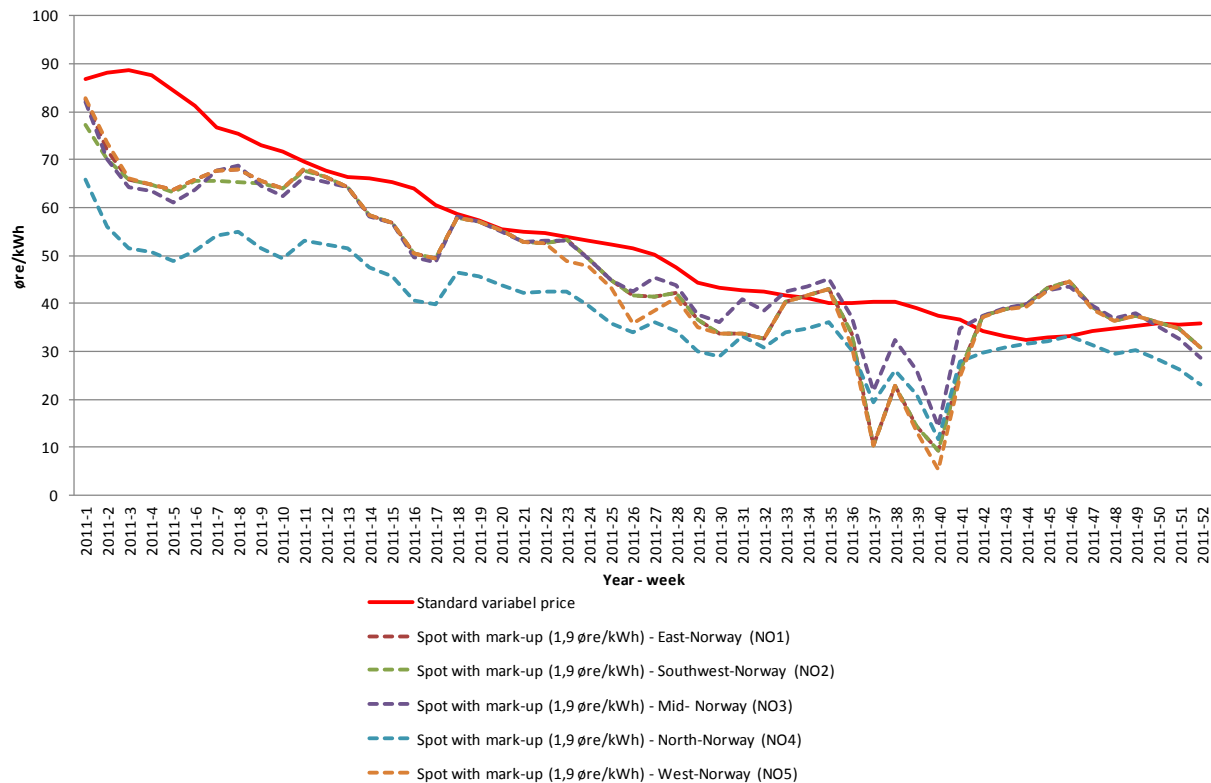


Fig 3

The figure above (figure 3) shows the average price development for the spot contract in the five Norwegian bidding areas of the Nord Pool Spot power exchange, together with the standard variable contract<sup>1</sup>. The standard variable contract is the default contract offered by most of the incumbent suppliers. The standard variable contract typically follows the spot price with a lag of about two weeks, since the supplier is obliged to inform about price modifications two weeks before they take place.

These contracts are the most common ones, but the customers can freely choose from a wide range of other contract types, e.g. fixed price contract of different time horizons, and variable contracts with a cap.

#### 3.2.2.2 Monitoring the level of transparency, including compliance with transparency obligations, and the level and effectiveness of market opening and competition

General competition legislation (The Norwegian Competition Act and the competition rules applicable to undertakings of the EEA Agreement) apply, and the Norwegian Competition Authority has full responsibility.

