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The European Gas and Oil Market: The Role of Norway

Florentina Harbo

October 2008

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Gouvernance européenne et géopolitique de l'énergie

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ISBN : 978-2-86592-397-7

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Contents

Introduction

« L'or noir […] Source de richesse et source de conflits ;
mais, plus encore, produit stratégique indispensable
au fonctionnement des économies modernes »

(André Giraud)

The research question of this paper is related to the role of Norway in the European gas and oil market. This study aims to give a presentation of the energy policy in Norway and Norwegian participation at the European level.

The first chapter will introduce Norwegian relations with Europe. For the purpose of my research, I will focus mainly on Norwegian energy policy in the second chapter, presenting Norway's oil industry in chapter 2.1.; Norwegian gas production in chapter 2.2.; and the Norwegian electrical power system in chapter 2.3. The sub-chapter 2.4. will analyse in detail the activity of the largest Norwegian oil and gas company, StatoilHydro. The third chapter will be dedicated to Norway's green energy policy (wind, sun and water), etc. The fourth chapter looks at the European perspective and will examine the European strategic gas and oil market in a globalised world. The fifth chapter will present Norway's participation in the European gas and oil market. Such strategic research must also include a look at the European Union's (EU) energy market development between Russia and Norway, which will be presented in chapter six. And finally, Norway's contribution to the development of an EU energy policy in fighting climate change will be emphasised in chapter seven.

This research will analyse the *following central issues*:

- Norwegian oil industry,
- Norwegian gas production,
- Norwegian electrical power system,
- Norwegian challenges in the European gas and oil market.

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Norway's relations with Europe

In the context of advanced economic development in Asia, Latin America and the United States of America (USA), Europe has changed its vision about the world as well. The North and Northern Europe are very often seen as a periphery on the European continent. The situation can, however, be seen from another view: Northern Europe, the Baltic region and Northern Russia are developing into powerful industrial and financial centres of gravity in Europe. Norway has a territory of 385,155 km² and a population of 4.7 million (2008). The population is expected to increase by 2012 to 5 million and to 6.9 million by 2060.[1] Norway is responsible for law making, law disputes and administration for 2,311,981 km^2 of the world's surface. The Norwegian continental shelf constitutes 30% of Europe's total continental shelf. Norway belongs to the leading group of the richest countries in the world measured by Gross Domestic Product (GDP) per capita. With a GDP per capita of USD 43,579 (3rd highest in the world after Luxembourg and USA) and an estimated national budget surplus, the Norwegian economy is very sound.[2] Real incomes are among the highest in the world; employment is high and unemployment low. Public finances are boosted by significant revenues from the petroleum sector. Other traditional economic activities are fisheries and fish farming (the Norwegian economic zone – 1,979,179 km^2 – is one of the biggest in the world for fish production) and shipping (Norway has the fourth largest fleet in the world), etc.

Growth in the North is much higher than in the whole of Europe. The North is characterised by significant energy resources, and new markets, like Russia, are growing. The modern metropolis of St. Petersburg is becoming a competitor to London and Berlin. This has economic consequences on the whole region and for Norway in particular. Norway is territorially, politically, economically, and culturally a part of Europe. There are grosso modo three myths about the Norwegian society. The United Nations (UN) used to confirm that Norway is the best country in the world to live. Another myth tells about the Norwegian "goodness regime" as an international sponsor for sustainable development and peace. And the third one is about Norway as a "noble outsider", which does not accept its politics to be conducted in a cynical, real power sort of way. Norway has a small economy, but one of great importance. After the Second World War,

[1] *Aftenposten*. Available on <www.aftenposten.no>, May 9, 2008.
[2] GDP as PPP (Purchasing Power Parities), USD in 2006: Luxembourg: USD 69.246; USA: USD 44.155; Norway: USD 43.579; Ireland: USD 41.925; Iceland: USD 38.885. Source: United Nations Statistic Division.

contributing to peace, stability and prosperity in Europe as well as in the rest of the world became a central concern of Norwegian foreign policy. Norway, thus, became one of the founders of the UN in 1945, of the Organisation for European Economic Co-operation (OEEC) in 1948, (which is today the Organisation for Economic Co-operation and Development [OECD]), and of the Council of Europe and the North Atlantic Treaty Organization (NATO) in 1949. However, Norwegian participation in the establishment of the European Community in the 1950s, what eventually became the EU, was not considered. The reason for this was the fact that Norway's close ally, Great Britain, did not take part either. Instead, Norway, together with Great Britain, Denmark, Sweden and several other states, established the European Free Trade Association (EFTA) in 1960. Norway applied for membership in the European Economic Community (EEC) later on in the 1960s, but with France blocking British membership, Norway's application was never dealt with. A Norwegian referendum held in 1972 returned a vote of 53.5% against Norwegian membership in the EC. Then in 1994, 52.2% of the Norwegian voters again voted "no." Thus, the European Economic Area (EEA) Agreement, which had entered into force on January 1, 1994, continued to be the cornerstone of Norway's association with the EU.[3] Norway started to play a significant role in Europe's petroleum policy in 1982. In order to prevent Western European countries from completing a notable gas contract with the Soviet Union in 1982, the US introduced a ban on all American exports to firms supporting the project. The US also boycotted European firms supplying equipment. The Americans claimed that if Western Europe became too dependent on Soviet gas, one might come under pressure in a future political crisis if the Soviets turned off the taps to stop the energy supply. The USA urged Norway to increase its gas exports as a substitute for Soviet gas. Norway, on the other hand, maintained that gas production could not be increased as quickly as desired. This was due to the long time lags between the adoption of a field development decision and when actual production could begin. The Norwegians also wanted, in case development should be accelerated, a "price premium" to justify an action that otherwise would have been different. From that time on, Norway was an active part of European energy geopolitics.

Norway's co-operation and contact with the EU cover most of the EU's spheres of activity. The Norwegian Prime Minister and many of the other ministers meet twice a year with their respective counterparts in the country holding the EU presidency, and meetings at the political level are held regularly with the European Commission and the European Parliament. The government also gives a high priority to co-operation in the Nordic, Barents, Baltic and North Sea regions.

Norway, as is the case with many other countries, is meeting the challenges of globalisation, situated in a strategic triangle between the US, the EU and Russia. An economically powerful China is also of strategic

[3] Norwegian Government. Available on: <www.regjeringen.no/en/sub/Europaportalen/Norways-relations-with-Europe.html?id=115260>.

importance for Norway. Access to strategic resources is very important for the development and the social stability of a country. Norway is very much following the idea of Claus von Clausewitz on "the logic of strategy with the grammar of commerce" (Clausewitz, 1813/1871).

At the same time, Norway does not want to become a member of the EU. When the President of the European Commission, José Manuel Barroso, visited Norway on February 25, 2008, he pointed out that Norway is the most disciplined (non-member) of the EU, since Norway implements very punctually and correctly all the EU directives.[4] Maybe, one day Norway will become a member of the EU, but the recent polls from May 2008 show that 60% are still against it.[5] *Dum spiro, spero*! (As long as we live, we hope!)

[4] Norwegian Government. Available on: <www.regjeringen.no/en/dep/ud.html?id=833>.

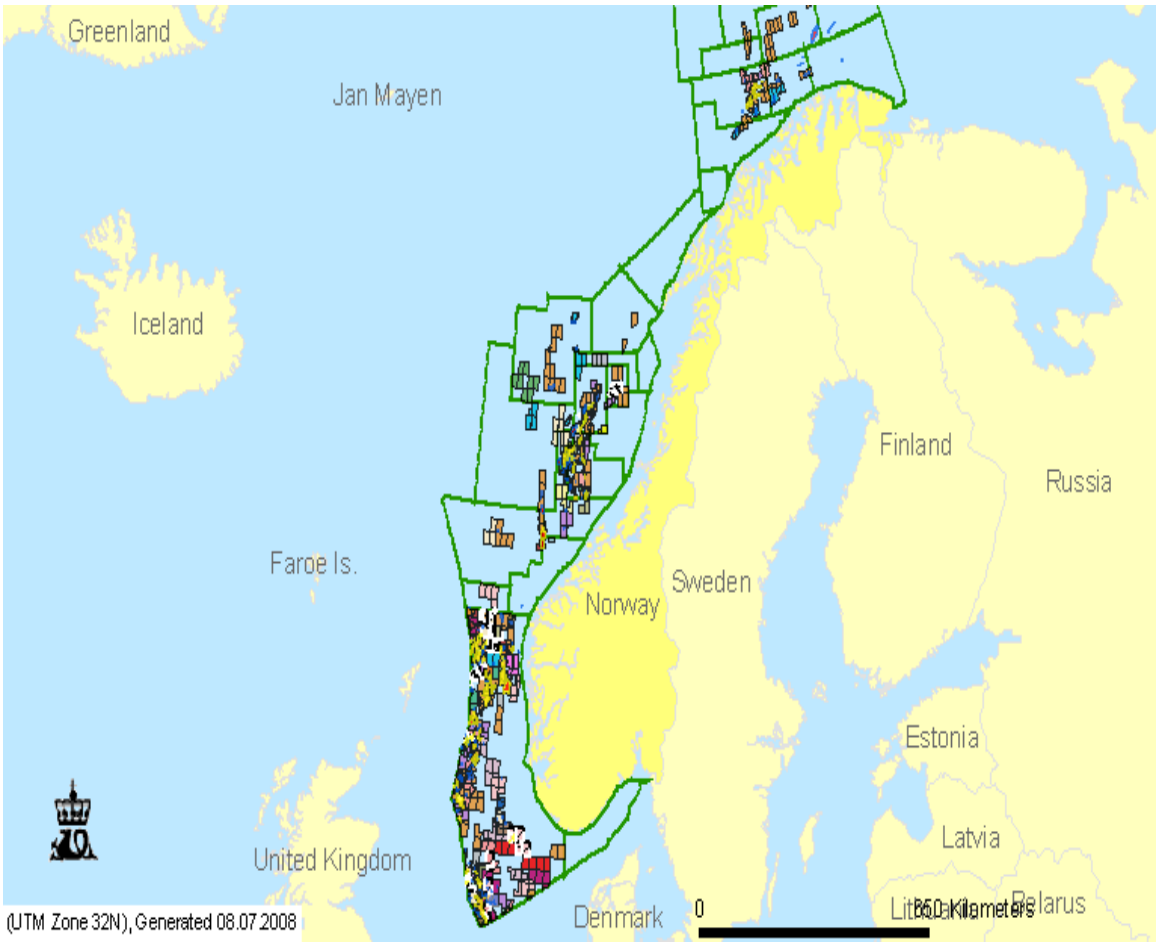
[5] *Aftenposten*. Available on: <www.aftenposten.no>, May 10, 2008.

Norwegian energy policy

Norway holds a unique position in producing and exporting oil and gas. Norway is Western Europe's second most important source of natural gas after Russia and the world's third largest exporter of oil and gas after Saudi Arabia and Russia. The oil and gas sectors constitute around 25% of Norway's GDP and 52% of Norwegian exports (35 times higher than the export value of fish). Norway has an annual oil production of nearly 3 million barrels per day (bpd) and an annual gas production of 85 billion cubic metres. Approximately 80,000 people are employed in the petroleum sector in Norway (2007). Today, the Norwegian continental shelf is the most energy-efficient petroleum-producing region in the world with CO_2 emissions that are less than a third of the global average per unit produced6. The Norwegian continental shelf is Europe's largest area for oil and gas production besides Russia. Early in the next decade, Norway's gas exports – almost all to Europe – will increase by 50% to an estimated 130 billion cubic metres, close to the level of Russia's exports. Exports from Norway will account for nearly a third of natural gas consumption. Norwegian gas exports account for approximately 15% of EU gas consumption today, with nearly 100% of Norwegian exports going to the EU. The main importers are: Germany (almost 30%), France (almost 20%), Great Britain (18%) and Belgium (8%). Energy imports from Norway amounted to USD 45.96 billion in 2006, i.e., 58.2% of total Norwegian imports to the EU. Norway has an average oil production of 3 million bpd (2005) and a consumption of only 213,000 bpd. The problem is, however, the fact that Norwegian oil production peaked in 2001 and is now undergoing a rapid decline – 7% in 2005.

[6] Olje- og Energidepartementet (Norwegian Ministry of Petroleum and Energy), Available on: <www.regjeringen.no/nb/dep/oed.html?id=750>.

Map 1. The Norwegian continental shelf – a treasure of oil and gas



Source: Norwegian Ministry of Petroleum and Energy.

In the late 1950s, very few people believed that the Norwegian continental shelf might conceal rich oil and gas deposits. However, the discovery of gas at Groningen in the Netherlands in 1959 caused people to revise their thinking on the petroleum potential of the North Sea. That discovery led to enthusiasm in a part of the world where energy consumption to a large extent was based on coal and imported oil. In the eagerness to find more, attention was drawn to the North Sea. Norway's geological expertise was pessimistic regarding oil and gas deposits, but this could not stop the enthusiasm after the discovery of gas in the Netherlands.

In October 1962, Philips Petroleum sent an application to the Norwegian authorities for exploration in the North Sea. The company wanted a licence for the parts of the North Sea that were on Norwegian territory, and that would possibly be included in the Norwegian shelf. The offer was USD 160,000 per month and was seen as an attempt to get exclusive rights, and for the authorities it was out of the question to hand

over the whole shelf to one company. If the areas were to be opened for exploration, many more companies had to participate. In May 1963, the government proclaimed sovereignty over the Norwegian continental shelf. A new law determined that the state owns all the natural resources on the Norwegian continental shelf, and that only the King (the government) is authorised to award licences for exploration and production. That same year, companies had the possibility to carry out preparatory exploration. The licences included rights to perform seismic surveys, but not drilling. Even though Norway had proclaimed sovereignty over large offshore areas, some important clarifications remained on how to divide the continental shelf, primarily with Denmark and Great Britain. Agreements on dividing the continental shelf in accordance with the median line principle were reached in March 1965. A first licensing round was announced on April 13, 1965. 22 production licences for a total of 78 blocks were awarded to oil companies or groups of companies. The production licences gave exclusive rights for exploring, drilling, and production in the licence area. The first well was drilled in the summer of 1966, but it was dry.

Photo 1. Ekofisk area

Source: Norwegian Ministry of Petroleum and Energy.

With the Ekofisk discovery on December 23, 1969,[7] the Norwegian oil adventure really began. The Norwegians called the oil discovery a “Christmas present.” Production from the field started on June 15, 1971, and in the following years a number of major discoveries were made. Exploration in the 1970s was confined to the area south of the 62nd parallel. The shelf was gradually opened, and only a restricted number of blocks were awarded in each licensing round. Foreign companies dominated exploration off Norway in the initial phase, and were responsible for developing the country's first oil and gas fields. When Statoil was created in 1972, the principle of 50% state participation in each production licence was established. This rule was later changed so that the Storting

[7] Petroleumskartet (Petroleum map), Ekofisk, Available on: <www.histos.no/ oljemuseet/ vis.php?id=1&kat=1>.

(Parliament) could evaluate whether the level of state participation should be lower or higher, depending on the circumstances.

Starting on January 1, 1985, the state's participation in petroleum operations was reorganised. It was split in two, one linked to the company and the other becoming part of the State's Direct Financial Interest (SDFI) in petroleum operations. The SDFI is an arrangement in which the state owns interests in a number of oil and gas fields, pipelines and onshore facilities. The government decides when production licences are awarded and the size varies from field to field. As one of several owners, the state pays its share of investments and costs, and receives a corresponding share of the revenue from the production licence. The Storting decided in the spring of 2001 that 21.5% of the SDFI's assets could be sold. 15% were sold to Statoil and 6.5% to other licensees. The sale of SDFI shares to Statoil was seen as an important element on the way to a successful listing and privatisation of Statoil. Statoil was listed in June of the same year. Petoro was established in May 2001 as a state-owned limited company to manage the SDFI on behalf of the state.

The SDFI has a direct financial interest in 114 production licenses. The 10 largest fields in the portfolio based on remaining reserves are:[8]

- Troll
- Ormen Lange
- Åsgard
- Heidrun
- Snøhvit
- Oseberg
- Snorre
- Gullfaks
- Grane
- Visund.

The SDFI's accounts are kept on a cash basis in the central government's budget and accounts. This means that revenues and expenses are posted in the period when they are paid and investment is expensed as incurred. Net cash flow to the SDFI is the difference between

[8] Statens direkte økonomiske engasjement (SDØE) (State's Direct Financial Interest [SDFI]), Norwegian Government. Available on: <www.regjeringen.no/nb/dep/oed/tema/Statlig_engasjement_i_petroleumsvirksomh/statens-direkte-okonomiske-engasjement>

receipts and outgoings. Net cash flow from the SDFI portfolio is transferred to the Government Pension Fund-Global (formerly the Government Petroleum Fund). In 2007, net cash flow from the SDFI portfolio was NOK 111.2 billion. Total revenues were NOK 162.9 billion, and costs were NOK 52.8 billion. Estimated net cash flows for 2008 are NOK 101.9 billion.

