2009

Annual Report

THE NORWEGIAN ENERGY REGULATOR

Content

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Preface

Oslo, June 2010

It is a pleasure to present the first annual regulator's report from Norwegian Water Resources and Energy Directorate (NVE). NVE will issue a similar regulator's report every year, and we hope the publication is well received.

The report provides an overview of the current regulation of the electricity and district heating markets in Norway, and explains relevant market development. An overview of legislative amendments, research work and international participation is also presented in the report.

I hope you will find this first regulator's report useful, and welcome any feedback that can help NVE improve further versions of the report.

Agnar Aas
Director General

1 Introduction

NVE regulates and monitors the Norwegian electricity and district heating markets. These activities are undertaken mainly by NVE's Energy and Regulation Department, which consists of eight sections with different responsibilities. This report was written by staff from all of these sections.

The main topic of this report is the Norwegian electricity sector, while the district heating sector receives much less attention. The reason for this is that the Norwegian district heating sector is small and NVE's responsibilities within this sector are limited. In chapter 2, we describe the electricity sector, NVE's regulatory responsibilities, ownership situation, various regulatory topics and the electricity market developments in 2009. Chapter 3 addresses the district heating market. Finally, the report describes NVE's legislative amendments, research work and national and international participation in 2009.

2 The electricity market

2.1 The Energy Act and NVE's regulatory responsibilities

Norwegian Water Resources and Energy Directorate (NVE) was assigned the role of electricity regulator when the Norwegian Energy Act entered into force on 1.1.1991. The act authorises the framework of regulations and licences necessary to establish and regulate an efficient power market, with free choice of supplier and regulated access to the networks, and the issuing of regulations concerning the rights and obligations of the various actors in the market.

NVE has been delegated powers to monitor compliance with, and take decisions according to, the Energy Act and regulations laid down in accordance with the act. NVE has also been delegated powers to issue regulations in main areas important to securing an efficient electricity market, such as network regulation and tariffs, quality of supply, metering and settlement, billing, supplier switching, neutrality and non-discrimination, and, finally, the obligations and powers of the transmission system operator (TSO) (Statnett SF).

A licence is needed by all actors engaged in the physical transportation and trade of physical electricity. The licences have different conditions depending on whether the licensee is a network company, a trader or a generator selling electricity in the market. The licence is generally granted to all actors participating in the electricity market (except actors buying electricity for their own use or acting as a trader or broker not directly involved in the physical delivery of electricity). The licences oblige the licensees to provide all the information NVE needs to exercise its duties as the regulator. However, the licence holders' main obligations are not stated in the licence as such, but in the set of regulations mentioned above, which define the rights and obligations to which the licensee must adhere.

In accordance with the Energy Act NVE also has the authority to issue licences on several other areas related to the roles and responsibilities in the electricity markets. This includes the marketplace licence, the balancing responsibility licence and the system operation licences.

According to the Energy Act a market place licence is necessary to organise and operate a marketplace (e.g. a power exchange) for trading physical electricity. At present Nord Pool Spot is the only entity that has been granted such a licence. The purpose of the marketplace is to promote efficient price formation in the power market by facilitating efficient, appropriate, trustworthy trading systems and trading rules.

Statnett SF is given the licence as the balance responsible in the Norwegian power system, and organises the daily physical and financial settlement of imbalances in the Norwegian power system.

As the TSO, Statnett SF also holds the licences as the system operator in the Norwegian power system. The role and responsibilities of the system operator follows from the regulation on system operation, where the over all goals is to facilitate an efficient electricity market with a satisfactory quality of supply.

NVE supervises the foreign exchange licences given to Statnett SF as the owner of the grid, and Nord Pool Spot. The purpose of this licence is to facilitate an efficient use of the foreign exchange capacity.

NVE has been delegated the power to take decisions according to the Energy Act and regulations.

NVE's cooperation with other authorities such as Norway's Competition Authority and Financial Supervisory Authority is agreed in bilateral contracts.

NVE actively participates in the Nordic and European regulatory co-operations through NordREG, CEER and ERGEG.

The Energy Act states that to fulfil Norway's agreed responsibilities towards another country, NVE can, without hindrance from legal confidentiality requirements, communicate confidential information to energy regulators in other EEA countries, including EU countries, when this information is necessary to promote the enforcement of regulations in the electricity market. Recipients of such information must declare they will treat this information confidentially.

2.2 Organisation and ownership

The Norwegian power sector consists of a large number of actors participating in various business areas. These areas may be categorised into four main areas: generation, transmission/distribution, supply and consumption. Depending on the activity pursued, the company is designated a generator, distributor, supplier or consumer. The distribution companies operate as natural monopolies subject to regulation by NVE, while generator and supplier companies operate under free competitive conditions. However companies may be involved in both monopoly (distribution) and competitive business areas (generation and/or supply). Companies with a mix of monopoly and competitive activities are referred to as vertically integrated companies. From a regulatory perspective this type of organisation produces important challenges for NVE in its work to achieve a well functioning electricity market.

Everyone involved in any of the above mentioned activities must hold a licence issued by NVE. The licence system affords NVE the authority it needs to regulate licence holders. The licence system may for instance require vertically integrated companies to split into unbundled entities in the event of mergers and acquisitions, as long as these mergers/acquisitions trigger the obligation to acquire a trading licence. In cases where a vertically integrated company has more than 100,000 connected customers, the Energy Act states that the company is obliged to separate its monopoly and competitive activities – legal unbundling. According to the Energy Act vertically integrated licence holders are also required to keep different accounts for their monopoly and competitive operations – unbundling of accounts.

A total of 409 companies held a licence as of 31.12.2009. Of these a total of 162 companies were involved in grid operations, while 64 companies are integrated companies engaged in generation, grid operation and supply to end-users. 42 companies were only involved in grid operations.

Around 90 per cent of the generation capacity is publically owned, while private ownership accounts for the remaining 10 per cent.

The Government, through the national transmission company Statnett SF, owns about 90 per cent of the national grid, while around 10 per cent is in private hands. At the distribution level, most of the grid is owned by county and municipal authorities.

Foreign ownership in the Norwegian power sector is limited to trading activities, mainly in the wholesale market.

Roughly 75 per cent of the licensees are organised as limited companies. Around five per cent are organised as cooperatives, while around 17 per cent are organised as municipal, county or inter-municipal companies.

2.3 Electricity trading and price determination

The Norwegian power system consists of 96 per cent hydropower generation, around 2 per cent combined cycle gas turbine production, and, finally, around 1 per cent wind power. The annual production for years with average inflow is estimated at 130.7 TWh and the installed capacity was 30,901 MW at the end of 2009. Somewhat more than 80 per cent of the installed capacity is available in the winter season. In total, the Norwegian hydropower system has a reservoir capacity of 84.3 TWh. Approximately 50 per cent of the annual inflow results from snow melting in May, June and July. Norway has transmission connections to the Netherlands (700 MW), Denmark (1,050 MW), Sweden (3,350 MW), Finland (50 MW) and Russia (30 MW). In a year with normal temperature conditions, the annual electricity consumption is in the region of 125-130 TWh. This consumption is split between households (35 TWh), power intensive industries (30 TWh), small manufacturing (20 TWh), and the service sector (25 TWh), which are the most important electricity consumers in Norway.

2.3.1 The wholesale market

2.3.1.1 System responsibilities

System responsibilities in Norway are regulated by separate regulations relating to system responsibilities in the power supply system.

The regulations shall facilitate an efficient electricity market and a satisfactory quality of supply in the power system. The regulations shall ensure that system responsibilities are exercised in an efficient manner, having due regard to public and private interests. Statnett SF has been granted a licence for system operation. This licence was extended in 2009 and will be valid from 1.1.2010 until 31.12.2012. NVE has the authority to approve and issue licences to system operators.

The system operator shall:

- provide frequency regulation and ensure continuous balance in the power system at all times,
- act in a neutral and non-discriminatory manner in relation to everyone covered by the regulations,
- develop market solutions which will help to ensure the efficient development and utilisation of the system,
- to the greatest possible extent make use of instruments which are based on market principles,
- coordinate and follow up the actions of licensees and end-users in order to achieve

a satisfactory quality of supply and efficient utilisation of the power system, and
- prepare and distribute information about power system related matters that have a bearing on the power market, as well as matters of significance to the general quality of supply.

The system operator has extended authority over other actors in the power system. The regulations apply to the system operator and anyone who wholly or partly owns or operates grids or power generation facilities, or organises marketplaces, as well as trading companies and end-users. NVE also carries out supervision and monitors that the system operator exercises its system responsibilities in a neutral and proper manner.

2.3.1.2 Power exchange

Nord Pool Spot organises the Nordic marketplace for trading electricity for physical delivery, and offers both day-ahead and intra-day markets to its participants (Elspot and Elbas). Nord Pool Spot is located in Norway, owned by the Nordic transmission system operators (TSOs), and regulated by NVE. The activities of Nord Pool Spot are governed by the Energy Act and additional concessions with accompanying conditions. Nord Pool Spot operates within the framework of both the marketplace licence issued by NVE and the licence for cross-border power exchange issued by the Ministry of Petroleum and Energy.

In the Elspot market, hourly power contracts for physical delivery in the next day's 24-hour period are traded daily. 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. The Elspot concept is based on bids for the purchase and sale of hourly contracts using three different bidding types: hourly bids, block bids, and flexible hourly bids that cover some or all of the 24 hours of the next day. The trade is based on implicit auctions.

Elbas is a continuous cross-border intra-day market that covers both the Nordic countries and Germany, where adjustments to trades made in the day-ahead market are made until one hour prior to delivery. Elbas connects its participants within and across the borders of the Nordic and German power markets. All trades made on Elbas are implicit utilising cross-border capacity.

Nord Pool Spot's marketplace concession was renewed on 1.1.2010. A study of the economic regulation of NPS was conducted in 2009 as a part of the renewal process.

As described above Nord Pool Spot is regulated by Norwegian law and authorities. However, there are guidelines for the Nordic cooperation relating to NVE's exercise of authority over Nord Pool Spot, and meetings between the Nordic energy regulators were held in 2009.

2.3.1.3 Transmission congestion management

The system operator shall define Elspot areas in order to deal with major and long-term bottlenecks in the regional and national grid system. Norway was divided into three price regions for most of the year in 2009.

The system operator shall also define separate Elspot areas when a shortage of energy is expected in a limited geographical area. Other bottlenecks in the regional and national grid system should normally be dealt with by the balancing electricity market. Any additional costs related to deviations from the normal sequences in the regulated electricity market, must be covered by the system operator.

The system operator shall notify the defined Elspot areas in reasonable time before they are used. In December 2009, a fourth Elspot area was defined to deal with bottlenecks and difficulties with capacity calculation in the eastern region of Norway. This Elspot area was established on 11.1.2010.

2.3.1.4 Power exchange with neighbouring countries

According to the Norwegian Energy Act, all (physical) cross-border exchange of electricity requires a trading licence for cross-border exchange issued by the Ministry of Petroleum and Energy.

Both Nord Pool Spot and Statnett SF have been granted licences for the organisation of cross-border exchange in the Nordic area and on the interconnection between Norway and the Netherlands, NorNed. According to the licences for cross-border exchange in the Nordic area, the physical trading between Norway and the other Nordic countries shall be based on implicit auctions in the Elspot market at the Nordic Power Exchange, Nord Pool Spot, and the Norwegian TSOs' participation in the Nordic System Operation Agreement. The licences for cross-border exchange on NorNed state that the trading arrangement should be based on implicit auctions and desterilised market coupling between the involved power exchanges. The regulator shall supervise compliance with these licences.

The overall aim of these licences for cross-border trade is efficient exchange, taking into account the security of supply. So far, however, the NorNed licences have an exemption clause, allowing for a daily, explicit auction for a limited period of time. The explicit auction arrangement in NorNed is due to the commitments to the Tri-Lateral Cooperation on the Dutch side. Through interactions with the owners of NorNed, the involved power exchanges and the Dutch regulator, NVE has worked towards a timely introduction of implicit auctions also on NorNed.

In our supervision of cross-border exchange within the Nordic area, special attention has been paid to Statnett SF's routines regarding the determination of trading capacity.

