

# 1

## Introduction

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## 1.1 Summary

Chapter 1.2 describes government organisation of the management of energy and water resources, with emphasis on the responsibilities of the Ministry of Petroleum and Energy for the administration of domestic stationary energy supplies.

Chapter 2 describes various distinctive features of electricity generation. The main emphasis is on various aspects of hydropower generation because of its important role in Norwegian electricity supply. Hydropower accounts for 99 per cent of total electricity production. The average production capability of Norway's hydropower stations is estimated to be about 119 TWh/year. Annual production varies substantially with precipitation levels. In 2000, hydropower production reached a record level of 143 TWh. The figure for 1996 was 105 TWh. Total electricity production in 2005 was 138 TWh. Figures from Statistics Norway show that the power supply sector accounted for about three per cent of mainland Norway's gross domestic product in 2005. This corresponds to NOK 37.7 billion.

Production of electricity from sources such as natural gas and wind are also described in chapter 2. The impact on the environment of some types of power production is discussed. The chapter also covers taxes and fees in the power sector.

Chapter 3 describes energy use and factors influencing its development. Net domestic energy consumption was 225 TWh in 2005. Around two thirds was supplied to stationary purposes<sup>1</sup>. Net stationary consumption of electric power was 112 TWh in 2005. Stationary consumption of oil products was just over 20 TWh. Consumption of different

types of gases was 6.6 TWh. Registered bioenergy use was 12.4 TWh. Use of district heating was 2.4 TWh.

Chapter 3 covers heating production and the impact of energy use on the environment. The state owned company Enova is described in more detail in chapter 3.4. Enova manages the Energy Fund. This fund is the main means available for leveraging the restructuring of energy consumption and production.

Legislation relating to energy and water resource management regulates every area from hydropower development via transport to energy use. Chapter 4 describes the legislative framework for the sector. Among other things, the legislation governs relations between different user groups and includes provisions relating to environmental considerations and landscape conservation.

The power supply sector consists of many different types of energy utilities. These vary in both size and their form of business organisation and ownership. About 87 per cent of production capacity is publicly owned, 50 per cent by counties and local authorities, and 37 per cent by central government. The structure of the market is constantly changing through acquisitions and mergers. Organisation and ownership in the power sector is described in chapter 5. The accounting key figures for power companies are also presented.

Energy carriers such as oil and gas are transported by road and rail in the same way as other goods. However, the transmission of electricity depends on a continuous infrastructure of transmission and distribution grids. This infrastructure is regarded as a natural monopoly. Monopoly regulation has therefore been established to safeguard consumer rights and ensure efficient development of the grid. Regulation of grid management and operations is described in Chapter 6.

<sup>1</sup> Stationary energy consumption is net domestic energy consumption less energy consumed by transport, international shipping and the energy sector.

Chapter 7 describes the framework for electricity trading in the Nordic region. It covers the physical basis for the single power market which now exists in Norway, Sweden and Finland, and Norway's transmission connections to other countries. An introduction is provided to the functioning of the power market and the organisation of its component markets. The chapter also provides an introduction to price formation in the Nordic power market and how this relates to production conditions.

Technological and political developments internationally can affect operating conditions in the sector. For example, international climate negotiations provide important parameters for trends in energy use and production in Norway, and for the value of hydropower. Chapter 8 discusses research and development, while international energy cooperation is described in Chapter 9.

Many conflicting interests collide when river systems are utilised for specific purposes. Water supply is the oldest use we know of. Fishing, communications, irrigation and hydropower generation are also widespread applications. The importance of different interests and uses varies from one river to another. User interests have also changed over the years. Chapter 10 describes the management of water resources in Norway.

The energy and power units used in this publication are defined in Appendix 1, which also presents conversion factors between the most commonly used energy units. In addition, the appendix specifies the energy content of various fuels.

In appendix 2, the challenges associated with CO<sub>2</sub> capture at gas fired power stations and establishing a CO<sub>2</sub> chain are described. Appendix 3 provides key figures for the power sector for 2005 in TWh. Appendix 4 provides an overview of transmission capacity between the

Nordic countries. Publications released by the Energy and Water Resources Department in 2005 are listed in appendix 5. Appendix 6 provides a summary of the internet addresses of important players in the energy industry.