There are two systems for awarding licenses on the Norwegian continental shelf today. In 2003, the government introduced the annual system of Awards in Predefined Areas (APA) in mature parts of the Norwegian continental shelf. This system replaced the annual North Sea Awards. The APA system ensures that very large areas close to existing and planned infrastructure are available to the industry. The APA area will be expanded as new areas mature, but the area is not to be reduced. In addition to the APA-system, there is a system of ordinary concession rounds held normally every two years. These rounds focus on frontier areas on the shelf, where the potential for petroleum is less explored and where fewer infrastructures are built.

At the end of 2006, 52 fields were in production on the Norwegian continental shelf. In 2006, these fields produced 2.8 million barrels of oil (including Liquefied Natural Gas [LNG] and condensate) per day and 88 billion standard cubic metres of gas.

The Ministry of Petroleum and Energy awarded 52 (APA) production licenses on the Norwegian continental shelf in 2007.[9] The production licenses are divided between the North Sea (24), the Norwegian Sea (21) and the Barents Sea (7). The 52 licenses were selected from 113 applications. There are some newcomers such as Bayerngas, Concedo, Dana Petroleum, etc., but some of the biggest companies are absent, such as BP and Chevron (see the list of operators and companies in Annex 1).

The today top 10 producing companies on the Norwegian continental shelf are: StatoilHydro, Petoro, ExxonMobil, Total, ConocoPhillips, Shell, Eni, BP, Idemitsu and Talisman. The American companies play a very important role. It started with the very first production license being awarded to Esso (ExxonMobil today). Today ConocoPhillips is investing heavily to expand production. Marathon's approach to the Alvheim field development has also helped unlock resources in the surrounding areas.

Three of the top 10 producing companies on the Norwegian continental shelf – Total, ConocoPhillips and ExxonMobil – will be presented here, while the largest company StatoilHydro will be analysed in sub-chapter 2.4.

Total E&P Norge AS is an oil and gas company, which is part of the worldwide French industrial group Total. It has been present in Norway for over forty years now. Measured in production, reserves and financial

[9] Olje- og Energidepartementet (Norwegian Ministry of Petroleum and Energy). Available on: <www.regjeringen.no/en/dep/oed/Press-Center/Press-releases/2008/Awards-in-APA-2007.html?id=499531>, February 8, 2008.

results, Total E&P Norge AS is a major player on the Norwegian continental shelf. In 2006, net production reached 372,000 barrels of oil equivalents per day. The company has an ownership interest in most areas on the shelf as well as in GASSLED. Total E&P Norge AS and Gaz de France are members of the Snøhvit project, with an ownership of 18,4% and 12%.[10]

ConocoPhillips Norge is the largest foreign operator on the Norwegian continental shelf and the third largest energy company in Norway. The main activity is exploration for and production of oil and gas. The company is the operator of fields in the Ekofisk area, the mainstay of the company's Norwegian activities. The company has a 35.112% interest in the Ekofisk, Eldfisk and Embla fields and 30.658% in the Tor field. With a daily production of around 210,000 barrels of oil equivalents on average in 2007, ConocoPhillips Norge makes up approximately 10% of the oil and gas production in the global company. It is also the largest business unit in the company outside of the US, measured in the number of employees.[11]

*ExxonMobil i*s the fourth largest oil and gas producer on the Norwegian continental shelf, holding ownership interests in more than 20 producing gas and oil fields, and approximately 10 % interest in Norwegian gas transportation and processing infrastructure. The company is the largest international producer and investor on the Norwegian shelf and operates the Balder, Jotun, Ringhorne, and Sigyn fields. Three-quart of the total production are liquids, i.e.: crude oil, condensate and LNG, while the remainder is gas. Total production in 2007 reached around 436,000 barrels of oil equivalents per day, which corresponds to about 11% of total Norwegian production, and 11% of ExxonMobil's production worldwide. ExxonMobil's earnings in Norway in 2007 was NOK 78 billion – an increase of 2,5% from 2006.[12]

Petroleum activities have contributed significantly to economic growth in Norway, and to the financing of the Norwegian welfare state. Over 30 years of operations, the industry has created values in excess of NOK 5000 billion in current terms. In 2006, the petroleum sector accounted for 25% of value creation in the country. This is twice the value creation of the manufacturing industry and around 18 times the total value creation of primary industries.

Since the petroleum industry started its activities on the Norwegian continental shelf, enormous sums have been invested in exploration, field development, transport infrastructure, and land facilities. At the end of 2006, this amounted to some NOK 2000 billion in current terms. Investments in 2006 amounted to NOK 95.7 billion, or 24% of the country's total real investments.

In spite of more than 30 years of production, only around one third of the total expected resources on the Norwegian continental shelf have

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[10] Total E&P Norge AS. Available on: <www.total.no>.
[11] ConocoPhillips Norge. Available on: <www.conocophillips.no>.
[12] ExxonMobil. Available on: <www.exxonmobil.com/Norway>.

been produced. Norwegian oil production has remained at a plateau level of about 3 million bpd since 1995. In a few years, oil production is expected to gradually decrease, but because of increasing gas production, total petroleum production will grow in the coming years. Representing approximately 35% of the total Norwegian petroleum production in 2006, gas production will probably increase its share to more than 50% in 2013. In the longer term, the number and size of new discoveries will be a critical factor for the production level.

Norwegian petroleum reserves

According to the US Geological Service,[13] from the 1690 billion barrels of the world's undiscovered energy resources, 440 milliard barrels (26%) are in the Arctic. From them, 187 billion are oil and the rest natural gas. 57% is in northwestern Russia (250 billion barrels) and the rest is in the eastern side of Barents Sea and Timan/Pechora. However, such strategically disputed regions, like the Barents Sea (South and North Barents Sea), the northern part of Kara Sea between Novaja Zemlja and Franz Josef Land, the regions around Spitsbergen and the North Pole, are not mentioned in the report. This could mean that the total reserves in several parts of the Arctic, which either belong to or neighbour Norway, could be much more significant. The region between West Siberia and Spitsbergen could have much greater reserves than Saudi Arabia (250 billion barrels) has. This again explains the big powers' interest in the region.

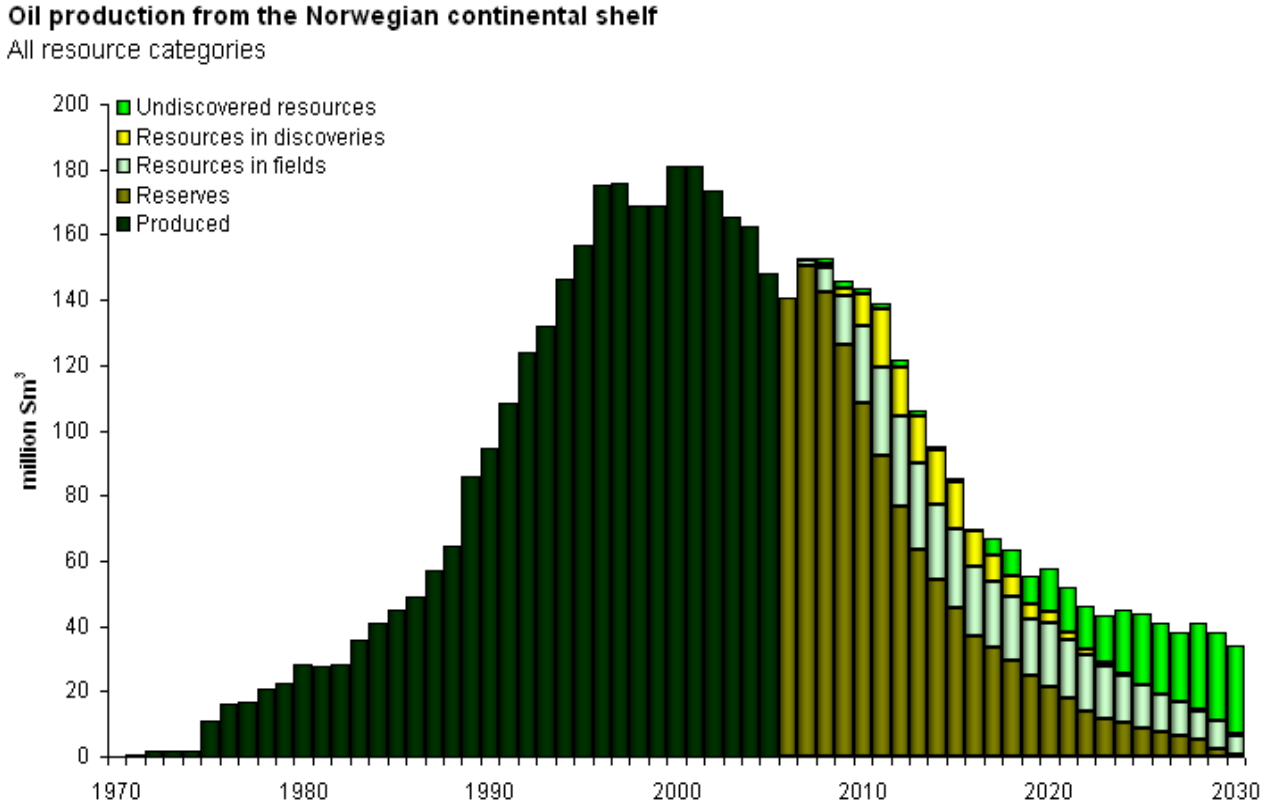
The total oil resources on the Norwegian continental shelf are calculated at 13 billion standard cubic metres of oil. 31% of these resources have already been used. Of the remaining 69%, almost one half is set for production. In total, nearly 40% of the discovered marketable oil resources on the Norwegian shelf have not yet been extracted. In addition, there are probably many undiscovered fields. The Norwegian Petroleum Directorate estimates that the undiscovered resources alone amount to 7.3 billion barrels of oil.[14] There is a high degree of uncertainty in this estimation, therefore the total resources are calculated to be somewhere between 10.6 and 16.9 billion cubic metres. Of these resources, 35% are sold and delivered, and the remaining 65% are distributed as follows: 28% are proven resources, 11% are contingent resources yet to be decided for development, and 26% are undiscovered resources. About half of the expected recoverable oil resources (including LNG and condensate) of a total 7.1 billion cubic metres have already been produced. Oil resources in fields amount to some 1 360 million cubic metres. In addition, the industry is expected to develop another 560 million cubic metres, using different measures to increase oil recovery, and to carry out development plans. The undiscovered oil resources amount to some 1,500 million cubic metres.

Until now, more than 4 000 billion cubic metres of recoverable gas reserves have been proven on the Norwegian continental shelf. In the

[13] USA Geological Service. Available on: <www.usgs.gov/>
[14] Oljedirektoratet (Norwegian Petroleum Directorate). Available on: <www.npd.no>.

future, another 2 000 billion cubic metres of gas is expected to be discovered. The question of how long gas production in Norway will last depends on the resource base, the authorities' framework conditions, the companies' will to identify and develop new discoveries, as well as the market demand for gas. In addition, large amounts of gas are reinjected into the reservoirs in order to increase oil recovery. This gas can be produced at a later stage.

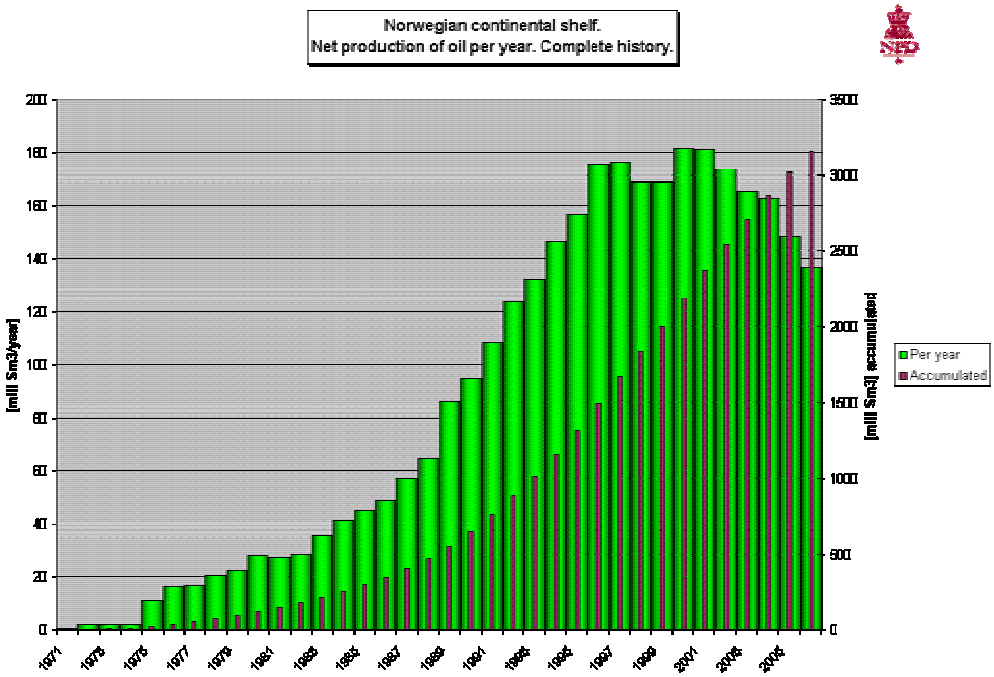
Figure 1. Developments in Norwegian oil production since 1970



Source: Norwegian Ministry of Petroleum and Energy. Available on: <www.regjeringen.no/nb/dep/oed, 2007>.

In Figure 2 we see clearly that Norwegian oil production has decreased by 28% from the year 2000. The total net petroleum production (oil, gas, LNG and condensate) has decreased since 2004.

Figure 2

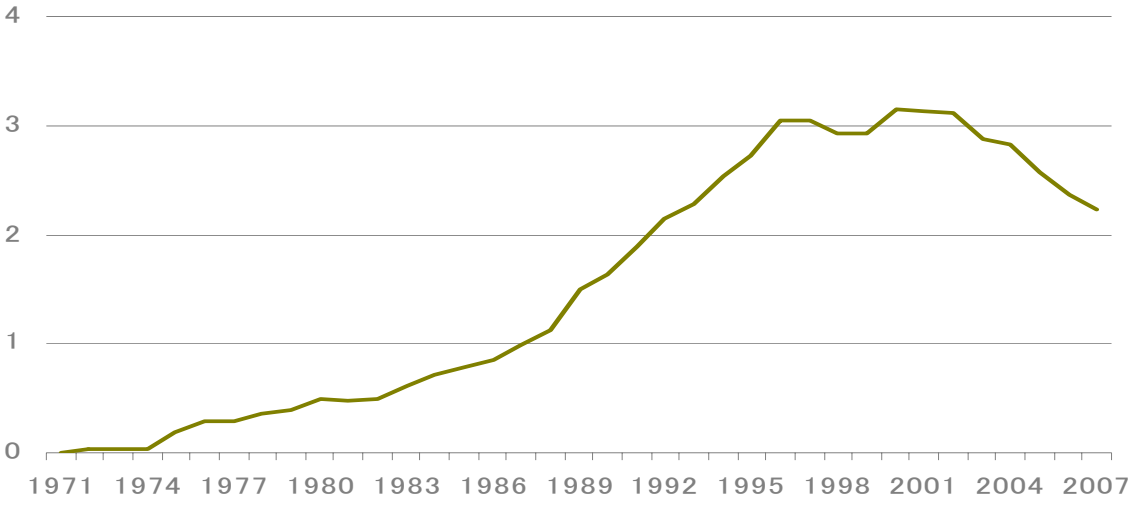


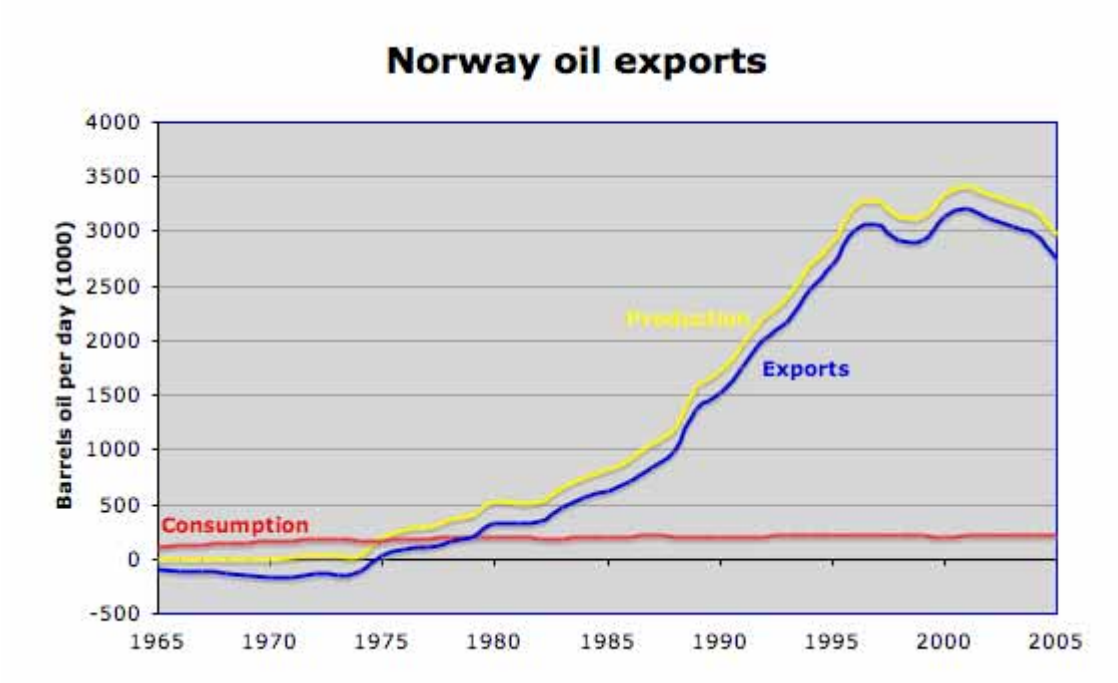
Source: Norwegian Petroleum Directorate, 12.07.2007.