2.3.2 End-user market

The end-user market is characterised by a division between its participants, namely the suppliers, distributors and end-users. The distribution companies operate as natural monopolies and are subject to regulation, while supplier companies as the generators operate under free competitive conditions. The nature of this market structure imposes important responsibilities on the distribution companies. They proved a market facilitator service in order to ensure equal conditions for the competitive actors in the end-user market. Proactive supervision by NVE is required

to detect and correct discriminatory behaviour among distribution companies. Neutrality, as a supervision topic, was emphasised in 2009. During the second part of 2009, NVE monitored the neutrality of the websites of 45 distribution companies. In addition, NVE has engaged a consultancy firm to work out a strategy for NVE's monitoring of neutrality. The work will be finalised during 2010.

During 2009, NVE and the Swedish Energy Markets Inspectorate held a joint workshop in Oslo. The workshop served to identify common key issues relating to the end-user market, in which the need for collaboration is expected intensify in the period prior to the implementation of the Nordic end-user market in 2015.

During 2009, the Nordic countries developed a joint approach to the third legislative package on retail and consumer issues. The objective of this work was to assess the extent to which the implementation of the provisions in the third package needs to be harmonised between the Nordic countries. This effort must be seen in relation to the ongoing process towards a common Nordic end-user market.

2.3.2.1 Metering and settlement

The distribution company is responsible for all meter values from every metering point within its grid area. Even when the handling of meters and metering data are outsourced to a third part, the distribution companies are still responsible for ensuring the quality of all metering data and the handling of the data in the whole value chain. The distribution company shall document its routines to ensure quality.

The distribution company has to send the collected metering data to the entity responsible for the settlement of imbalances, Statnett SF, and to each party responsible for the imbalances. Given that settlement is based on the distribution company's own adjusted system load profile, they will carry out periodical financial settlements for the generators, customers and suppliers in their grid area.

Smart metering will be introduced to all metering points in Norway. During 2009, NVE carried out a general consultation on the functional requirements for the advanced metering and control systems. The timeframe for the implementation of smart metering in Norway will depend on the EU standardisation process. The first part of this standardisation process is expected to conclude in 2010.

2.3.2.2 Retail market contracts

Although the suppliers in the Norwegian retail market offer a variety of contracts, the contracts can normally be divided into three groups. These are spot price, standard variable price and fixed price contracts.

Spot price contracts are based on daily prices from Nord Pool Spot plus a mark-up that consists of a variable and in some cases a fixed yearly fee.

For a standard variable contract, the supplier may freely choose the price and its duration given that any price change must be announced to its customers at least 14 days in advance.

Fixed price contracts are based on an agreement to deliver electricity at a fixed price for the duration of the contract.

According to regulations issued pursuant to the competition laws, a supplier that delivers electricity to a household customer shall report prices to the Norwegian Competition Authority. This applies for the three types of contracts mentioned above.

The Norwegian Competition Authority maintains an updated comparison of prices on its website. Based on these prices NVE produces weekly and quarterly surveillance reports on the end-user market. During the workshop between NVE and the Swedish Energy Markets Inspectorate in 2009 (see page 11), it was agreed to incorporate comparable Swedish contract types into NVE's market surveillance reports. The cooperation on the end-user market surveillance between NVE and Swedish Energy Market is expected to be intensified in 2010.

2.3.2.3 Customer switch procedure

A more customer-friendly switching procedure has been an overall goal since the Energy Act came into force in 1991.

- The fees for changing supplier were totally removed in 1997
- Weekly change of supplier has been possible since 1998
- Hourly metering of all customer with annual consumption above 100,000 kWh/year since 2005
- Introduction of Nordic Utilities Information Exchange (NUBIX) in 2008

NUBIX seeks to make the end-user market more efficient by enhancing the flow of information between the actors involved (customers, suppliers and distribution companies) and tightening the deadlines for carrying out switches.

2.3.2.4 Supplier of last resort

According to the Energy Act, the distribution company is assigned the role of supplier of last resort within its grid area, meaning that it is the distribution company's duty to supply electricity to customers without an ordinary supplier.

Both customers who are unable to get an ordinary supply contract (for instance due to insolvency) and customers who are temporarily without a supply contract (for instance if they have just moved to a new address or their former supplier has gone bankrupt) are covered by the distribution company's obligation to supply.

If an end-user has not chosen a supplier and is on an obligation-to-supply tariff, the distribution company shall, without delay, inform the customer of the terms and conditions for this temporary tariff and at the same time provide an overview of all available suppliers. If the customer for some reason remains on the obligation-to-supply tariff, they shall receive the same information at least every three months. When it starts supplying them, the distribution company shall also send the customer a standard information letter composed by NVE about its obligation to supply.

The obligation-to-supply tariff is regulated for the first six weeks. The distribution company can charge no more than the Nord Pool Spot area price plus 0.05 NOK/kWh for the first six weeks. After those six weeks the obligation-to-supply tariff should give the customer an incentive to conclude an ordinary supply contract (implying that

it should be higher than market based tariffs). Any cost and income associated with customers on an obligation-to-supply tariff is included in the income regulation, so that the distribution company does not have incentive to set the price in or to keep the customers on such a tariff.

Through its supervision of distribution companies NVE has experienced that the number of customers on obligation-to-supply contracts are considerable. Therefore, NVE engaged a consultancy firm to investigate alternative, viable ways of arranging the obligation-to-supply scheme. The conclusions and recommendations from this work, which is expected at the beginning of 2010, will be of great value to NVE's work on this issue.

2.4 Transmission and distribution grids and network regulation

2.4.1 Financial regulation

NVE regulates the 155 network companies in Norway via a revenue cap (RC). The revenue caps are calculated according to the formula:

$$RC_t = 0.4C_t + 0.6C_t^* + AI_t$$

RC_t is the revenue cap in year t. C_t is the cost base for each network company, based on costs from year t-2.

C_t^* is the norm cost for the company, which is the result of a benchmarking analysis of the companies, also based on data from year t-2. AI_t is an addition for investments made in year t-2. NVE uses data envelopment analysis (DEA) to benchmark the companies' costs. NVE defines a weighted average cost of capital (WACC) to calculate the capital cost for each company.

The cost base is calculated according to the formula:

$$C_t = (OM_{t-2} + CENS_{t-2}) \times \frac{CPI_t}{CPI_{t-2}} + NL_{t-2} \times P_t + DEP_{t-2} + RAB_{t-2} \times WACC_t$$

OM is the operation and maintenance cost for the company and CENS is the company's costs of energy not supplied. The cost of network losses is calculated by multiplying actual network loss (NL) with the reference price of power (P). This price is a volume weighted monthly area spot price Nord Pool Spot. DEP is depreciations, and RAB is the regulatory asset base (book value plus 1 per cent of working capital).

Table 2-1 below compares the key figures in the revenue cap for 2008 and 2009. The sum of all RCs for all network companies is set to equal the expected total costs of the industry. If there is a deviation between the expected total costs of the industry and the actual costs in a year, the deviation is included in the revenue cap

calculation two years later. This addition to the RC is new from 2009. The deviation between expected total costs in 2007 and actual costs in 2007 is included in the RC for 2009. This deviation was calculated to be NOK 934,306 million, including two years' interest, so that the actual total RC for the DSOs is NOK 15,144 million.

Table 2-1
Comparison of key figures in the revenue cap. DSOs and TSO Statnett SF. (Costs in 1000 NOK).

	DSOs '09	TSO '09	DSOs '08	TSO '08
Cost base	13,926,455	3,181,554	13,960,151	2,754,143
Operation and maintenance costs (OM)	6,669,407	1,049,513	6,175,993	690,887
Depreciations	2,532,619	500,612	2,488,446	611,568
Costs of energy not supplied (CENS)	386,966	45,891	403,061	43,900
Cost of network losses	1,895,773	651,810	1,975,229	758,634
Return on capital	2,430,292	979,619	2,421,485	693,054
Revenue cap before addition	14,209,694	3,856,031	13,960,151	3,199,592
Addition for deviation between expected an actual costs, 2007 934,306		–	–	–
Revenue cap	15,144,000	3,856,031	13,960,151	3,199,592

As is shown in Table 2-1, OM costs and depreciations were higher in 2009 than in 2008. In general, there has been an increase in OM, DEP, RAB and NL in the last five years. This increase occurred because of higher factor prices and an increased level of activity in the companies. However, the difference in total revenue cap from 2008 to 2009 does not fully reflect these increases. This is mainly because the power price was higher in 2008, and thus made the costs of network losses higher in 2008 than in 2009. The RAB of the network companies increased from 2008 to 2009. But because of the lower interest rate in 2009, the total return on capital was almost the same in these two years. A comparison of the variables WACC, CPI and reference price for power in 2008 and 2009 is shown in Table 2-2.

Table 2-2
Comparison of WACC, CPI and reference price for power

	2009	2008
WACC (1.14*r + 2.39 %)	6.19%	7.44%
CPIt/CPIt-2	1.0599	1.0459
Reference price for power (P)	318 NOK/MWh	361 NOK/MWh

Investments have increased every year since 2005. The big leap in investments for Statnett SF from 2007 to 2008 was mainly due to the new DC subsea interconnector between Norway and the Netherlands (NorNed). The RAB has also been increasing in the same period, as shown in Figure 2.2, though less rapidly.

Figure 2.1
Development in investments

- Distribution and regional network
- TSO Statnett

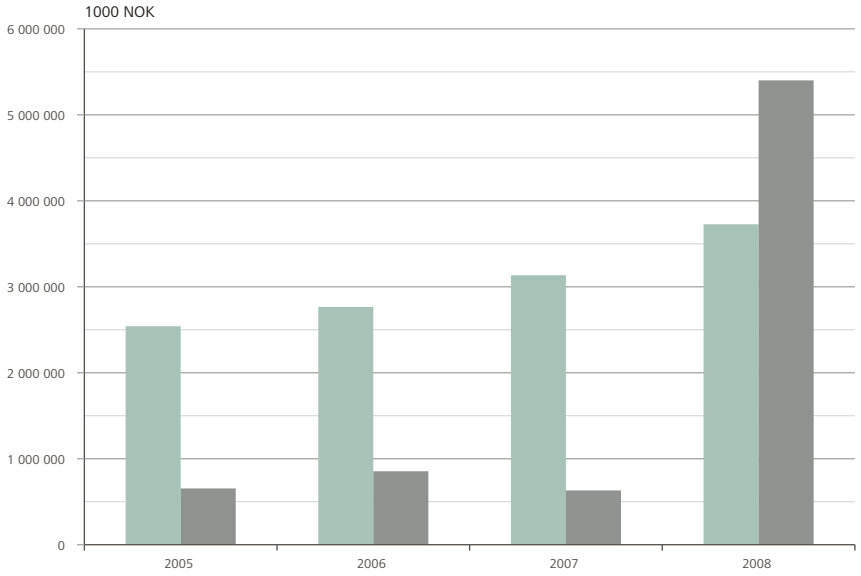
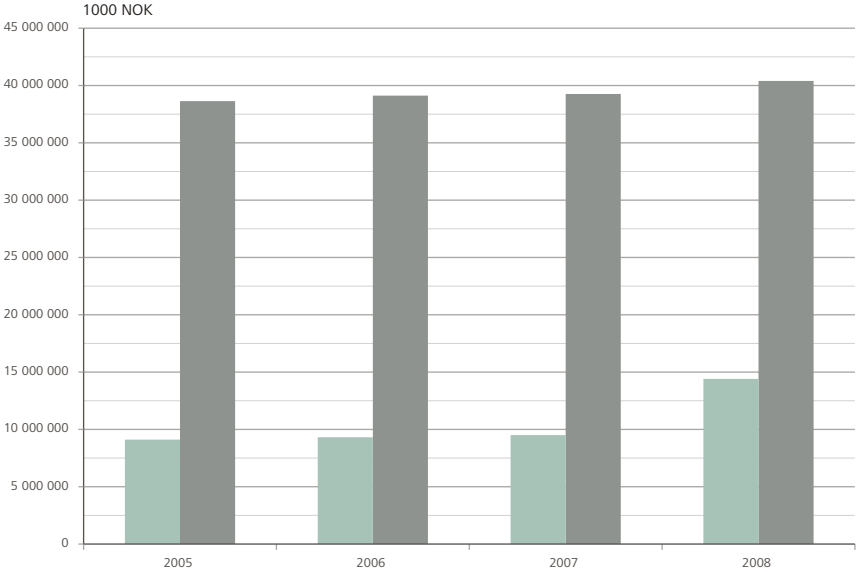


Figure 2.2
Development of the RAB 2005-2008

- TSO
- Distribution and regional network



2.4.1.1 Development of financial regulation in 2009

Because of the uncertainty in the financial markets, the industry late in 2008 raised the question whether there would be companies for which the WACC will be too low. NVE asked the network companies to report their actual lending costs during 2009. NVE compared these costs with the premises that form the basis for the WACC. The result shows that the WACC was not too low, and hence there was no need for granting an exemption from the regulations and allow a higher WACC.