<sup>1</sup> The Standard variable contract offers a price based on the spot price, but without the peak variations. The price is set by the energy supplier alone, and even if in the long run follows the spot price, what determines the price at each moment in time, is less transparent than the price setting of the spot price contract. Customers with a standard variable contract type, the customers will be notified two weeks in advance of price changes.

The physical power exchange, Nord Pool Spot AS (NPS), operates under a market place license issued by NVE pursuant to the Norwegian Energy Act. In 2009 this license was renewed and altered with an increased focus on risk and adequate liable capital. In the following, the relevant framework for 2009 is described.

#### *Rules governing conduct of companies in the retail market*

In the retail market, according to the Electricity Directive, network and supply companies may be bundled if the number of customers does not exceed 100 000. NVE monitors network companies and ensures compliance with the neutrality criteria as laid down in the Energy Act of 1990 and Regulation no 301, from 11 June 1999.

The neutrality criteria require clear separation of monopoly activities (network) and supply (power sales). E.g. the network part of the business is not allowed to give information about customers to the supply side of the business. In 2011 NVE inspected several network companies with specific focus on compliance with the neutrality criteria. The inspections in them self have an educational and disciplining effect. On the basis of the neutrality criteria, NVE has not effectuated sanctions towards network companies in 2011.

In December 2011 NVE published revised guidelines on how the DSOs can comply with the neutrality criteria, including practical solutions of how the DSOs can fulfill this criterion in various situations.

#### *Monitoring of DSO's web pages*

Internet has become one of the most important channels of information, so also for the DSOs and suppliers. As the Norwegian regulation on neutrality of DSOs not explicitly mentions the issue of web pages, NVE sent a guideline to all DSOs during the first quarter of 2009, explaining how to interpret the regulation regarding information on DSO's web pages. The guidelines have later been revised and improved, and published together with the new guidelines of neutrality requirements of the DSOs, as referred to above.

The supervision of the web sites aims at getting the DSOs to have neutral websites, giving as accurate information about DSO services as possible without web links or advertisement to any particular supplier. From the logo or the web address it should be clear to everyone who is the responsible party (the DSO) of the web page and the information on it.

### **3.2.3** *Carry out investigations and imposing measures to promote effective competition*

The two preceding winters challenged the Norwegian power system. The winter 2009/2010 was characterized by long periods with very cold and dry weather. Additionally the available generation capacity in Swedish nuclear power plants was low due to technical problems and delayed restart after yearly maintenance. As consequence the hydro production was very high and the reservoir level decreased. In several hours there was scarcity and extreme price spikes in the Nordic region except the southern part of Norway and Jutland (DK1). At the beginning of winter 2010/2011 the reservoir level was at a very low level. The reservoir level was lower than the earlier registered minimum level until week 13 in 2011. Mild weather and early snow melting led to an increase in the reservoir level after week 13.

NVE has in the aftermath of both preceding winters published a report with a detailed description of the power situation during the winters and evaluated security of supply and the functioning of the market in

these periods. In a specific report, published September 2011, NVE assessed the utilization of hydro reservoirs during the winters.

A main conclusion in this report is that hydro producers can not be criticized for their production planning during these winters. They have satisfactorily managed the hydro resources at their disposal given the current market system and available information at each point in time. This is based on an investigation of detailed reservoir data and NVE's own assessments and forecasts of the future resource situation during the winter.

Although the functioning of the electricity market has worked satisfactorily, NVE concludes that there is room for improvements. There may be large deviations in reservoir level between different water ways and smaller areas within the elspot areas today. Therefore the effect of more precise price signals through more elspot areas on the utilization of hydro reservoirs should be investigated.

NVE has an ongoing project looking into possible improvements of market design in a broader sense. More specifically the project group will look into how the allowance of more prices and a better representation of the transmission grid in determination of prices could lead to more efficient congestion management and improve security of supply.

