OVERVIEW OF THE NORWEGIAN OIL AND GAS INDUSTRY

Report - Offshore Norway

prepared for
Offshore Center Denmark
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1 Executive Summary

Election Year
This year (2009) is election year and the political parties in Norway are all taking a stand on the topic of oil and gas activities on the Norwegian continental shelf. The oil and gas sector is a hot political topic, not only because of the sectors huge importance with regards to its contribution to the Norwegian economy, but also because of the implications that increased oil and gas activity might have on the Arctic regions and the overall environmental situation. On the 14th of September 2009 it will be decided which parties will be forming the Norwegian government in the years to come.

The environment and the States wish to expand oil and gas activities in the Northern and Arctic areas are two very hot and conflicting political topics which have much of the election campaign focus for most political parties. The largest political party in Norway, Arbeiderpartiet (AP) – the workers party, wants to keep value creation, employment, and competences of the oil and gas sector at a high level and suggests that extraction efficiency is increased through intensified research and the use of CO2 injection. They say that the exploration activity must be increased and interesting geographical areas must be opened to the oil and gas industry.

The development of regions like the Barents Sea and the Norwegian Sea should be done in cooperation with Russia in an effort to create the best environmental surveillance and oil emergency preparedness in the world. Through thorough evaluation and monitoring of the different Norwegian coastal areas, the government will decide which areas should remain petroleum free and which should be opened to the industry.

In the quest to find new areas of exploration for the oil and gas industry, the sitting government faces a lot of disagreements and protesting from local inhabitants, political parties, environmental interests, and business interests. Especially the fishermen in the Northern areas have given their opinion on the possible invasion of oil companies in their waters. Not only have they protested against any oil and gas activity coming to their waters, but they have also claimed that the seismic tests carried out during 2009 have damaged the population of fish in the area. This has resulted in huge payments from the oil and gas companies in order to get accept of the fishermen to do the research. The result of which will be known in early 2010.

The Economy
The latest macro economical analysis of the Norwegian economy states that Norway has reached the bottom and economic indicators are pointing in a positive direction. Expansive financial politics together with low interest rates and a maintained high level of oil investments have carried Norway through the crisis in very strong position compared to most other countries, resulting in projections of GDP growth of almost 3% in 2010.
The oil price has been developing positively from a sector point of view and is now at a level well above the “investment freezing point” previously estimated at around USD 50-55 per barrel, but now ranging around USD 30-40 per barrel, making way for the realization of those future investments which have temporarily been put on hold. This is good news for the industrial production sector, which has been suffering the most during the financial crisis, as the PMI index (Purchasing Managers Index) rose to 48.7 in June and getting very close the magic level of 50, which indicates that manufacturing is expanding. In fact industry production is expected to rise as soon as in the 3rd quarter of 2009.

**The Market**

Norway has a major, but mature and highly competitive upstream oil and gas sector, featuring most of the key national and international operators and suppliers. The downstream oil segment is small, open to competition and deregulated. Supplying to the upstream activities connected to finding and extracting the oil and gas resources presents by far largest potential in the Norwegian oil and gas industry, but with talk of developing new and remote areas in the North, supplying the downstream oil and gas segment within refining and distribution could prove to be a lucrative business in the coming years.

Oil has been dominating the production on the Norwegian continental shelf since production began in the early 1970s. During recent years production of natural gas has taken up an increasing part of the total production of petroleum products in Norway and estimates for future production predict that gas will become the main petroleum product extracted from the Norwegian underground. This belief in the natural gas resources of Norway means that several of the largest international oil and gas producing companies have long-term investment plans for the Norwegian continental shelf in order to be freed from their dependence of other more uncertain markets.

The States intervention in the Norwegian oil and gas industry can be viewed as both strength as well as weakness. Although highly influenced by the Norwegian State and the government in decisions concerning exploration licenses, the Norwegian oil and gas industry has always been known as a fair and legally sound industry, not giving in to corruption and other kinds of fraud. This security provides a great foundation for the Norwegian oil and gas industry to come out on top and remaining one of the most attractive petroleum industries in the world.

Expert opinions on when the existing oil and gas resources will run dry various a lot and actual estimates lie in the range from 8 to 40 years. The opportunity is great if the operators succeed in developing more efficient ways of extracting the oil compared to today. Also the Northern regions around areas like Lofoten and also the Arctic Sea represent great but still uncertain possibilities for the Norwegian oil and gas industry, but there is a major hurdle to overcome in convincing the local habitants and politicians that the environment will not be harmed.
**S-W-O-T analyse**

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Achilles

Achilles Joint Qualification System (JQS) is a unique collaboration between Norwegian and Danish oil and gas operators and management contractors. The participating organizations use the system to provide information and to select suppliers and contractors when buying goods and services. Those buyers not subject to the EC procurement directives are actively using the system as a joint vendor database.

Being qualified by the Achilles is not an absolute demand if you wish to become a supplier to the Norwegian oil and gas industry and of course the expense connected to being qualified can seem large to some companies. However, the qualification can be a way to ease access to oil and gas contracts. For some of the main players in the industry a preliminary evaluation of different supplier bids on a project can sometimes be done upon whether or not the supplier is qualified by Achilles. In that sense being qualified in the Achilles system can shorten the process of winning supplier contracts and is by most members viewed as a good investment.
2 Introduction to Norway

2.1 Economical & Political Situation

The present situation
Primarily as a result of the worldwide financial crisis, the Norwegian economy is facing a slight downturn in some industries, primarily within mainland activities. The economic downturn had its introduction about a year ago, but did not really kick in until the end of 2008 and 1st quarter of 2009. The Norwegian economy has experienced some very good years and is considered one of the strongest economies when it comes to handling a financial crisis. Although this is true, numbers do show an increase in the unemployment rate and the setback is to some extent visible in most sectors. All indicators point towards an economic downturn which will strike mainly among mainland industries, but as Norway is coming from an all time high the damages of the financial crisis will be minimal.

Not only private consumption, but also business investments into the Norwegian mainland economy has developed quite weakly in 2008. In the 1st quarter of 2009 mainland business investments have dropped significantly, which in turn has contributed to an even bigger fall in the overall level of activity and a drop in mainland production. But looking into the investments done in the Norwegian petroleum industry we see that these investments have continued to increase throughout 2008 and into 2009 which has played a decisive role in limiting the downturn of the Norwegian economy overall.