The addition for investments has been much discussed in the industry. Consequently, NVE has analysed the way the two-year lag on revenue from investments is handled in the regulations. From this analysis, NVE has decided to delete the addition for investments, and instead let the companies get the revenue from the actual year the investment is made. The companies will also get an addition for investments made in 2007 and 2008 for a transitional period of two years, during 2009 and 2010.

Costs for energy not supplied (CENS) has historically been calculated on the basis of interruptions to the supply that lasted longer than 3 minutes. From 2009, interruptions with shorter duration than 3 minutes (short-term CENS) will also be included in actual CENS. Therefore, a new method for calculating an addition to each company's revenue cap in 2009 and 2010 for short-term CENS in 2007 and 2008 has been developed.

The cost norm for each network company is a result of benchmarking analysis. A minor amendment related to the treatment of CENS costs in the DEA model for regional network operators has been implemented. NVE has also amended the model for the distribution network operators. From 2010, the companies' cost norms will be calculated by a two-step analysis. In the first step, DEA-scores are calculated. In the second step, these DEA scores are corrected through regression analysis. The variables used in step two are: installed capacity for small hydro power generators connected to the grid, number of supplied remote islands, and a variable for assets in the distribution network which actually are regional network assets.

2.4.2 Direct regulations

Financial and direct instruments must be combined in the regulation of power networks in order to achieve optimal adjustment and at the same time avoid unwanted external effects. This is why the power networks are subject to many sets of rules in laws, regulations and conditions for licensing which regulates their duties and rights. These regulations guide the power networks' activities, and are intended to ensure the companies invest and maintain the network, that safety and emergency preparedness concerns are addressed, that the quality of supply is adequately sustained, that the security of supply is maintained in demanding situations, that the electrical structures are sufficiently robust, and that investments with large environmental disadvantages are not carried through if society's benefits from the investments are lower than the social costs.

The Storting (Norwegian parliament) amended the Energy Act in 2009. Based on the amendments, NVE determined in 2009 that power networks have a duty to connect all customers in the distribution grid. From 1.1.2010, all power networks also in the distribution network must connect all customers who wish to be connected.

NVE expects the network companies to comply with the direct regulations, and all financially rational, social actions to be carried out in accordance with these.

2.5 Security of supply

2.5.1 Regulations on Quality of Supply in Norway

NVE put into force a new regulation on quality of supply from 1.1.2005. Some modifications entered into force in 2006 and some in 2007. The purpose of the regulations on quality of supply is to help ensure a satisfactory quality of supply in the Norwegian power system and a socially rational operation, expansion and development of the power system. This includes taking into account the affected public and private interests.

The aims of developing national regulations in Norway with specific requirements for the quality of supply were as follows (not in order of priority):

- To attain a quality of supply that is beneficial for society as a whole, and not only to achieve a general improvement in the power quality.
- To define what level of quality is regarded as a satisfactory quality of supply. The actual level of the quality of supply in today's system was generally regarded as satisfactory. The requirements were therefore primarily aimed at describing today's quality level.
- To prevent an undesirable deterioration in the quality of supply due to an overall reduction in companies' costs after the introduction of incentive-based financial regulation (revenue caps).
- To improve the companies' knowledge about the actual power quality being supplied to the customers. Realistic reference levels are needed in order to at least allow customers to adopt their own countermeasures if they have special requirements for power quality.
- To provide a good basis for handling disputes between network companies and between suppliers and customers.
- To improve legal rights for the end-users regarding quality of supply, and to focus on the ability of the network companies to supply services and electricity of a satisfactory quality.

When developing the Norwegian regulations, NVE noted the importance of compatibility between different regulations and standards. Hence, the Norwegian requirements take into account both emission and immunity levels given in international standards. International standards were, however, found to be unsatisfactory as references for limits, although for measurement methods, relevant standards from CENELEC and IEC are referred to. The regulations on quality of supply define requirements for (in short):

- A minimum acceptable level of voltage disturbances at the point of connection
- Continuous monitoring of voltage quality
- Registration and reporting of short and long interruptions
- Information to customers about historical power quality levels and the future power quality levels that can be expected
- Time limits for handling and resolving customers' complaints relating to power quality
- Restoration of supply and rectification of violated limits without undue delay

As far as voltage quality is concerned, minimum requirements have been introduced for power frequency, supply voltage variations, voltage surges (exemptions for some causes), voltage dips (exemptions for some causes), rapid voltage changes (exemptions for some causes), flicker, voltage imbalance, and harmonics. The regulations cover everyone connected to the power system, i.e. network companies, end-users and power producers. Due to the nature of electricity, it was considered important to have requirements for all parties connected to the power system. The regulations apply to "those who wholly or partially own, operate or use electrical installations or electrical equipment that are connected within the Norwegian power system, and those who pursuant to the Energy Act are the designated transmission system operators." The regulations further point out that power quality shall form part of the network contract between the network companies and their customers. Such a contract can be an important instrument for limiting disturbances generated by customers, so that the voltage quality requirements at all supply terminals can be managed.

2.5.1.1 Continuity indicators and limit values

A standardised system for registering and reporting faults and interruptions is used in Norway. The system is called FASIT (Fault and Interruption Statistics in the Total network). It includes both long interruptions (< 3 minutes) and short interruptions (≤ 3 minutes). It takes into account information about the network topology (NIS), customer information system (CIS), circuit breaker operations (e.g. from SCADA), temperature data and load measurements or standardised load profiles. FASIT applies to all network companies with grid customers. The network companies know exactly how many customers (end-users) are supplied from a reporting point (which is either a distribution transformer or one end-user connected above 1 kV). All the network companies are obliged to report specific interruption data to the Norwegian Water Resources and Energy directorate (NVE) once a year. The data are distributed for all high voltage levels (above 1 kV), for notified (V) and not-notified (IV) interruptions, and for each end-user group (e.g. households, industry, farming, etc. A total of 36 end-user groups are specified).

Short (≤ 3 minutes) interruptions	SAIFI [number interruptions / end-user]			CAIFI [number interruptions / affected end-user]			SAIDI [min / end-user]			CAIDI [min / interruption]			CTAIDI [min / affected end-user]		
	notified	not notified	TOT	notified	not notified	TOT	notified	not notified	TOT	notified	not notified	TOT	notified	not notified	TOT
2006	0.1	1.7	1.8	1.6	3.8	3.8	0.1	1.3	1.4	1.0	0.8	0.8	1.7	3.0	3.0
2007	0.1	1.8	1.9	1.6	3.8	3.9	0.1	1.4	1.4	1.1	0.8	0.8	1.8	2.9	3.0
2008	0.1	2.1	2.1	1.8	4.3	4.3	0.1	1.6	1.7	1.1	0.8	0.8	2.0	3.3	3.3
2009	0.1	1.7	1.8	1.8	3.7	3.8	0.1	1.2	1.2	1.0	0.7	0.7	1.7	2.5	2.6

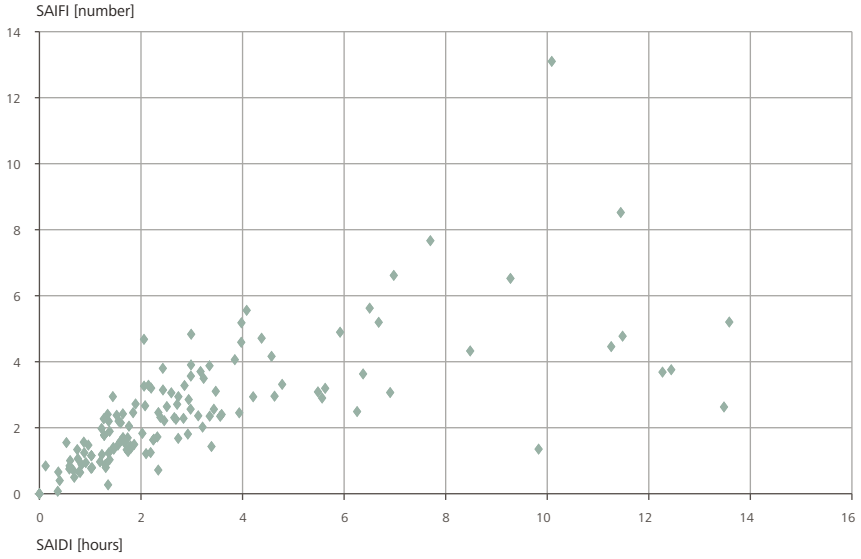
Long (> 3 minutes) interruptions	SAIFI [number interruptions / end-user]			CAIFI [number interruptions / affected end-user]			SAIDI [hours / end-user]			CAIDI [hours / interruption]			CTAIDI [hours / affected end-user]		
	notified	not notified	TOT	notified	not notified	TOT	notified	not notified	TOT	notified	not notified	TOT	notified	not notified	TOT
2005	0.3	1.5	1.9	1.6	2.7	3.1	0.7	1.6	2.3	2.3	1.0	1.2	3.8	2.7	3.8
2006	0.3	1.8	2.1	1.6	2.9	3.3	0.7	1.9	2.6	2.3	1.1	1.3	3.6	3.1	4.1
2007	0.3	1.7	2.0	1.7	2.8	3.1	0.8	1.6	2.4	2.4	0.9	1.2	4.2	2.6	3.6
2008	0.3	1.8	2.1	1.8	3.1	3.3	0.7	1.7	2.5	2.3	1.0	1.2	4.1	3.0	3.9
2009	0.3	1.6	1.8	1.7	2.6	2.9	0.7	1.4	2.0	2.4	0.9	1.1	4.1	2.3	3.2

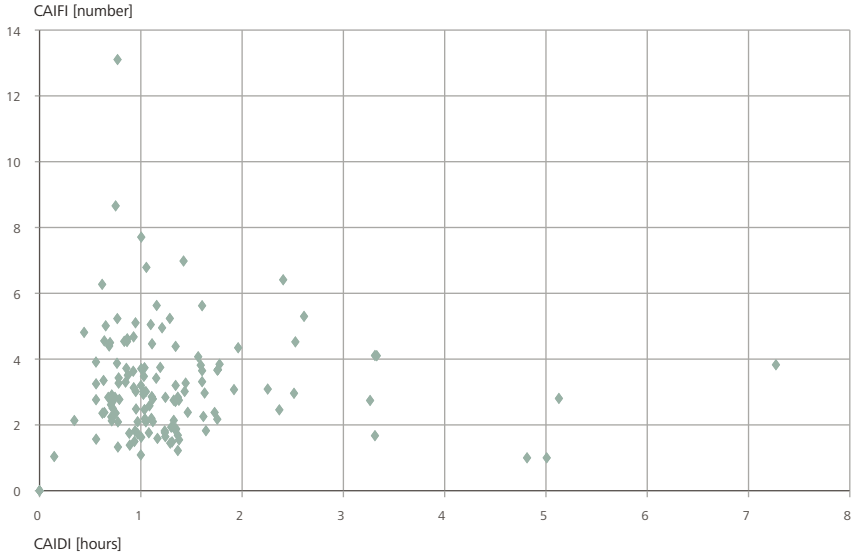
The table above shows the continuity indicators calculated for Norway. NVE publishes these indicators together with other interruption statistics every year.

- SAIFI: System average interruption frequency index
- CAIFI: Customer average interruption frequency index
- SAIDI: System average interruption duration index
- CAIDI: Customer average interruption duration index
- CTAIDI: Customer total average interruption duration index.

Regarding notified (V) and not notified interruptions (IV): in the event of planned work involving interruptions or reduced capacity to supply end-users, network companies shall inform the affected network customers about their time schedule a reasonable amount of prior to the start of the work.

The variation of the continuity indicators between the different grid companies is illustrated in the figures on the following page (the data refer to reported 2009 values for long interruptions).