Unless otherwise stated, statistical data relating to energy production and used in this publication are taken from the energy accounts compiled by Statistics Norway. More information on the energy accounts can be found on Statistics Norway's web site at [www.ssb.no](http://www.ssb.no).

## **1.2 State organisation of the management of energy and water resources**

The Storting (parliament) sets the political framework for the energy sector and water resource management in Norway. The Ministry of Petroleum and Energy (MPE) has overall administrative responsibility for these sectors. It is the ministry's responsibility to ensure that the management follows the guidelines set by the Storting.

### **1.2.1 The Ministry of Petroleum and Energy**

The Ministry of Petroleum and Energy has overall responsibility for an integrated energy policy based on efficient utilisation of energy resources.

It comprises four departments: The Energy and Water Resources Department, the Oil and Gas Department, the Technology and Industry Department and the Department for Economic and Administrative Affairs as shown in figure 1.1.

The Oil and Gas Department is responsible for administering oil and gas activities on the Norwegian continental shelf. This part of the Ministry's responsibilities is not discussed here. We refer readers to 'Facts 2006 – Norwegian Petroleum Activities' and the



department's web site [www.oed.dep.no](http://www.oed.dep.no) for more information.

The Technology and Industry Department is responsible for the department's research and development activities, research programs within the energy and petroleum sectors and grants to the development of a Norwegian based international competitive energy industry. The department also handles the ministry's work on national climate policy and follows up international environmental issues, including international climate negotiations and regional climate cooperation work. The department manages the governmental control of Gassnova.

The Department for Economic and Administrative Affairs supervises the government's owner interests in petroleum activities. The department also handles the ministry's administrative tasks and general services. This includes organisational matters, personnel management, budgeting and economic affairs.

The responsibilities of the Energy and Water Resources Department are the subject of this publication. The department's main objective is to ensure sound management, in both economic and environmental terms, of water and hydropower resources and other domes-

tic energy sources. The department acts for the government as owner of the Statnett and Enova state enterprises. The Norwegian Water Resources and Energy Directorate (NVE) is a subordinate agency of the MPE, responsible for the management of energy and water resources in mainland Norway.

On 1 January 2002, responsibility for exercising the government's ownership function for Statkraft SF was transferred from the Ministry of Petroleum and Energy to the Ministry of Trade and Industry.

The Energy and Water Resources Department consists of the following sections:

#### *Water Resources and Area planning*

The section's working area includes water resource management (issues linked to the use and protection of watercourses and management of the licensing of small power stations), land use planning for energy plants, emergency planning and water course safety. Administrative responsibility for the NVE also lies here.

#### *Hydro Power- and Energy Law and EEA*

The section's main responsibilities are legal issues related to administration of

the energy sector. This includes watercourse regulation and hydropower development, licences for acquisition of water falls, reversion and licence management of electricity plants, power lines and district heating in accordance with the Energy Act. The section also is responsible for EEA issues linked to watercourse and energy management and to Nordic energy cooperation.

#### *Electricity Market*

The section's main working areas are: Issues linked to the power market in Norway, power trading with foreign countries, owner follow up of Statnett SF and the follow up of Statkraft's contracts with power intensive industries. Regulation of grid activities and issues relating to electricity grid tariffs are also a part of the section's work. The section also works with power industry financial issues, including taxes and fees, and is responsible for power supply emergency planning.

#### *Energy Policy*

The section's main responsibilities are general energy policy issues and analyses relating to the energy and power balance. The section is responsible for the use of the means available for restructuring energy usage and production. Owner follow up of the state owned company Enova, other international energy issues and administrative issues are also a part of the section's working area.

### **1.2.2 Norwegian Water Resources and Energy Directorate**

The NVE is a subordinate agency of the Ministry of Petroleum and Energy responsible for administration of Norway's water and energy resources.

