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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 marketplace 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 overall goal 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 and 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

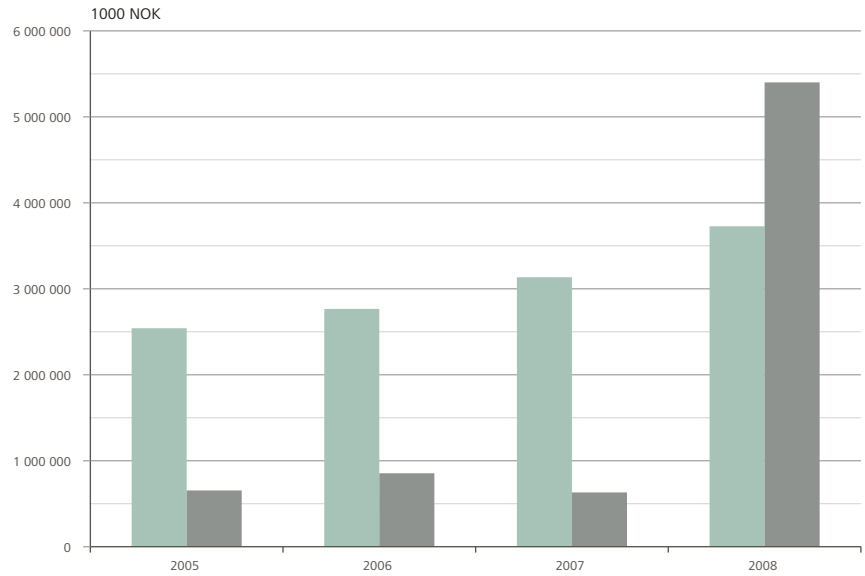
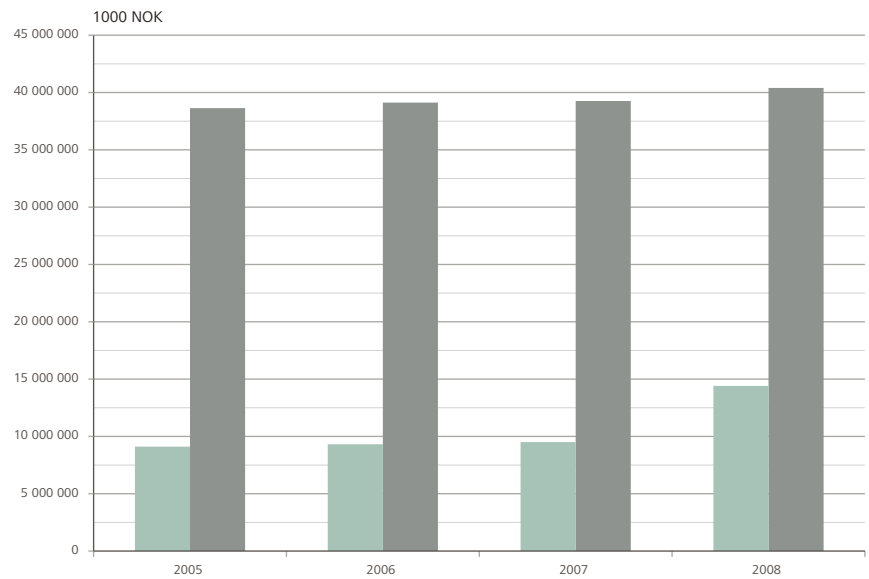


Figure 2.2

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.

2.5	Security of supply
2.5.1	Regulations on Quality of Supply in Norway

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.

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			CAIFI			SAIDI			CAIDI			CTAIDI		
	[number interruptions / end-user]			[number interruptions / affected end-user]			[min / end-user]			[min / interruption]			[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

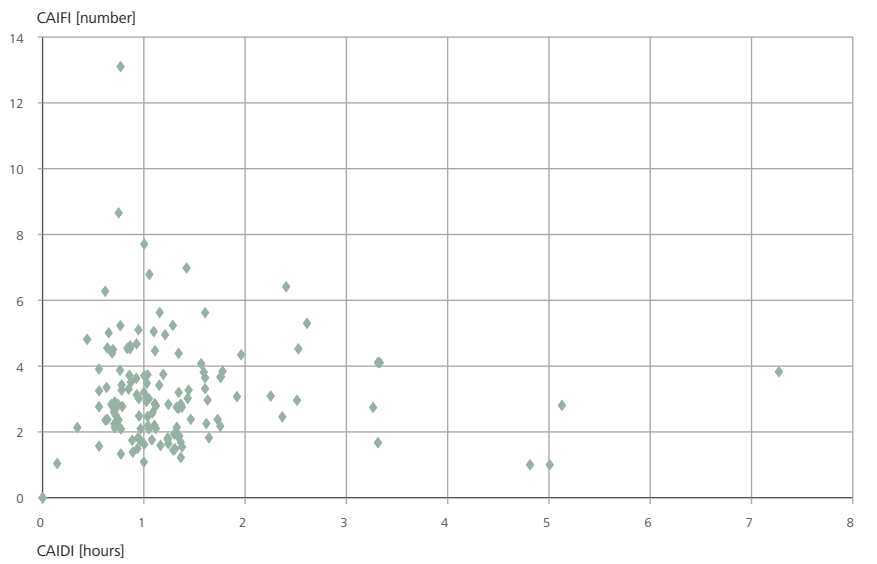
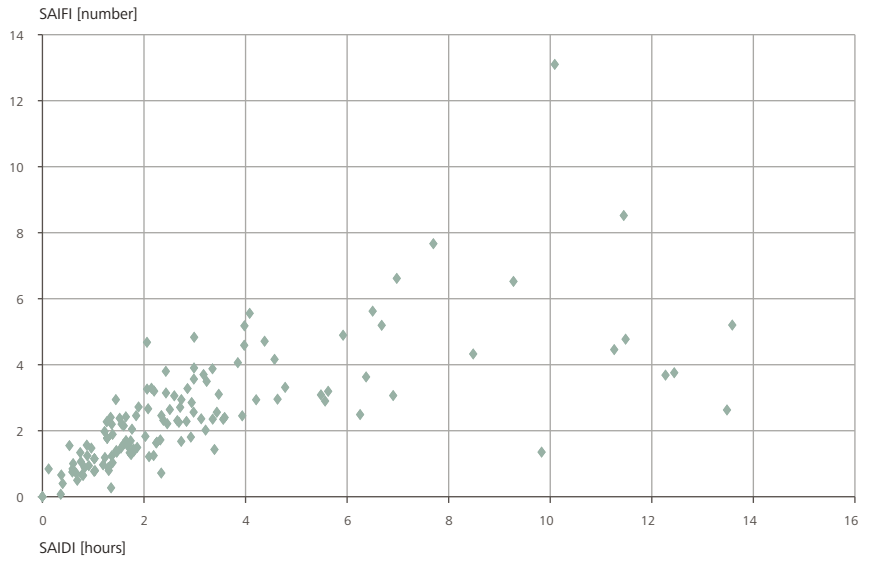
Long (> 3 minutes) interruptions	SAIFI			CAIFI			SAIDI			CAIDI			CTAIDI		
	[number interruptions / end-user]			[number interruptions / affected end-user]			[hours / end-user]			[hours / interruption]			[hours / affected end-user]		
	notified	not notified	TOT	notified	not notified	TOT	notified	not notified	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

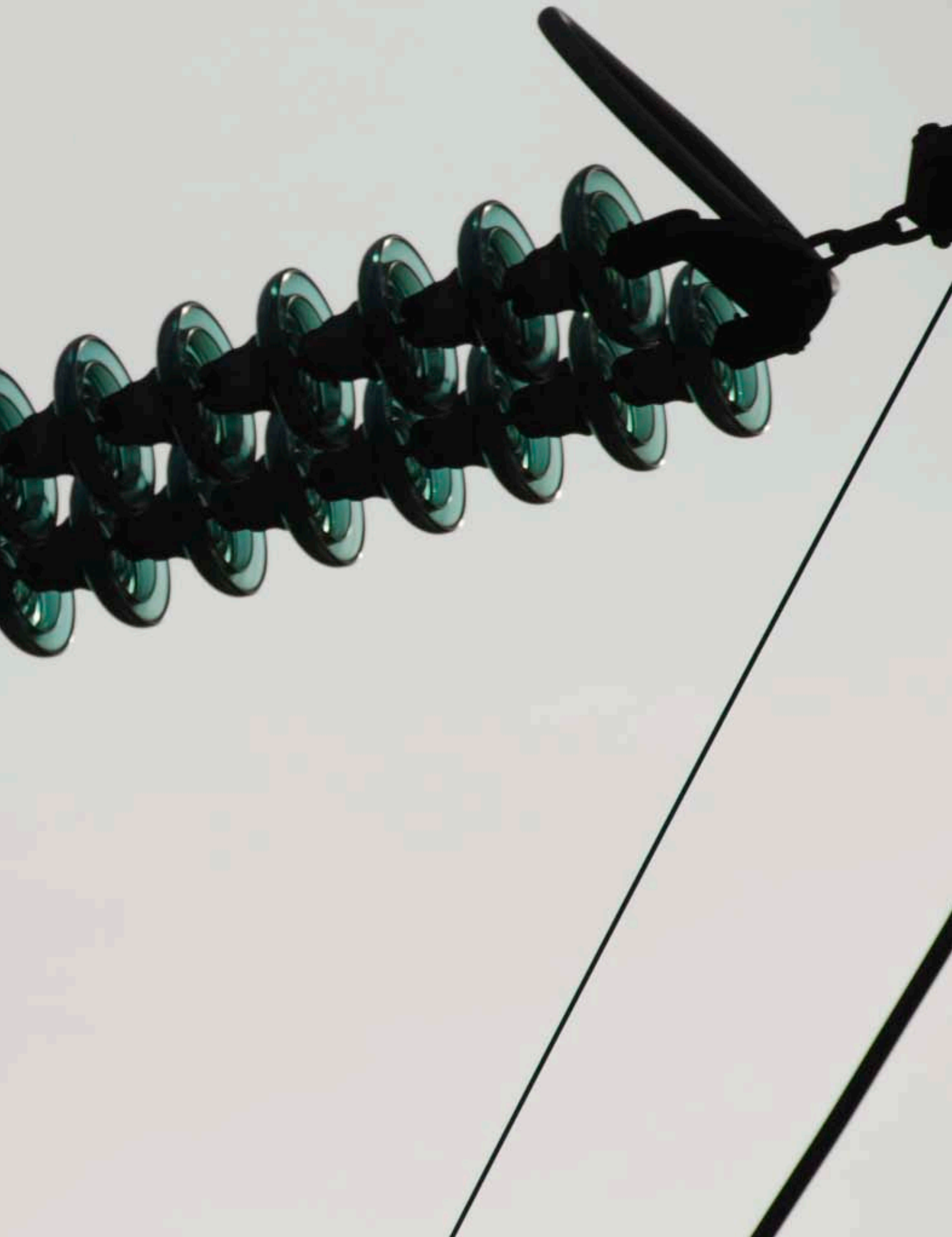
The table above shows the continuity indicators calculated for Norway. NVE publishes these indicators together with other interruption statistics every year.

- 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).





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	Mean year generation	Total capacity	Mean year generation	Total capacity	Mean year generation
	[MW]	[GWh]	[MW]	[GWh]	[MW]	[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.



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

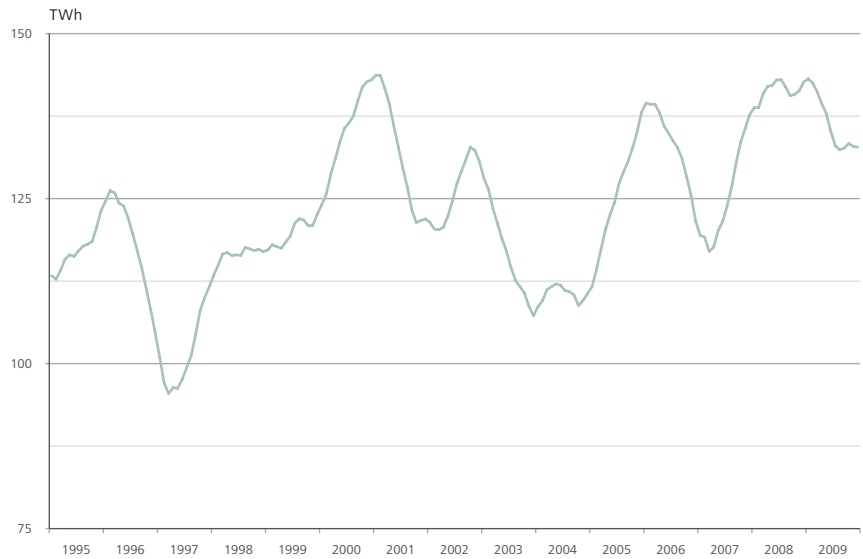


Figure 2.4
Norwegian aggregate electricity consumption
the last 12 months, 1995-2009. TWh.
Source: NVE

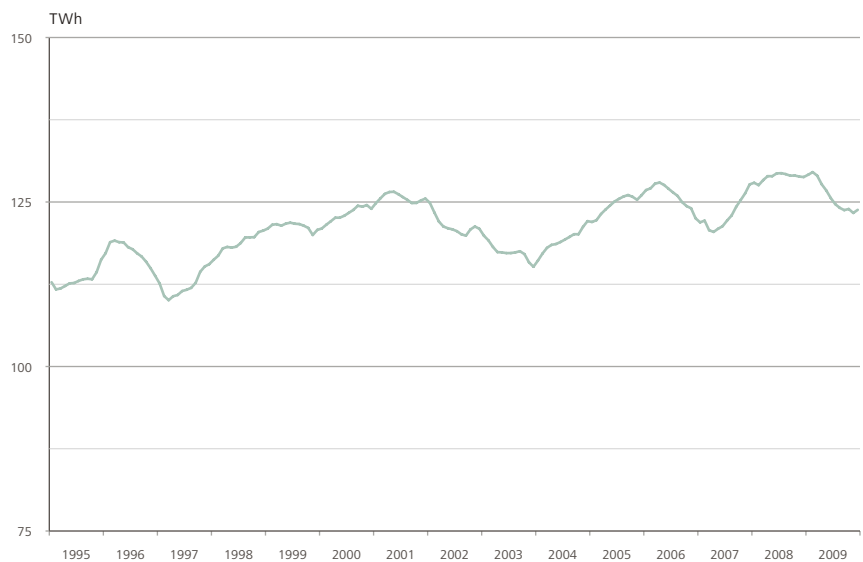
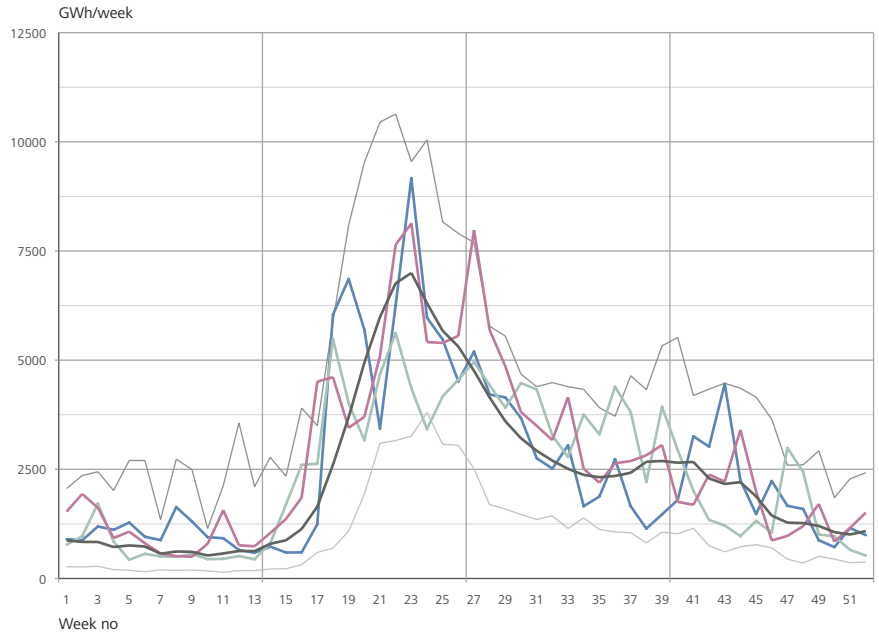


Figure 2.5
 Inflow to the Norwegian hydro-
 power system in 2007, 2008 and
 2009. GWh/week.
 Source: NVE and Nord Pool Spot.