SAIFI [number]
14
12
10
8
6
4
2
0
0
2
4
6
8
10
12
14
16
SAIDI [hours]


CAIFI [number]
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12
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2
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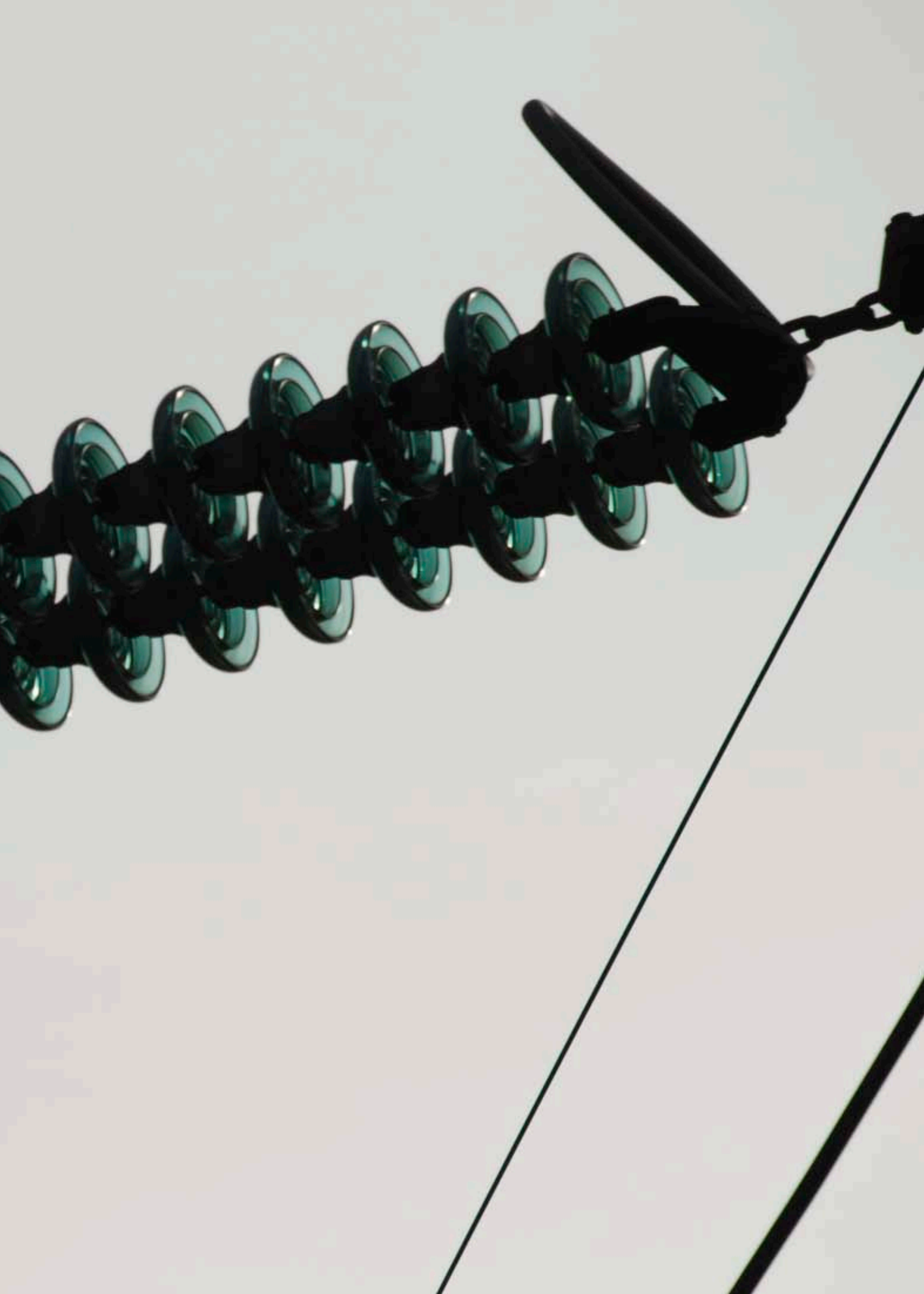
6
7
8
CAIDI [hours]



2.5.2 Capacity expansions

2.5.2.1 Generation

Norway's mean annual hydropower generation increased by 0.7 TWh in 2009, according to preliminary figures. Mean annual generation was 123.4 TWh by the start of 2010. Since liberalisation in 1991, new power plants with mean annual generation totalling 8.5 TWh have been built. The table below shows the generation capacity and capacity change by county.

County	Status end of 2008		Additions 2009*		End of 2008	
	Total capacity [MW]	Mean year generation [GWh]	Total capacity [MW]	Mean year generation [GWh]	Total capacity [MW]	Mean year generation [GWh]
Østfold	801	4,118	20	50	821	4,168
Akershus	183	925	–	–	183	925
Oslo	5	22	–	–	5	22
Hedmark	532	2,402	–	–	532	2,402
Oppland	1,526	5,895	6	27	1,532	5,922
Buskerud	1,924	8,383	5	20	1,929	8,404
Vestfold	4	16	–	–	4	16
Telemark	2,561	11,334	–	–	2,561	11,334
Aust-Agder	1,170	4,453	2	3	1,172	4,456
Vest-Agder	2,072	9,402	2	10	2,074	9,412
Rogaland	3,530	12,107	14	262	3,544	12,369
Hordaland	4,125	16,394	19	67	4,144	16,461
Sogn og Fjordane	3,789	14,123	23	83	3,813	14,205
Møre og Romsdal	1,357	6,485	8	26	1,365	6,511
Sør-Trøndelag	1,053	4,548	3	9	1,055	4,557
Nord-Trøndelag	718	3,192	10	34	728	3,226
Nordland	3,266	14,771	14	49	3,280	14,820
Troms	570	2,665	–	27	570	2,692
Finnmark	314	1,518	–	–	314	1,518
Total	29,500	122,753	126	667	29,626	123,420

* PRELIMINARY FIGURES

Norway now generates 431 MW of wind power from 18 wind plants and 200 wind turbines. During 2009, 2.3 MW of new wind power generation capacity was installed, while 0.3 MW was taken out of production. The table on the next page shows wind power by county (MW).

County	Status end of 2008	Addition 2009	End of 2009
Vest-Agder	3.8	–	3.8
Rogaland	1.2	2.3	3.5
Sogn og Fjordane	4.0	–	4.0
Møre og Romsdal	154.5	-0.3	154.2
Sør-Trøndelag	124.6	–	124.6
Nord-Trøndelag	52.6	–	52.6
Nordland	7.7	–	7.7
Troms	1.5	–	1.5
Finnmark	79.1	–	79.1
Total	429.0	–	431.0

No new thermal generation capacity was established in Norway in 2009. Thermal power generation capacity totalling 900 MW has been installed. In addition, Norway has two reserve gas power turbines in mid-Norway with a capacity of 300 MW. The table below shows the thermal power by county (MW).

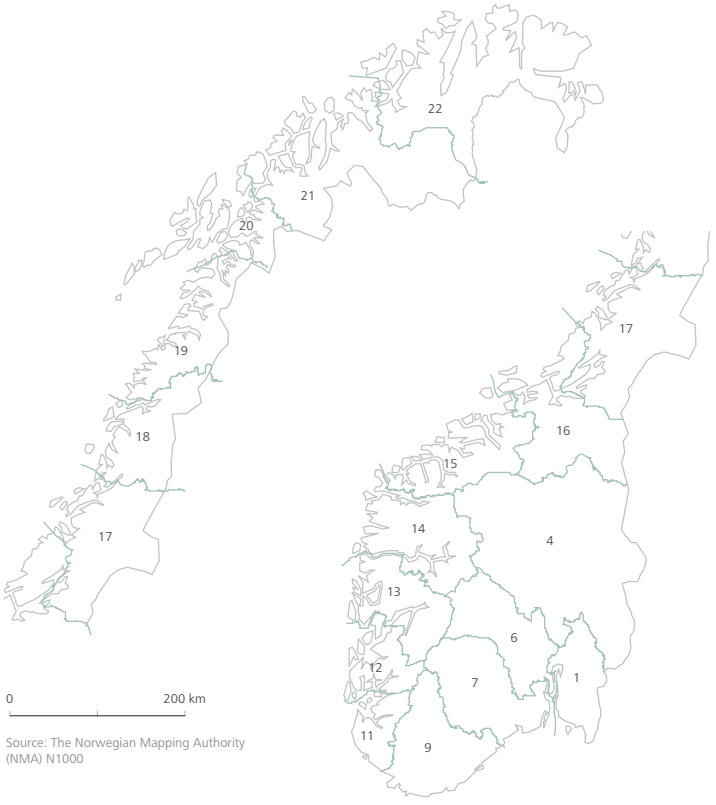
County	Status end of 2009
Østfold	34
Oslo	10
Hedmark	2
Buskerud	65
Telemark	12
Vest-Agder	14
Rogaland	456
Hordaland	25
Møre og Romsdal	28
Sør-Trøndelag	22
Nord-Trøndelag	10
Nordland	2
Finnmark	219
Total	899

2.5.2.2 Networks

Power System planning

NVE put into force new regulations relating to energy planning on 16.12.2002. The regulatory authority has delegated the responsibility for power system planning in Norway to an appointed concessionaire in a given planning area.

18 planning areas have been established: 17 regional areas as shown in the figure below, who comprise planning in the regional grids (33 kV – 132 kV), and one for planning the national grid (132 kV – 420 kV). Within each area one of the DSOs is responsible for coordinating the planning process among the DSOs in the area. Generally the areas follow the county borders, but there are some exceptions. In the national grid the TSO (Statnett SF) is responsible for the planning process and issuing the national grid study.



Source: The Norwegian Mapping Authority (NMA) N1000

Coordinated power system planning in the regional and national grid system should promote the socially efficient development of energy systems and provide a platform for processing licence applications.

Power System 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 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 investments. When applying for a concession 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 task and goal of the work with the power system studies, is to contribute to a socio-economically rational (assumed correct) 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 NVE's 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.

Some new large projects were commissioned in 2009. The 420 kV line from Nea in Norway to Järpströmmen in Sweden was commissioned in 2009 and has already increased the exchange capacities between the Nordic countries. 420 kV Kristiansand-Brokke in Southern Norway was also commissioned in 2009.

2.5.2.3 Investment contribution

A network company can require an investment contribution to cover the costs of connecting new customers to the network. It may also require an investment contribution for reinforcing the network for existing customers.

The objective of the investment contribution is to make the customer responsible for the costs related to a new connection or an upgrade of the customer's existing network connection. A network owner can always require an investment contribution for new connections to the network.

When a connection is reinforced, an investment contribution may be required when the customer's demand for improved capacity or quality causes a need for reinforcement. The network company shall inform the customer

in advance that a new connection or reinforcement will entail an investment contribution.

Calculation of an investment contribution is based on the cost of connecting the customer to the network. When a connection requires reinforcement in so-called radial joint networks, i.e. a clearly defined network installation (power line) which transmits electricity to the customer, a pro rata share of these costs may be included in the investment contribution.

Investment contributions shall be fixed independently of the customer's expected energy out-take and may as a maximum equal the investment cost for the installation less the connecting fee. The investment cost of the installation shall equal the necessary costs of connection or reinforcement, including hourly charges for personnel, machines and equipment.

The network owner may distribute the investment contribution between customers that are connected at the time the installation is brought to completion and customers that will be connected at a later point in time, but no later than 10 years after completion of the installation. The network owner may do so either by costing the investment contribution as and when new customers are connected, or by advancing the investment costs and subsequently distributing them on a proportional basis to customers that in due course are connected to the network.

The network company shall inform the customer in advance of the size and the calculation basis of the investment contribution.

2.5.2.4 Input of power and the duty to connect new generation

One prerequisite for an efficient electricity market is free market access with non-discriminatory and objective tariffs and conditions. In accordance with this and current regulations, network companies are required to offer network access to everybody on request. However, the overall principles and rules for tariff regulations must be taken into account. In this context, tariffs mean all the prices and other financial remuneration for connection and the use of network installations.

Network companies with area licences have a supply requirement, according to Section 3-3 of the Energy Act. The supply requirement entails a connection requirement, but only for consuming customers.

