1: Introduction

1.1 Summary

Section 1.2 describes the 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 roughly 96 per cent of the total installed production capacity. The average production capability of Norway's hydropower stations is estimated to be about 122 TWh per year. Annual production varies substantially with precipitation levels. In 2000, hydropower production reached a record level of 143 TWh, compared with only 105 TWh in 1996.

Production of electricity from sources such as natural gas and wind are also described in Chapter 2. The environmental impact of some types of power production is discussed.

In 2007 Norway generated almost 138 TWh electricity in total. Figures from Statistics Norway show that the power supply sector accounted for about 3 per cent of mainland Norway's gross domestic product in 2005. This corresponds to almost NOK 46 billion. This chapter also covers taxes and fees in the power sector.

Chapter 3 describes heating production and energy use. Net domestic energy consumption was 225 TWh in 2005. Of this, around two thirds was for stationary purposes[1]. Net stationary consumption of electric power was around 107 TWh in 2006. Stationary consumption of oil products was just over 10 TWh, and consumption of different types of gas was 10 TWh. Registered consumption of bioenergy was 12.2 TWh. Use of district heating was 2.6 TWh.

Chapter 3 deals with the environmental impact of energy use and measures to limit this. Enova manages the Energy Fund and 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 stakeholders and includes provisions relating to environmental considerations and landscape conservation.

The power supply sector consists of many different types of power plants. These vary in size and their form of business organisation and ownership. About 88 per cent of production capacity is publicly owned: 52 per cent by counties and municipal authorities, and 36 per cent by central government. The structure of the market is constantly changing through acquisitions and mergers. Chapter 5 describes organisation and ownership in the power sector. 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.

1 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. Norway is part of a common Nordic electricity market, which is also interconnected with Russia, Germany, the Netherlands, Estonia and Poland. The physical prerequisite for this common electricity market is is an interconnected transmission grid in the Nordic region.

An introduction is provided to the functioning of the power market and the organisation of its component markets. This chapter also provides an introduction to price formation in the Nordic electricity market and how this relates to production and consumption.

Technological and political developments internationally can affect operating conditions in the sector. For example, international climate agreements may affect the trends in energy use and production in Norway, and 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 common 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 2006, the Ministry of Petroleum and Energy initiated work to devise a comprehensive strategy for research and development of technology within the energy sector – Energi21. A draft strategy was presented to the Minister of Petroleum and Energy on 5 February 2008. This is discussed in Appendix 2.

Appendix 3 provides key figures for the power sector for 2007. Appendix 4 provides an overview of transmission capacity between the Nordic countries. Publications released by the Energy and Water Resources Department in 2006 and 2007 are listed in Appendix 5, and Appendix 6 provides a summary of the internet addresses of important players in the energy industry.

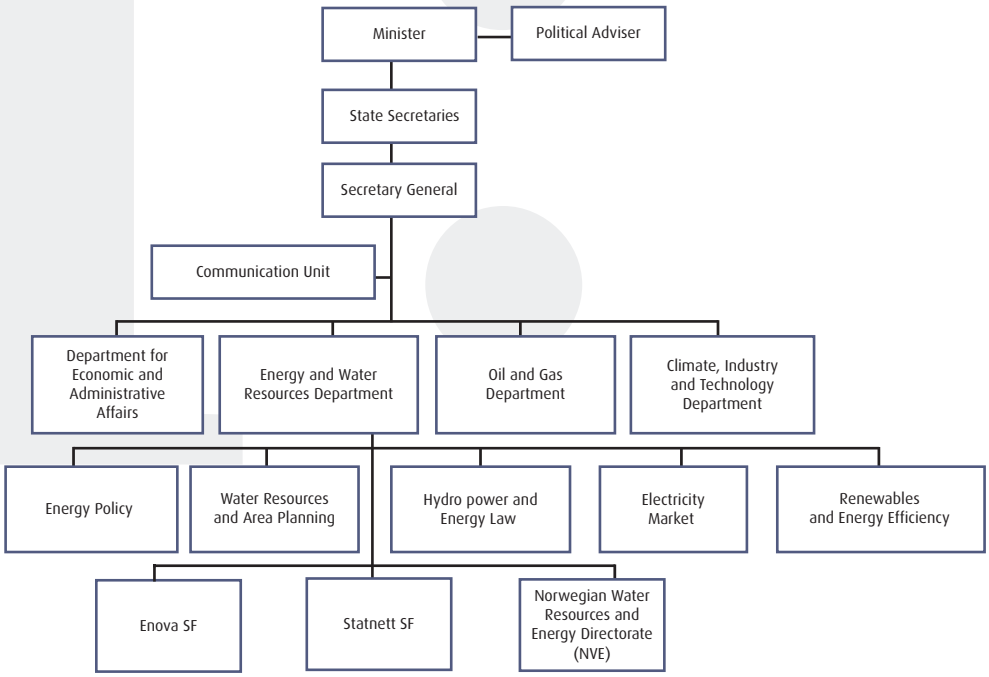
Unless otherwise stated, statistical data relating to energy production and used in this publication are taken from the Energy Accounts, which are compiled by Statistics Norway (SSB). More information on the energy accounts can be found on Statistics Norway's website at www.ssb.no/energi.