The actual growth in petroleum related investments was measured at 2.0 % from 4th quarter 2008 to 1st quarter 2009. The growth has especially been experienced within searching, but also production drilling has pulled up the total investments. Numbers indicate an increase in investments within oil drilling, searching and oil & gas piping of almost 25 % from 1st quarter 2008 to 1st quarter 2009. Investments made into oil extracting platforms, drilling rigs, and modules dropped by 10.2 % during the same period, contributing negatively to the overall increase in petroleum related investments of 9.6 % over the last year.

The very important oil price has, from a sector activity point of view, developed positively during the spring months which would support a relatively high search activity for 2009. Furthermore 2009 has already produced several very promising findings and promising findings will affect the search interest positively. Therefore investments within production drilling and searching are expected to keep increasing throughout 2009.

Although oil production dropped by 1 % from 1st quarter 2008 to 1st quarter 2009, the total petroleum production still managed to increase due to an increase in gas production of 6.8 %. The petroleum production in Norway has developed very positively during the last two years. The decrease in oil production has been more than made up for by the much bigger increase in gas production. It should be mentioned though, that due to the huge fall in production experienced in 2005 and 2006, the current production level is still not as high as peak year of 2004.
The price of crude oil and natural gas dropped even more than the traditional export goods and contributed to a drop in the price index of total export of 15%. This kind of negative development has not been seen in Norway since 1975. The export of oil and gas will continue to decrease until 2012 as it has done since 2002. The export development will be influenced in part by an increase in the export of gas and in part by a larger decrease in the export of oil.

The Norwegian government has set up a financial policy which includes automatic stabilizers that contribute to “softening” the effects of a worldwide financial setback. Without the rearrangement to expansive money and finance policies, the development in Norway would have been characterized by a significantly larger increase in the unemployment rate and a much bigger decrease of mainland GDP for 2009 as compared to what we expect. The high level of petroleum related investments also contribute to the stabilization of the Norwegian economy this year. Even though the oil price has fallen, the production of petroleum products is not influenced by the short term downturn. This stabilizes the Norwegian economy compared to countries where labour intensive industries dominate the export sector.

(Source: http://www.ssb.no/emner/08/05/10/oa/200903/norsk-ok.pdf)

**Economic Projections**

The worldwide financial crisis, but especially the duration of this crisis makes it very difficult to predict anything certain about the future economic development. Nonetheless production is expected to experience the present weak but positive development throughout 2009 and maybe into 2nd quarter of 2010, but 2011 and 2012 point in the direction of decreasing production rates. This evaluation is shared by most if not all of the industrial businesses except from the consumer goods industry, covering amongst other foods, beverages and tobacco, where expectations are more positive.

Investments made into oil extraction platforms and drilling rigs is estimated to increase slightly through 2010 as well as 2011 before dropping a bit in 2012. The development in the petroleum related investments is very important to the mainland economy, because of the ties between offshore operators and mainland suppliers. The uncertainty in connection to the expected price level of oil has to be considered quite significant as well as the effect of the financial crisis on the development in the investment level.

The demand from the oil business is expected to maintain a fairly high level in the future through increased demands from households and the public sector. On the other hand the demand in the Norwegian export markets is expected to decrease hence the industrial production will probably continue to drop, maybe up until 2011. From 2011 an increase is expected and the total export will therefore drop less than traditional export this year and next year. The export growth is also expected to be lower in the coming years due to a continued fall in the export of oil and natural gas.

(Source: http://www.ssb.no/emner/08/05/10/oa/200903/norsk-ok.pdf)
Political Framework
The Norwegian Parliament establishes the framework for the Norwegian petroleum activities. The methods used include passing legislation and adopting propositions, as well as discussing and responding to white papers concerning the petroleum activities. The opening of new areas for petroleum activities, major development projects or matters of great public importance must be discussed by the Norwegian Parliament. The Norwegian Parliament also supervises the Government and the public administration.

Figure 2.1

![Diagram showing the political framework of the Norwegian petroleum sector.](Source: NPD and the Norwegian fiscal budget)

The government holds the executive power over petroleum policy and shares responsibility for this policy with the Norwegian Parliament. In applying the policy, the government is supported by the ministries and subordinate directorates and agencies. The responsibility for executing the various roles within the petroleum policy is shared as follows:

- Responsible for resource management and for the sector as a whole
- Responsible for health, the working environment and safety
- Responsible for state revenues
- Responsible for oil spill contingency measures
- Responsible for the external environment

Through the 40 years of petroleum activities on the Norwegian continental shelf, OLF (Oljeindustriens Landsforening), OLF members and the Ministry have jointly appreciated the importance of close dialogue, communication and interaction between the industry and government in the petroleum sector. The Norwegian government regards it as very important for the state to play a role as a substantial, long-term and stable owner in order to retain a Norwegian base for StatoilHydro. Norway’s private sector has limited capacity to replace the state in capital-intensive and strategically-important state-owned companies. In particular, petroleum and
energy companies are of such a substantial size that an extensive sale of
government holdings could not be replaced by Norwegian private-sector interests.

The government aims at:
- Continuing to take SDFI (The States Direct Financial Interest) holdings
  where good profitability or a large resource potential is offered.
- Ensuring that Petoro manages the SDFI in accordance with the
  assumptions and targets defined by the government and the Norwegian
  Parliament.
- Emphasizing the significance of the state’s role as a long-term and stable
  owner in order to ensure a national base for StatoilHydro.

The Role of the Government
There are two systems for awarding licenses on the Norwegian continental shelf.
In 2003 the Government introduced the annual system of Awards in Predefined
Areas (APA) in mature parts of the Norwegian continental shelf (NCS). This
system replaced the annual North Sea Awards. The APA system ensures that very
large areas close to existing and planned infrastructure are available for 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 second year. These rounds focus on
frontier areas on the shelf where the potential for petroleum is less explored and
where fewer infrastructures are built.

Since the beginning of 2009 many financial packages have been given by the
Norwegian government to keep the industry going, but the financial packages do
not change the fact that export demand from other important markets are still
decreasing, hurting the activity in the Norwegian industry. Furthermore the
Norwegian oils & gas sector is dominated by cash investments financed through
the cash flow of the oil producing companies. This means that the fact that the
government provides financial aid to different lending institutions does not mean
that the investment activity of the oil and gas sector will increase. Activity in the
sector is bound to the actual oil price and that alone.
(Source: www.regjeringen.no)

2.2 Business Culture

Meeting & Greeting
Greetings are casual and follow no ritual. A handshake, eye contact and a smile are
enough when doing business in Norway. Although Norwegians are relatively
informal they will often introduce themselves using their surnames. People move
to first names quickly but until that occurs one should address people with "Herr"
(Mr.) or "Fru" (Mrs.) plus the surname.