However, the connection requirement does not give customers who withdraw electricity the right to cost-free network connection, but entails a payment requirement for customer specific installations. Network companies do not have a similar connection requirement for producers.

For producers, the network company's only requirement will be to provide market access with non-discriminatory and objective tariffs and conditions. This means the network company is not obliged to provide necessary network

installations between the producer and the connection point in the network company's network.

When connecting a producer to the existing overlying network, the network company can require that the producer himself builds, maintains and covers all the costs related to the necessary customer specific installations, as well as any investment needed to increase capacity in the network company's network. The network company's rights to charge parts of these costs to the producer are regulated by the regulations concerning investment contributions.

Investment contribution

Network companies can require an investment contribution to cover the construction costs of connecting new production or extending production capacity. When a producer wants to connect, the network company must inform the customer how the investment contribution is calculated and how it is charged. The main rule is that the calculation of the investment contribution is based on the costs of the connection or extension.

In cases where connection requires the reinforcement of installations with several network users, a pro rata share of these costs may be included in the investment contribution.

In so-called meshed networks, i.e. networks where it is difficult to attach the need for new investments to one particular customer, the network owner can usually not require an investment contribution. In general the current regulations allow network companies to require investment contributions for all voltage levels.

The network company may distribute the investment contribution between customers that are connected at the time the installation is brought to completion and customers that will be connected at a later point in time, but no later than 10 years after completion of the installation. The network owner may do so either by charging the investment contribution as new customers are connected, or by advancing the investment costs and subsequently distributing them on a proportional basis to customers that in due course connect to the network.

To avoid over or under dimensioning of the network, and following transferral of costs to producers, network companies will try to coordinate projects that occur at the same time, or are localised to a certain part of the network.

Input tariffs are what the power producer must pay to feed in power in a network point. All network companies shall use point tariffs as payment for the transmission of electrical power. Point tariff means that a producer only pays transmission tariff to his local network company, independently of to whom he sells his power. The term transmission tariff is also used instead of point tariff.

Input tariffs have several components: an energy component that varies with the customer's current input and other components that are a fixed amount. The

fixed component is independent of the customer's current input of power and shall give network companies sufficient income according to permitted income, which is fixed annually for each company by NVE. The national grid input tariff shall be normative for the fixed component by power input into regional and distribution networks. The national grid input tariff for 2008 was 0.0056 NOK/kWh.

Settled production volume shall be based on the power plant's median annual output. For power plants with installed capacity below 1 MW, settled volume shall as a maximum be 30 per cent of installed load capacity multiplied by 5,000 hours.

The Norwegian transmission system operator (Statnett SF) has introduced a special reduced tariff of 0.001 NOK/kWh for new production with a favourable location for the network. Producers in selected network areas are offered such a tariff in agreement with Statnett SF.

The energy component depends on the customer's current input of energy. When electricity is transmitted, heat develops in lines and transformers, so that some of the energy is lost. The energy component shall reflect costs of change in energy loss when one extra kWh is transmitted (marginal loss). The loss increases with increased network use, and can become substantial when approaching capacity limits in the network. The energy component shall refer to the connection point.

The energy component is calculated individually for each separate input point and is determined on the basis of marginal loss costs in the whole network system. Marginal loss costs depend on loss rates at each separate point and the value of the network loss.

Network loss value is determined by the current electricity market price. Marginal loss rates are determined for all exchange points with the national grid. Each network company calculates loss rates in its own network, related to each input point. These are normally added to the loss rates in the national grid exchange point.

A producer may have a favourable location in the network, where increased production reduces network loss. In such cases the loss rate, and consequently the energy component, are negative. This means the producer is paid for energy input. In areas with production surplus, input has a high loss rate and outtake a negative loss rate. In points with both outtake and input, loss rates shall be symmetrical around zero. In the national grid, loss rates vary between +10 and -10 per cent.

The energy component shall give customers a price signal indicating the cost of transmitting an extra kWh, in the form of changed network loss. To obtain this, calculation of the energy component shall be based on estimated loss rates. Estimated loss rates shall be available for the producers, so that their production can be adjusted accordingly.

Since marginal losses change, the energy component shall be time-differentiated with periods for at least winter day, winter night/weekend and summer. There are weekly calculations of marginal loss rates for national grid exchange points.

Tariffs and conditions shall be publicised in a separate brochure, or in other written information available to network customers.

Tariffs include all prices and other financial remuneration that the licensee establishes for connection to and use of electrical network installations.

The energy component is composed of the marginal loss rate and current power price, and consequently cannot be publicised in advance. The energy component's purpose is not to be known in advance, but to ensure producers adapt according to the known marginal loss rate in each connection point and the current power market price. Network companies are therefore required to make marginal loss rates in each connection point available.

Network companies shall inform each network customer about tariff changes, within a reasonable period of time before the new tariffs become operative. The information shall include a reason for the tariff changes.

2.5.3 Norway's special regulations for highly critical power situations

Regulations relating to power system operation regarding handling of extreme situations came into force 1.1.2005. These regulations aim to address extreme situations and are not relevant for normal operation.

These regulations impose an extended responsibility on the Norwegian TSO (Statnett SF) to continuously investigate and develop the measures necessary to ensure there is continuous balance at all times and to ensure the energy balance during the winter season. Statnett SF shall inform NVE of its various findings. NVE shall approve, with terms, the different measures before they are put into force. Permanent and operational costs for the different measures shall be handled within Statnett SF's income cap.

Statnett SF has to develop the means within the following set of premises:

- Not to entirely eliminate the probability of electricity rationing, but to reduce the risk
- Must be effective for handling extreme situations, and yet not affect the electricity market or investment decisions regarding production or transmission grid
- Not to change or affect the TSO's (Statnett) neutral and independent position in the power market.
- Contribute to the socio-economic management of extreme situations and not to reduce the efficiency of the physical power market
- Take into consideration the already existing flexibility in production, transmission and consumption.

The different measures approved by NVE are:

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

The measures can only be activated following a decision by NVE. The measures will only be accepted in situations where rationing is considered likely.

2.5.4 Security and Emergency

The Energy Act was amended several times during 2009 with effect from 1.1.2010. From a security and emergency preparedness perspective the extension of the provisions regarding concessions for electricity installations and remote heating plants to include ownership are an important measure.

Finalised and ongoing work

NVE has increased supervision of all of the most important energy companies working with risk assessments, safety and preparedness in relation to extraordinary events. This includes both events caused by forces of nature, technical failure and deliberate vandalism. NVE has in parallel reinforced efforts to guide the energy industry in securing and preparedness. NVE conducted two major regional contingency exercises in 2009 to improve coordinated repair in the case of a breakdown in the supply of energy and other critical infrastructure. NVE actively contributed to establishing better Nordic cooperation on emergency repairs. NVE has begun work to facilitate adequate follow-up of the EU Directive on the protection of cross-border infrastructure.

2.6 Market surveillance and information

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

At the end of each quarter, NVE issues a quarterly report on developments in the Norwegian and Nordic electricity market. The reports analyse the previous quarter and the 4th quarter report also contains an analysis of the previous year's developments.

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

As a condition for its marketplace licence issued pursuant to the Energy Act, Nord Pool Spot has an obligation to establish appropriate procedures to monitor the behaviour of parties in the organised marketplace, and Nord Pool Spot's Market Surveillance performs this task. The market monitoring shall contribute to ensuring the parties behave in accordance with the objectives of the Energy Act and regulations issued pursuant to this act. The Norwegian Financial Supervisory Authority also requires the establishment of internal market surveillance by Nord Pool ASA.

Nord Pool Spot's Market Surveillance cooperates with Nord Pool ASA's Market Surveillance in a joint function, and monitors the trading activities in the spot and derivatives markets at Nord Pool and conducts investigations of possible breaches of laws and regulations. Market Surveillance can obtain information from Statnett SF as the entity responsible for the system and for settlement of balancing power. Market Surveillance may also request information about physical OTC trades.

As a condition for the marketplace licence, Nord Pool Spot has an obligation to report to NVE any behaviour in the concessionaire's markets that has a restrictive effect on competition or otherwise contravenes current laws and regulations.

NVE has organised regular meetings with Nord Pool Spot and Market Surveillance to supervise compliance with the marketplace licence.

Cooperation with other authorities

NVE and the Competition Authority have over several years established bilateral cooperation in the electricity market. NVE's responsibilities include supervision of both the end-user market and the wholesale market. If the exercising of market power is suspected, NVE will report this to the Competition Authority.

NVE supports and helps the Competition Authority with their monitoring of Norwegian wholesale prices. When Statkraft SF was granted permission to buy Trondheim Energiverk in 2002, one of the conditions was that the Competition Authority would develop and utilise a model for monitoring wholesale price movements. Econ Pöyry developed a model. The model compares the actual market price to an expected price calculated from model simulations of the efficient utilisation of reservoir water (estimation of water values).

A group with representatives from the Competition Authority and NVE meets bimonthly to evaluate the results from the model. When the model has identified abnormal prices which cannot be explained by hydrological or power system realities, the Competition Authority has in some cases continued its investigations and asked power producers for more information regarding their production decisions.

There is also regular cooperation between NVE, the Competition Authority and the Norwegian Financial Supervisory Authority, as the Norwegian Financial Supervisory Authority supervises the derivatives markets in Nord Pool ASA.

A high level meeting between the Nordic energy regulators, competition authorities and financial supervisory authorities was held in 2009.

Statnett SF's settlement licence

The Norwegian TSO, Statnett SF, holds a licence from NVE to organise a marketplace for balancing power and conduct settlements in this market.

The balancing power market is used to ensure balance between the supply and demand of electrical power, and to control the frequency of the system (at 50.00 Hz). The balancing market is available to both producers and large consumers, and the participants submit price and volume bids for which they are willing to alter their production or consumption. When there is an imbalance in the system, Statnett SF can call on these bids to balance the system.

Statnett SF performs the settlement after the operating hour and participants that have delivered either up or down regulation to Statnett SF are remunerated.

Market actors that have deviated from their planned production or consumption are charged the imbalance price for the hour they were out of balance.

In 2009 the balance settlement system was harmonised between the four Nordic countries. Statnett SF switched from a one-price system (in which all actors were faced with the same settlement price in any hour) to a two-price system for producers and a one-price settlement for consumers. The system was intended to incentivise producers to submit more accurate production plans. The new system was part of a negotiated compromise between the four Nordic TSOs.

Settlement of the balancing power market is considered a critical function in the whole power system. Reviewing the risks associated with settlement was thus a key part of the process when NVE renewed Statnett SF's settlement licence in 2009.

2.7 The electricity market in 2009

2.7.1 Generation and consumption of electricity

Electricity generation

In 2009, total electricity production in Norway amounted to 132.8 TWh. This was a reduction of 6.9 per cent on the previous year. In 2009, hydropower accounted for 127.1 TWh, thermal power 4.7 TWh and wind power 1 TWh. A new all-time high generation record was set on Friday 18.12.2009. On this day, between 8 am and 9 am, production amounted to 25,266 MWh.

Norwegian electricity generation varies with the inflow conditions. Dry weather periods in 1996 and 2002 resulted in low production, while wet conditions in 2000 and 2005 resulted in high production. Low inflow during autumn 2002 affected hydropower production until the end of 2004. Low snow volumes in winter 2005/2006 and the dry summer and autumn in 2006 resulted in low generation, and a lot of rain and high inflow in 2008 lead to high production. During the first half of 2009 generation was again down.

Electricity consumption

Norwegian electricity consumption amounted to 123.8 TWh in 2009. This was a reduction of 3.9 per cent compared to 2008. The period 1995-2009 has seen average annual growth of 0.5 per cent. The reduction in 2009 was primarily due to lower consumption in the power intensive industries. The consumption in 2009 was approximately 7 TWh lower than average annual generation.

From April 2006, consumption was reduced for 12 months. From May 2007 consumption rose until summer 2008. Since then consumption has trended downwards. The main reason for this is the financial crisis and the slowdown of economic growth.

By comparing Figure 2.3 and Figure 2.4 we can see a correlation between production and consumption. This is due to the fact that low production results in high prices and vice versa. High prices discipline consumption, and result in reduced consumption as is necessary in order to maintain equilibrium between generation and consumption in drought periods.