- Max 1970-99
- Average 1970-99
- Min 1970-99
- 2009
- 2008
- 2007



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 led 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.

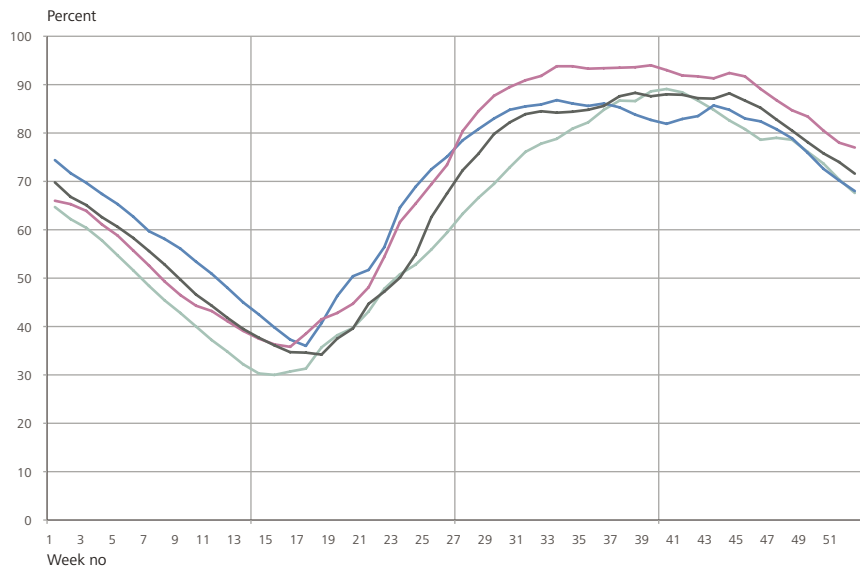
Hydropower reservoir development

At the beginning of 2009, the reservoirs held less water than in a normal year¹. High generation led 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

— Median
— 2009
— 2008
— 2007



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

■ Import
■ Export
— Net exchange

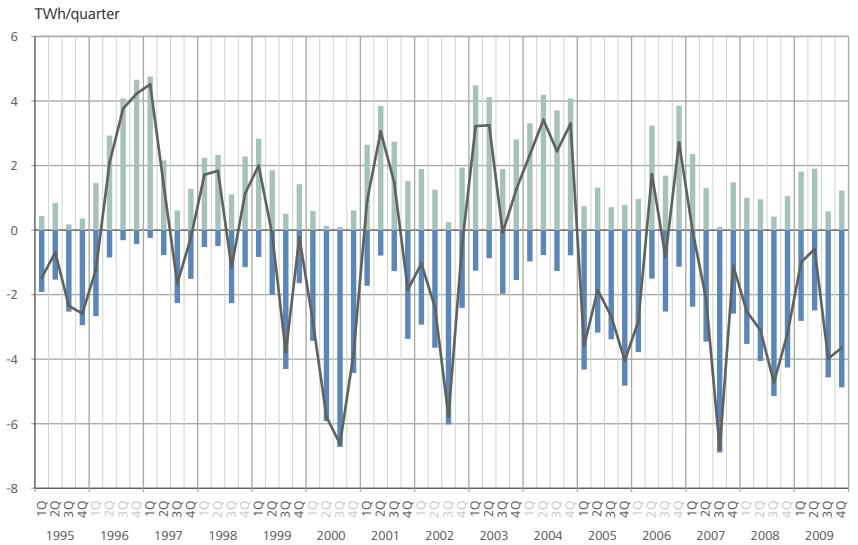


Figure 2.8
Electricity spot price (system price) in 2008
and 2009, weekly average. NOK/MWh.

— 2009
— 2008

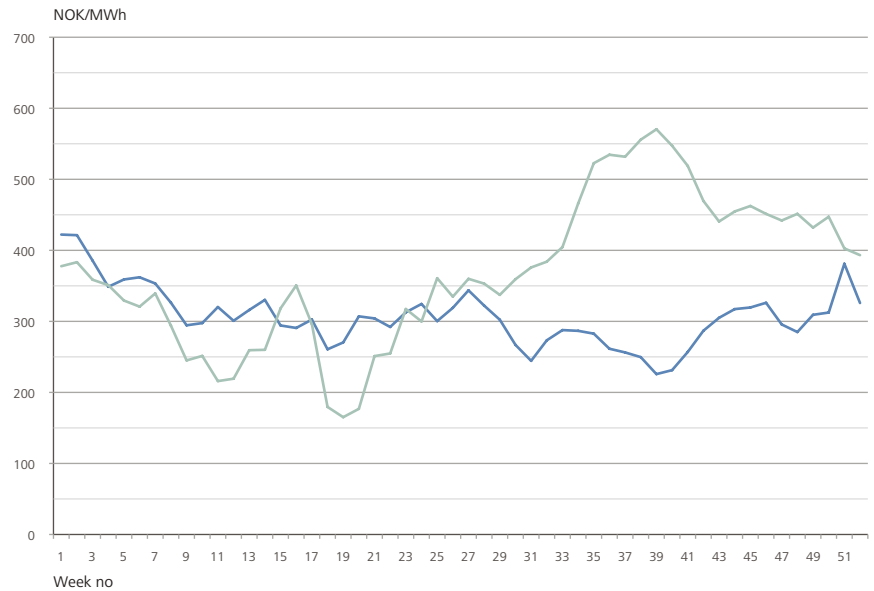
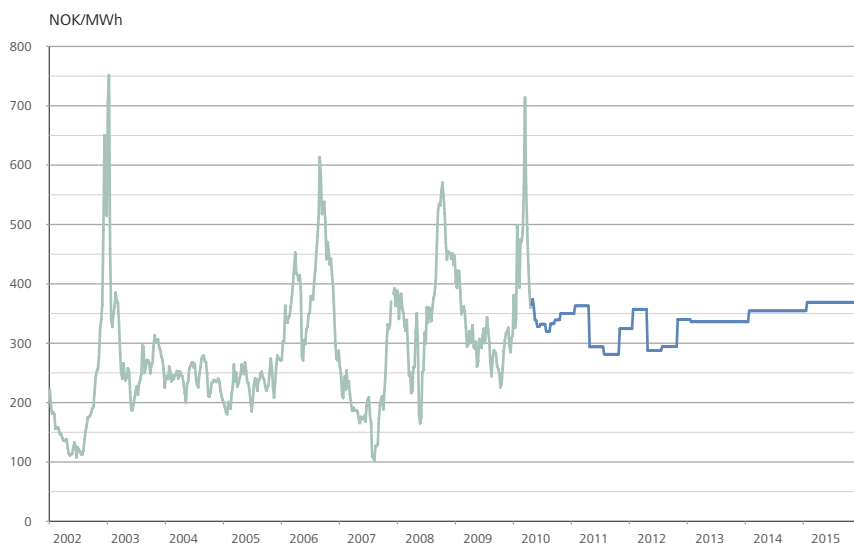


Figure 2.9
Electricity spot prices (system price) and forward prices in the financial market. NOK/MWh.
Source: Nord Pool Spot

— Spot
— Forward



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

- Standard variable contract
- Spot based contract
- Fixed price, 1-year contract
- Other fixed price contracts

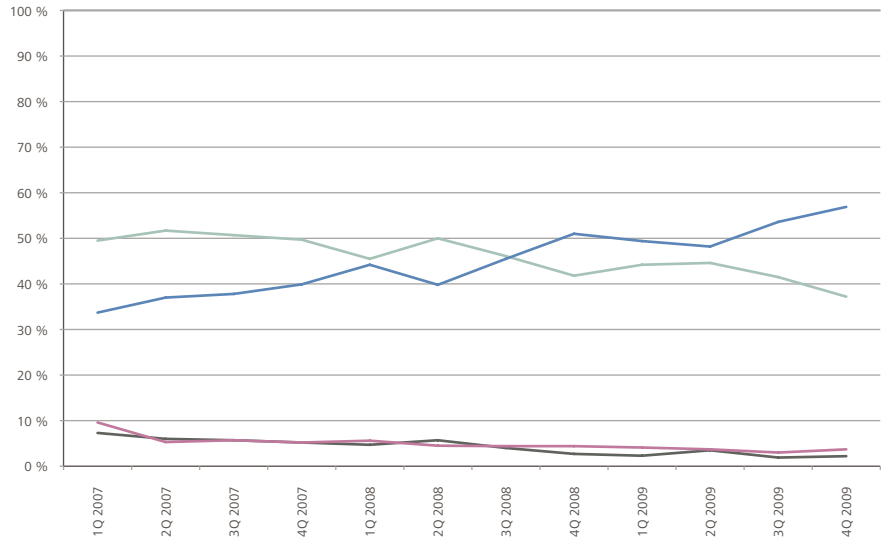


Figure 2.11
Standard variable electricity price from incumbent suppliers and spot based contract prices (Elspot areas NO1, NO2 and NO3) with margin, 0.019 NOK/kWh inclusive of 25% VAT.
Source: The Norwegian Competition Authority and NVE

- Standard variable price – Incumbent suppliers
- Standard variable price – Nationwide suppliers
- Spot with markup (1,9 øre) South-Norway (NO1)
- Spot with markup (1,9 øre) Mid-Norway (NO2)
- Spot with markup (1,9 øre) North-Norway (NO3)
- Spot with markup (1,9 øre) Mid-North Norway, former Mid-Norway (NO2)

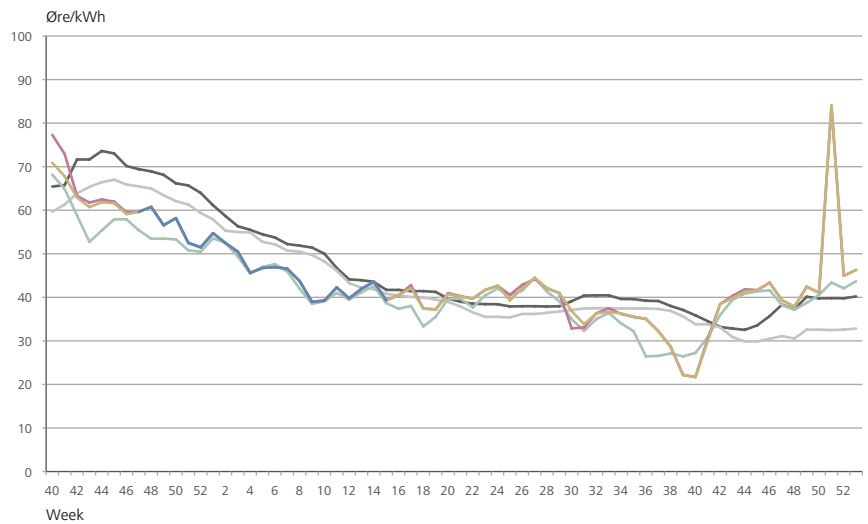
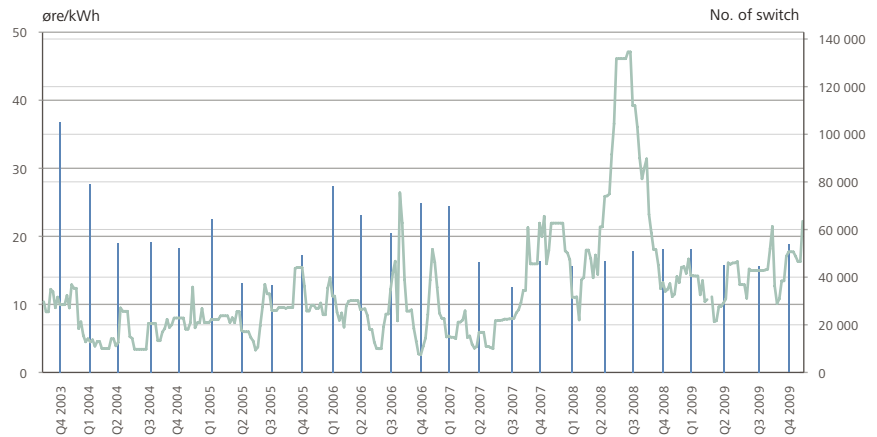


Figure 2.12

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 worldwide 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/EREG 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/>





Annual Report 2009

The cooperation between the Norwegian Agency for Development Cooperation (**Norad**), the Ministry of Foreign Affairs (**MFA**) and the Norwegian Water Resources and Energy Directorate (**NVE**)

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«Water and energy
for **sustainable**
development»



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Preface



Most developing countries in the world are today facing shortage of electricity. Power cuts and load shedding are common, either because of lack of resources for proper maintenance and operation, or lack of knowledge and capacity. At the same time we are facing the global challenges of climate change and increased CO₂ content in the atmosphere, accelerating the increase of temperature in most areas of the world. Clean energy is therefore high on the agenda in Norwegian development aid, not only to reduce the rate of air pollution and increased temperature but also to combat poverty and improve health conditions.

The promotion and development of clean energy is thus one of the most important goals for the Norwegian Water Resources and Energy Directorate (NVE), in fulfilling our cooperation agreement with the Norwegian Agency for Development Cooperation (Norad).

Another challenge and opportunity is the increased demand for results-based management, monitoring and reporting in the institutional cooperation between NVE and similar organisations in developing countries. NVE has always been results oriented in our practical work and assistance. Now it has to be well documented and reported, based upon solid baseline information, which will also enable systematic collection and dissemination of experiences and lessons learned. Once documented, they may also be published and used for competence building both within NVE and among our foreign partners.

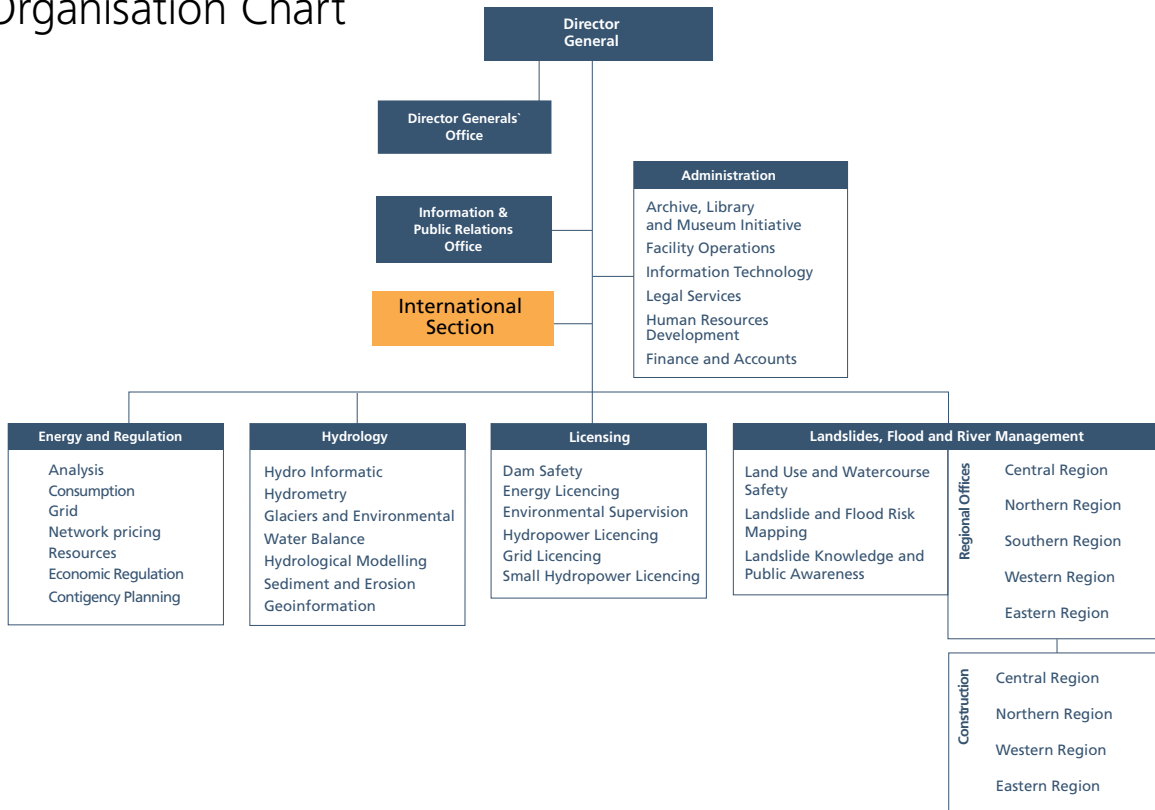
In order to meet these challenges in the years to come, NVE is now emphasising the need for thorough education and training in order to fulfil our obligations to institutional partners in the world of development cooperation. Last year a new and comprehensive internal course was developed, covering not only topics like legal framework, project documents, terms of reference, evaluations, contracts and negotiations, but also the “softer” components like culture and gender. Internal, and external lecturers from Norad and the Ministry of Foreign Affairs as well as private consultants have hopefully helped to make NVE staff better qualified to advise and assist Norad and our partners abroad. The future looks bright, considering that more than 60 of our staff attended the course, showing their interest in development cooperation.