When presenting one-self be sure not to appear too over confident or self-
promoting. A cornerstone of Norwegian culture is egalitarianism, embodied in
what is called "Jante's Law". Jante's Law teaches people to be modest and humble.
This is seen through most people's refusal to criticize others and the awareness not to flaunt their wealth or financial achievements.

**Communication**

If one were to sum up the Norwegian communication style it would be informal, transactional and direct. Due to the influence of egalitarianism, Norwegian business culture lacks airs and graces. On the whole people are generally easy going and informal in business dealings and communication. However, informality does not offer anyone a license to act unprofessionally. It is important to always remain polite and respectful when doing business in Norway.

Although business is transactional in nature, there is still the need to build trust and confidence. This is achieved through building rapport but at the same time providing lots on background information on yourself, experience, qualifications and that of your company. Relationships develop slowly.

Norwegians are straight-talkers and not very emotive. They have no difficulty disagreeing with people or speaking their minds within a business context as this is viewed as separately to personal life. Criticisms and the like are more often than not based on facts rather than opinion. They are scrupulous about honesty in communication, often to the point of pointing out the negatives in their own proposals in greater detail than the positives.

**Meetings & Negotiating**

Punctuality is imperative when doing business in Norway. If delayed always call ahead to warn people. Business meetings will have a small amount of small talk but quickly get down to the business at hand. Try and mirror the tempo the hosts are working at. If presenting, ensure you back up arguments or concepts with concrete facts and figures neatly organized in charts. Norwegians are analytical thinkers and this helps them reach conclusions easily. Avoid hype or exaggerated claims in your presentation when in meetings or doing business in Norway.

(Source: [http://www.kwintessential.co.uk/etiquette/doing-business-norway.html](http://www.kwintessential.co.uk/etiquette/doing-business-norway.html))

**Level of corruption in Norway**

In the latest version of the corruption index, presented by Transparency International, Norway is ranked as the 14th least corrupt country of the 180 countries in the analysis. This is a very good position and the Norwegian government continues to put a lot of focus on this issue and treats it in a very serious manner.

This increased governmental focus has now effectuated some very positive initiatives to increase awareness and the willingness amongst Norwegian companies to report acts of corruption to the relevant authorities. Norway has the lowest level of corruption within its oil and gas sector, and the Norwegian Oil and gas Minister, Terje Riis-Johansen, has announced that Norway will be one of the front runners in the work to prevent corruption in oil producing countries in especially Africa.

(Source: Dagens Næringsliv, Debatt side 3, 28.06.2009)
The map below indicates the level of corruption worldwide. The darker the colour, the higher the level of corruption is in the given country.

**Figure 2.2**

Norway has chosen to implement EITI (Extraction Industries Transparency International) which covers oil, gas, and extraction of solid mineral resources. This is done in order to secure openness and transparency within these sectors and is seen as an important signal sent to all countries also within the OECD. These sectors are often subject to corruption as they often involve significant investments as well as both private and governmental interests. This is a reputation Norway is making a great effort to avoid and in fact acts of corruption within the Norwegian Oil & Gas sector is close to none existent. 

(Source: www.transparency.no)

**Cultural Aspects**

Drawing upon the theoretic work of the Dutch professor and author Geert Hofstede can help Danish suppliers realize the cultural differences between Norway and Denmark. Although we are neighbours and very similar in language and living standard there are some, and in many situations quite important, differences to be aware of. The figure below depicts the five cultural dimensions which Geert Hofstede uses to compare different countries for business purposes.

**Figure 2.3**

(Source: http://www.geert-hofstede.com/)
The five dimensions are Power Distance Index (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance Index (UAI), and Long-Term Orientation (LTO). In the model above, a comparison is done for Denmark and Norway and from the five pairs of columns it becomes quite obvious that there are significant differences between the two countries on more dimensions. It is important to notice, that the figure only shows the cultural tendencies of each country and that there will be examples of companies with positions on these five dimensions that are different from the suggested country norm.

The Norwegian score on the Power Distance Index is higher than the Danish score, but both are ranked on the low part of index which means that little attention is paid to the hierarchical levels of the organisation in Norwegian as well as Danish companies. In a negotiation situation, this means that there is a better chance of constructive discussion as everyone will have a chance to have their opinions heard.

The dimension on Individualism is almost the same meaning that both Danes and Norwegians work toward the fulfilment of personal goals and not as much the social goals, but on the Masculinity dimension Denmark scores almost double the score of Norway. This means that there is a tendency that Danish companies will be much more eager to get started and make profits from the cooperation, whereas Norwegian companies tend to focus more on the social values of business co-operations and the long-term possibilities. Hence a Dane in Norway should not be too hasty in your negotiation processes and you should not be too focused on the immediate financial gain alone.

The final two dimensions show obvious differences as well. The Uncertainty Avoidance Index tells us that Norwegians prefer to take the safe route as opposed to Danes who are much more willing to take risks and enter into new projects and co-operations. This means that it is very important for Danish companies not to push Norwegian business partners into making decisions on new ventures as this would the Norwegian company stall even more. The Long-Term Orientation is not registered for Denmark, but the tendency would be that Norwegians prefer a more long-term co-operation which is in line with the more feminine values compared to Denmark.

(Source: http://www.geert-hofstede.com/)
3 The Oil & Gas Sector

3.1 Introduction

In the following a brief historic run through of the Norwegian Oil and Gas sector will be given. Furthermore a brief description of the present main areas of activity as well as areas of development will be given. Finally different political trends of the sector especially regarding the environment will be introduced to give an impression of the main focus areas.

3.1.1 Brief History of the Sector

Agreements on dividing the North Sea in accordance with the median line principle were reached by Norway with the UK and Denmark in 1965. The Norwegian continental shelf south of Stad (62°N) - which is taken as the northern limit of the North Sea - was divided into 37 quadrants, each comprising 12 blocks covering 15 minutes of latitude and 20 minutes of longitude.

Norway's first offshore licensing round was announced on 13 April 1965, and 22 production licences covering a total of 78 blocks were awarded. The first well was drilled off Norway in the summer of 1966. It proved to be dry.