Figure 2.3
Electricity generation in Norway, aggregate for the last 12 months, 1995-2009. TWh.
Source: NVE

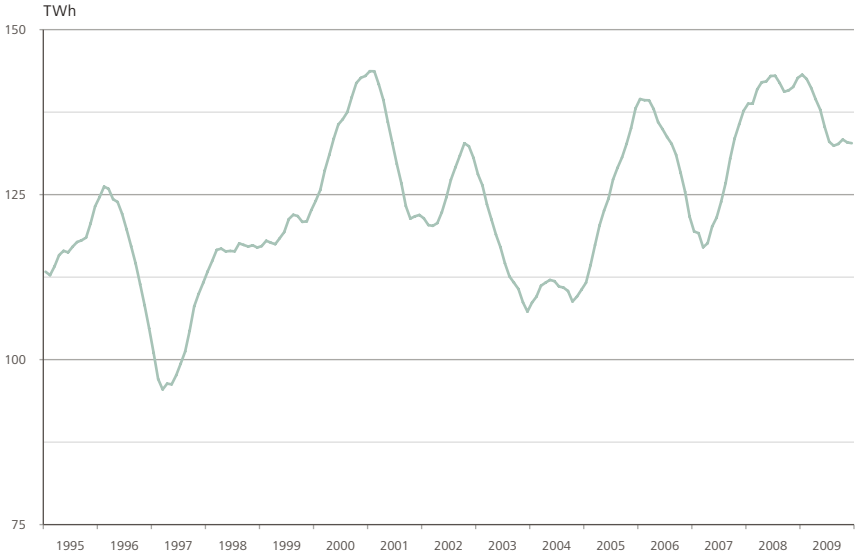
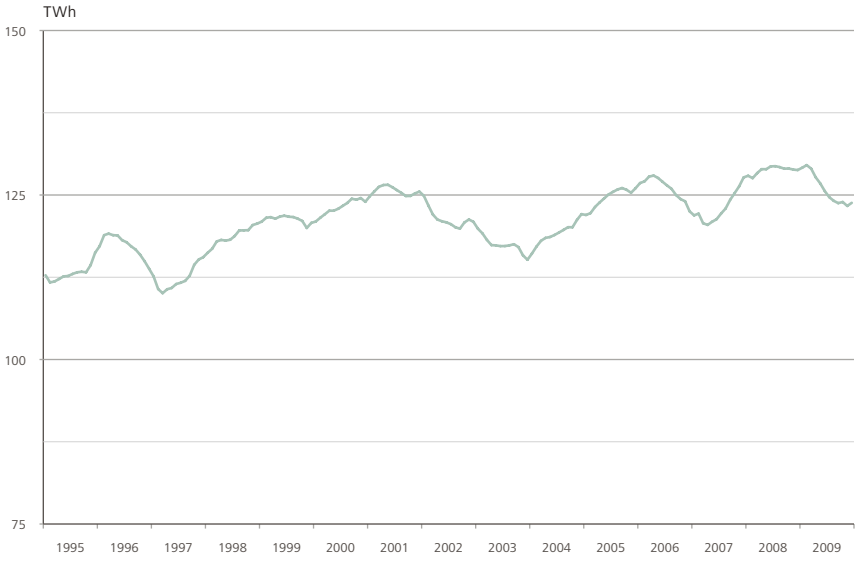


Figure 2.4
Norwegian aggregate electricity consumption the last 12 months, 1995-2009. TWh.
Source: NVE



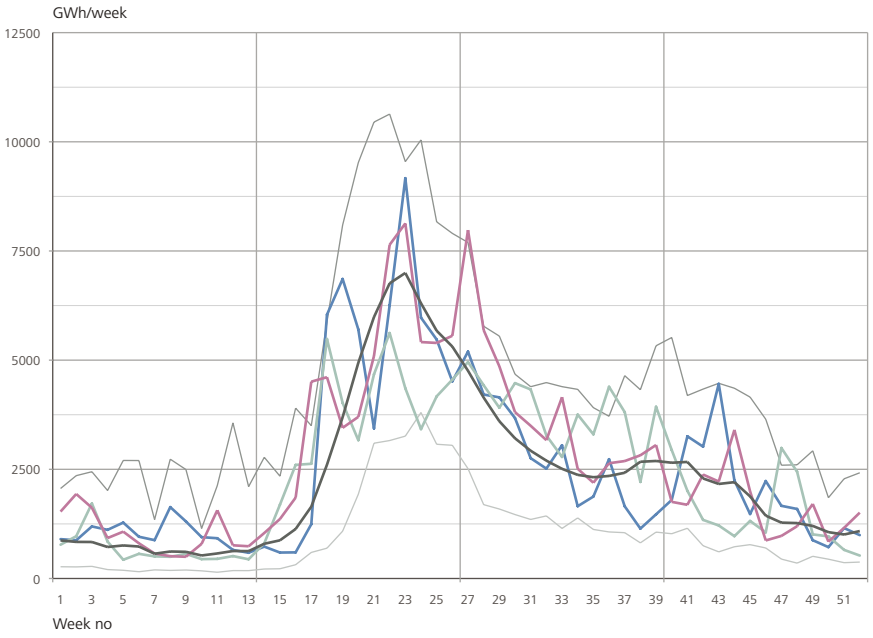


Figure 2.5
Inflow to the Norwegian hydropower system in 2007, 2008 and 2009. GWh/week.
Source: NVE and Nord Pool Spot.

2.7.2 Hydrology and reservoir development

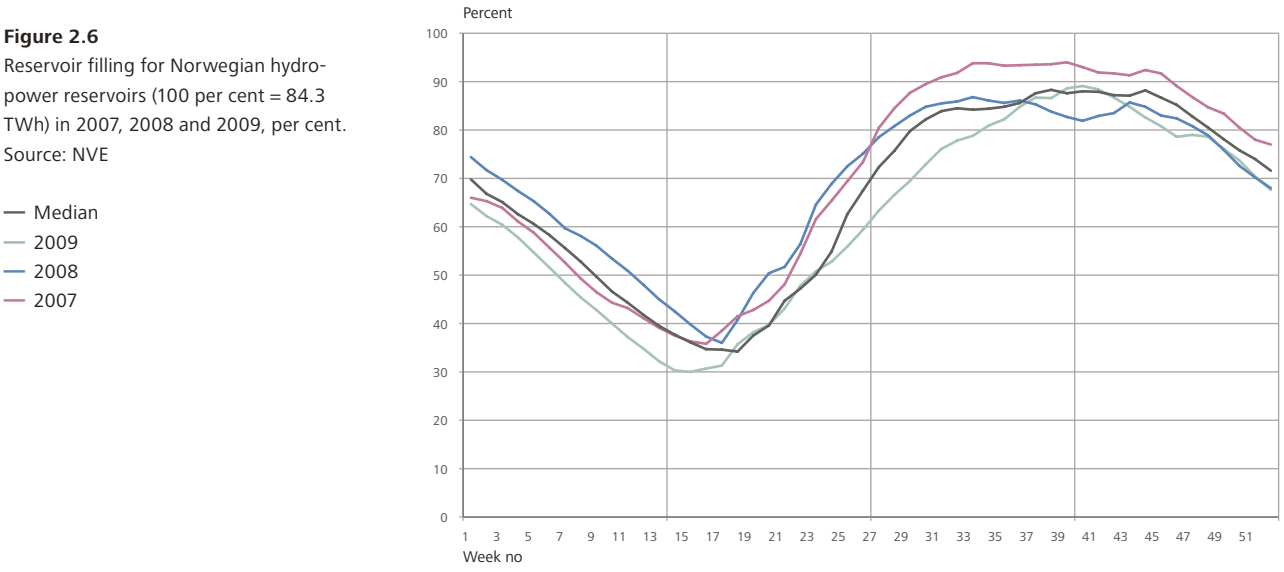
Inflow to hydropower reservoirs
In 2009, the inflow was 124.9 TWh. That is 2.4 TWh more than in a normal year. The lowest inflow came in February and March (week 5-13) with around 0.5 TWh/week. An early spring in large parts of the country resulted in high inflow towards the end of April. Towards the end of the year the weather was cold throughout the country, and that lead to a low inflow of around 0.5 TWh/week.

Temperature
According to meteorological statistics the average temperature for Norway was 1 degree Celsius above normal in 2009. All weather stations recorded positive deviations from normal. The largest deviation was in Nord-Trøndelag and southern parts of Finnmark with 1.5-2 degrees above normal.

Hydropower reservoir development
At the beginning of 2009, the reservoirs held less water than in a normal year[1]. High generation lead to high run-off from reservoirs towards the spring. Reservoirs reached their lowest level by mid-April at 30.0 per cent. Low snow volumes resulted in low inflow at the beginning of the summer and reservoirs stayed lower than

[1] Median for the period 1990-2007

Figure 2.6
Reservoir filling for Norwegian hydro-power reservoirs (100 per cent = 84.3 TWh) in 2007, 2008 and 2009, per cent. Source: NVE



normal into the autumn season. High precipitation lead to high inflow and the restoration of reservoirs, and reservoirs were higher than normal from the end of September. The reservoirs reached maximum at 89.1 per cent at the beginning of October (week 40). Towards the end of the year, the reservoirs were drawn down to 67.6 per cent: 4.0 percentage points below normal level for that time of the year.

2.7.3 Electricity exchange and the transmission grid

Norway had a net export of 9 TWh in 2009. Behind the net export figure we find a much larger gross trade as Norway often exports during the day and imports during night and weekends. Norway exported 7.8 TWh to Sweden and imported 2.6 TWh from Sweden. It exported 3.9 TWh to Denmark and imported 1.4 TWh from Denmark. It exported 2.9 TWh to the Netherlands and imported 1.2 TWh from the Netherlands. The trade between Norway and Finland was balanced with 0.1 TWh in both directions.

2.7.4 Electricity prices

2.7.4.1 Spot prices

The spot price decreased from about 400 NOK/MWh at the start of 2009 to about 200 NOK/MWh at the end of September. Subsequently the spot price rose, reaching a bit more than NOK 300 at the end of the year. Figure 2.8 shows variations in the spot price for the years 2008 and 2009.

Figure 2.7
Norway's electricity exchange, 1995-2009. TWh.
Source: Nord Pool Spot

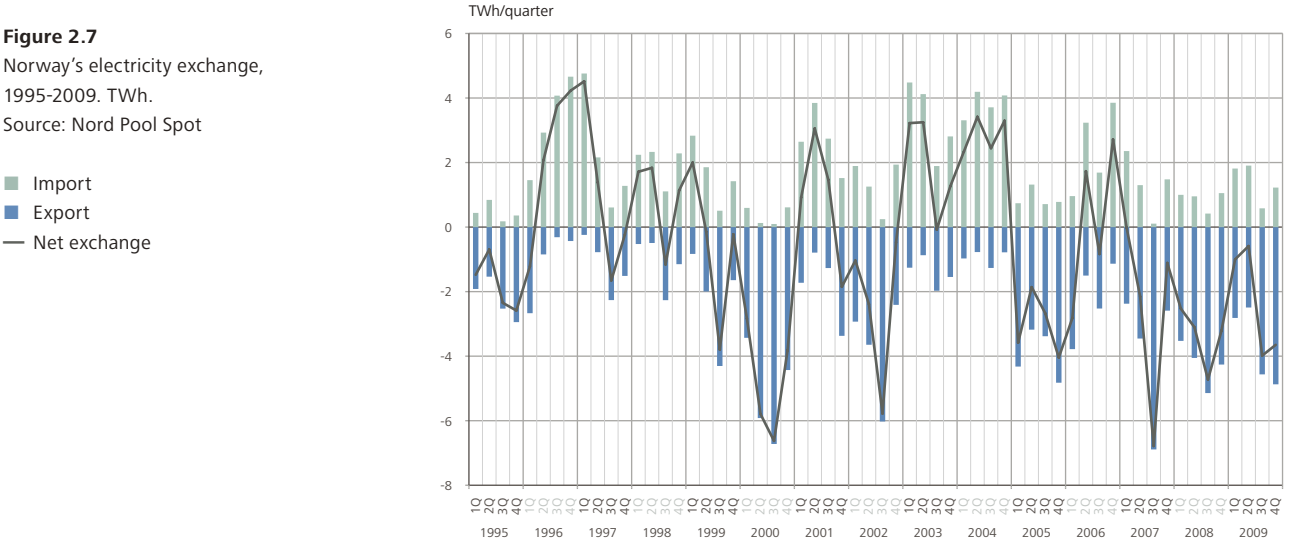


Figure 2.8
Electricity spot price (system price) in 2008 and 2009, weekly average. NOK/MWh.
Source: Nord Pool Spot