Norwegian oil industry

Today, there are 51 active oil and gas fields on the Norwegian continental shelf, and even after 35 years of production, the Norwegian Petroleum Directorate believes that Ekofisk still has the largest reserves. In 2006, Norway produced 2.8 million bpd of oil, or 3.5% of world production, whereas exports amounted to 2.5 million bpd.

Figure 3. Norway: Production, consuption and exports





Source: The Oil Drum: Europe. Available on:
<europe.theoildrum.com/story/2006/9/22/95855/4850>

The export value of petroleum products amounted to more than NOK 511 billion in 2006. In 2007, the state's net cash flow from the petroleum sector was NOK 319 billion, and around 295 of that has been allocated to the Government Pension Fund-Global.[15]

As an important net exporter of oil, Norway shares common interests with the Organisation of the Petroleum Exporting Countries (OPEC) in the oil market, but OPEC membership has not been an issue for Norway. Norway is also a member of the International Energy Agency (IEA).

Sales of Norwegian crude oil

A main principle of the Norwegian marketing and sales policy has been that the sale of Norwegian oil shall be carried out by commercial companies, and be based on business criteria within the general framework established by the authorities. This means that the producers on the shelf sell crude oil at market conditions. The oil is transported by pipeline to on-shore terminals or buoy-loaded to tankers. The price depends on the situation in the oil market and the quality of the oil. The crude oil price is normally based on a reference price in the spot market. The price of oil from the British Brent field is a reference for crude oil from the North Sea

[15] As far as the situation looks now, Norway is going to possess 1% of the European actions, says the director of the Government Pension Fund-Global, Yngve Slyngstad. From 2009, the Fund will be able to possess 10% of any company (see: *Aftenposten*, January 30, 2008, p. 2).

basin. The different oil types are often marketed together as a blend, out of commercial and technical considerations. Both oil quality and flexibility as regard to loading and storage influence the actual sale price. The Norwegian authorities stipulate a norm price based on the companies' sales, which is used in the calculation of the petroleum tax.

Most oil companies on the Norwegian continental shelf are parts of corporations with a diversified global business portfolio. Produced petroleum is, therefore, largely sold to associated companies. It can often be a difficult task for the petroleum tax authorities to assess whether prices agreed between two parties are equal to what two independent parties would have agreed upon jointly for each individual sale. In order to avoid this problem, Section 4 of the Petroleum Tax Act[16] states that norm prices may be stipulated and used in the calculation of taxable income, instead of the actual sale price. The methods for stipulation and use of norm prices are described in the regulations. The norm price is fixed by the Norm Price Board, and should be equivalent to the price paid for the petroleum had it been traded between independent parties. The Norm Price Board has six members; four of them are independent, while the Ministry of Finance and the Ministry of Petroleum and Energy have two members each.

Norway does not just sell crude oil. Norway also has a refinery system. The Norwegian refinery industry consists of two refineries, Mongstad and Slagen. The Mongstad refinery is owned by StatoilHydro (79%) and Shell (21%), whereas ExxonMobil owns the Slagen refinery. The two refineries' capacities total approximately 300,000 barrels per day. Production at Mongstad is approximately double that of Slagen. The two refineries buy crude oil and sell products on the world market; thus the refineries do not necessarily process Norwegian oil. Most of the refineries' production is exported.

[16] LOV 1975-06-13 No. 35: Lov om skattlegging av undersjøiske petroleumsforekomster m.v. (Law on taxes on petroleum resources).

Norwegian gas production

As of today, Norway has exported more than 1 100 billion cubic metres of gas. Of the total expected recoverable resources of 6 000 billion cubic metres, only about 20% has been produced. Norway is relatively isolated in the Western world as far as its interests in high and stable natural gas prices are concerned. The price policy is shared with export countries, like Algeria and Russia. This requires a new dimension of foreign policy balancing of Norway's interests as a petroleum producer in relations with other countries. The oversupply of natural gas in a liberalised market would not be in Norway's interest. An unfavourable development in market liberalisation and increased natural gas excise taxes could lead to lower profits for producers and increase uncertainty as far as long-term investments are concerned. The economic profit resulting from the producer going directly to the Norwegian treasury becomes a conflict of concern for the Norwegian Government. Therefore, it is very important for Norway to follow the development of production in other gas exporting countries. It is a matter of high security. This could also lead to international conflicts. There is a need for strategic defence capabilities in order to not lose control over the Norwegian energy policy.

The Ministry of Petroleum and Energy plays an important role in establishing transport capacity and increasing system capacity. It is important to ensure efficient operation, including achieving economies of scale. Norwegian gas is mainly transported from the field to the consumer in pipelines. The authorities evaluate a number of transport alternatives, so that the selected solution is as robust as possible. Costs involved in constructing pipelines are considerable, and there are significant economies of scale involved in investment in the transport system. Current capacity in the Norwegian pipeline system is about 120 billion cubic metres. The Langeled pipeline was completed in October 2007 and has a total capacity equivalent to one-fifth of Great Britain's gas consumption. It is the world's longest offshore pipeline. There are four receiving terminals for Norwegian gas on the Continent (two in Germany, one in Belgium and one in France) and two receiving terminals in Great Britain. The Norwegian gas transport system is extensive and, following completion of Langeled, consists of a network of 7,800 km of pipelines. Treaties have been developed to govern rights and obligations between Norway and the countries that have landing sites for gas.

Map 2. Gas transport system

Source: Norwegian Ministry of Petroleum and Energy. Available on: <www.regjeringen.no/nb/dep/oed>.

Norway has made considerable investments in the production and transmission of natural gas over the past 20-30 years. To safeguard these investments, a number of long-term contracts have been entered into with continental transmission companies with so-called take-or-pay (TOP)

clauses. Natural gas customers (large industrial users and gas power plants, as well as local distribution companies) can in a liberalised market enter into new contracts with gas of another origin than what Norway has already sold to the transmission companies. The transmission companies have purchased the gas from Norway on long-term contracts under the assumption that they would re-sell it to these buyers. By splitting the transportation and sales functions of the transmission companies, and if their margins are lowered through competition or regulations, the companies may in a liberalised market be unable to fulfil their obligations towards the exporters. The wholesaler role of the transmission companies may then have to be assumed by the producers through a larger and more diversified contract portfolio directly to buyers to replace the "old gas" under take-or-pay agreements. Alternatively, transmission companies may go bankrupt if they are not freed from or are not able to renegotiate their commitments based on a force majeure. Such was the case in the US in the 1980s after the Open Access System was introduced and the excess supply of natural gas (the "gas bubble" [see: Austvik, 2003: 17]) that followed, due to the liberalisation of the market and the drop in oil prices. Over supply of gas in the short and medium term may lead to lower investments in new production (particularly large fields) and a lower supply of gas with consequentially higher prices in the long-term. The liberalisation process is already challenging the ways Norway organises the production, transportation and sale of gas. The important question is how Norway will organise the industry so that it does not appear to put Norwegian companies into competition with each other, which will then put downward pressure on prices in the market at the expense of long-term supply. At the same time, the organization has to be done in such a way that companies are allowed to reap the benefits of increased competition downstream. Generally, free competition between companies operating on the Norwegian continental shelf could contribute to a larger supply of natural gas on the market in the short and medium term with pressure pushing prices down, as compared to a situation that regulates the total supply of gas.

There are three central instruments in the Norwegian gas transport system: the operator Gassco, the coordinated ownership Gassled, and regulated conditions for access to the transport system. The Ministry of Petroleum and Energy assesses the use of these instruments in connection with the development of new infrastructure and when the use of the existing infrastructure is changed.

Gassco

Gassco AS[17] is the operating company for Gassled, which comprises most of the transport system on the Norwegian continental shelf. Gassco was established in 2001, and is wholly owned by the Norwegian state. Gassco is responsible for operations (the planning, monitoring, coordination and

[17] Gassco. Available on: <www.gassco.no/>.

administration of transport from the fields to the receiving terminals), allocation of capacity and development of the transport system. Gassco is contributing to the comprehensive development of Norwegian gas infrastructure. In cases where major developments are considered, this means that gas in addition to those fields that trigger transport needs has to be taken into consideration. Further development of gas infrastructure takes place in a manner that is expedient for the existing gas infrastructure on the Norwegian continental shelf.

A neutral company ensures that equal consideration is given to all parties involved in the submission of development alternatives for infrastructure, as well as the exploitation of economics of scale. Gassco's task is to coordinate the processes for further development of the upstream network of gas pipelines, and to assess the need for such further development. Gassco recommends solutions, but does not itself invest in infrastructure. Therefore, the independent operator of the gas transport system ensures that all users of the system are treated equally, both in regard to making use of the system and in the consideration of capacity increases. This is necessary in order to ensure efficient exploitation of resources on the continental shelf. Efficient exploitation of the existing gas transport system may also contribute to the reduction, or postponement of the need for new investments.

Gassled

The transport system for Norwegian gas, i.e., pipelines and terminals, is mainly owned by the Gassled partnership.[18] Gassled encompasses all rich and dry gas facilities that are currently in use or that are planned to be used by parties other than the owners (third party access). New pipelines and transport-related facilities are intended to be included in Gassled from the time they are used by third parties, and are thus part of the central upstream gas transport system.

Common ownership of the transport system ensures that the gas is transported as efficiently as possible. The greatest value is produced when conflicts of interest about which pipeline should be used to transport the gas is avoided. All licensees on the Norwegian continental shelf are responsible for selling their own gas. StatoilHydro sells the state's oil and gas together with its own petroleum, in accordance with the Ministry of Petroleum and Energy's instruction concerning the marketing and sale of oil and gas.

The pipeline system is a natural monopoly, with high, irrevocable investment costs and low operating costs. This is why gas transport tariffs are governed by special regulations issued by the Ministry of Petroleum and Energy. This ensures that the economic returns are earned from producing fields and not from the transportation system. The oil companies' access to capacity in the system is based on their needs for gas transport.

[18] Gassled. Available on: <energilink.tu.no/leksikon/gassled.aspx>.

In order to ensure good resource management, transport rights can be transferred between users when needs change. Gassco is responsible for allocating capacity.

Norwegian electrical power system

Norway has the world's largest per capita hydropower production, and is the sixth largest hydropower producer in the world. In a year with normal precipitation, hydropower generation is around 120 TWh, corresponding to approximately 99% of Norway's total electric power production. In addition to hydropower, Norway has wind power stations, thermal power plants, and is constructing gas-fired power plants. Total generation from the Norwegian electricity system in a normal year is now calculated to be about 121 TWh.[19]

The largest hydropower development projects were carried out between 1970 and 1985, when installed capacity increased by 10,730 MWh, or an average of 4.1% per year. Towards the end of the 1980s, Norway's rate of hydropower development declined. Since the beginning of the 1990s, the addition of new production capacity has been consistently low. Capacity increased by 800 MWh from 1993 to 2005. The increase in the 1990s was primarily due to the refurbishment and upgrading of old power stations, which resulted in better utilisation of existing power stations.

Hydropower generation can vary substantially from one year to another, depending on precipitation and inflow. Precipitation levels vary between regions, between seasons and between years. Inflow is high during the spring thaw, but normally decreases during summer and towards autumn. Autumn floods generally result in an increase before the onset of winter, when inflow is normally very low. The spring flood comes later in inland regions and in the mountains than near the coast and in lowland areas. Precipitation varies substantially from year to year and is more than twice as high in the wettest years as in the driest ones.

Many power plants can store water in reservoirs and are referred to as reservoir power plants. The reservoirs allow water to be retained in flood periods and released in drought periods, typically in the winter. Water is collected in the reservoirs when inflow is high and consumption low. Normally, water will be drawn off during autumn and winter, when electricity demand is the highest. In spring and summer, electricity demand reaches its lowest level, and the reservoirs refill. At the start of 2006, total energy capacity of Norway's reservoirs was about 84.3 TWh, which is equivalent to around two-thirds of the annual electricity consumption. Other types of hydropower plants instead utilise a large water volume with a small head, typical for a run-of-river power station. Since regulating the flow of water is

[19] Norwegian Ministry of Petroleum and Energy. Available on: <www.regjeringen.no/nb/dep/oed>.

difficult, it is generally used as and when available. Thus, the amount of electricity generated rises considerably in flood periods with snowmelt or when precipitation is very high. Most run-of-river power stations are situated in lowland areas.

Wind power is a variable energy source and unlike hydropower, cannot be regulated. Since such facilities necessarily operate when the wind is blowing, they can only cover a part of electricity needs. A wind power station consists of one or more wind turbines and the necessary electrical installations. When several turbines are installed, it is often called a wind farm. In practice, a wind turbine can utilise up to 40% of the kinetic energy of the wind that passes across the blades. The maximum theoretical energy utilisation rate is about 60%.

By the end of 2005, approximately 280 MWh of wind power was installed in Norway, distributed across 138 turbines. This represents a production capacity of around 0.85 TWh, which is equivalent to the electricity consumption of around 40,000 households. Some 507 GWh of wind power was generated in Norway during 2005. This was nearly double the previous year's generation. Report No. 29 to Parliament on energy policy (1998-99) set a target of building wind power stations with a generating capacity of 3 TWh by 2010.

Gas-fired power is often used as a general designation for all facilities that use natural gas to generate electricity and possibly heat. Several types of gas-fired power plants exist. One in which gas turbines generate all the electricity is known as a simple-cycle gas turbine station. Such facilities can be started up and shut down at short notice, and are therefore suitable for providing peak-load power. Running costs are relatively high. Plants of this type are currently found on fixed installations in the North Sea.

Electricity generation in gas turbines also produces heat. Combined cycle gas turbine stations and cogeneration plants (combined heat and power) use this heat, making them considerably more efficient than simple-cycle gas turbine units. In combined cycle power plants, steam turbines are used to generate electricity from the waste heat given off by the gas turbines. When used together, these turbines can give a net efficiency for electricity generation of up to 60%. A cogeneration facility produces both electricity and heat, for space heating for example. Surplus heat from steam turbines or in gas turbine exhaust fumes is carried to a heat distribution system. A cogeneration plant generates less electricity than a combined cycle gas turbine plant for the same level of gas consumption. However, it converts a larger proportion, over 80%, of the energy content of the gas to usable energy in the form of both electricity and heat.

The electrical power market

All generating companies supply electricity to the transmission or distribution network. Once delivery has been made, it is no longer possible to separate supplies from different generators. When a consumer turns on the electricity, it is impossible to say where the power originated. Electricity

prices are primarily determined by supply and demand in the Nordic power market. The Nordic countries' power systems are connected, and the countries' systems are mutually dependant. The market determines power prices, based on generation, transmission and consumption conditions in the Nordic region, and thus the price varies over time. The price of power also reflects possible congestion in transmission capacity between areas, but the price is equal in all areas of the Nordic region if there is no such congestion. Inflow to hydropower plants is of great importance for the determination of power prices, since hydropower represents such a large share of the Norwegian and Nordic power supply. In Norway, consumption is slightly higher than the power production in years with normal precipitation and temperature conditions, and this means that Norway is dependant on imports from abroad. In years with low inflow, the need for power imports is even higher. Temperature and weather conditions influence demand in the Nordic region and Europe in the short term, which also affects power prices. Periods with cold temperatures and high demand can especially result in higher power prices.