Key goals for Norwegian oil and gas policies since the early 1970s have been national management and control, building a Norwegian oil community and state participation. Decisions on opening new areas lay with the Norwegian Stortinget (Norwegian Parliament), while licenses for petroleum operations were to be awarded by the government. Exploration in the 1970s was confined to the area south of the 62nd parallel. A phased opening of the continental shelf to exploration and restrictions on the number of blocks awarded in each licensing round were used to maintain a moderate pace.

Foreign companies dominated exploration off Norway in the initial phase, and were responsible for developing the country’s first oil and gas fields. While these multinational firms were also intended to play an important long-term role, the goal of building up a Norwegian oil community was defined at an early stage. Statoil was created as a state-owned oil company, and the principle of 50% state participation in each production licence was established. The Norwegian Parliament later decided that the level of state participation could be higher or lower than 50%, depending on circumstances.

State participation in petroleum operations was reorganised on 1 January 1985. Statoil's interest in many licences was split into two components, one linked to the company's commercial participation and the other becoming part of the state’s direct financial interest (SDFI) in petroleum operations. This arrangement means that the state itself funds the exploration expenses, investment and operating costs falling to the SDFI, and receives the share of production and revenues which corresponds to its interest in each production license. The Norwegian Parliament resolved in the spring of 2001 that 21.5 % of the SDFI's assets could be sold. Fifteen % was sold to Statoil that same spring, and the remaining 6.5 % was sold to other companies in March 2002.
The North-East Frigg gas field became the first development off Norway to cease production in May 1993. A total of 12 fields had been shut in on the NCS at January 2002. Norwegian oil and gas production has increased substantially over the past 10 years, and the country ranks today as the world’s third largest exporter of crude oil after Saudi Arabia and Russia. Petroleum operations now play a substantial role in Norway’s economy, and contribute considerable revenues to the state.
(Source: http://www.npd.no/)

3.1.2 Location of the Oil & Gas Fields – Present and Potential

The North Sea
The Balder field was discovered in 1967. Ekofisk was proven in December 1969, and it became obvious in early 1970 that this was a large discovery. Later that year, several interesting finds were made in the same area. Norwegian North Sea oil production began in 1971 when Ekofisk at the southern end of the sector came on stream. Its oil was loaded into tankers on the field until the Norpipe oil line to the UK was completed in 1975. The Norpipe system’s lean gas line from Ekofisk to Emden in Germany began operating in 1977, initiating Norwegian natural gas exports to continental Europe.

The Frigg field was discovered in May 1971 and came on stream six years later. A dry gas export pipeline was built to St Fergus in Britain. Discovered in 1974, Statfjord is shared between Norway and the UK. All three concrete gravity base structures on this giant field stand in the Norwegian sector. The first of these platforms came on stream in November 1979.

The map below shows the predefined areas of the Norwegian Sea as well as the announced blocks and areas covered by a license.

Figure 3.1

(Source: Factbook 2009 by the Ministry of Petroleum and Energy)
In 1985, the first North Sea gas was landed in Norway through a trunk line from Statfjord to Kårstø north of Stavanger, where condensate is removed and the lean gas piped on to continental Europe. Statfjord represented Statoil's first major assignment as operator. Embracing Statfjord, Gullfaks, Snorre and several smaller fields, Tampen became the most important oil-producing region of the Norwegian continental shelf during the 1980s and 1990s. Offshore loading into shuttle tankers is used to ship oil from the area.

Development of Oseberg was approved in 1984, with production starting in 1988. Oil from this field is piped to Sture near Bergen. Oseberg was the first Norwegian field to receive injection gas from another reservoir, using the Togi facility on Troll. The Sleipner East and Troll Phase I gas developments were approved by the Norwegian Parliament in 1986. This reflects a trend in which gas is becoming increasingly important in overall Norwegian petroleum production. Developing Troll ranks as one of the world's biggest energy projects. Embracing production from thin oil zones, the second phase was approved in 1992 and has put Troll among Norway's major oil fields since it came on stream in 1995. Crude from Troll is piped to Mongstad near Bergen.

**The Norwegian Sea**

The first three production licenses above the 62nd parallel were awarded in 1980. In the following year, petroleum was found on the Halten Bank with the discovery of Midgard (now part of the Åsgard field). A number of oil and gas accumulations have since been discovered. Draugen became the first oil field approved for development on the Halten Bank in the autumn of 1988, and came on stream in October 1993. Heidrun, Njord, Norne and Åsgard have subsequently come on stream. Plans for development and operation (PDOs) of Kristin and Mikkel were approved in 2001.

The map below shows the predefined areas of the Norwegian Sea as well as the announced blocks and areas covered by a license.

**Figure 3.2**

(Source: Factbook 2009 by the Ministry of Petroleum and Energy)
The Norwegian Parliament approved construction of the Haltenpipe gas transport system from Heidrun to Tjeldbergodden in mid-Norway in February 1992. Heidrun came on stream in 1995, and associated gas from this field has provided feedstock for methanol production at Tjeldbergodden since 1997. In connection with the Åsgard development, approval was also sought for a new gas trunk line to Kårsto.

Deepwater areas of the Norwegian Sea were put on offer for the first time in the 15th offshore licensing round. Seven of the 18 licenses awarded in this 1995 round are located in deepwater parts of the Møre and Voring areas. Two large discoveries made in these licenses during 1997 confirmed that the area has great potential. One of these was Ormen Lange, the second-largest gas discovery on the NCS, with 400 million scm of gas. New production licenses were awarded in these waters in the 16th round.

The Barents Sea
A total of 39 production licenses have been awarded in the Barents Sea since 1980. A number of these have yielded a series of minor and medium-sized gas discoveries. Plans for development and operation (PDO) and installation and operation (PIO) for the Snøhvit LNG project were submitted to the authorities in September 2001 and approved by the Norwegian Parliament the following March. These are based on subsea installations tied back by a multiphase gas and condensate pipeline to a receiving terminal at Melkøya outside Hammerfest in northern Norway. The gas will be processed there, liquefied and exported in liquefied natural gas carriers. The Goliat oil discovery was made in 2000.

(Source: http://www.npd.no/English/)

The map below shows the predefined areas of the Norwegian Sea as well as the announced blocks and areas covered by a license.

Figure 3.3
Where will the activity be in the future?

The Shtokman Field
The Shtokman was discovered in 1988 and is located 555 kilometers Northeast of Murmansk in the Russian part of the Barents Sea. The Sea depth in that area is around 350 meters. The Shtokman field is the worlds’ largest subsea gas field and covers an area of 1400 square kilometers. The field contains estimated quantities of between 2500 and 3.2 billion cubic meters extractable gas and large quantities of condenses.