### **3.3 Consumer protection**

To secure appropriate treatment of vulnerable customers, all distribution companies in Norway have an obligation to be supplier of last resort. In addition, the social security system takes care of those unable to pay for necessities.

Customers are protected from disconnection when life or health is at risk. If the social services have guaranteed for the payment of the customer, disconnection is prohibited. There are no data available on the number of disconnections in Norway.

The electricity market is fully open for all customers, and the prices are set in the market. Suppliers are required to provide information on prices and contract terms. There are no regulated prices in Norway. The first six weeks new customers who have not yet chosen a supplier (supplier of last resort) shall be served by the network company at a price that is maximal 5 øre/kWh excl. VAT (or 6.25 øre/kWh incl VAT) above spot price. After 6 weeks the network companies are obliged to set the price so that the Customers that have not chosen a supplier are provided with an incentive to find a supplier.

All network companies are regulated with an income cap, covering all cost elements. Customers can file complaints regarding the network tariffs to the regulator.

To ensure transparency of the terms and conditions of supply contracts, the network companies have an obligation to act in a neutral and transparent manner. Further on the network tariffs are regulated, in addition to the income cap mentioned above.

Most suppliers use the standard supply contract which is made through negotiation between the branch organisation Energy Norway and the consumer ombudsman.

The Norwegian Parliament grants annually a certain amount of support to reduce network tariffs for certain customers. The aim of the arrangement is to directly reduce the tariffs for customers in areas of Norway with high distribution costs. The arrangement do not influence on the incentives in the income



regulation described above. The criteria for allocation is average cost per kWh, measured as total income cap in the network company divided on delivered energy measured in kWh. The scope of this arrangement is dependent on the annual budgets decisions of the Parliament.

According to regulations managed by the Norwegian Competition Authority, all electricity suppliers are obligated to publish their prices on certain standard products/contracts offered to household customers at a website hosted by the Norwegian Competition Authority for price comparison.

Further, all suppliers are obliged to state the price on the products/contracts they are offering in a certain way according to regulations managed by The Consumer Ombudsman.

Change of supplier has been free of charge for all customers since 1997.

### **3.4 Security of supply (if and in so far as NRA is competent authority)**

#### *3.4.1 Monitoring balance of supply and demand*

##### *Electricity peak demand*

Domestic gross consumption in 2011 was 125.1 TWh (132.0 TWh in 2010).

The Norwegian peak demand occurs during winter season. The current all time peak electricity demand is 23 994 MW. This was measured in January 2010.

The table below shows the peak demand for the last 10 seasons.

Year	Weekday	Date	Hour	Demand [MW]
2002	Friday	04.01.2002	11	20 689
2003	Monday	06.01.2003	10	19 085
2004	Monday	21.01.2004	9	20 675
2005	Wednesday	03.02.2005	9	21 401
2006	Monday	06.03.2006	9	21 575
2007	Wednesday	21.02.2007	19	21 450
2008	Thursday	14.02.2008	10	21 589
2009	Monday	05.01.2009	9	21 884
2010	Wednesday	06.01.2010	9	23 994
2011	Monday	21.02.2011	9	22 129

Table 5

According to demand forecast developed by the Norwegian TSO, Statnett, the expected peak demand for Norway season 2014/2015 will be 25 000 MW with temperatures corresponding to a ten years winter day. The same forecast based on average winter temperatures shows an expected peak demand of 23 330 MW.

#### *Currently available generation capacity*

The Norwegian net generation was 128.1 TWh in 2011 (124.5 TWh in 2010). At the end of 2011 the mean annual generation from hydro- and wind power is 126.9 TWh and maximum annual generation from thermal power is about 7.4 TWh including internal production. Due to hydro dependency the generation from hydro power will vary between 90 and 150 TWh dependent on the precipitation and inflow from year to another.