The power market is often divided into wholesale and retail markets.

The wholesale market includes generators, suppliers, big industrial enterprises and other large undertakings. Electricity is traded bilaterally between different market players and in the markets organised by the Nordic power exchange, Nord Pool. Currently, a number of companies trade standard bilateral contracts, but a growing proportion of contracts are traded in Nord Pool's markets. About 400 actors currently trade in one or more of Nord Pool's markets, and traded volume in the physical market totalled 251 TWh in 2006. The value of the physical trading volume increased by around 127% from 2005, and amounted to more than EUR 12 billion in 2006. Nord Pool's products are divided into three principal categories: the physical market, the financial market and clearing services.[20] For a power producer, the amount of electricity sold directly to clients at any time does not need to correspond to the amount generated. To maximise earnings, generators place the water in the reservoirs on the basis of the spot price at any given time and future price expectations. To ensure that output corresponds to sales commitments, generators can buy and sell power in the market, Nord Pool for instance.

Anyone who buys electricity for his or her own consumption is an end-user. Small end-users normally buy power from an electricity supply company. Larger end-users, such as industrial companies, often buy directly from the wholesale market. The total electricity price has several components: electricity price, transmission tariff, consumption tax (electricity tax), value added tax (VAT) and a levy on the transmission tariff earmarked for the Energy Fund. All end-users must pay a transmission tariff to the local grid company to which they are connected. The consumption tax is imposed on electricity that is consumed in Norway. Prices for private households were relatively stable from 1985 to 2002.

[20] Nord Pool. Available on: <www.nordpool.com>.

However, the cold winter in 1995-1996, combined with low inflow in 1996, resulted in a sharp rise in wholesale prices, which in turn led to an increase in household prices from 1996 to 1997. Precipitation was above normal every year from 1997 to 2000, with relatively high hydropower output. This was reflected in a general decline in prices over the whole period. Inflow to the reservoirs declined substantially in the autumn of 2002, which resulted in a significant increase in household prices for many in the beginning of 2003. A normalised reservoir situation resulted in declining prices later that year. Also in the last half of 2006, lower inflow led to higher prices in both the spot market and the end-user market. However, above-normal precipitation in the period from November to January resulted in falling prices in first quarter of 2007.

All end-users are free to choose electricity suppliers and contract types. The most common contracts for households have prices that vary according to market conditions. In 2006, 57.8% of households had contracts with variable prices, which meant that the power suppliers could change the price according to market conditions, given that they announce this two weeks in advance. 25.4% of households had Elspot-based contracts, for example a contract that charges the Elspot price plus a fixed mark-up. The remaining household customers had various types of fixed-price contracts. A fixed price, for example over one year, means that the power supplier cannot alter the price during the contract period, even if the market prices change. In 2006, 16.8% of household customers had this type of contract.

International electric power trading

Norway was traditionally a net exporter of electric power. However, in the late 1990s consumption of electricity rose faster than the power supply, as hydropower development has been limited in recent times. Thus, Norway has on average been a net importer ever since. In certain years, however, high precipitation and inflow to reservoirs can result in exports exceeding imports. For example, Norwegian net power exports totalled 9.7 TWh in 2002, while Norway had a net import situation in the following year that amounted to 7.8 TWh. In 2005, the net export was around 12.2 TWh.[21]

International electric power trading is determined by generating and consumption patterns in each country, in addition to the capacity on the interconnectors and the conditions for their use. The motive for power trading is the opportunities it offers countries to derive mutual benefit from differences in national generating systems. Exchanging power is important for Norway, because it reduces the country's vulnerability to variations in precipitation and inflow and makes use of the regulatory capacity of hydro-power. The opportunity to exchange power moderates Norway's need to maintain a large domestic reserve capacity as an insurance against dry years, and is important to ensure security of supply.

[21] Norwegian Ministry of Petroleum and Energy. Available on: <www.regjeringen.no/nb/dep/oed>.

Norway has interconnectors towards Sweden, Denmark, Finland and Russia. The transmission capacities towards Finland and Russia are low, and the connection with Russia is used only for imports to Norway. The highest transmission capacity from Norway goes towards Sweden, at about 3600 MWh, while capacity in the other direction is somewhat lower. Capacity between Norway and Denmark is about 1000 MWh. The specified transmission capacity on the interconnectors is what the system operators consider to be realistic for large parts of the year. However, estimates indicate that if this capacity were fully utilised, it would be theoretically possible to exchange almost 20 TWh per year between Norway and neighbouring countries. A new interconnector between the Netherlands and Norway was put into place at the end of 2007.

Owners and organization in the electric power sector

The electric power supply sector is organised in various ways around electricity generation, transmission and trading activities. Depending on which activity is being pursued, the companies can be designated as generating companies, network companies, power suppliers or vertically integrated companies. In some cases, they are described collectively as energy utilities. In addition, some companies are brokers or traders of electricity contracts.

As of 2006, a total of 345 companies carried out one or several of these activities. Of these, 84 companies have trading as their only activity, 47 are pure network companies, and 47 are engaged solely in generation. The remaining 167 companies have two or several activities within generation, trading and/or networks.

Table 1 shows companies' ownership. 232 are wholly or partly owned by local authorities, and 143 of these are wholly owned by local authorities. A company that is wholly local-authority-owned may nevertheless have several local authorities as shareholders. Many companies have several owners, and cross-ownership is on the rise in this sector. Foreign ownership is relatively limited in the Norwegian electric power supply sector, but there are some foreign companies present in Norway. These concentrate mainly on the wholesale and spot markets.

Table 1. Ownership as of January 1, 2006

Ownership	Stake	Sole owner
Local authorities	232	143
County municipality	35	12
Central government	28	9
Private	159	83

Source: Norwegian Water Resources and Energy Directorate. Available on: <www.nve.no/modules/module_109/publisher_view_product.asp>

Local authorities and county councils own around 50% of Norway's electricity generation capacity. The government, through Statkraft AS, owns about 30%, and private companies roughly 13%. The 10 largest generating

companies in Norway account for nearly 70% of the country's total average production, and make up about the same proportion of installed capacity.

As far as the transmission grid is concerned, the government owns a large proportion of the centrale grid through Statnett SF, whereas private companies, counties and local authorities own the remainder. Local authorities and county councils own most of the regional and distribution grids. Since the Energy Act[22] came into effect on January 1, 1991, many power utilities have converted from local authority ownership to limited companies, which now represent 74% of all companies in the Norwegian electric power sector. Limited companies must keep accounts in accordance with the Accounting Act, and a limited company also allows owners to restrict their personal financial liability. They are liable for their share of the paid-up capital, but not for any company debts. Companies owned by counties or local authorities, on the other hand, have unlimited liability for all their operations, including debts.

Table 2.
The 10 largest power producers in Norway, as of January 1, 2006

Production company	Mean annual production (TWh)	Market share (%)	MWh	Installed capacity (%)
Statkraft Energi AS/Statkraft SF	35.9	30.0	8 677	30.7
BKK Produksjon AS	6.9	5.8	1 612	5.7
Norsk Hydro ASA	6.9	5.8	1 527	5.4
E-CO Vannkraft AS	6.8	5.6	1 887	6.7
Lyse Produksjon AS	5.9	4.9	1 544	5.5
Agder Energi Produksjon AS	5.6	4.7	1 188	4.2
Skagerak Kraft AS	4.0	3.4	1 056	3.7
Nord-Trøndelag Elektrisitetsverk FKF	3.3	2.8	744	2.6
Trondheim Energiverk Kraft AS	3.2	2.7	746	2.6
Otra Kraft AS	2.6	2.2	870	3.1

The table does not include stakes in other companies, with the exception of Norsk Hydro, where the figures include Norsk Hydro Produksjon AS and Norsk Hydro ASA.
Source: Norwegian Water Resources and Energy Directorate. Available on: <www.nve.no/modules/module_109/publisher_view_product.asp>

StatoilHydro

A new chapter in the Norwegian oil adventure is *StatoilHydro ASA*. The company was established on October 1, 2007, when Norsk Hydro sold its

[22] LOV 1990-06-29 No. 50: Lov om produksjon, omforming, overføring, omsetning, fordeling og bruk av energi m.m. (energiloven) (Law on production, transformation, trade, distribution and use of energy [Energy Law]). Available on: <www.lovdata.no/all/hl-19900629-050.html>.

oil and gas division to its larger Norwegian rival Statoil.[23] The new company has more than 30 years of experience on the Norwegian continental shelf and it is today the largest operator on it, accounting for 60% of total production. It is the world's largest underwater operator, active in waters more than 100 metres deep. The company is a world leader in carbon capture and storage and a leading player in sub-sea development. It operates 39 producing oil and gas fields. Its daily oil and gas production averages more than 1.7 million bpd. It is the biggest seller of oil products in Scandinavia and one of the world's largest crude oil and gas suppliers. StatoilHydro is the second largest supplier of natural gas to Europe. The new company is the ninth largest oil company in the world and the 48th largest company in the world on the current Fortune Global 500 list with a revenue of NOK 480 billion. It has about 31,000 employees in 40 countries. It is listed on the Oslo Stock Exchange (ticker: STL) and New York Stock Exchange (ticker: STO). Statoil's shareholders hold 67.3% of the new company and Norsk Hydro shareholders own the remaining 32.7%. The Norwegian government, the biggest shareholder in both Statoil and Norsk Hydro, holds 62.5% of the company.

The operated fields of StatoilHydro are Glitne, Gullfaks, Heidrun, Huldra, Kristin, Kvitebjørn, Mikkel, Norne, Ormen Lange, Sleipner, Snorre, Snøhvit, Statfjord, Sygna, Tordis, Troll, Veslefrikk, Vigdis, Visund, Volve and Åsgard. The company also has processing plants at Kolsnes, Kårstø, Mongstad, Tjeldbergodden and Melkøya. In addition to the Norwegian continental shelf, StatoilHydro operates oil and gas fields in Algeria, Angola, Azerbaijan, Brazil, Canada, China, Iran, Libya, Nigeria, Russia, the US and Venezuela. StatoilHydro is looking currently for possible ventures in countries such as Egypt, Mexico, Qatar and the United Arab Emirates. The company has processing plants in Belgium, Denmark, France and Germany. StatoilHydro is involved in a number of pipelines, including Zeepipe, Statpipe, Europipe I and Europipe II, and Franpipe from the Norwegian continental shelf to Western Europe in addition to the Baku-Tbilisi-Ceyhan pipeline in Central Asia. The pipelines from Norway are organised through Gassled. The company has trading offices for crude oil, refined petroleum products and natural gas liquids in London, Stamford and Singapore. The company operates three brands of fuel stations: Statoil, Hydro and 1-2-3. StatoilHydro operates petrol station services in Denmark, Estonia, Ireland, Latvia, Lithuania, Norway, Poland, Russia and Sweden. Some fully automated stations are branded 1-2-3. In Sweden, the company also operates Hydro stations. In total, StatoilHydro has about 2,000 fuelling stations. StatoilHydro is also a significant provider of electricity, owning and managing 2,000 petrol stations in 9 countries (Scandinavia and Eastern Europe) and is present in petrochemistry: it operates a methanol plant, which is a raw material in the chemical industry, and is also used for fuel. The group is also implementing such big projects as the underwater network of pipelines crossing continental Europe, or the Åsgard offshore exploration platform. The Group's principal activities are to explore,

[23] StatoilHydro. Available on: <www.statoilhydro.com>

produce, transport, refine and market petroleum and petroleum-derived products. The Group operates in four segments: Exploration and Production Norway, International Exploration and Production, Natural Gas and Manufacturing, and the Marketing Group. Exploration and Production Norway includes exploration, development and production of oil and gas on the Norwegian continental shelf. International Exploration and Production includes all upstream related activities of exploration, development and production operations outside Norway. The Natural Gas division transports, processes and markets oil and gas to European destinations. The Manufacturing and Marketing division comprises downstream activities including sales and trading of crude oil, LNG and petroleum products, refining, methanol production, retail and industrial marketing of oil. The company has proven reserves of over 6 billion barrels of oil equivalent.

StatoilHydro Venture is a venture capital investment arm of StatoilHydro ASA specialising in start-up investments. It primarily invests in technology companies with a focus on oil and gas, and new energies. Within oil and gas, the firm focuses on exploration, reservoir management, gas chain technology, sub-sea field development, and environmental technologies. Its investment in new energy includes biofuels, solar, marine renewables (wave/tidal), wind, geothermal, hydrogen production and storage, energy efficiency technologies, and CO_2 capture and storage. The firm has no geographical restrictions for new investments; however, its main focus of current investment is Europe and North America. It typically invests between NOK 10 million and NOK 50 million in its portfolio companies and may also co-invest with other firms. The firm takes minority positions in its portfolio companies, typically an interest of 10% to 40% and also seeks board directorships. It seeks to pull its investment out within three to six years.

StatoilHydro ASA net profit for the first quarter of 2008 was NOK 16.04 billion, much higher compared to NOK 9.93 billion in the first quarter of 2007 (May 13, 2008). The net operating profit amounted to NOK 51.44 billion, as compared to NOK 34.46 billion in the first quarter of 2007. The earnings increase was mainly due to higher oil and natural gas prices, lower inventory write-downs, asset sales gains and currency gains. The increase was somewhat tempered by increased exploration costs. StatoilHydro was announced on July 4, 2008 as the largest company in the North for 2007 according to its turnover.[24]

But what is the history behind this big success? The proposal for the Statoil and Norsk Hydro merger was announced in December 2006. Under the rules of the EEA, the merger was approved by the EU on May 3, 2007 and by the Norwegian Parliament on June 8, 2007.

Statoil (Den Norske Stats Oljeselskap A/S) was founded as a private limited company owned by the government of Norway on July 14, 1972. This was politically motivated by a desire for Norwegian participation

[24] According to a report by the business information company Nordic Netproducts. Available on: <www.nordicnet.net/>, July 4, 2008.

in the oil industry on the continental shelf and to build up Norwegian competency within the petroleum industry and to establish the foundations of a domestic industry. In 1973, the company started work in the petrochemical industry. This resulted in the development of processing plants in Rafsnes and, in partnership with Norsk Hydro, the Mongstad plant in 1980. In 1981, the company acquired, as the first Norwegian company, operator rights on the Norwegian continental shelf for the Gullfaks field. In 2001, Statoil was privatised and became a public limited company, and was listed on both the Oslo Stock Exchange and the New York Stock Exchange. At the same time, it changed its name to Statoil ASA. The Government still retained a majority ownership in the company. In 2007, Statoil bought a large area in the Athabasca oil sand field in Canada after purchasing North American Oil Sands Corporation for USD 2.2 billion. The platform Troll, located in the North Sea, had a production capacity of 1,300 billion cubic metres of natural gas. In 2006, Statoil was approved to undertake the world's largest project to implement carbon sequestration as a means to mitigate carbon emissions to the atmosphere.

Norsk Hydro ASA was a Norwegian aluminium and renewable energy company. The company was founded on December 2, 1905 as Norsk hydro-elektrisk Kvælstofaktieselskab (Norwegian hydro-electric nitrogen limited) with the financial support of the Swedish Wallenberg family and French banks. In 1965, Hydro joined Elf Aquitaine and six other French companies to form Petronord to search for oil and gas in the North Sea. Hydro soon became a major company in the North Sea petroleum industry, and also became operator of a number of fields, the first being Oseberg. In 1999, Hydro acquired Norway's third largest petroleum company Saga Petroleum, who had major upstream operations primarily in Norway and Great Britain. The British operations were later sold. Hydro was the fourth largest integrated aluminium company worldwide. It had operations in some 40 countries around the world and was active on all continents. The Norwegian state held a 43.8% ownership interest in the company, which employed approximately 28,000 people. The company had a significant presence in oil and gas fields. Norsk Hydro was also a major producer of wind and hydroelectric power.