The expansion costs for three phases have been estimated at around NOK 147 billion. A future fourth phase at Shtokman could prove necessary. The expansion concept of the Shtokman field will most likely consist of sea bed installations and pipelines to the mainland where the gas will be processed. Those in charge of the field expansion estimates that four platforms will be used, 144 production wells of which around 40 will most likely be subsea completed wells. (Source: http://www.offshore.no/nyheter/newspick_shtokman.aspx?foc=2)

The Field Expansion
The Russian oil and gas market continues to attract significant interest from the Norwegian petroleum cluster. Gazprom’s decision to move forward with development of the giant Shtokman field in partnership with Total and StatoilHydro is adding further interest in the Russian Barents Sea. A final investment decision on the first phase of developments will probably be made by the partners in 2009, but companies are already positioning themselves for the challenges of developing the field, 550 km into the Barents Sea. The Shtokman partners are looking at extracting gas for the first time in 2013 and LNG (Liquefied Natural Gas) in 2014 – an ambitious schedule.

Norwegian companies have documented their competitiveness by gaining a major share of the work in the development of the Prirazlomnoye field in the Barents Sea; a field which Sevmorneftegaz believes can start production in 2010. The aim of the Barents 2020 initiative is to stimulate development of new expertise and technology, needed for petroleum operations in the north. Barents 2020 is also focusing on how to reconcile petroleum technology and environmental considerations in the sensitive marine ecosystem of the High North. This technological area of expertise represents interesting possibilities for Danish suppliers to the Norwegian oil and gas sector. (Source: Yearly report by INTSOK from 2007)

3.1.3 Current Political Trends and Issues in the Sector
While competition is desirable, cooperation between the players in the petroleum industry is also beneficial. Therefore, the main rule is that the authorities award production licences to a group of companies instead of one company alone, normally on the basis of applications from oil companies in connection with licensing rounds. The most important award criteria include understanding of the geology, technical expertise, financial strength and the experience the authorities have had with the specific oil company. Based on the applications, the Ministry of Petroleum and Energy establishes a licensee group. In this group, the oil companies exchange ideas and experience, and share the costs and revenues
associated with the production licence. The companies compete, but must also cooperate to maximise the value in the production licence they have been awarded.

Under this system, expertise and experience are gathered from a number of companies from all over the world. The licensee group also functions as an internal control system within the production licence, where each licensee is responsible for monitoring the work of the operator. The petroleum sector is driven by technological innovation. Maximising the values on the Norwegian continental shelf requires that oil companies constantly apply the best available technology, and that they carry out the necessary research and development. Therefore, the Norwegian authorities have established an environment that promotes technological development. Today there is close collaboration between oil companies, research institutes, the supply industry and the authorities when it comes to technology and research.

Environmental issues
Emissions to air consist mainly of exhaust gases from combustion of gas in turbines, gas flaring and combustion of diesel. These exhaust gases contain components such as carbon dioxide (CO2) and nitrogen oxides (NOx). The petroleum sector accounts for about one-fourth of Norway's total greenhouse gas emissions. Most of the emissions from this sector are linked to energy production on the offshore facilities. The most important reasons for the increase are extended lifetime and higher energy needs associated with tail production, in addition to longer transport distances for gas to the market. The figures below show the historical and expected emissions of CO2 and NOx.

Figure 3.4

Key emission sources for both CO2 and NOx include burning of gas in turbines and motors, gas flaring and diesel consumption on the facilities. In 2008, the Government established a project called Climate Cure 2020. The objective of the project is to produce basic data for evaluating new policy instruments aimed at achieving the Government's climate goals. The NPD is participating in this work together with other agencies, under the leadership of the Norwegian Pollution Control Authority. During the fall of 2008, the NPD took part in work to evaluate the cost-benefit of introducing the Barents Sea requirements (zero discharges to sea) in the Norwegian Sea and the North Sea.

Since the very beginning of the petroleum activities on the Norwegian shelf, Norway has focused on reducing gas flaring. Little flaring takes place on the
Norwegian shelf compared with other petroleum-producing countries. The NPD is now involved in an international joint effort to reduce flaring on a global level. This can result in less greenhouse gas emissions and enhanced value creation in those countries which succeed in implementing these principles. The NPD also participates in the work on the comprehensive management plan for the Norwegian Sea, which will be submitted to the Norwegian Parliament during the spring of 2009.

(Source: http://www.npd.no/English/Emner/Ytre+miljo/2009_1_8_miljo.htm)

3.1.4 Development Plans

New fields of exploration

Goliat
The plan for development and operation (PDO) of the Goliat field in the Barents Sea was approved by the Norwegian Parliament on 19 June 2009. The investments associated with Goliat are estimated at more than NOK 28 billion. The field’s reserves are around 174 million barrels of oil. The licensees are Eni Norge AS (operator) and StatoilHydro Petroleum AS. Goliat will meet the strict environmental requirements established in the comprehensive management plan for the Barents Sea. Goliat will report its power consumption needs for full electrification from 2017. The PDO approval is contingent on the licensees submitting a plan for increased use of power from land to Goliat as soon as the power supply situation in the area has been reinforced, but no later than 1 January 2019.

Oselvar
On 19 June 2009, the Government approved the plan for development and operation of Oselvar. The field is located in the North Sea, 250 km from the Norwegian coast. Dong E&P Norge AS is the operator of the development. The other licensees are Bayerngas Produksjon Norge AS and Norwegian Energy Company AS. The operator has estimated the investments at NOK 4.6 billion. The field will be developed with a trawlable seabed facility, and the production from Oselvar will be tied in to Ula for processing. Oselvar is located 23 km west of Ula. According to the plan, production from Oselvar will commence in November 2011. The operator estimates the recoverable reserves at 4.34 billion cubic metres of gas and 3.91 million cubic meters of oil.

Troll projects
On 19 June 2009, the Government approved the plan for development and operation of Troll projects in the North Sea. The projects deal with long-term development of the oil and gas resources on the Troll field. The plan does not entail a new development, but two modifications that will extend the lifetime of the Troll field. Installation of a third rich gas pipeline from Troll A to the process facility at Kollsnes Gas injection from Troll B and on behalf of the licensees in production licences 054 and 085, the operator StatoilHydro has estimated the investments at NOK 5.7 billion.