Agnar Aas
Director General

Organisation of NVE

Established in 1921, the Norwegian Water Resources and Energy Directorate is a directorate under the Ministry of Petroleum and Energy and is responsible for the management of Norway's water and energy resources. Our mandate is to ensure an integrated and environmentally sound management of the country's water resources, promote efficient energy markets and cost-effective energy systems and contribute to the economic utilization of energy. We are Norway's national centre of expertise for hydrology, and play a central role in national flood contingency planning. NVE also has the overall responsibility for maintaining national power supplies. NVE is based in Oslo and has five regional offices in Norway and a total of 520 employees.

Organisation Chart



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From left to right: Lisbeth Karijord, Morten B. Johnsen, Amir Messiha, Alf V. Adeler, Kim Chi Tran-Gulbrandsen, David A. Wright, Kjell Repp.



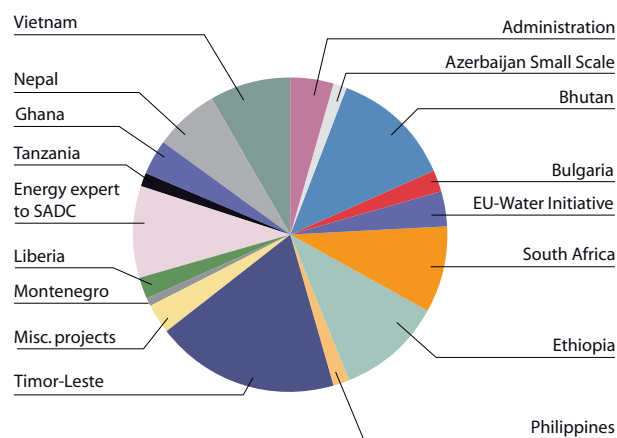
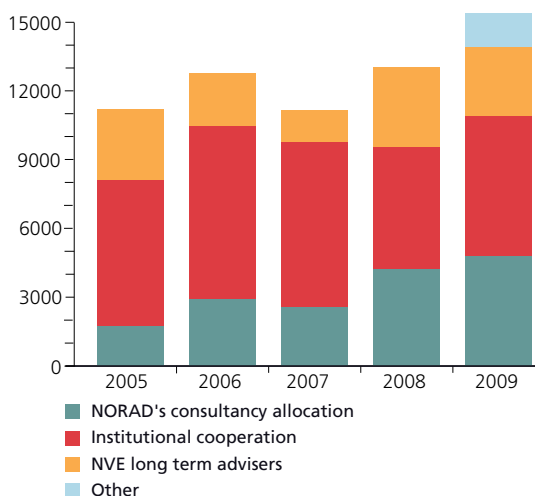
Overview of Activities and Time Consumption

NVE's development assistance is organized and coordinated by the International Section which at the start of 2009 had five staff at the main office in Oslo and two stationed abroad, in Timor-Leste and Mozambique.

By the end of the year the staff was increased to seven at the main office due to an increased number of tasks from Norad and the Ministry of Foreign Affairs.

The main tasks of the International Section are preparation of energy and water resources related projects and cost & quality control of projects and programmes during implementation. The major part of the professional work is carried out by staff from the various technical departments and sections of NVE. During 2009 a total of 63 persons were involved in the assistance, compared to 62 in the previous year. In addition, private consultants and professionals from other directorates and research institutions were subcontracted to assist NVE in cases where NVE either lacked competence or was temporarily short of capacity.

The volume of activities in 2009 was recorded at 11 person-years (one person-year being 1400 effective working hours), compared to 9.3 person-years in 2008. In addition, however, NVE has also been asked to assist in a few other development projects outside of the scope of the Norad-NVE agreement, such as a UNDP-funded project in Azerbaijan (mainly licensing), and two projects in Bulgaria, funded by Innovation Norway (one on water resources monitoring and one on electricity regulation). NVE is also participating in a EU-funded water research project entitled SPLASH, coordinated by the Department for International Development (DFID) in the United Kingdom and with participation from 16 EU countries.



NVE-staff are widely used as lecturers in courses (including the International Centre for Hydropower's courses). The International Section also normally coordinates visits to NVE by international delegations. An increase in activities is foreseen, mainly due to the institutional cooperation with Liberia which will be established in 2010. A further increase is expected in 2011 in cooperation with Nepal.

Countries worked in





Assignments for **Norad** and **Ministry of Foreign Affairs**

The Norwegian Agency for Development Cooperation (Norad) is the principal government agency for international development. Being organised as a directorate under the Ministry of Foreign Affairs, its main tasks are to provide advisory services to the Ministry, to embassies in developing countries and to multilateral development organizations. According to its strategy Norad aims at maximising the effectiveness of its work with focus on quality and results.

NVE and many other organisations assist Norad in its many endeavours within their respective specialities. Thus NVE, through a framework agreement, has assisted Norad on assignments within the fields of water resources and energy assessment, monitoring and management. The engagements have varied from identification of projects and evaluation of reports, to planning and preparatory work for new projects, and monitoring of water resources.

Additionally, NVE has been asked directly by the Ministry of Foreign Affairs to assist and advise on its support to the Balkan states, specifically on environmental impact assessment related to hydropower development in Montenegro.

Norway has long supported the development of hydropower resources in Ethiopia which is crucial to underpin Ethiopia's overall economic development and industrialization efforts and make the development sustainable. Ethiopia and Norway have a similar hydropower potential of around 30,000 MW. Norway's potential is substantially developed, and Norwegian support can help Ethiopia do the same through sharing experience from this development.

To this end, Norway has entered into a bilateral agreement with Ethiopia giving support to the feasibility studies of the Mandaya and Beko-Abo Multipurpose projects on the Abay River (also known as the Blue Nile within Ethiopia). The bilateral agreement also allowed for a complementary study of flows and sediment transports, to be measured during the 2008 and 2009 flood seasons.

It is worth noting that the Blue Nile has historically been a major reason for political tension between Egypt and Ethiopia. A regional office under an UN-umbrella has now been established to facilitate mutually favourable developments.

Feasibility Studies Mandaya & Beko-Abo Multipurpose Projects, Abay River

Background:

Ethiopia has requested assistance from Norway to carry out studies of two multipurpose projects on the Abay River (the Blue Nile within Ethiopia, the largest tributary to the Nile River), namely the Mandaya and Beko-Abo Multipurpose projects. These are large strategic projects of regional importance. Both projects include hydropower stations with more than 2,000 MW installed capacity. The large reservoirs may provide additional water to downstream users, e.g. for irrigation. Norad engaged NVE to assist MoWR with the formulation of the two feasibility studies.

Being the responsible authority for study of hydropower in Ethiopia, MoWR is Executing Agency for the feasibility studies. Implementation and construction of hydropower plants is however the responsibility of the Ethiopian Electric Power Corporation (EEPCO). Due to the projects' regional importance and impact, efforts are being made to involve all regional stakeholders with the assistance of ENTRO.



Capital: Addis Ababa

GDP (10⁹ USD): \$26.39

GDP per capita (GPP): \$ 900 (2008 est.),
country comparison to the world: 214

Population: 85.2 million

Total installed capacity: 1 000 MW

Main Energy Sector Authorities:

Ethiopian Ministry of Water resources
(MOWR)



Activities and Outputs:

In the short time since the project became fully active, the efforts have mostly entailed different preparatory tasks. The tender process for the feasibility studies for the Mandaya and Beko Abo projects was initiated in autumn 2009. The current status is:

- Project preparation has so far encompassed, i.a.: Soliciting proposals for Technical Consultants for the Feasibility Studies of the Mandaya and Beko-Abo Multipurpose Projects, Preproposal Conference, Evaluation of Proposals with the elaboration of a Proposal Evaluation Report, and preparation of recommendations to MoWR for contract negotiations with consultants

- Other specific assistance to MoWR has dealt with the preparation of: Terms of Reference and Request for Proposals for environmental consultancy, Terms of Reference for and procurement of panels of experts for dam safety and environmental issues, and Project Document for the institutional cooperation between MoWR and NVE.



New Kessie bridge on the Abbay River (Blue Nile) in Ethiopia

■ In preparation for the Capacity Building component, an identification workshop was held in Addis Ababa during second half of 2009, with participation from relevant departments and sections of the MoWR.

Issues and Challenges:

Human resources capacity within MoWR needs strengthening through engagement of new experienced staff. The Ministry is primarily a custodian of Ethiopia's water resources, and it is in some areas short of capacity to manage complex multi-purpose project studies.

Contact: David A. Wright

Overall Project Data

Client: Ministry of Water Resources (MoWR).

NVE Mandate: Advisory services to executing agency MoWR on: i) Implementation of two feasibility studies, and; ii) Preparation of project document for Capacity Building in collaboration with MoWR.

Contract Value/Duration: MNOK 4.500; started (formally) November 2006 and lasting till Summer 2010.

Type of Activities: Workshops, seminars, site visits, preparation of documents, procurement, advisory services, sub-consultant to Eastern Nile Technical Regional Office (ENTRO).

Work Completed 2009: Project preparation for technical consultants' work and identification workshop on Capacity Building.

Work in Progress 2009: Assistance to MoWR in definition of specialised tasks, complementary to the feasibility studies, and institutional cooperation between MoWR and NVE.

Results/Outcome:

It is too early for concrete results/ outcomes to have materialized. However, steps already taken by MoWR and NVE have helped MoWR towards performing its mandate more effectively:

- Capacity Building workshop laid the basis for designing programs of institutional cooperation and capacity building within the MoWR - in a participatory way.
- Increased motivation within MoWR has been noted as tasks have progressed.
- Procurement of technical consultants' services which is now well under way, has been conducted to high professional standards in all aspects.



Dowsing with holy water under festival of Epiphany in Addis Ababa, Ethiopia.

Sediment & Hydrology Campaign, Abay River

Overall Project Data

Client:	Ministry of Water Resources (MoWR), Ethiopia.
NVE Mandate:	Professional services to MoWR in carrying out sediment concentration and flow measurements in the Abay River, Ethiopia.
Contract Value/Duration:	MNOK 1.364, started in 2008 and completed 2009.
Type of Activities:	Procurement, field measurements, staff training, data analysis and reporting.
Work Completed 2009:	The second campaign was planned, implemented and completed in 2009.

Background:

Flow, and in particular, sediment data is important for the planned large scale hydro-power developments on the Abay River, the largest tributary to the Nile River. The Norad-sponsored programme of sediment and flow measurements at two sites on the Abay River was carried out by the MoWR's Hydrology Department with assistance from NVE. Two campaigns have been conducted during the 2008 and the 2009 flood seasons, respectively.

Activities and Outputs:

During the 2009 high flow season field work, including measurement of flows and taking samples of suspended sediments, was carried out.

Related procurement and on-the-job training of MoWR staff were also conducted. A final report was issued, including results and conclusions based on the campaigns.

Issues and Challenges:

Customs clearance in Ethiopia proved time consuming. The agreement between Ethiopia and Norway which would have alleviated this problem, came into effect after the campaign was finalised. In order not to lose time, the project budget had to be increased with allocations to cover duties on all imported equipment.

Contact: David A. Wright

Results/Outcome:

The study was successfully completed in 2009. Findings will be crucial for the upcoming feasibility studies of multipurpose projects planned on the Abay River. The sediment measurements will in particular, enhance knowledge related to catchments area erosion and sediment loads in the Abay River; - critical issues for water resources in the Ethiopian highlands and in many other parts of Africa.

The increased ability of MoWR to perform measurements, data collection and analysis as done in this study will contribute towards a better basis for future projects, including mitigation measures in the catchments.

HSAF Sustainability Assessment Protocol International Hydropower Association

Background:

NVE was engaged by NORAD to participate in the Hydropower Sustainability Assessment Forum for development of the Hydropower Sustainability Assessment Protocol of the International Hydropower Association (IHA). The protocol is a tool to measure and guide sustainability performance of the hydropower sector, based on review and revision of the existing IHA Sustainability Assessment Protocol (2006). The aspiration is that the hydropower sustainability assessment protocol will reflect a broadly endorsed view of what sustainability means in practice for the hydropower sector and provide a practical measurement tool that can be implemented across a range of contexts.

The composition of the Hydropower Sustainability Assessment Forum (HSAF) includes Non Government Organisations, developing and developed country governments, commercial and development banks and the hydropower sector, and was guided through the joint efforts of the World Wildlife Fund,

The Nature Conservancy and the International Hydropower Association, as were the initial efforts to obtain the necessary financial support. The Hydropower Sustainability Assessment Forum is funded by the governments of Norway (NORAD), Iceland, Germany, IHA and The Nature Conservancy. The HSAF held its first meeting in March 2008 and aims to produce a final revised protocol by 2010.

The hydropower sustainability assessment protocol has the potential to be used by companies, governments, financial institutions and other stakeholders to improve decision-making relating to proposed hydropower developments; identify, manage and mitigate risks; guide development of new projects in a sustainable way, taking environmental impacts into consideration; and assess and improve the performance of existing operations.

Issues and Challenges:

The project will address and try to resolve:

- Simplification of the Protocol in order to make it accessible to a broad sector of users.
- Acceptance of the revised Protocol as an independent assessment tool for considering sustainability of hydropower projects.

Outputs:

The following was noted during 2009:

- Revised IHA Sustainability Assessment Protocol
- Input to Protocol updates.
- Trialling of revised draft Protocol on a project in Africa by way of desk study carried out in Norway.

Contact: David A. Wright

Overall Project Data

Client:	Norad.
NVE Mandate:	Alternate to Norad in IHA HSAF forum activities.
Contract Value/ Duration:	Open.
Type of Activities:	Participation as alternate to Norad expert in IHA HSAF Forum meetings, assist Norad in carrying out field trials and in providing recommendations for update of the International Hydropower Association Sustainability Assessment Protocol.
Work Completed 2009:	Attendance of IHA working group for drafting of revised Protocol in spring 2009. Attendance of IHA HSAF forum meeting in Iceland in June 2009. Assistance to Norad in carrying out field testing of revised IHA SAP in Norway in autumn 2009.


Ghana

Establishment of National Dam Safety Unit (NDSU)

Background:

Dams impose a serious threat as dam breakage can cause serious damage to life, property and environment. In Ghana there is no single authority responsible for the safety of dams. The need for a centralised body set up to ensure that these items are in place for all dams, is therefore apparent. There are 3 major owners of dams of significant height and/or reservoir volume in Ghana, namely: the Volta River Authority (VRA), the Ghana Water Company Ltd.(GWCL), and the Ghana Irrigation Development Authority (GIDA). These stakeholders own some 30 dams. In addition, there are also about 1,500 smaller dams built for local water supply or irrigation purposes. These are owned by the local authorities.

NVE was engaged by NORAD (2008) to assist the WRC formulate a Project Document for the establishment of an authority responsible for dam safety. By the end of the Project - after 3 years - it is expected that an independent NDSU has been established in Ghana. NVE's inputs have been covered by special funding from NORAD.