StatoilHydro's recent developments

StatoilHydro joined the USD 30 billion Russian gas project Stockman in the Barents Sea together with Russia's gas monopoly *Gazprom* and France's Total SA on October 25, 2007. StatoilHydro[25] took a 24% stake in an operating company that will plan, finance and build the first stage of the technically daunting Stockman gas field, which can eventually produce up to 100 billion cubic metres of gas per year. The US Houston-based ConocoPhillips was a contender for the stake. France's Total SA has a 25% stake in the operating company, while state-controlled OAO Gazprom keeps 51%. Gazprom will also retain ownership of Stockman's reserves,

[25] StatoilHydro. Available on: <www.statoilhydro.com >

estimated at 3.7 trillion cubic metres of gas (the equivalent of six years of Russia's current annual production and 3 or 4 times as big as the Norwegian Troll) and 31 million cubic metres of condensate gas. Stockman's reserves represent more than all of Canada's gas reserves and much more than the Netherlands' Groening. It is, thus, one of the largest gas fields in the world. Stockman can be a very important gas provider to Europe and the world in the long-term. Russia currently provides 30% of the EU's oil imports and 42% of its natural gas imports. Gazprom affirmed in a statement that the first shipments of Stockman gas would be made in 2013, when production would reach 23.7 billion cubic metres. The field is projected to have an active life of more than 50 years, with gas output peaking at some 97 billion cubic metres for 25 years, according to ZAO Sevmorneftegaz, the Gazprom-controlled company that owns the license to the field.[26] The world's largest gas field will be constructed in a record period. In September 2008, construction should begin in order to deliver the first gas by 2013 and LNG by 2014.[27] The second stage is 2016 and the third one by 2020. More than 40 Norwegian companies are established in Murmansk. First, a pipeline will be built from the Kola Peninsula to the Russian Baltic coast. The gas from Stockman will be directed through the Nord Stream pipeline to Greifswald in North Germany. Then, a LNG plant will be built in the village of Teriberka, northwest of Murmansk. The whole project is, however, very demanding.

There is also alarming news concerning this project. Gazprom, StatoilHydro and Total could pull out of the Stockman Development Co. before a final development decision is made in late 2009, according to the *Scandinavian Oil and Gas Magazine.*[28] The reason is that the criteria for hiring contractors — Russian or foreign — remain unsettled. About 100 sub-contractors in Murmansk and Archangelsk Oblast have been identified, while roughly 350 companies in northern Norway are considered possible Stockman contractors.

- With the opening of the liquefaction and export plant at Melkøya in Northern Norway in 2007, Norwegian gas now reaches markets outside Europe for the first time. *Snøhvit*, the first offshore field in the Barents Sea, in the Hammerfest Basin, located at a depth of 340 metres and developed by StatoilHydro, is Europe's first LNG[29] export facility, and has an annual capacity of 5.7 billion cubic metres. It contains condensate and an underlying oil zone. The production facility consists of 19 production wells and a CO_2 injection well. There are 160 billion cubic metres of recoverable gas

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[26] Акционерное Общество "Севморнефтегаз" (Action company "Sevmorneftegaz"). Available on: <www.sevmorneftegaz.ru>, April 15, 2008.
[27] *Aftenposten*, May 26, 2008, p. 6.
[28] *Barents Observer*. Available on: <www.barentsobserver.com/statoilhydro-total-could-pull-out-of-shtokman.4479014-16178.html> - 28.04.08.
[29] Norwegian Ministry of Petroleum and Energy. Available on: <www.regjeringen.no/nb/dep/oed.html?id=750>.

reserves. The untreated well stream is directed through a 160 km-long pipeline to the facility at Melkøya, where the gas is processed and cooled to liquefied form. A cooling process transforms natural gas into fluid gas at minus 163 degrees under normal atmospheric pressure. The CO_2 in the gas is extracted and sent back to the field to be reinjected. The company had to develop much of the technology needed to produce the gas in harsh Arctic conditions, and in an environment similar to Stockman. The project has no facilities above the ocean surface and is remotely controlled from land. Stockman gas was first delivered to the North American market in liquefied form by ship in October 2007. This is the first transatlantic project.[30]

- In taking over Norsk Hydro's oil and gas unit, the new StatoilHydro also acquired the technology and expertise that went into building the giant *Ormen Lange* natural gas field in the Norwegian Sea, in which all of the installations are underwater and had to be placed on the extremely steep and uneven area of the sea floor in order to be able to withstand exceptional currents, extreme wind and wave conditions, and subzero temperatures on the sea floor.[31] Ormen Lange is located at depths of between 800 and 1,100 metres off the coast of mid-Norway. It contains 375 billion cubic metres of gas. Twenty-four wells are planned for Ormen Lange, in four seabed templates. The untreated well stream will be directed through two multiphase pipes to an onshore facility at Nyhavna, where the gas will be dried and compressed before being sent 1,200 km to Great Britain through the world's longest offshore gas export pipeline.

- The Norwegian Petroleum Directorate has confirmed a new oil discovery by StatoilHydro in the *Barents Sea*. The company has found oil 65 km north of the city of Honningsvåg. The find may be larger than the Goliath oil field and could mark the beginning of a real petroleum boom for the far north of the country. The new StatoilHydro field could contain as much as 300-350 million barrels of oil, compared to the Goliath field's 250 million. The two fields are only 45 km away from each other.[32]

- StatoilHydro has confirmed the existence of gas in the *Ververis prospect in the Barents Sea*, whereas an exploration well in the Stetind prospect in the Norwegian Sea

[30] *Innovasjon Norge* (*Innovation Norway*). Available on: <www.innovasjonnorge.no>.
[31] Ormen Lange. Available on: <www.norsk-hydro.com/ormenlange/no>.
[32] Available on: <ec.europa.eu/trade/issues/bilateral/countries/norway/index_en.htm>, 9.04.08.

turned out to be dry. This was the 13th discovery on the Norwegian continental shelf that StatoilHydro was involved in 2008. Ververis is the first well in production licence 395, which was awarded in the 19th licensing round in 2006. The licensees in production licence 395 are: StatoilHydro ASA (operator, 50%), BG Norge AS (30%), Petoro AS (20%).[33]

- It is estimated that the areas surrounding the *Lofoten and Vesterålen archipelago* in Northern Norway contain oil and gas resources with a value between EUR 10 and 15 billion.[34] However, the Norwegian fishing industry will fight hard to keep the petroleum industry away from the area. The areas surrounding the Lofoten and Vesterålen archipelago are preserved from any petroleum activity, but the petroleum industry would like this to be changed. Their demand will probably not be helped by the recently released estimates of the undeveloped values, which can be found in these areas. The consulting firm Econ estimates the reserves in the area to be around two billion barrels of oil and gas, with a total value of EUR 12-15 billion. The local coast fishing association says that this area should be the last opened up for petroleum development. Their opinion is that Norway is extremely wealthy and invests its wealth in all kinds of useless projects around the world, instead of conserving a renewable resource like fish.

- The expected developments seem to be as follows: production starts-up at Tordis IOR, Njord Gas, Volve and Marimba; production ramp-ups at Snøhvit and Ormen Lange and restarts at Kvitebjørn. StatoilHydro also has a new plan for the development and operation of the Troll field in order to ensure the long-term management of the oil and gas reserves in Norway's largest gas field. It has to improve oil recovery on Troll West, while providing for continuation of the current gas export capacity from Troll East of 120 million standard cubic metres per day.[35] StatoilHydro has decided to build the world's first full scale floating wind turbine, Hywind, and test it over a two-year period offshore Karmøy. The company is investing approximately NOK 400 million. Planned start-up is autumn 2009.[36]

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[33] *Oil Voice*. Available on: <www.oilvoice.com>, July 4, 2008.
[34] *Barents Observer*. Available on: <www.barentsobserver.com/resources-worth-12-5-billion-eur-in-lofoten.4476512-16178.html> - 21.04.08.
[35] *Oil Voice*. Available on: <www.oilvoice.com>, June 27, 2008.
[36] StatoilHydro. Available on: <www.statoilhydro.com/en/NewsAndMedia/News/2008/Pages/hywind_fullscale.aspx>, May 22, 2008.

Norwegian green energy policy

The Ministry of Petroleum and Energy presented on February 5, 2008 a strategy document *Energi21* that is likely to have a decisive impact on Norwegian energy research.[37] The objective of the strategy is to provide a secure platform for the growth of sustainable economic activity and supply-side security in the energy sector by promoting and coordinating a commitment to research, development, demonstration and commercialisation of new technology. Energi21 addresses topics relevant to stationary production of energy, energy transport and energy use.

Green energy: wind, sun and water

Oil, gas and coal will in the future cover 80-85% of energy demand but it is also expected that wind, water and sun will cover 8-9% (the rest will be nuclear power). Norway has Europe's best wind conditions. Wind, sun and water are very significant resources for Norway and, thus, Norway could become a green energy supplier for Europe. Norway intends to double the present day production of renewable energy during the next 20 years. 1400 TWh is a reality, but today it stands at just 125 TWh.[38] It is not possible to store wind and sun energy at the same time, therefore the wind will be used when it is available and water when necessary. The Norwegian water deposit is one of the best stores in the world and water can also be pumped back into the deposit. Investments in wind power have increased by 30% every half a year for the last 10 years. The results are evident only in some countries such as Denmark (16%), Spain (8%) and Germany (5%). Despite the success, wind power covers only 0,7% of energy demand at the global scale.[39] The Norwegian-Danish Force Technology is currently launching a new type of liquid sea windmill, which could be placed anywhere from 40 metres depth and above.[40]

The Norwegian *Statkraft* is becoming more and more internationalised in its hydropower policy. It is the leading producer of renewable energy in Europe, administrating 135 Norwegian hydropower

[37] Energi21. Available on: <www.energi21.no>
[38] Sverre Gotaas, Statkraft, Energy 21, February 6, 2008. Available on: <www.aftenbladet.no/energi/fornybar/article591490.ece>.
[39] Available on: <www.vindkraft.no/vindkraftmyter/>.
[40] "Havmøllen som slepes til kais" ("Sea windmill sent to quays"), February 6, 2008. Available on: <aftenbladet.no/energi/fornybar/article591492.ece>.

stations, three wind parks and a new gas power station beginning in autumn 2008. Its latest projects are oriented towards southeastern Europe. A new hydropower project was launched in Bosnia-Herzegovina. Statkraft Western Balkans was formally established in 2007 and officially opened in Serbia on January 31, 2008. The necessity for energy in the region is greatly increasing and at the same time the hydropower potential is quite significant. Statkraft also signed a contract with the government of the Republic Srpaka in Bosnia-Herzegovina concerning major cooperation in the energy sector. Four hydroelectric power stations will be developed on the lower part of the Vrbas River. The project has an expected output of 75 MWh and a yearly production capacity of 450 GWh. 100 million euros will be invested in this project.[41]

The company *Enova SF* was officially created on June 22, 2001 and became operational on January 1, 2002. Enova SF is a public enterprise owned by the Ministry of Petroleum and Energy. Enova SF's main objective is to contribute to environmentally friendly and rational use and production of energy, relying on financial instruments and incentives to stimulate market actors and mechanisms to achieve national energy policy goals. The establishment of Enova SF is a shift in Norway's organization and in the implementation of its energy efficiency and renewable energy policy. By bringing together many strategic policy undertakings into this one company, Norway wanted to create an agency that has the capacity to stimulate energy efficiency by motivating cost-effective and environmentally sound investment decisions. Enova SF enjoys considerable freedom regarding its strategic policy.

Enova SF advises the Ministry of Petroleum and Energy in questions relating to energy efficiency and new renewable energy. The goal of Enova is to attain 3TWh wind capacity by 2010. Starting in 2001, Enova has supported 10 power plants with an early contract production of 1,4 TWh. In order to achieve the final goal, there is a need of 1,6 TWh more.[42]

Only 80% of energy produced in Norway in 2007 is from hydropower. It represents 11% less than in 2005, according to the Norwegian Water Resources and Energy Directorate.[43] In 2007, Norwegian hydropower producers earned NOK 26 million on the sale of so-called guarantees of origin to foreign traders. In some years, these guarantees of origin can bring in billions of NOK. Brussels is following this process very attentively and is developing a system that would revise the guarantees of origin for Norwegian hydropower projects.

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[41] Available on: <www.elektronett.no>.

[42] Enova. Available on: <www.regjeringen.no/en/dep/oed/Whats-new/News/2008/nytt-vindkraftprogram.html?id=508489>, April 21, 2008.

[43] Norges Vassdrags- og Energidirektorat (Norwegian Water Resources and Energy Directorate). Available on: <www.nve.no/modules/module_111/news_group_view.asp?iCategoryid=623&lang=e>.

When a Norwegian *hydropower* producer sells "guarantees of origin", which guarantees that the buyer has bought good Norwegian hydropower, Norwegian electricity consumption automatically uses less wind power. But this is only on paper. The part of renewable energy is still lower than in reality. This makes it difficult for the Norwegian companies to keep positive climate accounts. In 2007, Norway produced more renewable energy than it used, but at the same time renewable energy does not make up more than 82% in the Norwegian Water Resources and Energy Directorate's so-called commodity declaration on national consumption. The reason is that energy producers earned money through the export of the guarantees of origin to foreign countries (which are renewable energy certificates that are available to producers of renewable energy). Even if the price is quite low today, the market is still in development and the Norwegian wind power proprietors see, by selling such guarantees of origin, a future "gold mine" in Norway. If Norwegian energy producers continue to sell the guarantees of origin for a year of Norwegian hydropower production, billions will come in. And if the payment willingness for a guarantee of origin increases by 20%, this translates into increased revenue per year of about NOK 7.5 billion going directly into the pockets of Norwegian hydropower producers. But the situation is not yet so bright. The new EU directive for renewable energy suggests that a power plant established before the directive comes into force in 2010 does not have the right to export guarantees of origin. Thus, Norwegian hydropower producers risk being excluded from that market. But the new "gold mine" has another aspect. Investing more money in old power plants does not lead to more engagement for renewable energy production, such as wind and sun power. The money goes directly in the pockets of the energy producers, as there is no obligation to invest in new types of renewable energy production. In reality, it means that the producers rake in money by maintaining the status quo of renewable energy production. The large number of hydropower producers inundates the market with guarantees of origin, which implies that the prices for guarantees remain too low and this does not lead to renewable energy investments. Even if a Norwegian industrial company in practice uses 95% of renewable energy in its production, it can credit only 82% renewable energy consumption in its climate accounts. This is because Norwegian hydropower producers have already exported the guarantees of origin to foreign countries, which have to be drawn from the total Norwegian energy consumption. Thus, Norwegian industry and Norwegian consumers are on paper less environmentally friendly than in reality. In order to compensate for the foreign sale of guarantees of origin, Norway has to buy CO_2 quotas, or avoid guarantees of origin contracts. Companies' efforts to reduce CO_2 is not taken into account by the energy producers in the export of guarantees of origin, when they decide upon how much renewable energy is accessible in Norway. The critique is that the physical consumers of renewable energy have to decide themselves how climate friendly the enterprises in Norway should be and not prioritise the export of guarantees of origin.

In Norway, wind power has always been a natural good. In Europe, one is not used to having such large access to renewable energy; that is why the willingness to pay is higher. At the same time, foreign consumers

make off with the entire environmental impact of Norwegian hydropower, if the Norwegian consumers and enterprises pay more for the same current. There is too much supply of guarantees of origin on the market and not enough demand. This drags prices down and does not lead to investments in renewable energy production. It is quite a challenge to explain to consumers that they have to pay more for renewable energy, when the money does not go to the production of new plants. When the export of guarantees of origin increases, the Norwegian CO_2 imprint is also increasing, if the Norwegians do not buy the guarantees of origin energy themselves. When a foreign company buys a guarantee of origin from a Norwegian energy producer, the CO_2 imprint increases for the Norwegian companies, which do not have guarantees of origin energy contracts, but the foreign companies reduce their CO_2 imprint at the same time. Trade with the guarantees of origin aims to build renewable energy production, such as wind and sun power. However, this goal has not yet been achieved.

Hydropower plants are today facing many challenges. Many people even question their very value. The visual aspect of nature is a reversible situation, compared to climate change and the extermination of species. The preservation of natural variety, especially birds, has to be taken more into consideration. The goal is to produce 3 TWh by 2010. This could lead to major natural encroachment and Norway is not (yet) experiencing an energy crisis. Norway has already planned 130 projects. 17 have begun their activities. 11 are directed by the Ministry of Petroleum and Energy.[44]

Biofuel is very *à la mode* today

The only problem is that to produce it, one has to use resources such as corn and rapeseed, which could otherwise be used for food. The Norwegian Government wants to increase by up to 7% the total volume of biofuel used by 2010. Recently, because of the world food crisis, the government has begun to revise this goal, but the need for biofuel will in any case increase over the next few years because of the need to reduce CO_2 emissions. On April 1, 2008, the government presented its "Strategy for Increased Expansion of Bioenergy."[45] It says that second generation biofuels will not be produced from food, but from food waste, forestry rests, cow pat, rot, etc. There is also a big potential in marine resources, like algae and tangle. *Sea tangle* could be used as a raw material for bioethanol. Norway has worked during the last 35 years in this area and harvests amount to 170,000 tonnes of tangle annually. But in order to produce bioethanol out of tangle, one cannot just harvest it; there is a need for cultivation. To cultivate tangle, one needs nitrogen and sollys. There is enough nitrogen in its natural form in the sea. The production of bioethanol

[44] Norwegian Ministry of Petroleum and Energy. Available on: <www.regjeringen.no/nb/dep>.