(Source: The Norwegian Petroleum Directorate’s (NPD’s) report for the second quarter of 2009)
On 30 April, the Ministry of Petroleum and Energy awarded 21 new production licences in the 20th licensing round on the Norwegian continental shelf. The awards include nine new production licences in the Barents Sea and 12 new production licences in the Norwegian Sea. The map above shows the awards given in the 20th licensing round and the percentage ownership of each production license.

Future Developments

There are many projects planned for the future on the Norwegian continental shelf. Some are slowly being realized and others are still at a stage where political and economic aspects can still put the projects to the grave. In the following, three of these future developments are briefly described.

Snøhvit – Snøhvit is the first offshore development in the Barents Sea. Without surface installations, this project involves bringing natural gas to land for liquefaction and export from the first plant of its kind in Europe and the world’s northernmost liquefied natural gas facility. Arctic LNG supplies from Snøhvit provide new opportunities for the Norwegian oil and gas sector. Snøhvit is the first major development on the Norwegian continental shelf with no surface installations.

The seabed facilities are designed to be over-trawlable, so that neither they nor fishing equipment will suffer any damage from coming into contact. No fixed or floating units are positioned in the Barents Sea. Instead, the subsea production facilities stand on the seabed, in water depths of 250-345 metres. A total of 20 wells are due to produce gas from the Snøhvit, Askeladd and Albatross fields. This output is transported to land through a 143-kilometre pipeline. A total of nine
wells are planned on Snøhvit, including eight for production and one for injecting carbon dioxide back below ground.

Six of the producers and the carbon dioxide injector were drilled during 2004-05, with the remaining two following in 2011. In addition, the production wells were drilled on Albatross in 2005-06. This field also forms part of the Snøhvit development. The Snøhvit and Albatross wells came on stream in 2007. The Askeladd part of the development is not due to come on stream until 2014-15.

**Ormen Lange** – The development of the Ormen Lange field in the Norwegian Sea is one of the largest and most demanding industrial projects ever carried out in Norway. The field will be able to cover as much as 20% of Britain’s gas needs, for up to 40 years. The plan for development and operation (PDO) of the Ormen Lange field was submitted to the Norwegian authorities on December 4th 2003. Norske Shell took over as operator on December 1st 2007.

The field has been developed with sea-floor installations at depths of between 800 and 1,100 metres, combined with an onshore plant at Nyhamna in Aukra municipality in Norway, for processing and exporting the gas. This represents a significant advance in technological development on the Norwegian continental shelf. Not a single installation is visible on the surface of the sea above Ormen Lange. All the installations are at sea depths of 800 to 1,100 meters. Following a gradual increase in production over the first two to three years, the field will produce 70 million scm of gas per 24-hour period.

With recoverable gas reserves estimated at 397 billion scm, deliveries are likely to continue for 30 to 40 years. Following processing at the onshore facility in Aukra, the gas will be exported through the 1,200-kilometre long pipeline Langeled, to the reception centre in Easington on the east coast of the UK. The gas can also be transported via the riser platform in the Sleipner area of the North Sea to customers in continental Europe.

**Jan Mayen** – The arctic sea around Jan Mayen is the latest area of discussion and interest in the Norwegian Oil and gas sector. Jan Mayen is a volcanic island that belongs to Norway and that is home to special animals and fauna. The Norwegian government have long been very protective of this Island because of its environmental significance, but now that existing oil reserves are running out and other countries such as Iceland are beginning their preliminary oil and gas activities in the sea surrounding Jan Mayen, the Norwegian government has decided to look into the possibility of Norwegian oil and gas activity in the area as well.

An agreement between Iceland and Norway from 1981 has divided the Jan Mayen area between the two and Iceland has already opened its part oil and gas activity. The arctic areas as a whole is the a very “warm” topic these days and a decision to increase focus and activities in the arctic region will make way for increased demand for new technologies suited for the working environment of the arctic sea. These technologies represent areas where Norwegian expertise is scarce and where Danish suppliers could gain access to the Norwegian market.
3.2 **The Players in the Sector (Operators)**

3.2.1 **Companies**

In the following two sections an overview of the largest national and international players will be given with relevant company data as well as brief descriptions of the main activities and relations in the Norwegian supply industry. The companies are ranked according to the level of activity on the Norwegian continental shelf measured in the sum of “Operatorship in production license”, “Licensee in production license” and “Licensee in field”.

The full field of oil producing companies on the Norwegian continental shelf covers a large number of national and international companies including:

<table>
<thead>
<tr>
<th>Aker Exploration AS</th>
<th>Bayerngas Norge AS</th>
<th>BG Norge Limited</th>
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<tr>
<td>BP Norge AS</td>
<td>Bridge Energy AS</td>
<td>Centrica Enieri</td>
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<tr>
<td>Chevron Norge AS</td>
<td>Concedo ASA</td>
<td>ConocoPhillips Norge</td>
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<td>Dana Petroleum Norway</td>
<td>Det Norske ASA</td>
<td>Discover Petroleum AS</td>
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<tr>
<td>DONG E&amp;P Norge AS</td>
<td>Edison International</td>
<td>Eni Norge AS</td>
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<tr>
<td>E.ON Ruhrgas Norge AS</td>
<td>Esso Norge AS</td>
<td>Faroe Petroleum Norge AS</td>
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<tr>
<td>Gassco AS</td>
<td>GDF SUEZ E&amp;P</td>
<td>Genesis Petroleum AS</td>
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<tr>
<td>Hess Norge AS</td>
<td>Idemitsu Petroleum</td>
<td>LOTOS E&amp;P Norway</td>
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<tr>
<td>Lundin Norway AS</td>
<td>Maersk Oil Norway</td>
<td>Marathon Petroleum Co.</td>
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<tr>
<td>Nexen Exploration AS</td>
<td>Norske AEDC AS</td>
<td>Norwegian Energy Co.</td>
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<tr>
<td>A/S Norske Shell</td>
<td>North Energy</td>
<td>OMV (Norge) AS</td>
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<tr>
<td>Petoro AS</td>
<td>Petro-Canada AS</td>
<td>PGNIG Norway AS</td>
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<tr>
<td>Premier Oil Norge AS</td>
<td>Rocksource ASA</td>
<td>RWE Dea Norge AS</td>
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<td>StatoilHydro</td>
<td>Svenska Petroleum</td>
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<td>Talisman Energy Norge AS</td>
<td>Total E&amp;P Norge</td>
<td>VNG Norge AS</td>
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<td>Wintershall Norge ASA</td>
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**National Players**

**Top Norwegian operators (Level 1)**

**StatoilHydro ASA**

Website: [www.statoilhydro.com](http://www.statoilhydro.com)

StatoilHydro became a reality on October 1, 2007, after the plan for the merger was announced between Statoil and Hydro's oil and gas division on December 18, 2006. The Norwegian parliament, the Norwegian Parliament, approved the merger plan in June 2007, and the new company has both the size and the strength to expand internationally.