GHANA

Capital: Accra


GDP (10⁹ USD): \$16.65

GDP per capita (GPP): \$1,500 (2008 est.), country comparison to the world: 198

Population: 23.8 million

Total installed capacity: 1 490 MW

Water Resources Authorities: Ministry of Water Resources, Works and Housing



Overall Project Data	
Client:	Water Resources Commission of Ghana (WRC)
NVE Mandate:	NVE to assist the WRC developing key steps and inputs towards the planned National Damsafety Unit (NDSU)
Contract Value/Duration:	MNOK 6.7 for the project from Norad, with an additional MNOK 0.53 as a national input from Ghana. Still awaiting Norad's final approval, the project started in late 2009 and is expected to last for 3 years.
Type of Activities:	Preparation of legal provisions and regulations, technical and operational guidelines, data management, capacity building, and long term financing strategy, all as required for the functioning of NDSU.
Work Completed 2009:	Inception Workshop with relevant actors to prepare for establishment of the NDSU, as well as various capacity building initiatives.
Work in Progress 2009:	With the Dam Safety Working Group (DSWG) as a basis, activities continued towards implementation of the fully operational NDSU.



From the local market in Swedru

Activities and Outputs:

The NDSU Inception Workshop was organized in November 2009 and was able to agree on the establishment of the DSWG; its Terms of Reference were drawn up and agreed upon. Hence the group was officially established with the mandate to:

- Function as the steering committee for the establishment of the NDSU.
- Develop and approve Terms of Reference for technical committees.
- Make recommendations on findings of technical committees.

Special Norad funding was used in 2009 for limited capacity building and attendance in international courses in support of the preliminary stage of the Project. This included two WRC staff attending the Dam Safety Course arranged by the International Centre for Hydropower (ICH) in Trondheim, Norway, September 2009.

The Project Document contains detailed activities and planned outputs required to fully implement the NDSU. The progress on these will be reported on in due course.

Issues and Challenges:

Some activities were started in 2009 with special approval from Norad while awaiting the final Project Document approval. Human resources capacity within WRC is in need of strengthening through training and engagement of new experienced staff members,

particularly in the specialized field of dam safety, including operation of the associated data management system. As indicated above, this issue has already been addressed on a limited scale.

Contact: Amir Messiha

Results/Outcome:

There has been a strong commitment from all stakeholders in Ghana towards the program for establishment of the NDSU. This is evidenced by the following actions already taken:

- Establishment of the DSWG and Technical Committees (Dam, Legal and Finance).
- Technical Committees' Terms of Reference approved.
- First meeting of the DSWG held, December 2009, Accra.

Liberia

LIBERIA

Capital: Monrovia
GDP (10⁹ USD): \$ 0.850
GDP per capita (GPP): \$500 (2008 est.), country comparison to the world: 226
Population: 3.4 million
Total installed capacity: 188 MW*
Main Energy Sector Authorities: Ministry of Lands, Mines and Energy (MLME)
**including private owned*

Institutional Strengthening: of Water Resources and Power Sectors

Background:

Fifteen years of civil war has destroyed much of the country’s physical and human capital, severely damaging its institutions. The new Government of Liberia (GOL) established in 2006 is facing serious challenges which have been taken on in a systematic fashion. The GOL has prepared and endorsed programs in support of the recovery process. These are aimed, directly or indirectly, at eliminating poverty in the long-term and at ensuring self-sustainability of the country. Hence, the overall goal is to achieve economic and social development in Liberia’s important sectors.

The supply of electricity has been substantially affected since the start of the war during which the country’s main hydropower plant (Mount Coffee Hydropower Plant) was damaged. Since 2006, the GOL has provided diesel generators to supply emergency power for essential public services in Monrovia, while the rest of the country is virtually without power supply. Norway has decided to increase her assistance to Liberia in order to support the peace and stability program. In April 2007, Norway entered into an agreement with Liberia aiming at increasing the electricity

Overall Project Data	
Client:	Ministry of Lands, Mines and Energy (MLME)
NVE Mandate:	NVE is now requested by Norad/MLME to assist with development of a monitoring and management system for water and electricity resources in Liberia, with associated institutional support.
Contract Value/ Duration:	MNOK 51 proposed in the not yet approved project document for Norwegian support, covering period mid-2010 – 2015. Direct services by NVE are estimated at MNOK 34 (including 2 long-term advisers)
Type of Activities:	Institution and capacity building, incl. amongst others legal framework within the water and energy sectors, hydrology, and rural and renewable energy. Gender aspects and women’s empowerment are important parts of the cooperation program.
Work Completed 2009:	Two workshops and elaboration of Project Document, also covering NVE support.
Work in Progress 2009:	Finalization of the Project Document for subsequent approval by the Norwegian Embassy in Abidjan.



production in Monrovia. Liberia has expressed a wish to extend the cooperation with Norway within the power sector.

Activities and Outputs:

NVE has conducted a number of missions to Liberia since January 2008, funded by Norad. The contacts between NVE and the various energy and water resources sector authorities have enabled NVE to become quite familiar with Liberia's development issues and the sector specific problems in particular. A Draft Project Document was prepared in 2009 on the request of Norad, outlining the various activities to be included in a 5-year institutional cooperation between the Ministry (representing Liberia's sector stakeholders) and NVE. The focus is on assistance to development of monitoring and management of the water and energy resources, with special attention to institutional strengthening.

The 2009 activities in Liberia comprised:

- A workshop on identification of indicators and gender issues with 34 participants from major stakeholders was carried out in Monrovia for preparation of the Project Document.
- Completion of the Draft Project Document, describing an institutional cooperation between NVE and the MLME of Liberia, based upon discussions and proposals by involved stakeholders during a number of meetings and workshops was submitted to MLME.

Mount Coffee hydropower plant at Saint Paul River

Issues and Challenges:

The general situation in Liberia following the 15 years of civil war constitutes a serious challenge for all kinds of infrastructure and institutional development work. As the GOL has adopted a systematic approach, NVE is aiming to fit proposed water and energy resources initiatives into this framework. The activities are now mostly pending, awaiting Norad's approval of the bilateral sector cooperation, including NVE's role.

Contact: Amir Messiha

Results/Outcome:

At this early stage of the cooperation, with mostly short term ad hoc activities, few results can be reported. However, the overall recovery and development framework provided by GOL, combined with the NVE assisted analysis of water/energy sector issues, has enhanced the Liberian authorities' understanding of measures to be taken.

Strategic Environmental Impact Assessment for Detailed Spatial Plan for Hydro Power Projects (HPPs) on the Morača River

Background:

The MSPE, through the ME of Montenegro, approached Norway for technical assistance with the preparation of the SEIA for the Morača River HPPs. The Norwegian Ministry of Foreign Affairs asked NVE to assist with procurement of consultants' services and quality assurance of the process and the report. The assistance for the SEIA is part of the bilateral cooperation between Norway and Montenegro. This is in pursuance of the program to support Montenegro's integration into the Euro-Atlantic structures. To achieve this overall objective, supporting projects are aimed at contributing to sustainable economic and social development, as well as to Montenegro's adaptation to EU guidelines and standards.

The project activities focus on the Morača River upstream of Podgorica where the potential for hydropower development have been investigated several times since the 1950's. The Detailed Spatial Plan proposes a cascade of four dams with associated HPPs; - the largest upstream dam is a regulating reservoir at Andrijevo, feeding progressively downstream to the run of river HPPs of Raslovići, Milunovići and Zlatica. The time for construction has been estimated at 6 years, and costs calculated



Capital: Podgorica
GDP (10⁹ USD): \$4.848
GDP per capita (GPP): \$10,100 (2008 est.), country comparison to the world: 104
Population: 672,180
Total installed capacity: 238 MW
Main Energy Sector Authorities: Ministry for Economic Development

to be of the order of € 500 - 550 million. The overall installed capacity of the scheme will be 238.4 MW, with an estimated generation of about 700 GWh/year.

Overall Project Data

Client:	Ministry of Economy (ME) and Ministry of Spatial Planning and Environment (MSPE).
NVE Mandate:	NVE to assist the ME with key aspects of the Strategic Environmental Impact Assessment (SEIA).
NVE Contract Value:	MNOK 0,5, covering period September 2008 - April 2010 (including delay).
Type of activities:	Site visit, preparation of documents, procurement activities, advisory services and quality control.
Work Completed 2009:	SEIA study commissioned to consultants (COWI) early 2009.
Work in Progress 2009:	Finalization of the Draft Final SEIA by the Consultant and reviewing by ME.



Consultation meeting with local NGO's

The SEIA for the Detailed Spatial Plan for HPPs on the Morača River was scheduled to be finalized during 2009 including necessary consultations and approval by the Government of Montenegro.

Issues and Challenges:

The progress of the project has been slower than anticipated due to a number of reasons and the Draft Final SEIA report was not finalized during 2009. The process for finalizing this Draft report has been challenging for all involved parties due to different experiences and practices with such studies and with the process requirements. A clarification meeting between the involved parties was held in Oslo in October, 2009, resulting in an agreed way forward. The Draft Final SEIA Report is now expected in early 2010, to be followed by a round of public consultations organized by MSPE. The Final SEIA report is scheduled to be finalized in April 2010.

Activities and Outputs:

A series of project preparation activities had been undertaken during late 2008 (Terms of Reference, invitation to consultants for proposals, and plans for quality assurance of the process). The SEIA project came off the ground from the beginning of 2009:

- Evaluation of consultants' proposals for the SEIA study carried out by a team from NVE and ME in early January.
- Contract for the study awarded to COWI and signed by NVE, on behalf of ME, on 20 January 2009, in the amount of MNOK 1.
- An Inception Report was submitted by COWI on 11th March, 2009.
- Joint supervision of the consultants' work continued through 2009, eventually with a delayed submission as explained above.

Contact: Morten B. Johnsen

Results/Outcome:

The project is considered to be a part of Montenegro's adaptation to the EU standards and guidelines. The Draft Final SEIA report was not finalized in 2009. The project is however considered to be successful as the process has led to improved understanding and enhanced competence regarding EU guidelines and practise for involved parties. This was achieved in part due to the process-oriented approach to services as adopted by NVE.

The Philippines

Improvement of the Flood Forecasting and Warning System for Magat Dam and Downstream Communities

Background:

The Cagayan river basin is the largest in the Philippines, encompassing the provinces of Nueva Viscaya, Isabela and Cagayan. The basin is affected by recurring floods due to tropical cyclones and the northeast monsoon.

To mitigate the impacts of flooding in the valley, the Philippine Government established the Cagayan Flood Forecasting and Warning System (FFWS) in 1982. The Flood Forecasting and Warning System, which was upgraded in 1992 with the inclusion of a warning system for operation of Magat Dam (multipurpose dam for irrigation of 102,000 hectares of farmland and power production), has since encountered problems including breakdown of the communication system and some of the monitoring stations. The ability to warn affected people downstream and to operate the spillways of the Magat Dam satisfactorily in order to decrease the flooding risk is therefore very limited.

In June 2008 Norad asked NVE to assist PAGASA in the preparation of a proposal for rehabilitation and upgrading of the system. A field visit including an assessment of the station network was conducted by NVE officials in November 2008, after which the proposal was prepared in close cooperation with PAGASA on how to structure the potential Norwegian support for

THE PHILIPPINES

Capital: Manila
GDP (10⁹ USD): \$166.9
GDP per capita (GPP): \$3,300 (2008 est.), country comparison to the world: 161
Population: 98.0 million
Total installed Capacity: 15 610 MW

rehabilitation and upgrading of the Flood Forecasting and Warning System. The proposal was later approved by Norad and the Norwegian Embassy in Manila, and the agreement between the Embassy and the Department of Science and Technology of the Philippines was signed in late December last year.

Contact: Kjell Repp

Overall Project Data	
Client:	Department of Science and Technology Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA).
NVE Mandate:	To provide assistance and advises to PAGASA in the implementation of the project.
Contract value/Duration:	MNOK 10.685, will start in 2010 and end in 2012.
Type of activities:	Restoration and enhancement of the communication system of the flood forecast and warning system, and rehabilitation and upgrading of the hydrometric network. Establishment of a decision support system for the operation of Magat dam, and enhancement of public information drive within the flood prone areas. Training is an essential part of the whole project.
Work completed in 2009:	Project Document completed.

Southern African Development Community (SADC) - Energy Coordinator

Overall Project Data	
Client:	Answerable to Norwegian Embassy, Maputo, acting as lead International Cooperating Partner (ICP) on energy in SADC.
NVE Mandate:	Responsible for energy sector coordination, communication and collaborative efforts between member countries and interested donors.
Contract Value/ Duration:	MNOK 2.5 annually for resident Coordinator and NVE's backstopping expenses. The current project period is 2008 – 2010.
Type of Activities:	Consultations with donors and responsible energy authorities, formulating initiatives, preparing documentation, providing advice and organizing events.
Work Completed 2009:	Disseminated information to partner organizations and facilitated high level energy sector meetings.
Work in Progress 2009:	Execution of general mandate, notably continuing to broker investments and to assist with development of the carbon trade initiative.



Background:

SADC is the post-apartheid continuation of the regional cooperation originally established to strengthen the member countries independence of South Africa's strong economy and political interference. The new organization has shifted its objective as the Republic of South Africa (RSA) is now a strong positive force in regional economic development.

Despite being rich in primary energy resources, the SADC region experiences a power shortage. Furthermore, about 80% of the region's population use various forms of biomass very inefficiently. Against this background there is a substantial involvement from various ICPs in energy related projects. In 2006 a new partnership between SADC and the ICPs was established, and Norway was appointed lead ICP on energy. To pursue this task the SADC Energy Thematic Group (ETG) was established. This Group is the main instrument for meeting the objectives of the energy co-ordination project.

The objectives of the Coordinator's work have been formulated in three key activity areas:

- Assist SADC in facilitating the coordination of ICPs involved or interested in activities within the energy sector.
- Strategically advise the SADC Secretariat and other SADC structures on the various ICPs' comparative advantages and individual ICP priorities of support to the sector.
- Maintain a continuous dialogue and flow of information between SADC and ICPs on regional energy issues.

Activities and Outputs:

Two meetings have been held in the ETG, with following outputs:

- Support and strengthening of the information exchange among the ICPs.
- Identification of areas where coordinated ICP initiatives can make a significant contribution to address SADC's energy challenges.
- ICP cooperation to fund new initiatives to develop renewable energy and energy efficiency programmes; Dialogue with and strategic support on energy issues to the SADC Secretariat.

Furthermore the Coordinator has interacted closely with SADC and associated institutions, thereby supporting and facilitating:

- Power Sector Investors Roundtable to enhance crucial power sector investments.
- Mini-seminar provided to SADC Energy Ministers and Officials on the opportunities and potential of carbon trading mechanisms.



From the SADC Energy Minister's meeting in Maputo. In addition to supporting the event as lead International Cooperating Partner on energy, Norway also succeeded in raising the minister's awareness on the opportunities and potential of carbon trading mechanisms

- Development of a SADC Carbon Markets Programme of Action.

Issues and Challenges:

The project is benefiting from the long standing collaboration among the member countries (now also joined by RSA). The political, regulatory and socio-economic conditions are however quite different across the region, - and, not least, very dynamic in most of the countries. This provides a challenge in some respects, as well as an opportunity for learning and transferring experiences across the borders.

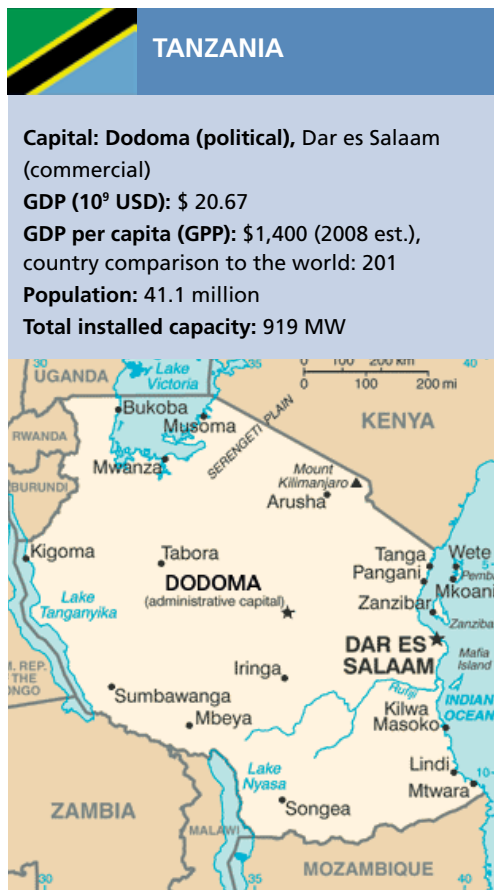
Contact: Hans Terje Ylvisåker

Results/Outcome:

Among SADC's overall goals is to ensure the availability of sufficient, reliable and least cost energy supplies. Some developments may be attributed to the coordination project, even though outcomes are not easily identified, given its broad and general nature:

- Increased high-level recognition and commitment to regional solutions.
- Increased recognition of the importance of energy access and efficient basic energy use.
- Enhanced political awareness of the relation between climate and energy, and the recognition of carbon trading opportunities.