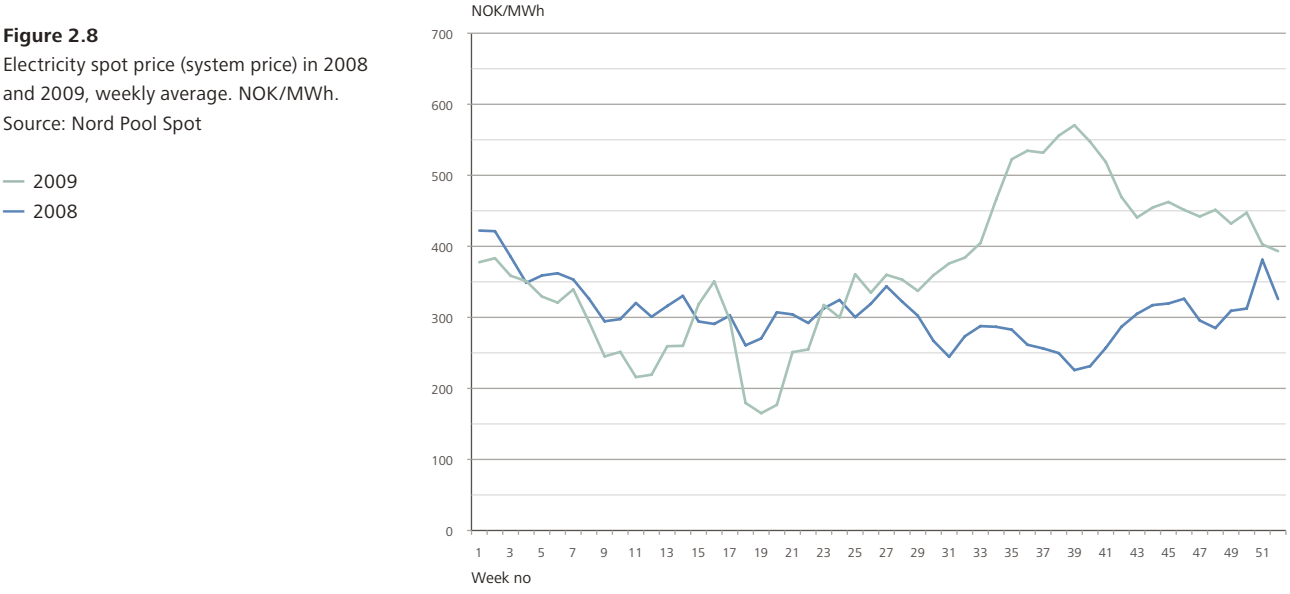
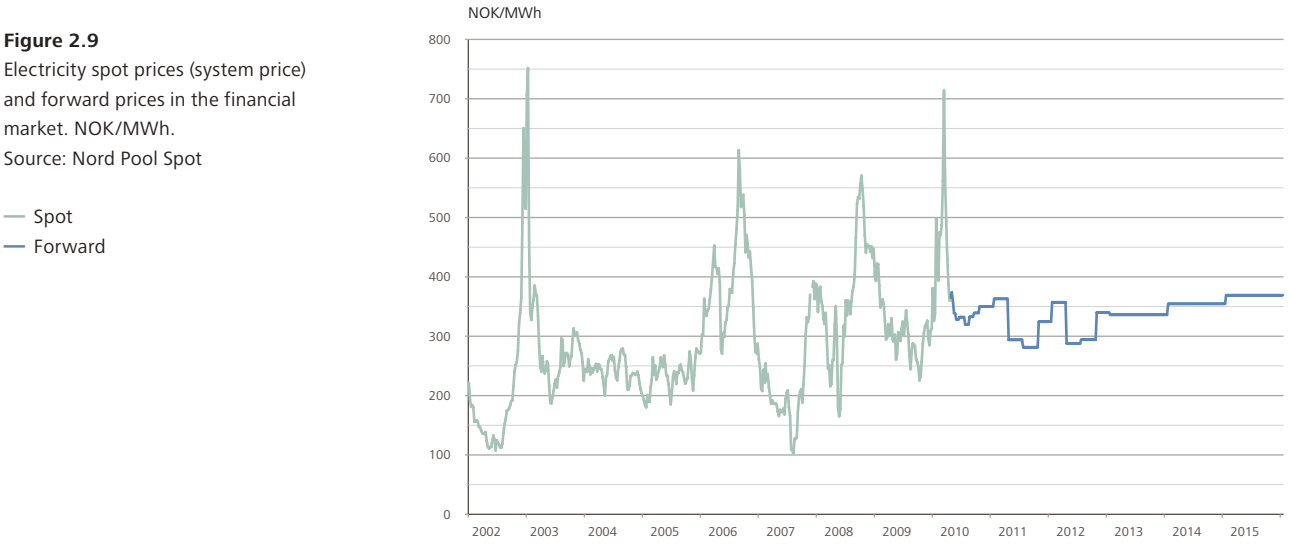


Figure 2.9
Electricity spot prices (system price) and forward prices in the financial market. NOK/MWh.
Source: Nord Pool Spot



2.7.4.2 Forward prices

The price for a Nord Pool forward contract for the first and second quarter 2010 increased during the fourth quarter 2009. At the beginning of the quarter, the contract for the first quarter 2010 could be traded at 283 NOK/MWh, while the contract for the second quarter was traded at 257 NOK/MWh. At the end of the quarter, the price for these contracts had risen to 355 and 328 NOK/MWh respectively. This price rise was particularly due to the fact that the fourth quarter 2009 saw less precipitation than normal in the Nordic countries, together with lower expected production from Swedish nuclear power stations.

2.7.5 End-user market developments

Figure 2.10 shows the distribution of households by various end-user contracts. An increasing fraction of households are choosing spot based contracts on which the customer pays the average monthly spot price in the actual region plus a margin. On average, the margin is estimated at 0.019 NOK/kWh or around 5 per cent for spot based contracts. The standard variable contract which is the default contract for customers who have not switched supplier or contract lost a few percentage points of support during 2009.

Figure 2.11 illustrates end-user contract price developments in 2009. Prices fell in the first three quarters of 2009, but climbed again in the fourth quarter.

More than 200,000 households switched to a different supplier in 2009, slightly less than 10 per cent of households. This indicates that there are a large number of active household customers which should presumably maintain a reasonable high

Figure 2.10
Household electricity supply contracts 2007-2009.
Source: Statistics Norway

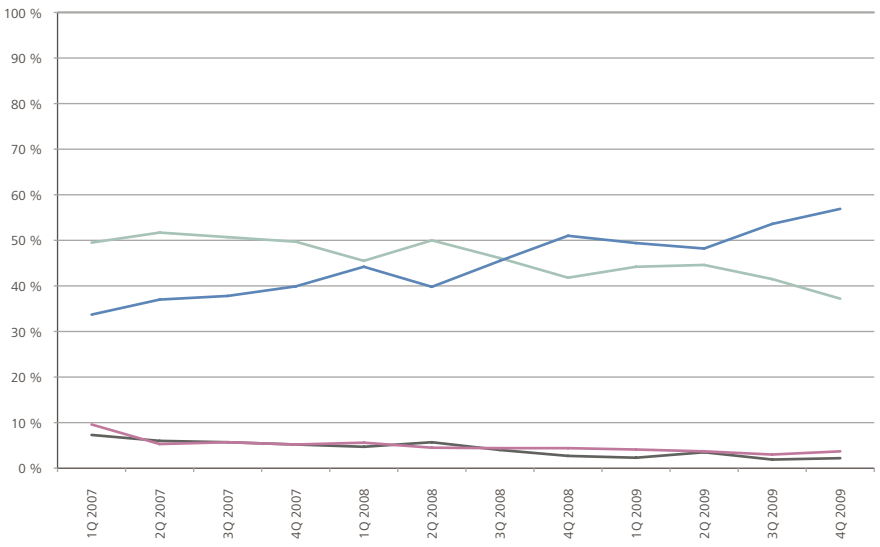


Figure 2.11
Standard variable electricity price from incumbent suppliers and spot based contract prices (Elspot areas NO1, NO2 and NO3) with margin, 0.019 NOK/kWh inclusive of 25% VAT.
Source: The Norwegian Competition Authority and NVE

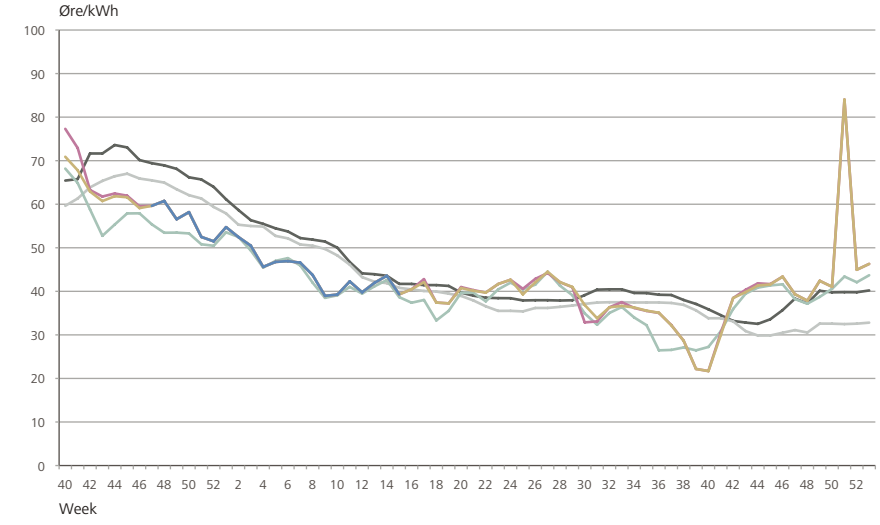
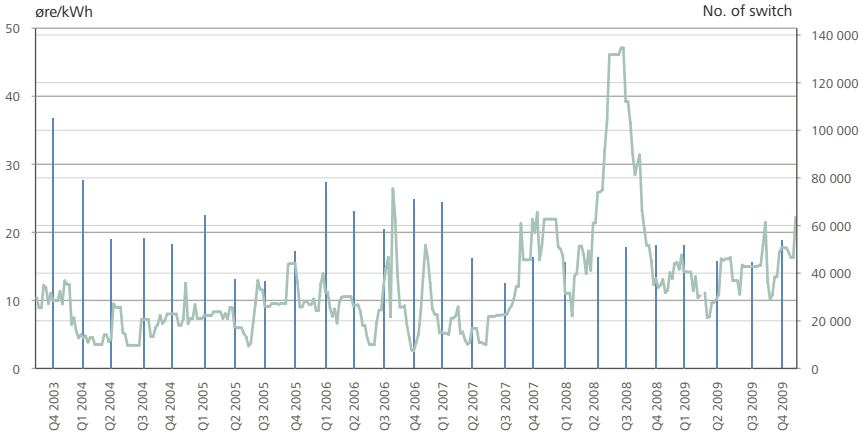


Figure 2.12
Price dispersion and number of supplier switches.
Source: The Norwegian Competition Authority and NVE

— Total number of supplier switch in the household sector
— Difference between the most expensive incumbent supplier and the cheapest nationwide supplier



level of competitive pressure on the suppliers in this market. However many of the customers still held a contract with their dominant local supplier at the end of 2009. This suggests that there still are potential for increasing the competitive pressure.

The price difference between the most expensive and the cheapest supplier was on average 0.046 NOK/kWh in the fourth quarter of 2009. That is higher than in the third quarter, but lower than the difference in the fourth quarter in 2008 (0.052 NOK/kWh).

2.7.6 New electricity production capacity

According to preliminary figures, Norway's mean annual hydropower generation increased by 0.7 TWh in 2009. Thus, the increase since liberalisation in 1991 has been 8.5 TWh.

In 2009, 0.6 TWh of new hydropower projects were granted licences. All this new production is from small hydropower plants. By the start of 2010, around 2.1 TWh of hydropower projects have licences but are still not online. In some cases licences are issued, but construction is not allowed before there is sufficient grid capacity. Some projects have to be postponed until the grid is upgraded. At the beginning of 2010, around 1.1 TWh of new hydropower was under construction.