The StatoilHydro stock is listed on the Oslo and New York Stock Exchange. After the merger, the Norwegian State will continue to be the majority owner in the new company, holding a total of 67% of the shares as of March 2009.

StatoilHydro employs about 29,500 people in 40 countries. It is the world's largest operator in waters more than 100 metres deep and operator for 39 producing oil and gas fields. StatoilHydro is the biggest seller of oil products in Scandinavia and is one of the world’s largest crude oil and gas suppliers.
The market capitalisation of the company is worth more than NOK 500 billion or approximately USD 80 billion and daily production rates average more than 1.7 million barrels of oil equivalent, with proven reserves of more than six billion barrels of oil equivalent. StatoilHydro is also the world leader in the use of deepwater technology and for carbon capture and storage.
(Source: Company website)

**Det norske oljeselskap ASA**

Website: [www.dettor.no](http://www.dettor.no)

On October 9th 2007, the Boards of Pertra ASA and DNO resolved to execute a combination of Pertra and DNO's Norwegian operations, organized as the company NOIL Energy. DNO changed its company name to DNO International. The combination was resolved in Extraordinary General Meetings in DNO and Pertra held 8 November 2007. Effective as of 19 November 2007, the new company name of Pertra was "Det norske oljeselskap", commonly known as "Det norske". NOIL Energy was formally merged into Det norske in 2008.

Det norske is the second-largest operating company on the Norwegian continental shelf with regard to number of license interests and operatorships. Det norske's current portfolio consists of 27 operatorships and interests in a total of 47 licenses. Det norske is an innovative, independent and aggressive oil company which focuses on getting more out of the oil resources and is experiencing rapid growth.

Det norske focuses on exploration and development of petroleum resources on the Norwegian Shelf. The company is present all over Norway with the main office located in Trondheim, and the headquarter functions divided between Trondheim and Oslo. In addition, the company has offices in Harstad and Stavanger. The company currently employs a staff of more than 140.
(Source: Company website)

**Norwegian Energy Company ASA**

Website: [www.noreco.no](http://www.noreco.no)

Noreco is a fast growing Norwegian, independent oil and gas company. The company’s focus is to explore, develop and produce oil and gas in the North Sea. Since incorporation in 2005, the company has grown rapidly through license rounds and acquisitions. Noreco operates in Norway, Denmark and United Kingdom.

Norwegian Energy Company has more than 50 licences in the North Sea and the Norwegian Sea. The company employs more than 75 oil and gas professionals and operates oil and gas production from seven offshore fields. Daily production rates average 15,400 barrels of oil equivalent. Norwegian Energy Company is listed on Oslo Stock Exchange and has offices in Stavanger, Copenhagen and Oslo.
(Source: Company website)

**Aker Exploration AS**

Website: [www.akerexploration.com](http://www.akerexploration.com)

Aker Exploration was established in 2006 and was pre-qualified as license holder on December 1st 2006. On November 16th 2007 the company was pre-qualified as operator. Aker Exploration AS has been listed on Oslo stock exchange Axess since December 17th 2007.
Aker Exploration employs more than 30 people in offices in Oslo and Stavanger. The company holds shares in 22 licenses on the Norwegian continental shelf and is the operator on 2 licenses (PL 468 and PL 256). The activity is focused on the areas in the northern part of the North Sea, Norwegian Sea, and Barents Sea. (Source: Company website)

**International Players**

*Top International Operators (Level 1)*

**ConocoPhillips Norge**

Website: [www.conocophillips.no](http://www.conocophillips.no)

ConocoPhillips Norge is the largest foreign operator on the Norwegian continental shelf. The company's main office is in Tananger, outside of Stavanger, and it employs approximately 1900 people. The main activity is exploration for and production of oil and gas. ConocoPhillips Norge is the third largest energy company in Norway. The production in Norway for 2008 was about 207.000 barrels of oil equivalent per day of which around 116.000 came from the Ekofisk Area.

ConocoPhillips Norge has a strong position on big fields on the Norwegian continental shelf. The company is the operator of the fields in the Ekofisk Area, which is the mainstay of the company’s activities in Norway. The company also has attractive assets in non-operated fields. In 2008 the production from non-operated fields totaled some 92,000 barrels of oil equivalent per day. ConocoPhillips has a variety of interests in related businesses, most of them within Downstream. (Source: Company website)

**ESSO Norge AS (Exxon)**

Website: [www.exxonmobil.no](http://www.exxonmobil.no)

ExxonMobil has its headquarters at Forus in Sandnes municipality, where all offshore exploration and production activities are coordinated. ExxonMobil is the second 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.

Exxon owns a refinery at Slagentangen which has a production capacity of 6 million tons of oil products per year, and its production is based on crude oil from the North Sea. ExxonMobil has a market share of about 20% of total sales of oil products in Norway. The company markets both Esso and Mobil branded products. The total number of employees in the company is 900. (Source: Company website)

**A/S Norske Shell**

Website: [www.shell.no](http://www.shell.no)

Shell has been active in Norway since 1912. The company activities include the upstream exploration and production of oil and gas and downstream activities such as refining, sales and marketing of petroleum products. The main office is located in Sola outside Stavanger. Upstream activities are run by offices in Kristiansund and Aukra, while downstream activities are run from the office in Oslo.
A/S Norske Shell is a significant player in Norway and by 2010 the company expects to be the largest international oil and gas company on the Norwegian continental shelf. Shell operates the Draugen oilfield and the Ormen Lange gas field in the Norwegian Sea and has part ownership of nine other fields. Furthermore Shell has operates eight licenses and has part ownership in another 17 licenses on the Norwegian shelf.
(Source: Company website)

BP Norge AS
Website: www.bp.no
BP is one of the world's largest energy companies, providing its customers with fuel for transportation, energy for heat and light, retail services and petrochemicals products for everyday items. BP employs approximately 92,000 people worldwide with activities in 29 countries and interests in 17 refineries. Daily production averages almost 4 million barrels of oil equivalent, whereof approximately 63% is oil and NGL's and 37% is natural gas. The proven reserves of BP are more than 18 billion barrels of oil equivalent, whereof approximately 57% is oil and NGL's and 43% are natural gas.
(Source: Company website)