The more tangible outcomes of the coordination project will be evidenced by specific actions taken by member countries, - either collectively or at the respective national levels.



TANZANIA

Capital: Dodoma (political), Dar es Salaam (commercial)

GDP (10⁹ USD): \$ 20.67

GDP per capita (GPP): \$1,400 (2008 est.), country comparison to the world: 201

Population: 41.1 million

Total installed capacity: 919 MW

Operation and Maintenance of Hydropower Plants

Background:

NVE has had a long cooperation with Tanzania within hydrology, hydropower and electrification, through the Rural Energy Agency, the Energy and Water Utilities Regulatory Authority, the Regional Electricity Regulators Association and TANESCO.

The Norwegian Embassy requested in mid 2009 NVE to carry out a Feasibility Study on human resource capacity building on aspects of operation and maintenance of existing hydro power plants and on hydropower technology in Tanzania.

The background for the request was the increased demand for electricity and the gradual deterioration of the existing hydropower plants in the country. Without proper action to be taken soon, several of the hydropower plants might be exposed for breakdowns in the near future. A program for rehabilitation of the hydropower plants is under preparation by Tanzania Electricity Supply Company Ltd, (TANESCO), in cooperation with consultants. It is a lack of skilled personnel to operate and maintain the hydropower plants, and human resource capacity building within TANESCO is urgently needed. Also streamlining of TANESCO's organization and necessary tools –administrative and physical –to carry out the operation and maintenance are included in the proposals of the feasibility study

Activities and Outputs:

An NVE team consisting of two senior advisers visited Tanzania in November 2009 for a period of 9 days for a fact finding mission, including a full day site visit to three power plants and a training site. The TOR for the mission was worked out by TANESCO and the Norwegian Embassy, and an amount of NOK 190.000 was used in 2010, out of a total project budget of 800.000. The feasibility report will be presented in a workshop in Tanzania in June 2010. TANESCO has contributed with input and comments to the report, and arranged the fieldtrip.

Work is ongoing on the draft Feasibility Study Report.

Contact: Alf V. Adeler

Climate Change and Hydrology

Tanzania is facing similar challenges as most developing countries with regards to climate change. The temperature will rise and the precipitation pattern will change, with varying impacts on all water users. Lack of a reliable and up-to-date hydrological database makes it difficult to predict and monitor the effects of climate change. The Norwegian Embassy in Tanzania initiated a small workshop in Moshi in late November 2009, where invited participants discussed a possible cooperation programme between government and research institutions in both countries. As a result it was decided to establish a national working group in Tanzania which shall continue to develop the programme.

Contact: Kjell Repp



Institutional cooperation

Most of NVE's activities connected to development assistance are part of institutional cooperation with partner institutions in the developing country as elaborated in the following pages. Out of NVE's recorded hours on development assistance in 2009, approximately 50 % (or 5,5 person-years) was spent directly on cooperation with 10 institutions in 8 countries. In addition to this comes the preparatory work for the institutional agreements.

The institutional cooperation is always based on signed contracts, clearly defined objectives, scope and mode of work, time schedule, obligations of the parties, reporting, and total budget.

Under two separate Bilateral Agreements from May 2008, Norad is supporting the institutional development and capacity strengthening of the electrical sector in Bhutan, as well as the country's "Advanced Hydropower Development Program" which is part of Bhutan's current 5-year plan of economic development for the country. This support is the latest in a series of bilateral agreements through which Norway has enabled Bhutan to first map and thereafter be in a position to develop its hydropower resources for the economic benefit of the nation.

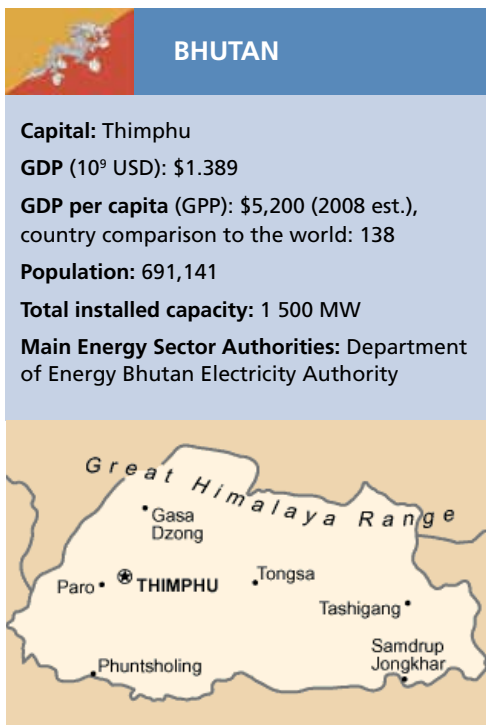
The low population and modest degree of energy intensive development of Bhutan, imply a limited domestic demand and a slow growth in industrial/ commercial electricity demand. With its relatively large hydropower potential, much of the generated electricity can be exported to neighbouring India in the foreseeable future. This has two distinct advantages: i) Bhutan will be able to make revenue from its natural resources; ii) India will be helped to reduce its dependence on fossil fuels.

Strengthening of the Energy Sector (Phase III)

Background:

The Goal of Bhutan's Programme is to accelerate development of the country's hydropower resources by improving both knowledge and managerial capacity, and thereby attracting investors for implementation of hydropower projects. This is seen as a stepping stone towards poverty reduction through economic and social development. Moreover, the Government of Bhutan has realized that improved regulatory capacity is a prerequisite for an orderly and cost-effective growth of the power sector. In this way the energy sector programme will better support the accelerated hydropower development strategy set out in the 10th Five Year Plan for Bhutan.

The specific purpose of the Norwegian supported Programme component is to ensure the availability of local expertise for planning the development of hydropower resources and strengthening of regulatory capacity in the energy sector. Phase III of energy sector cooperation between Bhutan and Norway is covered by the bilateral agreement signed in May 2008. Immediately afterwards, a contract was entered into between NVE and DoE, in July 2008, for continued institutional cooperation (July 2008 - June 2011), with a possible 2 years extension provided a positive outcome of Norad's review and assessment of project results.



Overall Project Data

Client:	Department of Energy (DoE), Bhutan.
NVE Mandate:	Institutional cooperation under the Contract between DoE and NVE, synchronized with Bhutan's 5-year plan for economic development of the country.
Contract Value: /Duration	MNOK 9.653 (NVE portion) and MNOK 5.170 (DoE portion), fully Norad financed. The current project covers the 3 year period May 2008 – June 2011.
Type of Activities:	Institutional strengthening and human resources development within the electricity sector, particularly for regulation and hydro meteorological services; studies of effect of climate change on hydropower flows.
Work Completed 2009:	Formal high level education and skills training of staff; strengthening of Bhutan Electricity Authority (BEA) and DoE's Hydromet Services Division.
Work in Progress 2009:	A series of initiatives aimed at institutional strengthening for development of energy sector; preparation for modelling of effects of climate change; management development in key areas; enhancing the DoE – NVE cooperation and coordination.



Activities and Outputs:

A Training Needs Assessment (TNA) is the basis for the staff training programmes in order to ensure that training activities are linked to the relevant institutional and organizational development issues, including defined skills requirements. Activities during 2009 include:

- Training and human resources development (various higher level education and short term courses).
- Supporting improved regulatory capacity of BEA to meet challenges related to accelerated hydropower development; Supporting DoE's Hydromet Services Division on data provision for accelerated hydropower development.
- NVE coordination and backstopping, including co-management of project with DoE project management.
- Preparations of Annual reports and consultation meetings.

Detailed outputs during 2009 included:

- Completed formal further education at educational institutions (MSc and other courses).
- Training activities carried out by NVE within the BEA and the Hydromet Services Division, in Bhutan as well as in Norway.
- Further development of the studies and modelling of the effects of climate change on hydropower flows.

Issues and Challenges:

Considerable efforts were made in 2009 to provide formal training (MSc, etc.) at institutions in Norway. This aim has long been pointed out by Norad in order to draw on Norway's comparative advantage in the hydropower sciences. It has however proved challenging to achieve, especially now that the formal MSc training courses within hydropower engineering at NTNU in Norway are no longer conducted. However, it is hoped steps taken during 2009 will bear fruits in 2010. Short-term training and informal

Outlet area Punatsangchhu-1 Hydro Power Plant in Wangduephodrang

courses are, as far as possible, carried out in Bhutan in order to have an additional impact on local competence and capacity building.

Results/Outcome:

Several DoE professionals have completed MSc courses at foreign training universities and have returned to their duties in Bhutan with greatly increased competence. BEA has strengthened its capacity and, most importantly, became an autonomous authority on 1 January, 2010. This is a strong indicator of improved institutional framework achieved as part of the project. The Hydromet Services Division has increased its know-how and capacity with regard to all aspects of data management. The Division is now in a better position to provide inputs to the planning, design and operations of hydropower schemes.

Support to Specific Projects of Accelerated Hydropower Development Programme

Background:

The main purpose of this component of the Programme is, on the national scale, to support the accelerated development of the hydropower resources of the country, - within Bhutan's overall development plan and poverty reduction strategies. The immediate objective is to facilitate accelerated hydropower development in the form of Programme finance

Overall Project Data	
Client:	Department of Energy (DoE).
NVE Mandate:	Project formulation and procurement through international competitive bidding, with joint management and supervision of Consultants by NVE and DoE.
Contract Value/ Duration:	MNOK 14.982 (100% Norad financed). Project period: July 2008 – June 2011.
Type of Activities:	Consulting services for study and planning of hydro-power projects selected from the Accelerated Hydropower Development Programme of Bhutan; procurement of services and supervision of consultants.
Work Completed 2009:	Procurement of consultants for reconnaissance and pre-feasibility studies.

(including specific projects) and power sales agreements, reconnaissance surveys for the remaining listed sites under the Power System Master Plan, pre-feasibility studies of project sites and a Detailed Project Report of one site, including environmental studies.

The bilateral agreement between Norway and Bhutan for “Support to Accelerated Hydro-power Development Programme of Bhutan” was signed between the two countries on 21 May 2008, in parallel with the Phase III Energy Sector support agreement. A contract was entered into between DoE and NVE for implementation of the project during the period July 2008 through June 2011. There is a provision in the contract for a possible 2 years extension provided Norad’s review of the Project results is positive.

Planned activities within project finance and power sales agreements have been cancelled. These issues became less relevant due to the fact that India offered to plan and construct all of the first 10,000 MW of projects which formed the first part of the Accelerated Hydropower Development Program. Consequently, the Norad support has been refocused to cover projects on some of the remaining 20,000 MW of hydropower potential in the country.

Activities and Outputs:

The main activity in 2009 was the procurement of consultants to carry out the below mentioned studies. The consultant issued the Inception Report for these studies in 2009 which is the main output of the year. The contracted work, which will result in outputs during 2010, includes:

- Reconnaissance Surveys for unvisited sites under the Power System Master Plan of Bhutan (15 sites).
- Pre-feasibility Studies of project sites incl. Environmental Studies (2 sites).

Issues and Challenges:

The decision by India to become a major investor in Bhutan’s hydropower sector caused the need for some re-planning and reallocations. This was however amicably resolved between Norad, the Bhutan authorities and NVE. No major challenges or issues have otherwise been apparent in 2009, and progress on the studies is proceeding well within schedule and budget.

Contact: David A. Wright

Results/Outcome:

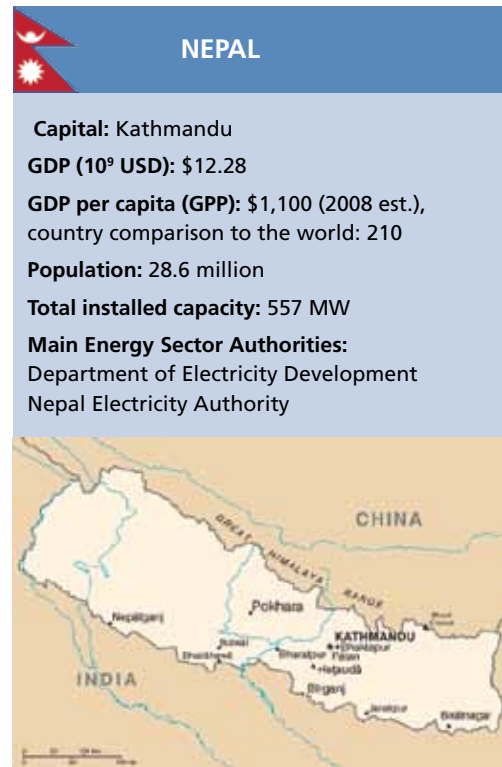
At this early stage there have been no tangible results of the project. The Inception Report on the Reconnaissance Surveys of 15 hydropower sites and the Pre-feasibility Studies of 2 hydropower sites have however been submitted, pointing out how a considerable body of additional knowledge about the hydropower potential will become available in the near future.

Feasibility Studies of Small and Medium Size Hydropower Projects

Background:

In an Agreement between the Governments of Norway and Nepal in 2004, Norway agreed to provide a grant of MNOK 10 to conduct Feasibility Studies and Environmental Impact Assessments (EIA) of small and medium sized hydropower projects in Nepal. The project was programmed into three lots, termed Package 1 – 3, with 3, 3 and 2 projects respectively; - a total of up to 10 projects were estimated initially, subject to costs and budget availability. It is a precondition that the studies shall be undertaken by Nepalese consulting companies based on competitive bidding. A contract covering institutional cooperation between DoED and NVE was signed in December 2004.

DoED is responsible for executing parts of MoEN's mandated role in the implementation of overall government policies related to the power/ electricity sector. The major role of DoED is to ensure transparency of the regulatory framework, and to accommodate, promote and facilitate the private sector's participation in the power sector by providing a "One Window" service and licensing to power projects. The purpose of the project, related to DoED's role, is to encourage investors to engage in implementation of small and medium sized hydropower projects.



Activities and Outputs:

The status as of end 2009 is as follows:

- Studies of three projects (entire Package 1) completed and approved.
- Consultants working on Package 2 projects, with some reports already presented and approved (before entire study documentation can be compiled) .

Overall Project Data

Client:	Department of Electricity Development (DoED), under Ministry of Energy (MoEN).
NVE Mandate:	Assistance to DoED on the implementation of the Feasibility Studies.
Contract Value/ Duration:	MNOK 2.85 (included in DoED's total budget for the studies), 2004 – 2011, with discussions on a prolongation going on.
Type of Activities:	Feasibility Studies, divided in 3 lots (Package 1 – 3); Terms of Reference, preparation of Letter of Invitation and Tender Documents, evaluation of tenders, review of reports and preparation of comments to DoED, transfer of NVE competence.
Work Completed 2009:	Package 1 studies completed and approved; Evaluation of tenders for two projects (Package 3).
Work in Progress 2009:	Package 2 studies being conducted by consultants. Discussions on how to fully complete project.



■ For the three projects in Package 1, necessary activities for further preparation towards investment have been defined in order for work to start in 2010.

Issues and challenges:

Although delays have occurred during implementation of the feasibility studies, the accumulated costs are within approved budgets. The evaluation of proposals for studies on the two projects in Package 3 has been carried out, showing that costs were significantly higher than estimated; it was agreed not to accept the submitted proposals.

The bilateral agreement will expire in 2011. It is not possible to implement the full process tendering and implementation of all Feasibility Studies within this time. The DoED has therefore requested the budget allocated for Package 3 to be re-allocated for a program containing short-term assistance on compe-

Himalaya, In the centre: Mount Everest

tence building within DoED's line of work. The proposed issues were by the end of 2009 under consideration by NVE with a view to give advice to the Norwegian Embassy.