Its job is to ensure coherent and environmentally-sound management of river systems and to promote efficient electricity trading, cost-effective energy

systems and effective energy use. It also plays a central role in emergency response to flooding and dam failure, and heads contingency planning for power supply.

Other duties relate to research and development work and to international cooperation within its sphere of responsibility. The directorate serves as Norway's national hydrological institution.

### **1.2.3 Norwegian Petroleum Directorate**

This is a subordinate agency of the Ministry of Petroleum and Energy. From 1 January 2004, the directorate was split into two independent agencies, the NPD and the Petroleum Safety Authority Norway (PSA) – see below.

The NPD's most important duties are:

- to exercise the administrative and financial control required to ensure that exploration for and production of petroleum is in accordance with statutes, regulations, decisions, licence terms and so forth
- to ensure that exploration for and production of petroleum resources is in accordance with the guidelines laid down by the Ministry
- to advise the Ministry on issues relating to exploration for or production of submarine natural resources.

### **1.2.4 Petroleum Safety Authority Norway**

The PSA was established on 1 January 2004 through a division of the NPD.

This regulator is responsible for safety, emergency response and the working environment in the petroleum business, and is a subordinate agency of the Ministry of Labour and Social Inclusion.

### **1.2.5 Statnett SF**

Statnett SF was founded in 1992. The Ministry of Petroleum and Energy acts as its owner on behalf of the government,

as specified in the Act of 30 August 1991 relating to state enterprises.

Statnett SF is responsible for construction and operation of the central grid. It owns about 87 per cent of the central grid, and operates the entire system. As the transmission system operator (TSO) in Norway, it is also responsible for short- and long-term system coordination. This means that it coordinates the operation of the entire Norwegian electricity supply system, and ensures that the amount of electricity generated is always equal to the amount consumed. Statnett's revenues are regulated by the NVE as part of its regulation of monopoly operations.

### 1.2.6 Enova SF

Enova SF was founded on 22 June 2001. Based in Trondheim, it is subordinate to the Ministry of Petroleum and Energy.

On 1 January 2002, Enova became responsible for government efforts to restructure energy production and use. This work had previously been split between the NVE and the electricity distribution utilities. Enova's activities are financed via an Energy Fund. The fund receives income from a supplement added

to the grid tariff of NOK 0.01 per kWh. Its tasks are to promote more efficient energy use, the production of new renewable forms of energy, and environment-friendly uses of natural gas. Quantitative goals have been set for Enova's activities.

Enova's activity is described in more detail in chapter 3.4.

### 1.2.7 Gassnova

Gassnova was established on 1 January 2005 to manage the authority's focus on the development of a gas fired power station with CO<sub>2</sub> processing.

Gassnova's goal is to develop cost effective and future orientated technologies for a power station with CO<sub>2</sub> processing, through providing financial support for test and demonstration projects. Gassnova, through its work, is to contribute to the realization of the government's goals relating to the development and use of CO<sub>2</sub> processing technologies. The activity's main finance source is yields from the NOK 2 billion Gas Technology Fund. This was almost NOK 92 million in 2006. Gassnova's support activities are also described in appendix 2.

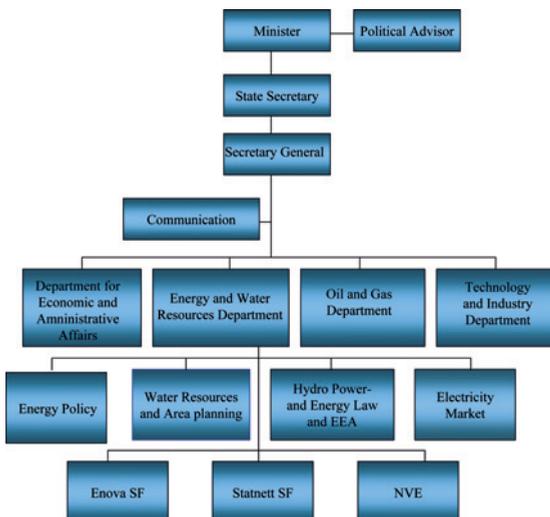


Figure 1.1 Organisation of the Ministry of Petroleum and Energy