[45] Norwegian Government. Available on: <www.regjeringen.no/nb/dep/oed/dok/rapporter_planer/rapporter/2008/strategi-for-okt-utbygging-av-bioenergi.html?id=505401>, April 1, 2008.

based on tangle is CO_2 neutral. Japan and Denmark already have plans to produce bioethanol out of tangle. Japan has the intention to produce raw material for bioethanol, which will constitute one-third of the fuel used in the country. Norway has the entire necessary infrastructure for the production and transport of tangle. It now just needs to start.

CO_2 capture technology in Norway is today experiencing a breakthrough

A small Norwegian company, Sargas, has developed new technology for CO_2 capture, and is now ready for an international launch of the technology in Hammerfest on the Barents Sea coast. Recent test results from a coal fired test plant outside Stockholm in Sweden were remarkable, with the hope to capture between 90% and 95% of the CO_2. The effect is apparently even better with gas-fired power plants. The company Hammerfest Energy, which runs the gas-fired power station at the Snøhvit LNG-plant, is one of Sargas' two partners in Norway. Hammerfest Energy is ready to make use of the technology as soon as the testing is finished. A pipeline that will transport CO_2 from the power station at Melkøya to deposit it at the Snøhvit gas field is already in place.[46]

[46] Barents Observer. Available on: <www.barentsobserver.com/co2-capture-technology-breakthrough.4477875-16178.html> - 24.04.08.

The European strategic gas and oil market

Modern society is very much dependent upon oil and gas resources. They represent its "oxygen." There is an ongoing liberalisation of European oil and gas markets and Norway has a very important role in this process as a major oil and gas exporter. The liberalisation of a market for non-renewable resources like natural gas and oil presents substantial challenges for the regulator as well as for the regulated. The production of oil and gas depends upon the economy, technology and new findings. The optimists expect "peak oil" by 2025-2035,[47] while the pessimists think it is already happening now. The rent to be distributed in the gas chain, for example, will make the European gas market much more politicised than most other markets for the foreseeable future. The EU has the aim of reducing its energy dependency through the diversification of sources, suppliers and routes in order not to rely on a single supplier for the main fuels in its energy mix. These processes are important not only to Norwegian and European economic interests and trade, but also for diplomatic, foreign and security policies. Control over oil and gas is not just economics, but also geopolitics, diplomacy and even military power. The very important question today is who will hold it?

European integration actually started with energy. However, the energy issue became more politicised only when Europe faced its first oil crisis in 1973-1974, when the international demand for oil started to exceed supply and OPEC increased crude oil prices to USD 12/barrel.[48] The Arab oil embargo was a signal for the urgent need for European cooperation on the subject of energy policy. The energy policy in the EU was very much influenced in the 1990s by the process of liberalisation and the establishment of an internal free trade market for oil and gas. Developments in the 2000s integrated some other issues such as continuously high pressure in the liberalisation of oil and gas markets, but with a more pronounced focus on energy security and the reduction of CO_2. The EU's problem has always been that member states were not ready to transfer the decision-making power to the European Commission as far as the administration of resources is concerned. Each EU member state has followed different individual strategies. While Great Britain and Holland have had large oil and gas production, France has been dependent on

[47] *World Energy Outlook 2008*. Available on: <www.worldenergyoutlook.org/>
[48] OPEC share of world crude oil reserves (2006). Available on: <www.opec.org/home/PowerPoint/Reserves/OPEC%20share.htm>

nuclear energy and partially on LNG imports from Algeria. Italy and Spain have had their own pipelines in North Africa, while Germany for a long time subsidised its old coal industry in absurdum. From the choice of different energy resources to bilateral relations, everything remained in the hands of each individual state. The European Commission was just a "facilitator." Big competition for oil resources in a world with an expected rise in demand from China and India started to influence the increase in oil prices from 2000 onwards. The EU's dependency on the import of oil and gas increased as a result of the decline in production and reserves mostly in the eastern part of Europe (mainly gas dependence on Russia). Special attention was given to Russia's political role as a powerful energy provider. There have also been other geopolitical changes such as the World Trade Center, the War in Iraq, the Middle-East conflicts, etc., which had an important role in the energy policy changes that occurred. The EU became very aware of climate policy, mainly when the US abandoned the Kyoto Protocol and the EU took the opportunity to become the world leader in climate issues. The EU is also following the negotiations within the World Trade Organization (WTO). At the same time, the view that global warming is also a consequence of the actions of Europe became popular. New industrial political interests linked to renewable energy technologies are becoming more and more developed. The 27 member states of the EU today want to implement the Kyoto objective (emissions lowered 8%) by 2012. The security of energy supply, rising energy prices, reliance on fossil fuels, increased import dependence, and the reliability of energy suppliers are all high priorities for the EU today. The globally competitive role of the EU is dependent upon energy prices; therefore the EU's explicit objective is low gas prices. Gas production in the US and Canada is in decline and gas prices are much higher within the EU. There is tough competition to be a global industrial leader in the new international order.

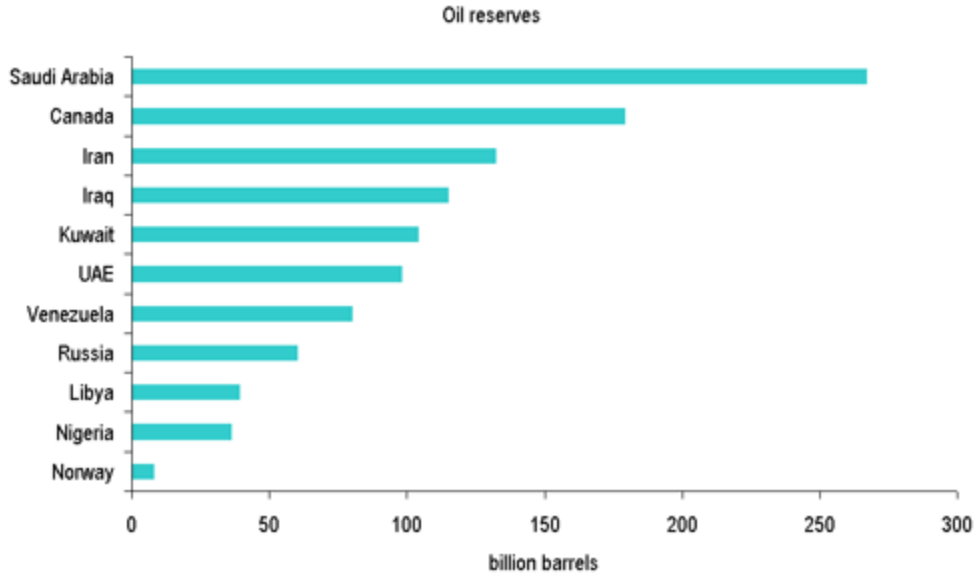
World primary energy consumption increased by 2,7% in 2005 and according to IEA data it is expected to increase by 52% between 2005-2030, reaching 16.3 billion tones of oil.[49] Oil accounted for 34,3% of the world's total primary energy supply in 2004. Between 2004 and 2030, world oil consumption is expected to increase by 40% to 115.4 million bpd from 82.1. The Middle East owns the major part of proved world oil reserves – 61.9%. The natural gas share in the world energy mix represented 20.9% in 2004 and it will increase by 87% to 4,000 billion cubic metres by 2030. Russia possesses the world largest gas resources – 26.6%. The situation is more optimistic as far as coal reserves are concerned, since they are distributed around the world and the reserves-to-production ration (R/P) is estimated at 155 years.[50] Demand will increase to 7,300 million tones in 2030 from 5,200 in 2003. The problem with coal is pollution. Nuclear power, another energy source, accounted for 6.5% of the world's total primary energy supply in 2004. The number of nuclear power reactors

[49] *World Energy Outlook 2008*. Available on: <www.worldenergyoutlook.org/>.
[50] European Energy Forum. Available on: <www.europeanenergyforum.eu/archives/news-from/international-energy-agency/key-world-energy-statistics-2007>.

around the world is estimated to increase up to 60% by 2030, according to an assessment by the International Atomic Energy Agency (IAEA).[51] Renewable energy sources have increased in the last few years, although fossil fuels dominate energy consumption. Renewable sources will increase their share of total energy consumption from 8% in 2003 to 9% in 2030. This is what the world consumes, being aware at the same time that 80% of world greenhouse gas (GHG) emissions come from energy consumption. What is important to note is that there is no agreement about reserves.

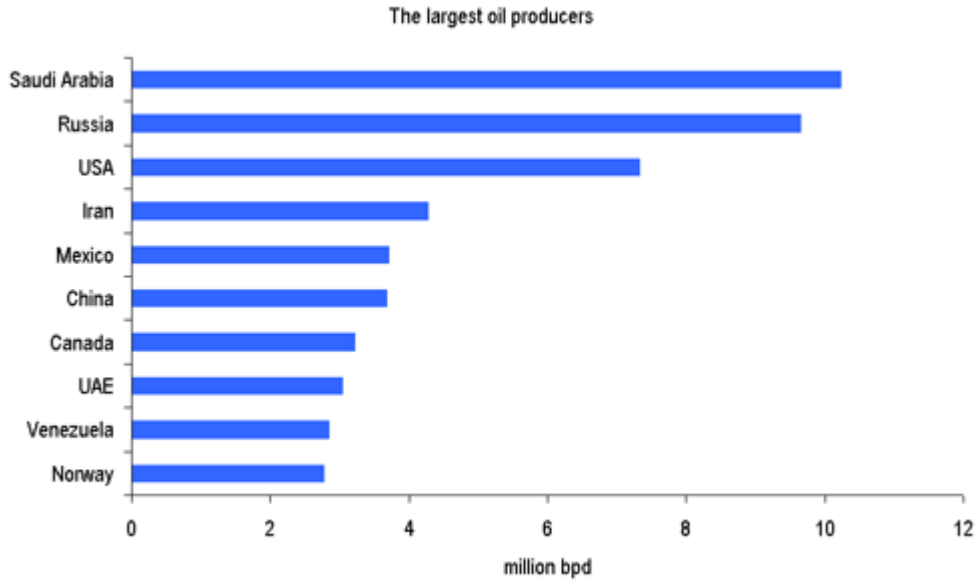
Figure 4 shows world oil reserves today. Norway is the last one on this list.

Figure 4. World oil reserves



Source: US Geological Service, 2007. Available on: <www.usgs.gov/>.

[51] United Nations Radio. Available on: <www.unmultimedia.org/radio/english/detail/9922.html> - June 19, 2008.



According to the BP Statistical Review of World Energy,[52] the figures and the ranking of oil producers, in billions of barrels, are as follows:

- Saudi Arabia: 262.7 (22.1%),
- Iran: 132.5 (11.1%),
- Iraq: 115 (9.7%),
- Kuwait: 99 (8.3%),
- United Arab Emirates: 97.8 (8.2%),
- Venezuela: 77.2 (6.5%),
- Russia: 72.3 (6.1%).

But estimates differ. According to the IEA, Iraq has 125 billions of barrels, but it is suspected of having more, up to as much as 300 billions of barrels.[53] Not all has been explored and the unofficial estimates rest on preliminary work done by Iraq, France and Russia. Two-thirds of the world's proven reserves are in the Middle East. 25.7% of world reserves (and roughly 40% of Middle East reserves) is in Saudi Arabia alone. Iraq has a share in world oil reserves of about 11%. Looking at the situation in the US and their total proven or unproven oil reserves, at the current rate of oil extraction through annual production one can see that they will not last

[52] *BP Statistical Review of World Energy 2007*. Available on: <www.finfacts.ie/irelandbusinessnews/publish/article_1010328.shtml>.
[53] Available on: <www.worldenergyoutlook.org/>, 2008.

for more than a couple of decades. Examining world oil reserves as a whole, at current rates of production there are more than 40 years left before exhaustion. Considering individual countries at their present production rates, for Iran there are 81 years left before the exhaustion of its oil reserves, 140 for Iraq, 150 for Kuwait, 96 for Saudi Arabia, 86 for the United Arab Emirates, 53 for Venezuela and only about 18 years left for the US.

Prior to 1975, the European Community states imported virtually all of their oil. With North Sea oil production however, dependency upon imported oil had fallen to below 60% by the late 1990s. In the year 2000, however, the import dependency curve turned and started to rise and will continue to rise sharply for the foreseeable future.

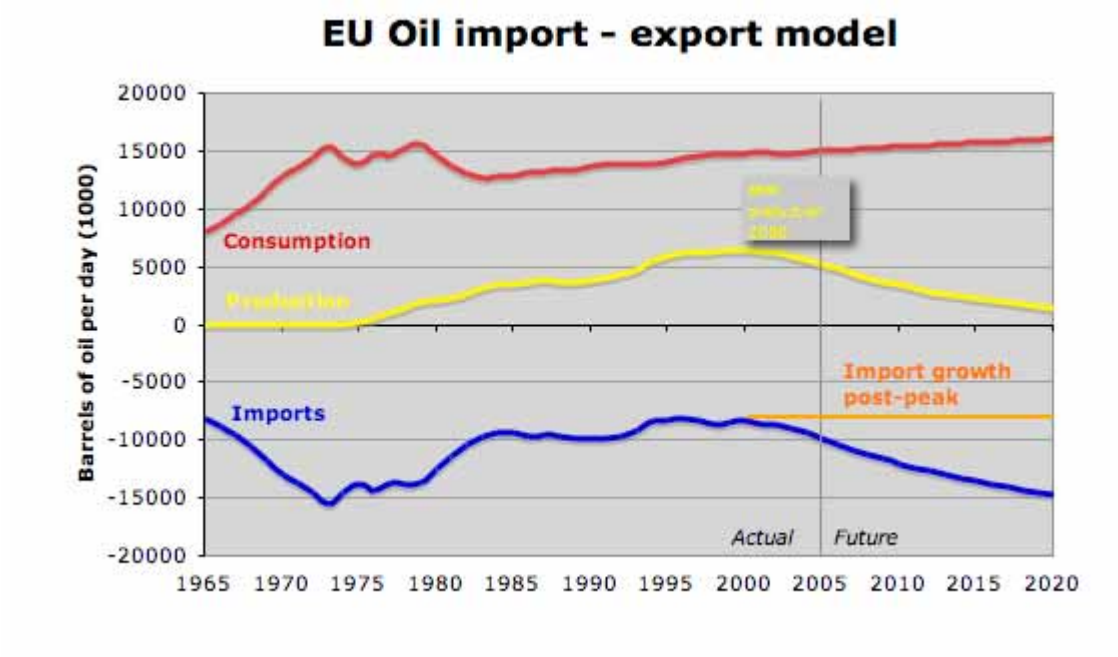
The EU today imports 50% of its energy consumption. The EU's own production of gas (Great Britain and the Netherlands) will decrease substantially by 2020. The necessity for gas imports will therefore double in the next 20 to 25 years, also as a consequence of increased consumption and because of climate challenges. By 2030, the EU will need to import more than 80% of oil and more than 90% of gas.

Oil will be mostly imported to the EU from Russia, Norway, Saudi Arabia, Iran, Iraq and Algeria:[54]

- Russia: 27%,
- Middle East: 19%,
- Norway: 16%,
- North Africa :12%,
- Other regions: 5%.

[54] *Energy for a Changing World*, Directorate-General for Energy and Transport EU, Available on: <ec.europa.eu/energy/energy_policy/index_en.htm>.

Figure 5. Oil import–export model for the EU + Norway



Source: Available on: <europe.theoildrum.com/story/2006/9/22/95855/4850>.

Gas consumption in the EU today represents 25% of the all EU energy consumption:[55]

- 46% of gas is produced within the EU;
- 25% of gas is imported from Russia;
- 15% of gas is imported from Norway;
- 14% of gas is imported from North Africa, the Middle East and Nigeria;
- 6-8% of gas is imported as LNG, the rest through pipelines.

In order to ensure its energy security, the EU is interested in collaborating with diverse partners such as: Norway, Russia, the Middle East, and the Caspian region; transit countries like Ukraine and Turkey; big countries like India, China and the US; and organizations such as the Energy Charter Treaty, the European Energy Community, the European Neighbourhood Policy (ENP), the International Energy Agency (IEA), etc.