Contact: Kjell Erik Stensby, kest@nve.no

Results/Outcome:

The Nepalese authorities are well versed with management of hydropower development. However, the policy and investment framework is under scrutiny and reform. This will be addressed more prominently in the other bilateral cooperation programme currently under preparation and discussion between Nepal and Norway. The major results, beyond just completed feasibility studies, as noted from the ongoing project include:

- Procedures for procurement of consulting services refined and followed in an orderly fashion.
- Projects with completed feasibility studies seem to move rapidly to implementation.
- EIAs have been given due attention and benefited from Norwegian experience and practises.
- The feasibility study requirements have been linked to reforms in the framework for licencing and financing.

Flood Control Master Plan for Bucayao and Mag-asawang Tubig Rivers

Background:

In 2003 the Provincial Government of Oriental Mindoro in the Philippines asked Norad for assistance to develop a “Flood Control Master Plan for Bucayao and Mag-asawang Tubig Rivers”, Norad requested NVE to assist in preparation of the Terms of Reference for the project and facilitate the tendering process. As a result of open competitive bidding, the contract for preparation of the Master Plan was awarded to SWECO Grøner AS (later SWECO NORGE) with co-partners in the Philippines, and work was started on the study in late 2007.

Activities and Outputs:

- The Flood Protection Plan has been completed and presented, serving as a basis for various flood mitigation measures in order to reduce flood risk and resulting flood damage with possible loss of lives.
- Public consultations.
- A plan for development of the hydrometric network and a flood warning system has been developed.

THE PHILIPPINES

Capital: Manila
GDP (10⁹ USD): \$166.9
GDP per capita (GPP): \$3,300 (2008 est.),
 country comparison to the world: 161
Population: 98.0 million
Total installed Capacity: 15 610 MW

Issues and Challenges:

The progress since early 2009 has been very slow, mainly because of poor communication between SWECO and their local partners in the Philippines. In the absence of additional input to be provided by the co-partner, SWECO submitted the final reports on the above mentioned topics in early July 2009. The final Environmental Baseline Study Report (EBSR) is still pending, however, and it is now being discussed how to finalize the project. The EBSR is of minor importance in defining and prioritizing the various proposals for mitigation measures.

Contact: Kjell Repp

Overall Project Data	
Client:	Provincial Government of Oriental Mindoro.
NVE Mandate:	Coordination and responsibility for overall execution of the project.
Contract value/ Duration:	MNOK 4.291, started in 2007 and will be completed in 2010.
Type of Activities:	Baseline studies, topographical surveys, modelling and mapping, including topographic and thematic maps. Proposals for flood mitigation measures, recommendations for a hydrometric network and a flood warning system.
Work completed 2009:	Technical reports and public consultations.
Work in Progress 2009:	Preparation of final report on Environmental Baseline Study and preparation of flood forecasting software.

Results/Outcome:

If the various proposals are implemented, the Provincial Government possesses a new tool for reducing the flood damage, and might be able to warn people of coming floods. If not implemented, however, the outcome of the project will be minor, except for training and capacity building carried out by the consultant. Even if implemented, it is important to notice that without information and public awareness campaigns, and without evacuation plans, the flood forecasting system will have a severely reduced effect.

Policy Research and Capacity Development Programme for the Energy Sector

Background:

Norway has a long tradition of supporting South Africa, first during the struggle for majority rule and thereafter the elected RSA Government. RSA embarked early on an ambitious programme of updating sector policies and strategies to conform to the new political situation. Norway offered cooperation to RSA's relatively sophisticated institutions in areas where Norway had a comparative advantage; - the power and energy sector received early attention in discussions between the two countries. In October 2006 NVE entered into a new contract with the Department of Minerals and Energy (DME) based upon a Memorandum of Understanding signed between the South African and Norwegian governments already in 1996. The new cooperation programme was intended to commence in 2006, partly based on the outcome of the earlier cooperation, including the role played by the Norwegian Petroleum Directorate (NPD). NVE was called upon to serve as the Norwegian Coordinator for four of the Norwegian supported sub-programmes.

Themes under Collaborative Programme:

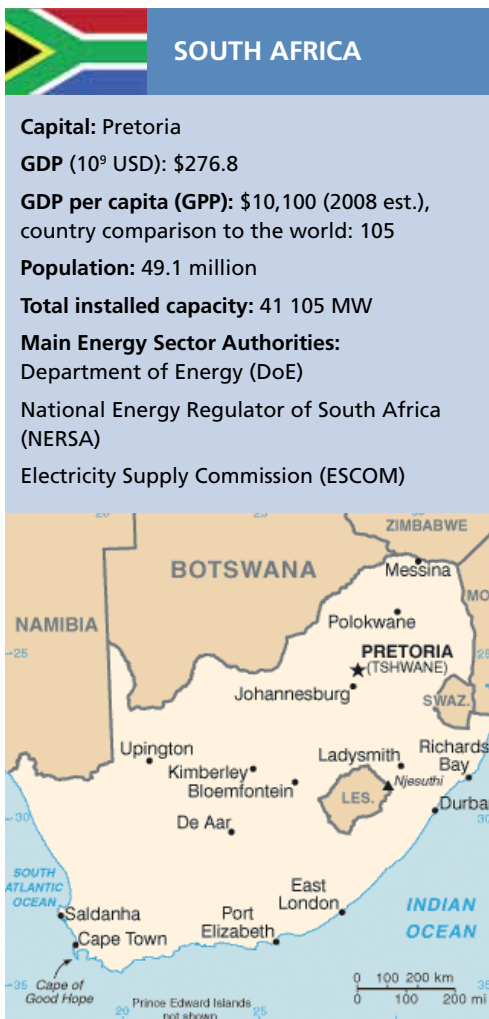
During the Annual Meeting between the Norwegian Embassy and DME in Pretoria in early June 2007 it was decided to merge and restructure the various sub-programmes into three main themes, or programme areas:

- Energy Planning
- Regulatory Environment
- Climate Change

The first two themes mainly belong to DME, with certain aspects belonging in other institutions. The last one, Climate Change, has been implemented by the Energy Development Corporation (EDC), under the Central Energy Fund (CEF). These seemingly "scattered" programme pieces are however tied firmly into the RSA framework for policy and strategy development. Due to delays and reallocation of funds, the Norwegian Embassy and DME agreed to cancel some of the originally planned activities.

Programme Components:

For clarity, the activities carried out during 2009 will be described under the various institutions or departments responsible for the implementation of the activities.



Department of Energy (DoE):

In the course of 2009 a restructuring of DME resulted in new Departments for Energy (DoE) and Minerals (DoM), respectively. Activities previous to this change, provided support to DME staff attending courses on energy policy management, conflict resolution, market analysis, public law and governance, and economic and financial assessment of the petroleum retail sector. According to a DoE Director involved in the process, the result was a substantial assistance for the task of processing licences for activities in the downstream petroleum sector.

The below three Directorates under the DoE are all responsible for NVE assisted Programme activities:

Chief Directorate: Electricity

There are two Programme components under this Directorate

i) Electricity Reticulation Networks:

The NVE led assessment of the electricity



Canyon in North
Eastern Area, South
Africa

reticulation networks in cities where the 2010 Soccer World Cup will be hosted in South Africa has been finalized. The final report was presented to all stakeholders and delivered to the DoE in May.

Activities/ Outputs:

During 2009 the following activities were carried out and outputs delivered:

- Mapping bottlenecks and weaknesses mainly in local energy distribution system.
- Study of Electricity Reticulation for the municipalities and local distributors.
- Capacity building through a series of meetings and workshops.
- Final report on the condition of electricity reticulation networks in the FIFA 2010 World Cup cities has been delivered.
- Stakeholder workshop on FIFA World Cup project findings and recommendations held.
- Five DME staff attended the Electricity Regulatory Initiative seminar in Norway.

Results/Outcome:

These have not been systematically measured but can be summarized as follows based on assessment and feedback:

- The recommended process to establish the System Operator Legislation is in progress.
- The participatory process has increased motivation among stakeholders.

ii) Independent Power Producer (IPP) Framework:

It was agreed to assist DoE developing a framework to facilitate participation of IPPs in the sector. Benchmark study tours to Turkey, Thailand and China, based on topics considered relevant to South Africa, were carried out in order to have better basis on which to:

- Make the RSA minerals and energy sectors to become healthier, cleaner and safer.
- Review and develop appropriate structures, processes, policies, systems and skills, as well as the maintenance thereof.
- Define and implement required economic policies and legislation for the minerals and energy sectors.

Activities and Outputs:

These includes:

- Proposals for legal framework on governance of the relationships between Eskom and IPPs developed.
- Necessary policy formulation and decisions to support implementation of the new system undertaken.
- Three benchmark study tours to Turkey, Thailand and China were accomplished.
- Draft IPP Framework report is in progress.

Results/Outcome:

It can be noted as a result that consensus was achieved and that policy formulation and decisions have been completed.

Chief Directorate: Energy Planning

The Programme component under this Directorate was finalized during 2009 (unless additional requests are accepted):

Bilateral Energy Planning Workshop: As follow-up to the 2008 workshop in Norway, Energy Planning and NVE agreed to continue the process for better understanding of energy modelling and planning. It was agreed to wind up the component with a final workshop and some follow-on support from NVE.

Activities and Outputs:

- Capacity building to implement the integrated energy modelling and planning functions conducted with key officials at DoE.
- Workshop on energy planning conducted for major stakeholders (16 participants) in Pretoria, August 2009; some officials of DoE, National Energy Regulator of South Africa (NERSA) and Statistics South Africa (SSA) attended the practical modelling sessions.

Results/Outcome:

- Recommendations for reform and innovative policies were discussed and elaborated.
- Planning functions for integrated energy modelling implemented on the basis of recommendation and are now functioning.

Chief Directorate: Hydrocarbons

One Programme component under this Directorate is in progress:

Petroleum Pricing Review and Petroleum Controller:

The recently established Petroleum Controller plays a critical role in administering the licensing system for the downstream petroleum sector in South Africa. There is a need to increase the Directorate's capacity and competence in this new area in order to perform the regulatory functions. Activities were carried out to define cost categories. The project will be finalised by end-March 2010 with NPD (not NVE) in the leading support role.

Activities and Outputs:

- Benchmark survey contracted out to consultants.
- Definition of cost categories for regulatory accounts, building accounts to balance sheet, trial regulatory accounts, accounting model, and benchmark surveys.
- Benchmark survey of 140 service stations completed within the Petroleum Pricing Framework.

Results/Outcome:

- Preliminary and final Capital Asset Pricing Models developed
- Service station survey results adopted as the premise for regulation and system implementation.

National Energy Regulator of South Africa (NERSA)

The core business of NERSA is to regulate the Energy Supply Industries in RSA. The NVE supported Programme component was active until September 2009 when it was terminated.

Background:

The mandated regulatory function requires NERSA to receive and manage information from a number of sources; - the licensees of NERSA to supply defined data on their assets and operations. The introduced Licensee Information System (LIS) will allow collection, capture, storage, analyses and dissemination of electricity information to underpin NERSA's decision-making and controlling roles.

Limited NVE activities were carried out in 2009 due to the delay in signing the contract between NERSA and NVE from 2007. NERSA

had however started internal activities while the cooperation with NVE was put on hold. Activities for 2009 were not defined and approved until April 2009, leaving less than ½ year for completion. Due to time limitations, and ensuring that as many NERSA officials as possible could benefit before termination, a Regulatory Conference was organized in Pretoria. The training for each day was presented as three consecutively run workshops. Each of the topics was presented on at least two different days. A special workshop on data collection was organized during the conference.

Activities and Outputs:

- Consultations and advice on various regulatory issues as part of ongoing work between NERSA and NVE (licensing, policy on energy pricing and sector modelling, practical web-based reporting, etc.).
- Development and follow-up towards implementation of the LIS.
- Regulatory Conference, Pretoria: Topics covered i.a. comparison of situation in RSA and Norway, legal provisions, renewable energy, electricity markets and tariffs; 53 NERSA staff members attended.
- Seven NERSA staff members attended the Electricity Regulatory Initiative Seminar (ELRI) in Oslo.
- Capacity building within LIS activities provided to clarify functions and provide skills to staff.

Results/Outcome:

- Capacity building workshops and other forms of interaction notably increased motivation and understanding of issues within NERSA.
- The LIS was successfully developed, tested and rolled-out; - now available as an active tool for energy regulation in RSA.
- NERSA will organize an annual conference on regulatory issues, supported by RSA resources.



South Africa, host of the World Championship in football 2010

Central Energy Fund (CEF)/ Energy Development Corporation (EDC)

The cooperation has as a main objective to strengthen RSA's commitment to prevent climate change and to identify viable measures to this end. The activity level during 2009 was low, mainly due to changes in staff.

Activities and Outputs:

- Limited staff training activities continued: Two staff members from CEF/EDC participated in the International Centre for Hydropower-course "Hydropower Financing and Project Economy", while four participated in the ICH-course "Hydropower Development and management".

Contact: Amir Messiha, Kjell Repp

Results/Outcome:


- Cooperation between CEF EDC and the Norwegian company Greenstream, established after the workshops in 2008, has been further developed and expanded.
- As a direct result of cooperation with Norway, CEF/EDC's representative in UK gave lectures free of charge on Clean Development Mechanisms (CDM) during a course on "Hydropower and Environment" in Zambia, organized by the International Centre for Hydropower (ICH).

Institutional Strengthening of the Water Resources and Power Sectors

Background:

The cooperation with Timor-Leste started with a request from the then President Alkatiri in December 2001 for Norwegian assistance within the energy sector. The request was considered favourably by Norad, and the institutional cooperation between ministries in Timor-Leste and NVE started early 2003. The key partner has changed as the Government responsibilities have been reorganized: Initially the Ministry of Transport, Communication and Public Works (MTCPW), from July 2005 the Ministry of Natural Resources, Minerals and Energy Policy (MNRMPPE), and from June 2007 the current client MIS had been granted custody of the energy sector. The bilateral cooperation has moved successfully into its 3rd Phase based on consolidated mutual trust and adequate response to the tasks. NVE has assigned a Resident Advisor to the Project from its beginning. A brief Project history is given in the table on the next page.



	TIMOR-LESTE
Capital: Dili	
GDP (10⁹ USD): \$0.499	
GDP per capita (GPP): \$2,300 (2008 est.), country comparison to the world: 180	
Population: 1.1 million	
Total installed capacity: 26 MW	
Main Energy Sector Authorities: Ministry of Infrastructure, Electricidade de Timor-Leste	

Overall Project Data	
Client:	Ministry of Infrastructure (MIS), representing also the respective Secretaries of State for Electricity, Water and Urbanization, for Energy Policy, and for the Environment.
NVE Mandate:	Assistance to Government of Timor-Leste towards institutional strengthening of the Water Resources and Power Sectors, as well as facilitating physical development and operation of selected hydropower projects.
Contract Value/ Duration:	MNOK 50 for Phase 3 of the cooperation covering period September 2009 – September 2014. Completion of Phase 2 which ended in August 2009.
Type of Activities:	Workshops/ seminars, field work, training and education programmes, preparation of documentation, procurement services, supervision of consultants, advice on policy issues, and coordination/ management.
Work Completed 2009:	Improved office facilities for National Directorate for Water Resources Management (NDWRM); Enhanced capacity for hydrology management; Studies and physical works regarding hydropower schemes; Various coordination and management tasks.
Work in Progress 2009:	Training Coordinator identified and training continuing; Work related to hydrology/ water resources monitoring continuing; Preparation of tender documents for new scheme; Legal advice being provided on trans-boundary river issues.

Installation of rainfall gauging station



Activities and Outputs:

The Project has been active with a greatly increased budget during the completion of Phase 2 and start-up of Phase 3. During 2009 the following were achieved.