Total installed generation capacity (at the end of 2010): 31 714 MW. Available generation capacity during a cold winter is about 25 000 MW.

#### *Current and expected generation fuel mix*

	Installed capacity 31.12.2011 [MW]	Mean annual generation 31.12.2011 [TWh/y]	Net capacity added in 2011 [MW]	Expected increase in capacity in 2012 [MW]	Under construction on 31.12.2011 [MW]	License/permit given, not yet built [MW]
Wind power	511.5	1.3	76.5	159	232	1557
Hydro power	30 140	125.7	178.9	544	673	1246
Thermal power	1 062.5*	7.4	6.3		0	1720

Table 6, Actual investment commissioning during 2011 (\* Does not include 300 MW capacity in gas-fired mobile reserve plants)

Net increase in hydropower generation capacity during 2011 has been about 179 MW. During 2011 85.1 MW wind power has been commissioned, but 8.6 MW has been decommissioned.

#### *Monitoring of balance of supply and demand on the national market, the level of expected future demand and envisaged additional capacity being planned or under construction.*

The regulatory authority has delegated the responsibility for power system planning in Norway to an appointed licensee in a given planning area. 18 planning areas have been established: 17 regional areas which comprise planning in the regional grids (33 kV – 132 kV), and one for planning the national grid (132 kV-420 kV).

Every year both regional planning areas and the national planning area have to develop and/or update a regional grid development study. The study period for the grid development is a minimum of 10 years.

The power system study must describe today's grid, future transmission conditions together with anticipated measures and investments. The study includes presentations of statistics with characteristics of generation, transmission and usage of electrical energy, and also includes conditions that are of importance and of relevance for the development of the power system in the designated area. Simplified socio-economical analysis must be presented for all grid investments that require environmental impact assessment (EIA). The main goal of for power system studies is to contribute to a socioeconomically rational development of the regional grids and the national grid.

The yearly updated power system studies are submitted to NVE for consent. The regulatory authority monitors the level of expected future demand and envisaged additional capacity being planned through the power system studies. The power system studies are also important in NVE's handling of the applications for a license to energy plants or network installations.

### *3.4.2 Monitoring investment in generation capacities in relation to SoS*

#### *Authorisation criteria for new generation investments and long term planning*

For all new projects (wind power plant, gas power plants, hydro power plants, power lines, transformers) a license to build and operate must be granted. For all projects NVE considers the project economy, public and private interests and environmental issues.

The regulatory authority has delegated responsibility for power system studies to an appointed concessionaire in a given grid area. The main task of the work on the power system studies is to contribute to a socio-economic rational development of the regional grids and the national grid. In this connection the energy carriers in question are for stationary energy usage. The power system studies will continue to be an important base document in the regulator NVEs handling of the applications for a concession to erect an energy plant or installation. This is especially of importance regarding applications for the larger overhead line projects.

#### *Implicit and explicit incentives*

In special regional areas with constraints in transmission capacity Statnett has introduced a "grid efficiency phasing-in tariff". This will give a reduced grid leasing tariff on new production facilities localised within certain areas, compared with the current level, for a period of 15 years. The criteria to get the phasing-in tariff, is that new production must be established within those areas and within those energy volumes where it is documented that new production will bring efficiency gains for the grid.

#### *Progress in major infrastructure projects*

A new 140 km 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 commission in 2014. There is also construction license applications for a DC cable to Germany with capacity of 1400 MW sent in 2009/2010. The project is being developed by the Norwegian TSO (Statnett) in cooperation with the German TSO (Tennet) and the German national bank (Kfw) and is expected to be commissioned in 2018. Further, the Norwegian TSO (Statnett) and National Grid in UK have signed a cooperation agreement with the aim of commissioning a new DC cable between Norway and UK within 2020. A license application is planned to be sent in 2013. Excepted capacity is 1400 MW.

The 92 km, 420 kV OH line from Sima to Samnanger is under construction and is expected to be commissioned in 2013/2014. 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.