[55] *Energy for a Changing World*, Directorate-General for Energy and Transport EU, Available on: <ec.europa.eu/energy/energy_policy/index_en.htm>.

The demand for energy is increasing and if renewable energy sources are not developed, non-renewable fossil fuels (oil, gas and coal) must cover most of the growth. In Europe, natural gas is “the winner” (Austvik, 2003: 230). The sources of supply that shall meet this demand are limited to a few large production areas and fields, many of them at locations far from the market. Russia is and will remain the key supplier, but Norway will also become more important. Russia and Norway will dominate gas exports to Europe.

Norwegian participation in the European gas and oil market

For Norway it is very important to see how the EU energy policy (revealed in the Green Paper *A European Strategy for Sustainable, Competitive and Secure Energy* in 2006 and strategically revised as *An Energy Policy for Europe* in January 2007, which should end up as part of an "energy law" in 2008/2009) influences Norwegian interests and how Norway should react to EU policy development in the area of oil and gas.

About 80% of oil produced in Norway is delivered to the EU market and almost all Norwegian gas is delivered through gas pipelines to Europe. Today Norway delivers natural gas to Germany, France, the Netherlands, Belgium, Spain, Austria, the Czech Republic, Italy, Poland, Denmark and Great Britain. Some in Norway even think that because of its oil and gas resources Norway does not need the world. However, Norway works very closely with other actors in Europe and around the world, such as the EU. Norway is a part of the common energy market through the EEA Agreement and cooperates directly with the EU in several areas of energy policy. Both the gas directive and the electricity directive are implemented in Norway on the basis of the EEA Agreement. The gas market directive gives common rules for the transport, distribution, delivery and storage of natural gas. The electricity directive includes common rules for the internal electricity market, and electricity production, transmission and distribution through the electric supply means. Norway also implements EU laws on energy efficiency and renewable energy. The exploration for energy resources in the High North and Barents Sea are included within the framework of the Energy Dialogue. The Northern Dimension of the EU intended to develop a Northern policy, but was directed more towards the Baltic region, than to the High North in general. Petroleum resources in the High North are very important for the EU, but Russia, is of course, the main partner. However, cooperation with Norway could also be significant, at least as far as supplies from the Norwegian continental shelf are concerned. Norway is a member of the Nordic Energy Market and a Nordic Energy Stock Exchange – Nord Pool – has been established. Through the EEA Agreement, Norway takes part in the EU framework program for research, development and demonstration of new technology. Norway fully applies the whole *acquis communautaire*, except for agriculture and fishing. Norway is among others part of the programs on renewable energy resources (ALTENER) and energy economisation (SAVE) under Intelligent Energy for Europe. Through EFTA's working groups on energy, Norway takes part in debates with the European Commission. Norway is also a member of the Baltic Sea Region Energy Cooperation (BASREC),

launched in 1999 in the framework of the EU's Northern Dimension. The other members are the EU, Sweden, Denmark, Finland, Iceland, Germany, Estonia, Latvia, Lithuania, Poland and Russia. Issues discussed include security of energy supply in the context of growing dependency on Russia, gas transit routes in the region, and progress on electricity and gas interconnections. Environmental issues on the agenda include energy efficiency, climate change, and renewable energies, such as bioenergy. Norway is also a member of the *Arctic Energy Agenda*. A round table of political and industrial decision-makers from Norway, Russia, the US and the EU was launched on July 7, 2005. The Arctic region is believed to be one of the most important remaining petroleum regions, with the marine environment being a particular challenge to the development of industrial activities in the Arctic. Norway has a High North strategy with the aim of strengthening cooperation across national borders and helping to increase a transfer of expertise between countries. A focused, long-term effort in the High North will also have positive effects on remote areas.

Norway is not only oil and gas. Norway is the 4th most important import market for EU (27) exports with USD 79.02 billion in 2006, after China, the US and Russia, and the 7th export market with USD 38.06 billion, after the US, Switzerland, Russia, China, Turkey and Japan. Thus, Norway's trade surplus with the EU is at USD 40.96 billion. Exports from the EU to Norway are mainly manufactured products, which made up 67.6% of total exports in 2006. Norway's exports to the EU are for the most part primary products (the share in 2006 was 70%, 58.2% of which was energy), whereas the export of manufactured products amounted to 12% of exports in 2006. Services account for a growing share of Norway's world trade. During 2005, Norway exported services worth approximately USD 22.9 billion, while imports totalled USD 21.9 billion.[56]

[56] Available on: <ec.europa.eu/trade/issues/bilateral/countries/norway/index_en.htm>.

EU energy market development between Russia and Norway

Since Norway has such a significant and powerful neighbour in Russia, it pays much attention to Russia's active energy diplomacy and its resource nationalism, based on supply security and diversification. Energy security has also became more and more important with the adherence of new Central and Eastern European countries to the EU over the last few years, which implies energy solidarity. The majority of these countries import energy from Russia for historical and geographical reasons.

Russia sees its energy wealth as a very significant factor in world economic development and modernisation, where it has great power. It is, therefore, naive to think that Russia will give up its power position by opening up its gas fields for the EU and reorganising its pipeline systems in order to open up "motorways" for the EU. This is something that Russia cannot even make its own companies do with their pipelines.

Russia possesses the largest world gas resources – 47.82 trillion cubic metres – and is the largest gas exporter. It is the second oil producer and exporter after Saudi Arabia. Russia expects to export its oil resources mainly towards North and East Asia, and its gas exports between Europe and Asia by 2025. But it will however, be the main exporter for Europe through use of its political power. Russia is also one of the biggest energy consumers in the world. Energy demand will increase in Russia by 150% by 2030.[57] IEA data show that investments for maintaining energy infrastructure in Russia will constitute USD 1 trillion by 2030.[58] Since the EU is dependent on Russian energy, it will have to take this development into consideration as well. A European security strategy would seek to include other suppliers, such as North Africa, the Middle East and the Caspian region. Cooperation between Russia and the EU is regulated under the Partnership and Cooperation Agreement of 1997. In 2000, the EU launched an Energy Dialogue with Russia. It is in the interest of the EU to have good relations with Russia, which is not always easy. Russia is very strategic in every action it takes. Gazprom, for example, is looking for direct access to customers in the EU in order to increase its market share from 26% to 38% by 2020. At the same time, Russia makes it very difficult for foreign companies to invest in its own country, e.g., the tax claim on

[57] Available on: <www.worldenergyoutlook.org/>, 2008.
[58] IEA Country Report – Russia. Available on: <www.iea.org/textbase/country/n_country.asp?COUNTRY_CODE=RU>.

British-Russian oil venture TNK-BP,[59] or the withdrawing of the license of Royal Dutch Shell for the Sakhalin 2 oil and gas field in Russia.[60]

Map 3. The new energy dynamic in the North

Recent findings show that there is more Russian oil reloading in Norway. The number of ship-to-ship oil reloading operations outside the Norwegian North Cape will double in 2009, according to the company Kirkenes Transit. So far this year, a total of 540,000 tons of Russian oil has been reloaded in the Norwegian High North waters61.

Russia and Norway are both energy exporters and polar neighbours and, therefore, they are both strategic, regional, European and global actors, who will have to act in cooperation or in competition with each other.

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[59] "Russian Police raid offices of oil firm TNK-BP," March 19, 2008. Available on: <capital.trendaz.com/?show=news&newsid=1160298&catid=583&subcatid=540&lang=EN>.

[60] Royal Dutch Shell's Sakhalin Nightmare, September 20, 2006. Available on: <royaldutchshellplc.com/2006/09/20/royal-dutch-shell%e2%80%99s-sakhalin-nightmare/>.

[61] *Barents Observer*. Available on: <www.barentsobserver.com/index.php?cat=16178a>, April 30, 2008.

Norwegian-Russian conflicts

Russia and Norway have experienced a number of conflicts, but to make a long, protracted, though often illuminating story short, only three of the conflicts will be discussed here: an old conflict – Svalbard –, a new conflict – the Arctic –, and a "little local problem" – Norilsk Nickel.

The Svalbard conflict

An old Norwegian-Russian conflict is Svalbard. Norway and Russia have negotiated over the delineation of the disputed 176,000 square km zone since the 1970s. While Norway has wanted a delineation deal to follow an equidistance or median-line principle, the Russian side has insisted that the delineation must follow a sector-line principle. The Barents Sea zone is expected to contain huge resources of hydrocarbons. Everything started with the Treaty concerning Spitsbergen of February 9, 1920, which declared the arctic archipelago of Spitsbergen (now called Svalbard) an overseas part of the Kingdom of Norway (Article 1).[62] The Treaty came into power on August 14, 1925.[63] It was a deal between Russia and Norway. The Norwegians recognised the Soviet Union and the Soviet Union recognised the Svalbard Treaty. Norway then took over sovereign governorship and immediately enacted a series of environmental protection measures. However, as part of the compromise between the signatories, despite Norwegian sovereignty, not all Norwegian laws are applied. The Treaty only partly demilitarises Svalbard. All signatories were given equal rights to engage in commercial activities (mainly coal mining) on the islands. Currently (as of 2007), Norway and Russia are both utilising this right. There has been a long-running dispute, primarily between Norway and the Soviet Union (and now Russia) over fishing rights in the region. In 1977, Norway established a regulated fishery in a 200-nautical-mile (370 km) zone around Svalbard (though it did not close the zone to foreign access). Norway argues that the Treaty's provisions of equal economic access only apply to the islands and their territorial waters, but not to the wider Exclusive Economic Zone. In addition, Norway argues that the continental shelf is a part of mainland Norway's continental shelf, and should be governed by the 1958 Continental Shelf Convention. Russia still disputes this position and considers the Svalbard Treaty to apply to the entire zone. A Norwegian-Russian agreement on the disputed area in the

[62] The Treaty of Svalbard. Available on: <www.lovdata.no/traktater/texte/tre-19200209-001.html>.

[63] The original signatories include: Australia, Canada, Denmark, France, Italy, Japan, Netherlands, Norway, Sweden, the United Kingdom (including overseas dominions) and the United States. There are now over 40 signatories.

Barents Sea might come before production starts in the Stockman project in 2013.[64]

Map 4. The disputed Svalbard area in the Barents Sea

Source: Regjeringen (Norwegian Government). Available on: <www.regjeringen.no>.

The Arctic challenge

Another dispute between Norway and Russia, but also other countries, is who will have the rights to potential resources in the Arctic? On May 28 and 29, 2008, Norway, Russia, Denmark, Greenland, Canada and the US held a summit in Ilulissat, Greenland to discuss rights over the Arctic, oil and other resources.[65] The purpose of the conference was to improve co-

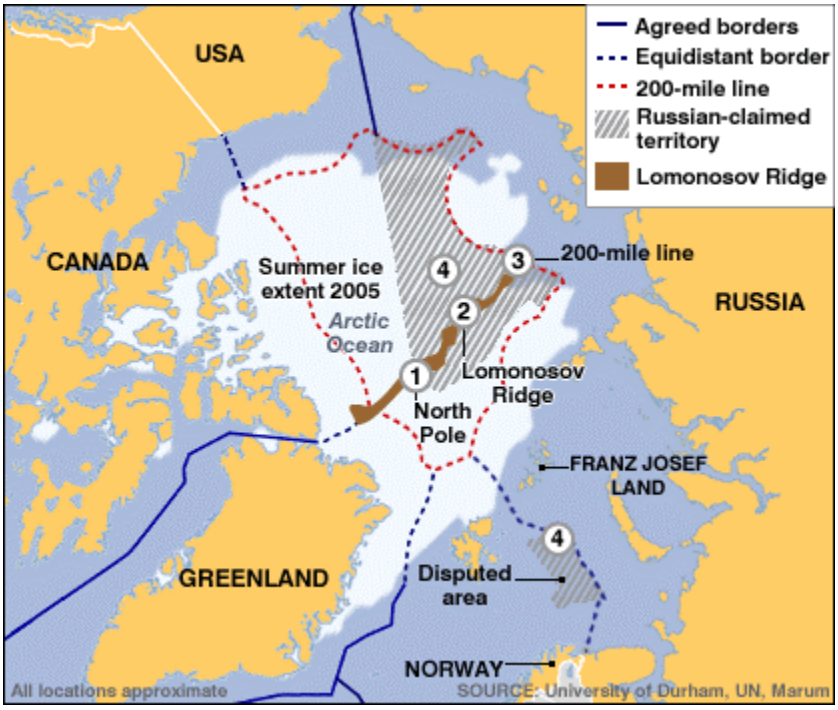
[64] *Barents Observer*. Available on: <www.barentsobserver.com>, June 16, 2008.
[65] Norden, official co-operation in the Nordic region. Available on: <www.norden.org/webb/news>.

operation in the administration of the Arctic seas. It was aimed at easing recent tensions as each nation seeks to extend its sovereignty to the Arctic waters that could hold 25% of the world's undiscovered oil and gas, according to the US Geological Survey.[66] According to international law (the Law of the Sea Convention from 1982), each of the countries bordering the Arctic holds sovereignty over a zone measuring 200 nautical miles (370 km). That leaves 465,000 square miles (1.2 million square km) of unclaimed territory. All the countries that ratified the Convention have to present a report if they claim more than the 200 nautical miles. Norway ratified the Convention in 1996. All the other countries besides the US have also ratified the Convention. In August 2007, Russian explorers, guided by the scientist and Vice-President of the Russian Parliament, Artur Tsjilingarov, planted their national flag at the bottom of the ocean, at a depth of more than 4,000 metres, after an expedition aimed at emphasizing Moscow's aspirations for Arctic territory. Russia argues that the underwater Lomonosov Ridge is an extension of its continental territory. Tsjilingarov affirmed that the Arctic has always been Russian and it will remain Russian. Vladimir Putin added that the expedition was not only scientifically, but also geopolitically very important for Russia.[67] The result of the conference in Greenland is that a UN decision is not expected until 2020 and that all the countries will try to cooperate in order to find solutions to the current problems. UN control over the Arctic could be the best solution. Norway is again confronting the same challenge as with Svalbard.

[66] *USA Geological Survey*. Available on: <www.usgs.gov>.

[67] Artur Tsjilingarov: “Die Arktis war immer russisch und bleibt russisch” (“Arctic was Russian and it will always be Russian”), Vladimir Putin: “… solche Expeditionen sind nicht nur für die Wissenschaft wichtig, sondern auch geopolitisch, vom Standpunkt der Interessen Russlands in diesem Teil der Welt” (“… these kinds of expeditions are important not only for the science, but also geopolitically, from the point of view of Russia’s interests in this part of the world”), *Der Spiegel*, No. 23, 2008, p. 109.

Map 5. The Arctic challenge



1. North Pole: Russia leaves its flag on the seabed, 4,000 m (13,100 ft) beneath the surface, as part of its claims on oil and gas reserves.
2. Lomonosov Ridge: Russia argues that this underwater feature is an extension of its continental territory and is searching for evidence.
3. 200-nautical mile (370 km) line: Shows how far countries' agreed economic area extends beyond their coastline. Often set from outlying islands.
4. Russian-claimed territory: The bid to claim a vast area is being closely watched by other countries. Some started to follow suit.
Source: Available on: <news.bbc.co.uk/2/hi/europe/6927395.stm>.

If the Arctic indeed contains the estimated resources, this will have implications for Russia, the EU and Norway. The strategic focus of Russia, and also partially of the EU, will move to the North. Western Europe will have to rely on Russian supplies from this area for the foreseeable future (Bingen, 2008).

A "little local problem," Norilsk Nickel

A current Russian-Norwegian "little local problem" (as a Soviet Environmental Minister used to say) is Norilsk Nickel, Russia's mining and metallurgy giant and the world's largest producer of nickel, palladium and platinum.[68] Never before has the Nickel plant, which is part of Kolskaya

[68] *Aftenposten*, May 27, 2008, p. 2.