- Hydrology and water resources monitoring: Enhanced capacity for hydrology management; Several new rainfall gauging stations installed; Potential sites for new hydrological gauging stations identified; Hydrological database, HYDATA, installed and in operation. Personnel trained for operation of database; Entering of hydrological data into database continued;
- Studies and physical works regarding hydropower development: Hydropower Master Plan and two Feasibility Studies advertised for proposals. Preparation of tender documents for Iralalaru Hydropower Plant; Work at commissioned Gariuai mini hydropower plant continued.
- Capacity building and training: Legal assistance given for negotiation of transboundary river issues; Improved office facilities for NDWRW; Training Coordinator identified and training activities continued (on-the-job, courses/ seminars, external students. New Internet system installed; Staff at NDWRM increased and trained; Norwegian student (NTNU) came to do MSc field work at Maliana small hydropower project, assisted by project's local staff.
- Various coordination and management tasks: Program Document for Phase 3 worked out; New Resident Adviser took up position in August; Delegation from Timor-Leste visited in Norway June in connection with new agreement; Updating of accounting system ongoing; Regular consultation meetings between NVE and MIS/NDWRM; Cooperation with the Norwegian Petroleum Sector actors in Timor-Leste established to coordinate capacity building activities.

Project	Year	Grant MNOK	Activity Focus and Comments
Inst. Cooperation, Phase 1	2003-2004	6	Upstart, training, survey completed as planned
Inst. Cooperation, Phase 2	2004-2009	30,4	Studies and training activities mostly completed, Hydrology (with some delays); continuing in Ph. 3
Inst. Cooperation, Phase 3	2009 -2014	50	Upstart as planned
Phase 2, other activities,	2005-2006	4,1	Completed as training projects according to plans/ budget; core drilling, security fence, youth project
Gariuai Mini H/power Plant	2005-2009	12,4	Designed and constructed. Inaugurated 2008, within budget, some work to be completed 2009



Traditional houses in Timor Leste

Issues and Challenges:

The required restructuring and changes of portfolios in the Timor-Leste Government – some confined to the energy and water sectors alone - have caused challenges in themselves, for example with regards to necessary amendments in the legal provisions. As the scope of activities has expanded, new collaboration issues have arisen and the experience of managing change been enhanced, on the part of both MIS/ NDWRM and NVE. So far the potential stumbling blocks have been addressed one by one as they occur, and the partners have adequate procedures for resolving issues. It is however recognized that the tracking of activities, outputs and results could be improved further; - the result would be access to a more precise tool for objectives oriented management and for measurement of results by relevant indicators.

Contact: Alf V. Adeler

Results/Outcome:

The long-term cooperation on energy and water resources has had a profound positive impact on Timor-Leste's ability to manage and develop its resources in these fields. The easiest quantifiable measure, indicative as it may be, is the number of staff of different categories trained and enabled to carry out their duties. Not only have institutions been strengthened but also appropriate reforms have come a long way. A promising feature is the "expansion" of the water resources and hydropower focus to cover more explicitly also related issues such as clean renewable energy, environmental management, and (through NVE) collaboration with the petroleum sector.

The Phase 3 Programme Document (i.e. skeleton activity plan) has adequately addressed and reflected new challenges and areas of cooperation. It would also – in NVE's opinion - be useful to put some more resources into Programme monitoring and evaluation. There is an untapped potential for enhancing the learning and ensuring better capturing of experiences. Moreover, long term results could in this way be measured quantitatively and qualitatively, partly with the help of assessment of well defined subject areas.

Hydropower Licensing Project

Background:

The project has been conceived within the overall objectives of water resources management in Vietnam: Have sustainable, environmentally as well as socially sound, management of the water resources and hydropower projects in the country. The main specific goal is to establish licensing routines for hydropower projects which will involve various authorities and stakeholders. Training of involved staff in licensing and related skills is also an important activity within the project. A handbook for hydropower licensing will be developed, and a standard framework for license conditions and rules of operation is also included in the scope of work. The Country Agreement between Vietnam and Norway was signed on 19 September 2006, and MONRE and NVE signed a contract on 20 October 2006.

Activities and Outputs:

A number of workshops including training aspects have been organised. The number of participants at the workshops counted between 30 and 40, including staff from MONRE, concerned ministries, authorities at provincial level and the Electricity of Vietnam. A study tour to Norway was organised in October 2009. Four administrative staff from MONRE attended the study tour which had

VIETNAM

Capital: Hanoi


GDP (10⁹ USD): \$89.83

GDP per capita (GPP): \$2,800 (2008 est.), country comparison to the world: 168

Population: 87.0 million

Total installed capacity: 12 400 MW

Main Energy Sector Authorities: Electricity of Vietnam, Ministry of Natural Resources and Environment (MONRE), Ministry of Industry and Commerce (Mol), Electricity Regulator Authority of Vietnam (ERAV) Ministry of Agriculture and Rural Development (MARD), Ministry of Planning and Investment (MPI)



Overall Project Data	
Client:	Department of Water Resources Management (DWRM), Vietnam, under the Ministry of Natural Resources and Environment (MONRE).
NVE Mandate:	Assist in formulation of processes and capacity building package on licensing water resources and exploitation and utilization for hydropower.
Contract Value/ Duration:	MNOK 6.157, started in 2006 and will be completed in 2010.
Type of activities:	Develop hydropower licensing guidelines, standard license documents and hydropower licensing database. Workshops, training courses, study visits, advice on actual licensing cases.
Work completed 2009:	Workshops, study tours and staff training, particularly on hydropower licensing.
Work in Progress 2009:	Elaboration of licensing guidelines (2nd draft) as well as documentation of framework for license conditions/ rules of operation.



Hydropower dam in North Central Vietnam

its focus on hydropower licensing and administrative support, such as legal aspects, etc. The programme included presentations at NVE, visit to Norad, and a visit to NVE's regional office in Trondheim as well as to nearby hydropower schemes. 4 candidates from MONRE attended courses at the International Centre for Hydropower in Trondheim, Norway, and found it highly relevant and useful for their work.

according to Vietnamese legislation have been presented and discussed in the workshops; - some anomalies need to be overcome. The Norwegian licensing system and practice has also been presented as a reference for discussions and ideas.

Contact: Knut Gakkestad (kga@nve.no)

Issues and Challenges:

Hydropower licensing involves several ministries and agencies in Vietnam, and the licensing process in Vietnam is not well coordinated. The tasks and responsibilities

Results/Outcome:

The project has brought the involved authorities together in several workshop activities, creating unprecedented dialogue on the subject matters. It seems that these contacts between ministries have already led to changes towards better coordination in the licensing procedures. The workshops have provided input to the second draft of the hydropower licensing guidelines. Through presentations from the Vietnamese participants and from NVE, and through group work and discussions, the participants have increased their skills with regards to development of licensing routines and procedures, and improved their knowledge on how to deal with and evaluate license applications.

Through training the participants have also increased their qualifications for stipulation of environmental flows related to hydropower development. The study tours and courses in Norway have increased their knowledge on resources development and licensing aspects, including basic knowledge on hydropower development and associated environmental issues. The above assessment of results is based on feed-back from individual participants and from their respective institutions.



Photo: Peter Furu, DBL – Centre for Health Research and Development

Other assignments

In addition to work for Norad, NVE has also carried out assignments within the water and energy sector as a result of bilateral contacts. Institution and capacity building within the government sector is a common feature for most of those assignments, which are funded from various sources.

Azerbaijan

Promoting development of small hydropower

As part of growing emphasis on the environment and restructuring of the power sector, Azerbaijan has committed itself to developing clean energy through several international agreements.

The Ministry of Industry and Energy is partner of the project "Promoting development of small hydropower in Azerbaijan" together with the Norwegian government, represented by the Ministry of Foreign Affairs funding the project. The implementing partner is the United Nations Development Program (UNDP) which, through its local representatives, has assumed the overall management of the project and is responsible for the attainment of project objectives.

The main output of the project is to achieve a healthy investment environment in order to exploit the existing hydropower potential in Azerbaijan. This will be achieved by revising the legal system, promoting investments and building one or more pilot projects. Some funds are budgeted to co-finance pilot projects.

As Norway has much experience from small hydropower stations, both technically, legally and environmentally, the project is organized to transfer this experience to Azerbaijan. On request from The Norwegian Society of Chartered Technical and Scientific Professionals (TEKNA) which is coordinating the Norwegian contribution to the project, NVE has been assigned the legislation and policy assessments elements of the project. This focuses on the



Azeri legal framework relevant for managing small hydropower development. NVE's role is, based on Norwegian know-how concerning the legal framework and design of licensing procedures, to collaborate with Azeri legal experts in the elaboration of a report dealing with the legal framework. The report will give relevant proposals and recommendations on which legal changes Azerbaijan may apply to secure a rational and inviting legal framework and practise for private development of small hydropower in Azerbaijan.

Contact: Kjell Repp

Overall Project Data

Client:	Ministry of Industry and Energy.
NVE mandate:	Contribution to a report dealing with the legal framework relevant for managing small hydropower development.
Contract value/ duration:	Open.
Type of activities:	Transfer of Norwegian experience regarding legal framework and licensing procedures.
Work completed in 2009:	Submitted to the Azeri legal experts an extended presentation of the Norwegian hydropower management system with focus on small hydropower development Azeri delegation visiting NVE. A report on the relevant Azeri legal framework finalized by the Azeri legal experts.

Bulgaria

Information System for Water Permits and Monitoring Management

Background:

Being a new European Union (EU) member country, Bulgaria is facing a number of challenges in adapting to EU rules and regulations. The Norwegian Ministry of Foreign Affairs is supporting and facilitating this process in some sectors with funds channelled through Innovation Norway.

As an important part of its water management policy, within Bulgarian law and in order to fulfill the EU Water Framework Directive, the MoEW will need to introduce a system for registration, monitoring and control of water uses and licensing. Especially it is important to control discharge points and to provide information to the public online on the status of permits.

Locally-based data systems, at the River Basin Districts level, are existing today for monitoring and issuing permits. An integrated system is however needed at the central level to meet



Overall Project Data

Client:	Ministry of Environment and Water (MoEW).
NVE Mandate:	Assistance to MoEW in setting up a database system for registration, monitoring and control of water uses and licensing.
Contract Value/ Duration:	€ 1,386,080 (grant of € 1,177,535 from Innovation Norway within the Norwegian Cooperation Programme with Bulgaria, and € 208,545 co-financed by MoEW. Project started officially 1 December, 2009, and shall end by 30 April 2011.
Type of Activities:	Study visits, preparation of documents, procurement activities, technical assistance, advisory services, advising on database system set up (both software and hardware), training workshops.
Work Completed 2009:	Project preparation up to call for and contract negotiations regarding candidates for position of Project Coordinator.
Work in Progress 2009:	Recruitment of Project Coordinator. Elaboration of Terms of Reference and procuring software for database system.



new requirements. MoEW has developed a project for Information System (IS) with this scope, based on its structures, existing systems, collected data, and within the existing resources. Resources are insufficient for the activities envisaged by MoEW in order to realize the integrated water information system, including services and data collection, monitoring of surface and ground water, discharge points, and water quality, as well as creating public awareness. In 2008 the MoEW, in cooperation with NVE, prepared an application for the project, entitled "Information System for Water Permits and Monitoring Management", which was subsequently approved by Innovation Norway in 2009.

Kick-off meeting and signing of Partnership Agreement between the Bulgarian Ministry of Environment and Water and Norwegian Water Resources and Energy Directorate.

Photo: Lubomir N. Dimov, Abeatus Ltd.

Contact: Kim Chi Tran-Gulbrandsen

Activities and Outputs:

- Project preparation, including budget and partnership agreement.
- Request for Proposals for Project Coordinator position. Evaluation of proposals and preparation of Evaluation Report. Terms of Reference for the Project Coordinator position elaborated.
- Contract negotiation for the project coordinator position carried out.

Issues and Challenges:

It is too early to identify specific results. The working process with MoEW has however been promising with increasing commitment noted. Restructuring of the MoEW at the end of December 2009 will however most likely lead to a delay in project activities. Furthermore, it is foreseen that the River Basin Directorates, with preference for separate locally-based databases may oppose the central database system, thus creating challenges for project execution.

Euro Electricity Market Design and Implementation

Background:

The purpose of the project is to contribute to the improvement of legislation and implementation of an efficient and competitive electricity market in compliance with EU legislation and Regional Initiatives in Bulgaria. The project is funded from the Norwegian EEA Grants as part of the Norwegian cooperation programmes with Romania and Bulgaria. NVE had established the contacts with Bulgarian authorities in early 2008, and this programme component is based on the partnership agreement between the MoEET and NVE. Some activities were allowed to commence already in September 2009, about a month before signing of the Grant Offer Letter between Innovation Norway and the MoEET. Statnett SF and Nord Pool Consulting AS will assist NVE during implementation of the Activity Plan.

Initially the project had been given high priority but was put on a wait list awaiting screening. Innovation Norway only provided a lump sum covering about 10% of the estimated full project cost initially. The partners then agreed to scale down the first phase of the project, covering preparation of a "road map" towards the Bulgarian Day-Ahead Market (DAM). If more Norwegian EEA Grant funds become available for the project later, new applications will be probably be forwarded in order to implement

the power exchange mechanisms and the DAM fully.

Activities and Outputs:

Project work started after a meeting in Bulgaria, September 2009. The first activity was to develop the general concept of a market monitoring office MMO; - role, responsibilities, functional structure, staffing, IT requirements, and specifications for the necessary equipment - taking into consideration the Norwegian and European "Good Practices". This activity shall be finalised in February 2010. There are meetings on a regular basis between NVE and the contractors. Status at the end of 2009 is:

- The Activity Plan prepared for 2010 covers issues elaborated during initial discussions and complying with agreed scaling down of the first phase.
- Development of Draft guidelines on reporting requirements for the Transmission System Operator (TSO); Market Operator (MO), Distribution System Operators (DSOs) and market participants, including the format and regularity of reports.
- Development of Draft Rules and Procedures for DAM, as an integral part of the Market Rules and including participation of priority generators in DAM.
- Review of European Good Practices for integration of Renewable Energy Systems (RES) in the market.

Overall Project Data

Client:	Ministry of Economy, Energy and Tourism (MoEET), Bulgaria.
NVE Mandate:	Assistance to MoEET on improvement of legislation and implementation of an efficient and competitive electricity market.
Contract Value/Duration:	€ 383,000 (of which € 57,000 for in-kind expenses) from Innovation Norway within the Norwegian Cooperation Programme with Bulgaria. Project started officially 13 November, 2009, lasting up to October, 2010 (or end of the year, making up for delayed project start).
Type of Activities:	Preparation of draft guidelines, rules and procedures for important electricity market actors, working sessions and workshops/ conference as arenas for developing consensus, adopting recommendations and formulating plans for completion as per original project concept.
Work Completed 2009:	Revised Activity Plan within available budget, and arranging necessary agreements with partners.
Work in Progress 2009:	Developing concept and detailed requirements of Market Monitoring Office (MMO).

There will be 4 working sessions according to current plans. Finally, a 1-day conference with project partners and stakeholders will be organized to wrap up this first phase, focussing on:

- Initial results of the project.
- Recommendations on electricity sector restructuring, and; Next steps towards development of the national market.
- The expected output of the conference is the so-called Map towards a Bulgarian DAM.

Issues and Challenges:

The delay and curtailing of funds have caused some initial frustrations but with the first phase well underway motivation is fast returning. One can expect that lack of familiarity with and understanding of the commercial approach to power market management (policy, regulation, distribution of roles and marketing-/ pricing- mechanisms) will constitute a challenge. This aspect is duly addressed in the Activity Plan and it will be up to the Bulgarian partners to disseminate and promote the relevant knowledge among politicians, bureaucrats and actors in the electricity sector.

Regional Cooperation in Europe

SPLASH - Coordinating European Water Research for Poverty Reduction

Overall Project Data	
Client:	EU-FP6 and the Finnish Ministry of Foreign Affairs.
Type of Activities:	Two tasks: 1) Together with the UK Department for International Development (DFID), NVE is responsible for making a Yellow Page; – searchable database of existing nationally funded programmes in water research in developing countries; 2) Develop, execute and manage the sub-project “Water and Energy: Sustainable development of hydropower involving the private sector in research collaboration in the Lower Mekong region”.
Contract Value/Duration:	€ 109,649 for NVE from EU-PF6 (above task 1), and € 150,000 from the Finnish Ministry of Foreign Affairs (above task 2). The two tasks have start - end years as follows: Task 1: 2007 – 2009; Task 2: 2009 – 2010.
Type of Activities:	Data collection, project development, preparation of project documents, workshops, seminars, reviews, technical advisory and supervision, project management.
Work Completed 2009:	“Yellow-Pages” is completed and displayed. The sub-project termed task 2 above defined in a concept note and some of the project documentation completed.
Work in Progress 2009:	Work on the task 2 project documentation in progress; this sub-project being executed and managed.