NVE currently has more than 500 licence applications for small hydropower projects. If all the applications receive a licence and are built, the potential generation is 5.4 TWh.

Norwegian windmills produced 981 GWh in 2009. This gives an operation time of 2,290 hours (capacity ¬factor 26 per cent), varying from 1,500 to 3,800 hours. Wind power accounts for 0.8 per cent of Norway's total power generation.

3 The market for district heating

NVE regulates the market for district heating by issuing licences and through price regulation.

NVE issues licences for district heating. A licence for district heating is a permit to build and operate a district heating plant with a certain installation, within a certain geographical area. An installed installation above 10 MW requires a licence, and only one licence can be given within one area. The municipalities can, when a licence is granted, adopt compulsory connection to the district heating system for new and rehabilitated buildings.

The Energy Act specifies that the price of district heating should not exceed the heating price of any alternative heating source, which in general is mainly electricity. Customers subject to compulsory connection can complain about heating prices to NVE.

In 2009, NVE issued 33 new licences, with a total installation of 722 MW. With an estimated 75 per cent of the installation covering base and peak load and an expected operating time of 2,200 h/year, this is expected to release 1.2 TWh in new heat production. In 2009, NVE refused 17 applications. These were considered to be unprofitable projects or were rejected due to competing applications. In total, by the end of 2009, NVE have granted licences releasing 4.3 TWh for district heating.

In 2009, NVE received two complaints about prices for district heating. In addition NVE received four written enquiries about district heating pricing. Three cases were brought to a conclusion in 2009. Two of these cases were rejected (having no right of appeal). At the end of 2009, two cases are undergoing initial consideration and one case is being prepared for transmission to the Ministry of Petroleum and Energy.

4 Legal amendments

The Energy Act was amended several times during 2009 with effect from 1.1. 2010. These amendments included inter alia:

- Extension of the provisions regarding concessions for electricity installations and remote heating plants to include ownership.
- Introduction of a requirement for a concession for low-voltage electricity installations as well, but with the possibility of excluding certain low-voltage electricity installations by Regulations.
- Introduction of a requirement for compulsory connection with regard to production installations and new installations for tapping of electricity that is not comprised by the duty to deliver.

In addition, several of the Regulations to the Energy Act were amended and these amendments included inter alia:

- On 5.6.2009, NVE resolved to abolish the control regulation, chapter 15, concerning "Practical design of tariffs for consumption made possible for disconnection" with effect from 1.7.2009. There is a transitional period until 1.7.2012 for existing customers with fuel-fired backup.
- The rules and regulations for common measurement of electricity systems were modified as of 1.1.2010. The changes mean that each individual housing unit or a holiday house shall be measured and settled separately.
- It was explicitly decided that, with effect from 28.12.2009, the duration of licences for the sale of electricity and licences for marketplaces could be up to 10 years.
- As a consequence of the introduction of a market for intra-day trading in Norway, the time-limits for reporting by production plans were changed with effect from 1.3.2009. Moreover, the TSO was permitted to impose a duty on the concessionaires with regard to contributing to the power of frequency and connected rotating reserves within the technical limits of the production unit. It was determined that the TSO should pay for such contributions and the elements for such payments were specified.
- Additionally, the provisions regarding clearing were amended with effect from 28.9.2009. The payment obligations shall be calculated for each entity responsible for clearing. Imbalances in power of frequency shall be calculated according to the prices in this market. Imbalances in power production shall be calculated according to the spot market as long as the imbalances reduce the total imbalance of the system. Buying and selling duties shall be submitted continuously and at least within 45 minutes before the hour of operation.

5 Finalised and ongoing research work

- As an important part of the licensing process NVE has focused strongly on the work with and content of the regional power system studies in 2009. Based on, i.a., the regional researches reviews, a list of municipalities lacking network capacity for regional and national grid was developed and used to prioritise the small power applications in the queue.
- NVE published the report: "National development study for the transmission facilities of the electricity power system", which provides an overview of planned investments in the Norwegian power system 2008-2017. NVE also increased the use of its own system analysis to assess the need and the consequences for the network of projected changes to the power system.
- In October 2008, the Auditor General published the document, "Auditor General Survey on government use of instruments for safe and reliable transmission of power in distribution". Based on this document NVE finalised 3.6.2009 a note to the Ministry of Petroleum and Energy on the reliability of the transmission grid, the economic regulation incentives for investment and maintenance, as well as a briefing on NVE's audit of the companies' duties under the Energy Regulations Section 3-4 regarding operation and maintenance. In the note NVE provided an orientation on the ongoing and planned regulatory work in the area.
- In 2009, NVE commissioned, in cooperation with the Ministry of Petroleum and Energy, a review of the overall network regulation. The review includes an assessment of whether the regulation is appropriate with regard to optimising the companies' incentives for investment and the efficient operation of the network. In the review NVE also considered an extension of the national grid, national tariffs and the use of "imposed construction contributions" for the connection of new production.
- A continuous effort to evaluate the standard cost models both for grid companies with distribution and with regional and national grid infrastructure is ongoing. The standard cost model for distribution has from 2010 been expanded to take into account the cost differences associated with the feed in from small power stations and distribution of islands. Concrete plans for further work with the regional and national grids have been drawn up. NVE aims to present its assessments of potential improvements to the standard cost model in the regional and national grid by the end of the first half of 2010.
- From the start of 2010, the marketplace licence also explicitly states that the licensee should have capital that is prudent in relation to the business being operated. The changes have been made on the basis of a study conducted by Pareto Securities AS on behalf of the NVE. The assessment also included proposals for more closely monitoring costs and revenues associated with the licensed business.
- The trend towards a common regulatory framework for the electricity market in Europe is of great importance for the rules NVE supervises as well, both in terms of the retail market and the wholesale market. NVE is working to facilitate effective exchange of power across borders, and facilitate the most efficient pricing possible in the Norwegian electricity market.

- In October 2009, the Nordic Council of Ministers endorsed the proposal from the Nordic regulators to facilitate the development of a common Nordic end-user market, and asked regulators in cooperation with market participants to prepare a proposed schedule for implementation by 2015.
- In February 2009, NVE received the consultation responses to NVE's proposal regarding functional requirements for new meters (AMS). Among other things, based on international developments relating to standards related to smart meters, NVE issued in June 2009 a revised draft of the regulatory provisions and time of implementation. Based on the input from the public consultation, NVE decided to postpone the decision on introduction in anticipation of developments in the European standardisation work.

6 NVE's participation in international regulatory cooperation

6.1 Description of the regulatory cooperation

NVE participates in NordREG which is an organisation for the Nordic energy regulators. NordREG's mission is to actively promote the legal and institutional frameworks and conditions necessary for developing the Nordic and European electricity markets. The basis for the cooperation within NordREG is to identify areas of work where cooperation can take the following forms:

- Exchange of information and views
- Mapping and analyses of energy market issues
- Issuing common reports and statements
- Common actions to influence the development of the Nordic or the European energy markets

At a European level NVE participates in CEER and ERGEG. The Council of European Energy Regulators (CEER) and the European Regulators' Group for Electricity and Gas (ERGEG) are two organisations established for the cooperation of the independent energy regulators of Europe. Both organisations pursue the same overall aim of facilitating the creation of a single, competitive, efficient and sustainable internal market for gas and electricity in Europe.

CEER and the ERGEG share similar objectives and the work and achievements of the CEER and ERGEG are intrinsically linked. Yet there is one main difference in the role of the organisations in relation to the EU and the other stakeholders of the energy sector in Europe. Cooperation within the framework of the CEER is based on a voluntary agreement among the regulators themselves, while ERGEG was founded by the European Commission in 2003 as its official advisory group on energy issues.

CEER is a "not-for-profit association" under Belgian law and has a small Brussels-based Secretariat. In March 2000, ten national energy regulatory authorities signed the "Memorandum of Understanding for the establishment of the Council of European Energy Regulators". They had voluntarily formed the council to facilitate cooperation in their common interests for the promotion of the internal electricity and gas market. In order to cope with a growing number of issues and to improve cooperation in the operational level, the regulators decided in 2003 to formally establish themselves as a not-for-profit association. CEER has now 29 members – the energy regulators from the 27 EU-Member States plus Iceland and Norway.

CEER acts as a platform for cooperation, information exchange and assistance between national energy regulators and is their interface at a European level with the European Commission, in particular the Directorate for General Transport and Energy (DG TREN), the Directorate for Competition (DG COMP) and the Directorate for Research (DG RESEARCH). It cooperates with the European Commission and competition authorities in order to ensure consistent application of competition law to the energy industry. CEER also strives to share regulatory experience world-wide through its links with similar associations in America (NARUC) and in Central/ Eastern Europe (ERRA) and its membership in the International Energy Regulation

Network (IERN). CEER has taken a central role in developing an efficient and competitive electricity and gas market in the Energy Community of South East Europe.

ERGEG was set up by the European Commission as its advisory body on internal energy market issues. It is made up of the national energy regulatory authorities of the EU's Member States. Its purpose is to facilitate a consistent application, in all Member States, of the provisions set out in Directive 2003/54/EC, Directive 2003/55/EC and Regulation (EC) No 1228/2003, as well as of possible future Community legislation in the field of electricity and gas".

ERGEG advises and assists the Commission on its own initiative or upon request, in particular with respect to the preparation of draft proposals implementing measures in the field of electricity and gas. For example, ERGEG provided significant input to the European Commission in the preparation of its third energy liberalisation legislative package (adopted during the summer 2009).

Establishment by ERGEG of Regional Initiatives, which it launched in the Spring of 2006, is an effort to speed up the integration of Europe's national energy markets. ERGEG Regional Initiatives establish 7 electricity and 3 regional gas markets in Europe as an intermediate step to the creation of a single, competitive EU market for electricity and gas.

In advising the Commission, ERGEG is required to consult stakeholders and to do so at an early stage. ERGEG is committed to best regulatory practice in terms of conducting its public consultations and engaging with stakeholders. ERGEG's established public consultation practices are based on four guiding principles: openness, transparency, consistency and accountability. ERGEG's written consultations are used in conjunction with public hearings and the European electricity and gas regulatory fora (Florence and Madrid respectively).

6.2 Description of the regulatory cooperation in 2009

The activities of the regulators on the Nordic and European scene were intense this last year. During this year the EU Council and Parliament decided on a revision of the electricity and gas directives, the so-called "third package". Within the European regulatory cooperation (CEER and ERGEG) a substantial amount of work to prepare the implementation of the third package has been ongoing and is still in focus. The formation of the new European authority, ACER, which will replace ERGEG, will promote the development of the internal market for electricity and gas. NVE has in 2009 continued its work with the goal that NVE should be included on the Board of Regulators in ACER with all rights and obligations. This is expected to be decided as part of the EEA negotiations on the third energy market package in 2010.

The work of the CEER/ERGEG is organised through several working groups. NVE has participated actively in most of these groups within the electricity area. Approximately 20 people from NVE have been engaged in the European international work. NVE has given priority to topics related to market design, trading

solutions and market coupling, congestion management, balancing markets and network investments. Moreover, NVE contributed actively with expertise in the development of a retail market and the framework for security of supply. In 2009 NVE chaired the Electricity Quality of Supply Task Force within CEER/ERGEG together with the Portuguese regulator. This group's main focus is continuity of supply, voltage quality and commercial quality, and it also deals with the issue of smart grids.

The establishment of a common regulatory framework for the electricity market in Europe has great importance for NVE' s regulatory work, both for the retail and wholesale market, as this is a prerequisite for facilitating the secure and effective exchange of power across borders as well as efficient pricing in the Norwegian electricity market.

In 2009 NVE has held the presidency in the Nordic regulator cooperation, NordREG. The focus has mainly been on the tasks assigned by the Nordic Energy Ministers in their annual meetings; the further development of a borderless electricity market in the Nordic area, and this past year the development of a common Nordic retail market with the goal of implementation in 2015.

In October 2009, the Nordic Council of Ministers endorsed the proposal from the Nordic regulators to create the basis for a common Nordic retail market and asked regulators in cooperation with market participants to prepare a proposal for a roadmap for implementation by 2015.

NordREG publications, consultation documents and press releases can be found on https://www.nordicenergyregulators.org/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