GMK, a regional subsidiary of Norilsk Nickel, had so much CO_2 emissions as it does this year. The nickel plant is located just a few kilometres from the border with Norway and poses a major environmental threat to the Russian-Norwegian borderlands. Norwegian authorities are pressuring the company to cut local sulphur pollution. In 1991, Norway allocated NOK 300 million to the plant for the installation of cleaning technology. Since then, however, little has happened. According to an agreement between the parties, Norway will be entitled to withdraw the money in 2008, should Norilsk Nickel fail to take environmental measures. About NOK 180 million is still not being used. The money is managed by the Nordic Investment Bank in Helsinki. The Ministry of Environment warned in the fall of 2007 that the Norilsk Nickel money would be revoked after the first three months of 2008. Norilsk Nickel has confirmed that it bought cleaning technology for its plant in the border town of Nickel. Norilsk Nickel now appears to be in a hurry to implement the cleaning measures. It remains to be seen however, whether the company will install the cleaning technology as announced. It has been promising to do just that for almost 20 years now. Despite its multi-billion dollar net profits, it has failed to help the local environment and the local population, both suffering severely from heavy sulphur dioxide emissions. Norway cannot continue to give its millions to the Russian billionaires. This is not at all a "little local problem"; it is a big environmental problem in the North and a challenge for Norwegian-Russian relations. The Norwegian Foreign Minister announced on June 18, 2008 that Norilsk Nickel would be closed by 2011.[69]

Russia considers that "the real problem is not Russia's use of its energy supplies as a weapon to achieve political dominance, which is an oversimplified reading of the Kremlin's clumsily executed, but essentially rational policies, but rather the risk that Gazprom may not be physically able to satisfy Europe's needs and honour its contracts" (Trenin, 2008: 136). That is why the Russian authorities project in the "Russian Energy Strategy until 2020" a change in the domestic energy market in favour of an increased share of coal, so that gas export commitments can be met.[70] Here again there is a conflict of interests. In order to avoid internal shortages and to guarantee the sustainability of its gas exports, Russia does not intend to save energy and to modernise its energy sector, but rather to switch to another fossil energy source, which would increase CO_2 emissions. This is an unacceptable strategy from the Norwegian point of view. It is true that the EU needs Russian oil and gas, but Russia also needs markets to sell its resources and, thus, has to respect the markets' rules.

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[69] The Norwegian Foreign Minister Jonas Gahr Støre's speech "About the relations between Norway and Russia and the development in Russia" ("Om forholdet mellom Norge og Russland og utviklingen i Russland"), the Norwegian Institute of International Affairs (Norsk Utenrikspolitisk Institutt [NUPI]), Oslo, June 18, 2008, .

[70] Энергетическая стратегия России на период до 2020 г. Российское газовое общество ("Russian Energy Strategy until 2020", Russian gas company). Available on: <www.gazo.ru/dokumenty/es/index.khtml>.

Officially, Norway and Russia have a friendly and good relationship, but the geoeconomic and geostrategic interests of both, which are well known, constitute a higher priority for each state. Norway and Russia have interests:

- in defending their sovereign rights;
- in securing the exploitation of energy resources;
- in securing access to markets;
- in securing the best possible flow of capital.

All this is easier said than done. At the same time, as Godzimirski states: "Norway is not interested in coordinating its energy policy with Russia or in joining any club of energy producers in which Russia could play a major part" (Godzimirski, 2007: 14). In a centre-periphery relationship, Russia still represents a "chaos-threat" (Kjølberg in: Knutsen et al. 1995: 324) and Norway is very aware of that in shaping its foreign policy. The Norwegian Foreign Minister said recently that Norway cannot be naïve, since it shares common borders with a Russia that time and again shows off its power. Development in Russia could suddenly take a negative turn and Norway has to be prepared for that. At the same time, the Minister warns against Russian phobia and Cold War reflexes in the Norwegian debate.[71] It is a challenge to predict the future of the Norwegian-Russian relationship, since as Count Alexander Benckendorff assessed with a fair amount of precision: "Russia's past was admirable, its present is more than magnificent and as for its future – it is beyond anything that the boldest mind can imagine" (Count Alexander Benckendorff, 1830).

[71] The Norwegian Foreign Minister Jonas Gahr Støre's speech on "Relations between Norway and Russia and Development in Russia" ("Om forholdet mellom Norge og Russland og utviklingen i Russland"), the Norwegian Institute of International Affairs, Oslo, June 18, 2008. Available on:
<www.regjeringen.no/nb/dep/ud/dep/Utenriksminister_Jonas_Gahr_Store/taler_artikler/2008/russland_nupi.html?id=517424>.

Norway's contribution to EU energy policy development in fighting climate change

It seems that 50 years after the foundation of the European Community the EU is returning to its integration motor, which is energy. A common energy policy was first introduced in the Treaty establishing a Constitution for Europe (the actual Reform Treaty), which is still not ratified. The EU Green Paper Towards a European Strategy for Security of Energy Supply of November 29, 2000, states that 450 million consumers acting together have the ability to protect and assert their interests and to succeed with their desire to reduce energy consumption by 20% by 2020, according to its Action Plan for Energy Efficiency (2007-2012).[72]

How to accomplish this?

- By improving gas-gas competition among the big EU external suppliers;
- By opening up the big Russian pipeline system through Third Party Access. (This could give the Europeans greater access to gas reserves in Central Asia [during 10 years of energy dialogue with Russia, the EU focused on Third Party Access/unbundling, the reduction of many agreements]). High oil prices, production increase and re-nationalisation of Russian energy industry have had major consequences on relations between Russia and the EU;
- By preventing third party buying of the transmission system Gazprom Clause;
- By breaking the relationship between oil and gas prices;
- By reducing the terms of the long-life take-or-pay agreements;

[72] Available on: <europa.eu/scadplus/leg/en/s14001.htm>.

- By reducing European gas market prices through the combination of a liberal internal market and competition from outside, and at the same time increasing imports;

- The EU has to decide about its role: will it be a liberal or power politics instrument?

In order to reduce the risk of complex problems related to the delivery of Norwegian gas to the EU market in the future, Norway wants long-term contracts, which would secure delivery and eventual Norwegian investment in EU infrastructures (transmission/ distribution).[73] This is, however, in contradiction with the EU's intensions (cessation of take-or-pay contracts and vertical disintegration in order to facilitate liberalisation). A second priority for Norway is a liberalized market, where all actors are equal, including Russia. As long as Russian interests (together with German and French) defensively pressure the EU towards the liberalisation of the gas market, it is evident that Norway will wish to negotiate with the EU over compensations in other related areas. Norway could, for example, aim for greater understanding of Norwegian special measures in important related areas for Norway (e.g. reversion), showing that the result here is less important for the EU liberalisation project than for the development of the gas market, where Norway already gave up its edge. Such issue-couplings could also be developed in other strategic areas for Norway and the EU. Norway's position might appear too aggressive here, since it seems as though the EU market is ever more restricted by Russian interests, which contradicts the European Commission's goal of having open and positive relations with diverse distributors. Norwegian gas production is almost entirely exported to the EU; it therefore represents a high priority for the EU's energy security goal. At the same time, Norway's interests are not only to maximise oil and gas revenue; Norway also has industrial political interests related to post-oil technology and global climate change. Current global CO_2 levels are the highest they have been in the past 650,000 years (Gore, 1992/2008: 12). Norway has a role to play concerning this issue.

[73] *Policy-utvikling i EU på olje- og gass-området* (*EU policy development in the areas of oil and gas*), Per Ove Eikeland, Fridtjov Nansens Institutt. Available on: <www.refleks/innspill/energi/eikeland>.

Conclusion

The world faces geopolitical and geostrategic dilemmas. The supply of strategic resources like oil and gas is becoming tight: “Not only does oil look extremely tight in five years time, but this coincides with the prospect of even tighter natural gas markets at the turn of the decade” (IEA, July 9, 2007). One the one hand, the reserves of the advanced economies are rapidly shrinking and, thus, overexploited, while, on the other hand, those of the Middle East are both much larger and significantly underexploited (Nell, Semmler, 2007). In the Western world, Norway is maybe the only state that profits from high gas and oil prices. The Norwegian Finance Minister, Kristin Halvorsen, revised the annual budget and declared on May 15, 2008 that the net income from gas and oil in 2008 will constitute NOK 356 billion (instead of the NOK 300 billion estimated in autumn 2007). That means that almost a third of the state’s budget comes from oil and gas revenues. This revision is based on oil at USD 100 a barrel.[74] Almost all the state’s oil revenue will be put aside. From the NOK 356 billion, only NOK 13 billion will be used in the state budget. The rest goes directly to the Oil Fund – The Government Pension Fund-Global. This Fund has evolved in recent years into one of the world's largest pension funds. The Fund has attracted interest also because of its stated policies of ethical investments and its efforts to be critical of companies that do not comply with the Norwegian government’s policy. The long-term project plans to use the Fund’s money to pay the pensions and other state expenses starting in 2020, when the number of pensioners in Norway will greatly increase. High oil and gas prices increase interest in searching for new resources. At the same time, the leading parties are facing challenges from the Ministry of Fisheries and Coastal Affairs, the Institute of Marine Research and other environmental organizations such as Bellona,[75] which are concerned that the search for new oil and gas resources could harm the sea and marine life.[76] The NOK 108 billion invested in oil in 2007 should increase to NOK 120 billion in 2008. This investment will provide for income, new production locations, shipbuilding and development of the equipment industry. High oil prices are also the best incentive to invest in renewable energy. But the automobile industry, for example, is not currently putting much effort into developing cars that run on new energy sources.

[74] Available on: <www.aftenposten.no>, May 23, 2008.
[75] Bellona. Available on: <www.bellona.no>.
[76] Havforskningsinstituttet (Institute for Sea Research). Available on: <www.imr.no>, May 19, 2008.

The changing character of the global oil market shows that oil production is close to peaking. Saudi Arabia can no longer be relied on to play its usual role of price regulator. Iraq, on the other hand, is believed to have huge unexplored reserves. The region needs the help of Western guidance, so that Iraq could work jointly with Saudi Arabia, or even replace it, if its role as regulator ends. Advanced nations and leaders could underwrite a so-called "Marshall Plan" for the Middle East, since the region has huge oil wealth. In return, the region could pledge to supply oil and gas at reliable prices for the foreseeable future, allowing a more gradual and less disruptive transition to other energy sources (Nell, Semmler, 2007: 580). Norway could also provide an example here. If Western companies would invest their best technological skills and expertise, the revenues from oil sales would be partially used for repaying the "Marshal Plan" loans and would partially go into a Development Fund, such as was the case with Norway[77] and Alaska. The Development Fund would be devoted exclusively to social infrastructure, public utilities, education, health, etc.

The present oil crisis, when oil approached USD130/barrel in May 2008 (13 times more expensive than 10 years ago, when it was at USD 10/barrel), requires concrete action. There is an urgent need to influence both the speed and direction of innovation and technological change. But innovation involves deep changes and meets intensive opposition from established interests. In this situation it seems imperative to find ways and means that offer prospects for sustainable development and that avoid unnecessary risks. In order to make technological change sustainable, innovation alone is not sufficient. Changes in society, such as users' practices, regulation and industrial networks are inevitable. Norway has the experience and the means to make a contribution in this area. It can, for example:

- apply new innovation theories in order to develop an industry that is adapted to the energy-related needs of the future;

- develop strategic mechanisms able to cope with the "Post-Petroleum" challenges, taking into consideration the rapid decline in Norwegian oil production since 2000, as well as the global "Peak Oil" problem;

- research and invest in the area of offshore wind-power and its impact on energy-intensive industry. Today's technology makes the running expenses of offshore wind-power far greater than other renewable energy sources. But a report presented by the Norwegian Energy Council on May 26, 2008 shows that within a period of 10 years offshore

[77] Statens pensjonsfond (Government Pension Fund-Global), 2006. Available on: <www.regjeringen.no/nb/dep/fin/tema/Statens_pensjonsfond.html?id=1441>.

wind-power will become profitable.[78] This will, in turn, make it a major Norwegian export industry to Europe. It costs between EUR 2.5 and 3.5 million per installed MWh of offshore wind-power. The Norwegian Energy Council states in the report that Norway should have access to 40 TWh of renewable energy sources, of which half comes from offshore wind-power. The total investments needed to achieve this will be between EUR 12 and 28 million. If Norway is able to reach this amount of renewable energy output, the reduction in CO_2 emissions will be up to 20 million tons annually. Norway has to work hard in order to achieve these goals, since the output of wind-power in 2007 was just 8 MWh from the total 345 MWh, compared to a 56,535 MWh increase in the EU in the same year. However, Norway has the necessary resources and competency to achieve this goal;

- research and invest in increased energy efficiency in buildings, by "Green KWh", e.g., improved building insulation, which would reduce the owners' heating bill and free up an equivalent amount of energy for other uses. In order to meet the currently developing shortage of electric power, gas-fired power plants have been proposed as a solution in Norway (Alfsen, 2008). Much heating of buildings comes from electricity, and a large potential exists for making this electric power available for other uses by finding other ways of keeping buildings warm. Buildings can be heated using bio-energy. Initial calculations indicate that this is both cheaper for consumers and frees up natural gas worth about NOK 1 billion (when compared to a gas-fired power-plant of about 3 TWh). Selling this natural gas, rather than burning it, would pay back modern, efficient technical installations for bio-fuel within three years, and subsequently bring in corresponding revenue.

Energy is an issue that provides food for thought. The goal of this study was to present and discuss the role of Norway in the European gas and oil market. There is little to add to the points mentioned in the study. One main conclusion to take away is that Norway will continue to play a significant role in Europe's energy policy, and Norway has the necessary experience and resources to do just that.

[78] Energirådet (Norwegian Energy Council) report, May 26, 2008. Available on: <www.regjeringen.no/en/dep/oed/Subject/Energy-in-Norway/energiradet-2/mote-i-energiradet-26-mai-2008.html?id=512752>.

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List of abbreviations

APA Awards in Predefined Areas
BASREC Baltic Sea Region Energy Cooperation
bpd Barrels per day
EEA European Economic Area
EEC European Economic Community
EFTA European Free Trade Association
EU European Union
EUR Euro
GDP Gross Domestic Product
GHG Greenhouse gas
GWh Gigawatt hour
IEA International Energy Agency
LNG Liquefied Natural Gas
MWh Megawatt hour
NATO North Atlantic Treaty Organization
NOK Norwegian Krone
OECD Organisation for Economic Co-operation and Development
OEEC Organisation for European Economic Co-operation
OPEC Organization of the Petroleum Exporting Countries
PPP Purchasing Power Parities
R/P Production ration
SDFI State's Direct Financial Interest
TWh Terawatt hour
UN United Nations
VAT Value added tax
WTO World Trade Organization

Annex 1

52 (APA) production licenses on the Norwegian continental shelf awarded by the Ministry of Petroleum and Energy in 2007:[79]

Offer to 19 operators: (number of operators in parenthesis)

Aker Exploration AS (1)

BG Norge AS (1)

Centrica Resources Norge AS (5)

Dana Petroleum Norway AS (1)

Det norske oljeselskap ASA (3)

Discover Petroleum AS (1)

DONG Norge AS (1)

E.ON Ruhrgas Norge AS (4)

Eni Norge AS (2)

Gaz de France Norge AS (1)

Lundin Norway AS (4)

Nexen Exploration Norge AS (3)

NOIL Energy ASA (4)

Norwegian Energy Company AS (Noreco) (3)

OMV Norge AS (1)

Revus Energy ASA (5)

Rocksource ASA (1)

StatoilHydro ASA (9)

Wintershall Norge AS (2)

[79] Ministry of Petroleum and Energy. Available on: <www.regjeringen.no/en/dep/oed/Press-Center/Press-releases/2008/Awards-in-APA-2007.html?id=499531>, 08.02.2008

Offer to 37 companies: (number of shares, included where the companies are operators, in parenthesis)

Aker Exploration AS (6)

AS Norske Shell (1)

Bayerngas Norge AS (1)

BG Norge AS (1)

Bridge Energy AS (3)

Centrica Resources Norge AS (6)

Concedo ASA (2)

Dana Petroleum Norway AS (3)

Det norske oljeselskap ASA (11)

Discover Petroleum AS (4)

DONG Norge AS (2)

E. ON Ruhrgas Norge AS (8)

Endeavour Energy Norge AS (2)

Eni Norge AS (5)

Esso Norge AS (3)

Faroe Petroleum Norge AS (5)

Gaz de France Norge AS (4)

Genesis Petroleum Norway AS (3)

Hess Norge AS (2)

Lundin Norway AS (7)

Maersk Oil Norway AS (2)

Nexen Exploration Norge AS (3)

NOIL Energy ASA (6)

Norwegian Energy Company AS (Noreco) (9)

OMV Norge AS (1)

PA Resources Norway AS (1)

Petro-Canada Norge AS (4)

Revus Energy ASA (7)

Rocksource ASA (3)

RWE Dea Norge AS (6)

Sagex Petroleum Norge AS (1)

Skagen44 AS (2)

Skeie Energy AS (1)

StatoilHydro ASA (12)

Talisman Energy Norge AS (1)

Total E&P Norge AS (3)

Wintershall Norge AS (5)

Annex 2

Exchange rate

USD 1 = NOK 5, Norges Bank (Central Norwegian Bank), June 2008.

EUR 1 = NOK 8, Norges Bank (Central Norwegian Bank), June 2008.