Background:

Established in 2007, SPLASH is part of the European Union Water Initiative Research Area Network (EUWI Era-Net), working towards strengthening research in Europe by bringing together appropriate research partner programmes from across Europe in

a coherent and coordinated way (for detailed information, see Annual Report 2008). The project activities are grouped into several Work Packages. At the beginning of the SPLASH project, there were 6 Work Packages. In 2009, three Work Packages were completed and three new ones added; the latter related

to dissemination, coordination of existing research programmes, and a joint call on sanitation. The Concept Note 14, entitled “Water and Energy: Sustainable development of hydropower involving the private sector in research collaboration in the Lower Mekong region”, was developed by NVE in collaboration with other SPLASH members and presented to the SPLASH Scientific Advisory Committee and SPLASH funders. It was accepted for funding by the Finnish Ministry of Foreign Affairs.

Based on Concept Note 14, the “Lower Mekong” sub-project was developed and became Task 3.5 of Work Package 3: “Research and Impact Management Practices Improved”. The sub-project aims to increase cooperation between research and private sector in hydro energy development in the Lower Mekong region. The aim is to assess the research, knowledge transfer and capacity building at the academic level and in the private sector on various topics related to hydropower development and sound private sector involvement in sustainable hydropower development; and to facilitate the application of scientific research findings/ results at practical and policy levels.

Activities and Outputs:

The “Yellow Pages” sub-project was elaborated, rolled out and established on SPLASH website (see: “www.splash-era.net/outputs/index.php”) On the “Lower Mekong” sub-project the end of 2009 status is as follows:

- Concept Note was elaborated and passed for approval.
- Following approval, a project document for the sub-project prepared to serve as the work plan and definition of project output.
- Contract documentation for consultants’ services elaborated. Local/regional consultants have been identified and procurement of services well under way.

Issues and Challenges:

Bureaucratic attitudes by authorities concerned with the Lower Mekong Basin causes delay in project execution. Through their networks in the region, NVE and SPLASH partners will most likely overcome the challenges.

Contact: Kim Chi Tran-Gulbrandsen

Results/Outcome:

The “Yellow Pages” is now available on the web and can be searched by donor, recipient country and major research themes. A total of 247 people had visited the home page of the “Yellow Pages” during 2009; - it is assumed that this will increase as the site becomes better known. In particular, one can expect more intensive use of web searches in connection with project preparation and reporting, often concentrated around end and beginning of the calendar year. The “Lower Mekong” sub-project is in its preparatory stages and no tangible results can be expected as yet.

Seminar on Electricity Regulation (ELRI)

ELRI (the Electricity Regulators’ Initiative) is a training programme for electricity regulators, primarily from developing countries. It also serves as a meeting place and a discussion forum for regulators from different countries, and in particular those countries with institutional cooperation with the Norwegian Water Resources and Energy Directorate (NVE).

The seminar was arranged for the first time in 2002 by NVE, with contributions from various actors like Nordpool Consulting, ECON Analysis and Statnett (the Transmission System Operator in Norway). The International Centre for Hydropower (ICH) has been responsible for the practical arrangements and logistics since 2006, while NVE is responsible for the professional input. The seminar in 2009 was attended by participants from Botswana,

Costa Rica, Ethiopia, Mozambique, Namibia, Nepal, Sri Lanka, Tanzania, Zambia, and South Africa. The participants expressed their satisfaction with the seminar, and in particular the possibilities to discuss the most recent developments within the electricity market regulations.

Contact: Kjell Repp

Appendices

Appendix I

TOTAL INVOICED 2009 Norad/Ministry of Foreign Affairs

Proj.no	Activity	NVE Hours	Fee Charged (NOK)	NVE-adviser (NOK)	NVE expenses (NOK)	Consultants (NOK)	TOTAL (NOK)
32001	General assistance Nepal, Energy Seminar 2009. Field trip expenses	692,00	556 652,50		65 414,84		622 067,34
	Angola. Finalization of water and energy projects	25,00	18 625,00		8 658,85	148 358,50	175 642,35
32076	Southern African Development Community (SADC). Energy Coordinator	80,00	64 200,00	1 354 685,31	668 190,78		2 087 076,09
32087	Ghana. Establishment of Dam Safety Unit. Project Document	44,00	32 780,00		34 176,07		66 956,07
32089	International Hydropower Association. Sustainability Assessment Protocol	137,00	105 457,50		32 424,46		137 881,96
32091	Feasibility Studies of the Mandaya and Beko-Abo Multipurpose Hydropower Projects	906,50	748 568,75		337 358,21	601 967,44	1 687 894,40
32092	Liberia. Institutional strenghtening. Water resources and power sectors	308,25	263 830,00		105 063,40	101 616,50	470 509,90
32094	The Philippines. Flood Control Master Plan for Bucayao and Magasawang Tubig Rivers	155,50	118 492,50		31 605,85		150 098,35
32095	Montenegro. Strategic Environmental Impact Assessment. Study at the Moraca River	140,75	121 045,00		4 284,87	199 840,00	325 169,87
32096	Nepal. Cooperation Power Sector	236,50	177 457,50		44 570,80	245 339,00	467 367,30
32097	Nepal. Seminar 2009	146,00	112 565,00		23 904,00	253 024,30	389 493,30
32098	Nepal. Verification Mission 2009	361,00	286 310,00		43 038,35	1 252 031,16	1 581 379,51
32099	Pemba Baseline Study	64,50	49 777,50				49 777,50
32100	Ethiopia. Sediment and Hydrology Campaign, Abay River	762,25	642 310,00		721 089,26		1 363 399,26
32101	Ghana. Finalization of Project Document	45,00	35 825,00		35 825,00		356993,09
32103	Working Meeting re energy and hydrology in Tanzania. Royal Norwegian Embassy, Tanzania	44,00	37 840,00		20 924,00	34 160,00	92 924,00
32104	Tanzania. Operation and Maintenance of Hydropower Plants	164,00	141 040,00		54 910,65		195 950,65
32557	Ghana. Support in establishment of National Dam Safety Unit.	455,00	391 300,00		234 584,55		625 884,55
32558	Timor Leste. Preparation of Project Document and delegation visit to Norway				374 282,07		374 282,07
TOTAL		4 767,25	3 904 076,25	1 354 685,31	2 805 744,01	2 836 336,90	10 900 842,47

Appendix II

TOTAL INVOICED - INSTITUTIONAL COOPERATION 2009

Proj.no	Activity	NVE Hours	Fee Charged (NOK)	NVE-adviser (NOK)	NVE expenses (NOK)	Consultants (NOK)	TOTAL (NOK)
32538	Timor Leste. Ministry of Infrastructure	650,5	505 495,00	751 677,68	457 843,12		1 715 015,80
32543	Nepal. Department of Electricity Development	278,0	219 875,00		160 570,87	70 369,00	450 814,87
32547	South Africa. National Energy Regulator	569,5	479 995,00		503 860,66		983 855,66
32548	South Africa. Department of Mineral and Energy	680,0	530 060,00		398 038,49	12 687,50	940 785,99
32550	The Philippines. The Provincial Government of Oriental Mindoro	114,0	86 080,00		64 994,30	976 235,00	1 127 309,30
32551	Vietnam. Ministry of Natural Resources and Environment	1 170,2	970 909,00		326 027,05		1 296 936,05
32552	South Africa. Department of Mineral and Energy. Alternative energy cooperation	55,0	40 975,00		147 882,73		188 857,73
32553	South Africa. Department of Mineral and Energy. Alternative energy cooperation. Hydrocarbon subprogramme	33,5	27 315,00		66 357,72		93 672,72
32555	Bhutan. Department of Energy. Phase III	1 543,5	1 250 791,25		580 890,94	397 747,28	2 229 429,47
32556	Bhutan. Department of Energy. Accelerated Hydropower Development Programme	410,8	317 508,75		129 654,12	2 926 001,00	3 373 163,8
32558	Timor Leste. Ministry of Infrastructure. Phase III	609,5	513 015,00	513 493,50	568 713,26	131 953,15	1 727 174,91
	TOTAL	6 114,4	4 942 019,00	1 265 171,18	3 404 833,26	4 514 992,93	14 127 016,37

Appendix III

NVE's Participation in International Research and Cooperation with International Institutions

Energy:

International Energy Agency (IEA)

Wind Energy: Member of the Executive Committee for the Implementing Agreement for Cooperation in the Research, Development and Deployment of Wind Energy Systems. Participate in Annex for Integration of wind and hydropower systems and Annex for wind system integration.

IEA Hydropower Implementing Agreement Participates in the Executive Committee, the Small Scale Hydropower annex and in the preparation of an annex on valuation methodology for hydropower's systems balancing and ancillary services.

The Council of European Energy Regulators (CEER)

The overall aim of the Council of European Energy Regulators (CEER) is to facilitate the creation of a single competitive, efficient and sustainable internal market for electricity and gas in Europe.

The European Regulators' Group for Electricity and Gas (ERGEG)

ERGEG is an advisory group of independent national regulatory authorities established to assist the European Commission in consolidating the Internal Market for electricity and gas.

International Council on Large Electric Systems (CIGRÉ)

CIGRE (International Council on Large Electric Systems) is one of the leading worldwide Organizations on Electric Power Systems, covering their technical, economic, environmental, organisational and regulatory aspects. NVE participates, inter alia, as a member of the Board in the Norwegian national committee and as a member of the study committee on System Environmental Performance.

European Committee for Electrotechnical Standardization (CENELEC)

CENELEC's mission is to prepare voluntary electrotechnical standards that help develop

the Single European Market/European Economic Area for electrical and electronic goods and services removing barriers to trade, creating new markets and cutting compliance costs.

The Union of the Electricity Industry (EURELECTRIC)

Its mission is to contribute to the development and competitiveness of the electricity industry and to promote the role of electricity in the advancement of society.

CIREN – International Conference on Electricity Distribution

CIREN works for the purpose of increasing the business relevant competencies, skills and knowledge of those who see themselves as a part of the electricity distribution community. CIREN is dedicated to the design, construction and operation of public distribution systems and of large installations using electrical energy in industry, services and transport. CIREN covers the whole field of Electricity Distribution Systems and associated services, including dispersed and embedded generation issues, the technical aspects of Electricity Supply and related aspects such as cost reduction, environment, regulation, organisation and related IT systems.

The Nordic Energy Regulators (NordREG)

NordREG is a cooperative organization for Nordic regulatory authorities in the energy field. Their mission is to actively promote legal and institutional framework and conditions necessary for developing the Nordic and European electricity markets.

Nordic Project on Distributed Energy for Remote Areas

The objective of the project is to identify renewable technologies and new energy technologies suitable for remote areas in Finland, Sweden, Denmark, Norway, Iceland, and Greenland.

Appendix III (contd.)

Climate and Energy:

International project

The project comprises several institutions representing Nordic and Baltic countries.

NATO; Industrial Planning Committee (IPC)

Ad Hoc Working Group on the Protection of Energy-Related Critical Infrastructure AHWG), subgroup electricity. The aim of the working group is to examine the electricity infrastructure and resulting vulnerabilities and discuss potential preventive and/or consequence management measures, and develop a catalogue of best practices for the protection of electricity-related critical infrastructure.

Nordisk Beredskapsforum (NordBER)

The objective of the forum is to conduct a dialogue between the involved parties concerning contingency planning and crisis management in the power sector. NordBER deals with issues which are not managed by TSO cooperation through Nordel. The forum consists of the Nordic energy authorities, TSOs and other relevant parties from the Nordic countries.

EU; The European Committee for Standardization (CEN)

Has created a working group on "Protection and Security of the Citizen" as a monitoring and coordination platform for stakeholders. Nine expert groups have identified needs, one of them is the expert group "Critical Infrastructure - Energy Supply". The CENELEC Joint Expert Group Critical Infrastructure - Energy Supply has identified needs and possibilities for standardisation activities for security and emergency preparedness within energy supply.

NordVind

Wind power working group appointed by the Government Officials Committee for Energy under the Nordic Council of Ministers. Collecting and communicating national experiences from practice and procedures as well as results from R&D projects to create a Nordic "best practice" for wind power development

International Commission on Large Dams (ICOLD)

NVE has the secretary function for the national dam committee (NNCOLD). NVE also has representatives in the following ICOLD technical committees: Committee of Governance of Dam Projects; Committee on Dam Safety; European Working Group on Legislation.

European Governments Dam Safety Network

Forum for sharing experience on issues relevant to dam safety between national authorities.

Water Resources:

Harmonizing water related databases along the Swedish-Norwegian border. Swedish Meteorological and Hydrological Institute, SMHI and NVE

Reference Information Specifications for Europe (RISE),

Funded by the 6th Framework Programme Participants: SMHI, Swedish mapping Authorities, Norwegian mapping authorities, NVE. Developing guidelines for the creation of geospatial data implementation specifications, with focus on hydrography, elevation models and land-use data themes.

CHIN GIS Workgroup

Participants: The Danish National Environmental Research Institute (DMU), SMHI, Finnish Environment Institute (SYKE), Icelandic National Energy Authority (OS) and NVE. Workshop in Silkeborg, DK focused on basic geographical information systems related to surface waters (rivers, lakes and catchments areas).

Cooperation with EU/EEA:

Stakeholders Forum related to a European Flood Action Programme. Norway has one representative; from NVE. In 2007 the forum was replaced by a Working Group F (WG F), dealing with the theme Flood risk management as part of the working structure

Appendix III (contd.)

for the Common Implementation Strategy (CIS) for the Water Framework Directive (WFD). The objectives of WG F are:

- support the implementation of the EU Floods Directive (adopted in 2007)
- ensure a platform for coordination with the WFD.
- ensure links with other CIS activities
- provide a platform for information exchange. As part of this Norway organised a workshop together with the Netherlands in Oslo Jan 31 - Feb 1, 2007 on the relation between flood risk management and land use planning.

China:

(1) Bilateral cooperation in hydrology between Bureau of Hydrology (main office in Beijing), MWR (Ministry of Water Resources) and Hydrology Department, NVE.

(2) Workshop, Beijing 21. - 22. March 2007 "Climate Change and Possible Effects on Water Resources in Mountain Areas"

(3) Cooperation between NVE and Haihe Water Conservancy Commission concerning groundwater monitoring and water management practices

EU: Participation and Vice Chair in COST 731. Long term research cooperation dealing with uncertainty in meteorological- and hydrological forecasting. NVE contributes to the EU WATCH project together with partners from other Nordic and Baltic hydrological services (climate and energy related research).

UNESCO/IHP: Represent NE-FRIEND cooperation

(Comprising institutions from NL, UK, Poland, Czech Republic, Slovakia, Austria, France and more), long term professional cooperation in hydrology.

WMO: National representation in international forums under WMO on operational hydrology (Hydrology Department)

IAHS/ICSW: International cooperation in hydrology, 2007-2010

UK – Centre of Ecology and Hydrology:

Long-term cooperation with CEH in hydrology.

Republic of Croatia

Regional Workshop on Hydrological Forecast and Real Time Data management in Croatia, May 2009, Dubrovnic. Cooperation between Meteorological and Hydrological Service in Croatia and NVE.

Montenegro Hydrometeorological Institute, Podgorica:

Preparation of masterplan for hydrological network and data acquisition in Montenegro. Cooperation between Meteorological and Hydrological Service in Montenegro and NVE

The Republic of Serbia:

Hydrological Flood Forecasting System for Small and Medium Sized Catchments in Serbia. Cooperation between Republic Hydrometeorological Service of Serbia (RHMS) and NVE.

The Republic of Armenia:

Hydrology in Armenia, cooperation between Armenian State Hydrometeorological and Monitoring Service (ArmStatHydroMet) and NVE.



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