The 285 km, 420 kV OH line from Sogndal to Ørskog was granted license in 2011. This line will improve the security of supply in the Mid-Norway area. It will also improve RES integration and net transfer capacity. It is expected to be commissioned in 2015.

The 160 km 420 kV OH line for Ofoten to Balsfjord was granted license in 2012. This line will improve the security of supply in the North of Norway. Expected load growth and RES integration will benefit from this investment. It is expected to be commissioned in 2016.

The 360 km 420 OH line for Balsfjord to Hammerfest was granted license in 2012. This line will improve the security of supply in the North of Norway. This line will improve the security of supply in the North of Norway. Expected load growth and RES integration will benefit from this investment. It is expected to be commissioned in 2018.

#### *The TSO processes for planning new network*

The grid system planning process in Norway is made compulsory from the regulator through power system studies. The country is divided in 17 regional planning areas where one of the DSO's has the responsibility of coordinating the planning process among the DSO's in the area, and make a regional grid development study. In the national grid the TSO (Statnett) has the responsibility for the planning process and issuing of the national grid study.

Every year both regional planning areas and the national planning area have to develop and/or update a regional grid development study. The yearly updated power system studies are submitted to NVE for consent. The study period for the grid development is a minimum of 10 years.

The power system study must describe today's grid, future transmission conditions together with anticipated measures and investments. The study includes presentations of statistics with characteristics of generation, transmission and usage of electrical energy, and also includes conditions that are of importance and relevance for the development of the power system in the designated area. Simplified socio-economical analysis must be presented for all grid investments that require environmental impact assessment (EIA). When applying for a license to build or reinvest in the regional grids or national grid, the applied solution must be part of the latest grid study submitted to the regulator.

The main goal of for power system studies is to contribute to a socioeconomically rational development of the regional grids and the national grid. The power system studies will continue to be important in NVE's handling of the applications for a license to energy plants or network installations.

#### **3.4.3** *Measures to cover peak demand or shortfalls of suppliers*

##### *The quality and level of maintenance of the networks*

NVE carries out audits on companies regarding operation and maintenance. The quality of the maintenance is monitored through these audits.

### *Measures to cover peak demand*

Through the national regulation of 7<sup>th</sup> May 2002 N<sup>o</sup> 448 on the system responsibility in the power system, the TSO is granted duties and responsibilities to require mandatory participation in the balancing market, require regulation of power production (even when not part of the balancing market), and to require load shedding. Load shedding may be ordered manually, however, load shedding also occurs due to use of automatic system protection schemes. System protection schemes in the transmission grid can only be installed and operated based on decisions by the TSO.

### *Shortfalls of one or more suppliers*

In the case of shortfall of a supplier, the local network company takes over as supplier of last resort. The tariff to the customer is regulated for the first six weeks at the elspotprice plus 5 øre/kWh excl. VAT (or 6.25 øre/kWh incl VAT). After six weeks, the network company are obliged to provide the customer with an incentive to chose a supply contract from a current supply company.

## **4 THE GAS MARKET**

By EEA Joint Committee Decision No 146/2005 of 2 December 2005, Norway was awarded status as an emergent market within the meaning of Article 2 (31) of the 2<sup>nd</sup> Gas Market Directive (Directive 2003/55/EC).

Net domestic consumption of natural gas was 388 million Sm<sup>3</sup> in 2011, excluding natural gas used for non-energy purposes. This is a 5,4 percent increase from the year before. The increase was in LNG; consumption of CNG and natural gas transported in pipelines decreased.

Net domestic consumption of natural gas in Norway (mill. Sm<sup>3</sup>):

2010			2011		
Natural gas transported in pipelines	CNG	LNG	Natural gas transported in pipelines	CNG	LNG
201	7	160	186	4	198

Net domestic consumption including non-energy use was 979 million Sm<sup>3</sup>.

The Norwegian gas market is small and is expected to remain small.