1.2 State organisation of the management of energy and water resources

The Storting (parliament) lays down the political framework for the energy sector and water resource management in Norway. The Ministry of Petroleum and Energy 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's main task is to provide an integrated energy policy based on efficient use of energy resources.



Figur 1.1 Organisation of the Ministry of Petroleum and Energy

The Ministry comprises four departments: the Energy and Water Resources Department, the Oil and Gas Department, the Climate, Industry and Technology Department and the Department for Economic and Administrative Affairs (see 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 2008 – Norwegian Petroleum Activities' and the Ministry's website www.oed.dep.no for more information.

The Climate, Industry and Technology Department is responsible for the Ministry's research and development activities, research programmes within the energy and petroleum sectors, and contributions to the development of an internationally competitive energy industry based in Norway. 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. This department is responsible for management 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 budgeting and economic affairs, organisational matters and personnel management.

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 domestic energy sources. This department is responsible for the Government's ownership functions over the state enterprises Statnett and Enova. The Norwegian Water Resources and Energy Directorate (NVE) is the Ministry's agency 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

This section's remit 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 watercourse safety. Administrative responsibility for the NVE also lies here.

Hydro power and Energy Law

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 waterfalls, reversion and licensing of of electricity plants, power lines and district heating in accordance with the Energy Act.

Electricity Market

This section's main working areas are linked to the electricity market in Norway and power trading with foreign countries, following up its ownership of Statnett SF and following up Statkraft's contracts with energy-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 financial issues in the power industry, including taxes and fees, and is responsible for power supply emergency planning.

Energy Policy

This section's main responsibilities are general energy policy issues and analyses relating to the energy and power balance. The section is responsible for EEA issues linked to watercourse and energy management and Nordic energy cooperation. Other international energy issues and administrative matters are also part of this section's remit.

Renewables and Energy Efficiency

This section is responsible for use of the means available for restructuring energy usage and production, and following up ownership of the state-owned company Enova.

1.2.2 Norwegian Water Resources and Energy Directorate

The Norwegian Water Resources and Energy Directorate (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 Norway's watercourses and to promote efficient electricity trading, cost-effective energy systems and efficient energy use. The NVE also plays a central role in emergency response to flooding and dam failure, and heads national contingency planning for power supplies.

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

1.2.3 Norwegian Petroleum Directorate

The Norwegian Petroleum Directorate is administratively subordinate to the Ministry of Petroleum and Energy. On 1 January 2004, the Directorate was split into two independent agencies: the Norwegian Petroleum Directorate and the Petroleum Safety Authority Norway.

The Norwegian Petroleum Directorate plays a major role in the management of the petroleum resources, and is an important advisory body for the Ministry of Petroleum and Energy. The Norwegian Petroleum Directorate exercises management authority in connection with exploration for and exploitation of petroleum deposits on the Norwegian continental shelf. This also includes authority to issue regulations and make decisions according to rules and regulations for the petroleum activities.

1.2.4 Petroleum Safety Authority Norway

The Petroleum Safety Authority Norway was established on 1 January 2004 through a division of the Norwegian Petroleum Directorate. The Petroleum Safety Authority Norway 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, and 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-owned 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.

Statnett SF is also responsible for short and long-term system operation. As the transmission system operator, Statnett is responsible for securing the overall power balance at all times and thus facilitating satisfactory supply quality all over Norway. The transmission system operator also has a duty to continuously analyse and develop the means necessary to fulfil this duty in periods with 'severely stressed power situations' (SAKS), which can arise, for example, in periods with much lower water inflow to hydropower plants than normal.

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 the Government's efforts to restructure energy production and use. This work had previously been split between the NVE and the electricity distribution companies. 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 and from the Basic Fund for Renewable Energy and Energy Efficiency, which was established 2 January 2007. The yield from the Basic Fund will be NOK 431 million in 2008. In 2008, Enova will also have a grant authorisation of NOK 400 million and receive an allocation in the national budget of NOK 200 million.

Enova's tasks are to promote more efficient energy use, 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 activities are described in more detail in Section 3.4.

1.2.7 Gassnova SF

Gassnova SF was established in summer 2007 and is the Government's enterprise for carbon capture and storage (CCS). Gassnova SF is a continuation of the former administrative body Gassnova and has been charged with managing the government's interests linked to the test centre for carbon capture at Mongstad, large-scale transport and geological storage of CO_2 from Mongstad and Kårstø, and full-scale carbon capture from the gas-fired power plant at Kårstø. Gassnova's main task is to manage governmental interests and support technology development within the area of CCS, and to promote development of future-oriented, environment-friendly and cost-efficient gas power technology with CCS. Gassnova is also the Ministry of Petroleum and Energy's advisory body on issues relating to this area.. Gassnova collaborates with Research Council of Norway on the governmental programme CLIMIT, which supports development and demonstration of solutions for gas-fired power plants with carbon processing.