Total E&P Norge AS
Website: www.total.no
TOTAL E&P NORGE AS is an oil and gas company which is part of the worldwide French industrial group TOTAL. Measured in production, reserves and financial results, TOTAL E&P NORGE AS is a major player on the Norwegian Continental Shelf. In 2008 the company’s net production reached 335,000 barrels of oil equivalents per day. Total E&P Norge has an ownership interest in most areas on the shelf as well as in GASSLED.
(Source: Company website)

Norwegian and International 2nd and 3rd Level Suppliers
The 2nd and 3rd level players in the Norwegian oil & gas sector are the most important when it comes to representing market possibilities for Danish suppliers. These companies mainly consists of main contractors at the level just under the operators or oil producing companies, and Systems integrators at the next level again. These companies bid on large contracts and then rely to a great extend on other suppliers to do smaller parts of the final product. For Danish suppliers these companies represent great possibilities to gain access to projects on the Norwegian oil & gas sector.

The market covers numerous players at the 2nd and 3rd level and below has been given two short lists of some of the main actors on each level. These companies rely a lot on sourcing of external competences when planning the completion of big contracts from the operators or oil producing companies on the Norwegian continental shelf. Some of these companies which are very interesting for Danish suppliers to notice are listed below:
Main Contractors (2nd level)

- Technip [www.technip.no]
- NLI Group [www.nlionline.com]
- Grenland Group [www.grenlandgroup.com]
- Aker Solutions [www.akersolutions.com]
- Oceaneering [www.oceaneering.com]
- FMC Technologies [www.fmctechnologies.com]
- IKM Gruppen [www.ikm.no]
- National Oilwell Varco [www.nov-norway.no]
- Aibel [www.aibel.com]
- Kongsberg Gruppen (Maritime) [www.kongsberg.com]

System Integrators (3rd level)

- Atlantis Deepwater Technology [www.atlantis-deepwater.com]
- Bennex Group AS [www.bennex.no]
- Dresser-Rand AS [www.dresser-rand.com]
- FMC Technologies Subsea Systems [www.fmctechnologies.com]
- Grenland MMO AS [www.grenlandgroup.com]
- Kongsberg Intellifield [www.intellifield.no]
- LMG Marin [www.lmgmarin.no]
- AS Nymo [www.nymo.no]
- Remora ASA [www.remoratech.com]
- Siemens Oil [www.siemens.no]

3.2.2 Other Players

The Ministry of Petroleum and Energy – The Ministry of Petroleum and Energy holds the overall responsibility for management of petroleum resources on the Norwegian continental shelf. This includes ensuring that the petroleum activities are carried out in accordance with the guidelines given by the Norwegian Parliament and the government. In addition, the Ministry has a particular responsibility for supervising the state-owned corporations, Petoro AS and Gassco AS, as well as the oil company in which the state holds a majority interest, StatoilHydro ASA.
(Source: [www.regjeringen.no])

Norsk Industri – The Federation of Norwegian Industries have approx. 2,200 member companies with approx 120,000 employees all across Norway. The Federation of Norwegian Industries is the result of a merger between the two large industrial federations of the Confederation of Norwegian Enterprise (NHO), the Federation of Norwegian Manufacturing Industries (TBL) and the Federation of Norwegian Process Industries (PIL).
(Source: [www.norskindustri.no])

NPD – The Norwegian Petroleum Directorate (NPD) is administratively subordinate to the Ministry of Petroleum and Energy. The NPD plays a key role in petroleum resource management, and is an advisory body for the Ministry of Petroleum and Energy. The NPD exercises authority in connection with exploration for and production of petroleum deposits on the Norwegian continental shelf, including statutory powers and to make decisions based on the rules regulations governing the petroleum activities.
(Source: [www.npd.no])
OLF – OLF, The Norwegian Oil Industry Association is a professional body and employer's association for oil and supplier companies engaged in the field of exploration and production of oil and gas on the Norwegian Continental Shelf. OLF is a member of the Confederation of Norwegian Business and Industry (NHO) and unites 47 oil and gas companies and 58 supplier companies on the Norwegian Shelf. The member companies account for approximately 29,000 employees.
(Source: www.olf.no)

INTSOK – Norwegian Oil and Gas Partners - was established in 1997 by the Norwegian oil and gas industry and the Norwegian Government. INTSOK’s objective is to work with companies throughout the industry to expand the business activities in the international oil and gas markets on the basis of the industry’s leading edge experience, technology and expertise. INTSOK is a network-based organisation where the partners exchange experience and knowledge of market developments internationally. The organisation encourages active dialogue between oil companies, technology suppliers, service companies and governments. The Norwegian Government actively supports INTSOK’s initiatives, and the activities are financed jointly by the industry and the government.
(Source: www.intsok.no)

NPF – The Norwegian Petroleum Society (NPF) is a membership body for people interested in the country’s oil and gas activities. At the same time NPF provides an important forum for professional discussion and exchange of new knowledge – independent of financial and political interests.
(Source: www.npf.no)

Gassnova – Gassnova is an administrative agency with the task of promoting and supporting innovation and development of environmentally friendly gas power technology.

Petoro AS – Petoro AS is a state-owned corporation which is responsible for the State’s Direct Financial Interest (SDFI) on behalf of the state.

Gassco AS – Gassco AS is a state-owned company responsible for the transport of natural gas from the Norwegian continental shelf. The company is the operator of Gassled, although it has no ownership interest in the company. Gassco AS handles this operatorship in a manner that is neutral for all owners and users.

3.3 The Actual Market Size
Norway has historically been mainly an oil nation. Up until the mid 1990s Norway almost did not produce gas at all. Since then there has been a dramatic change in the relation between production of oil and gas and in 2008 the production of gas made up 40% of the total production of oil and gas. This tendency is expected to grow, meaning that gas will continue to make up an increasing part of the total production and experts believe that because of decreasing oil production, the relation will be around 50/50 within five or six years.
(Source: Norwegian newspaper “Aftenposten”, Thursday 11th of June 2009)
The model above shows graphically the historic and expected development of the relation between oil and gas production in Norway. Experts talk about Norway leaving the category of oil producing countries and becoming mainly a gas producing country although this drastic change of category will not happen overnight. None the less this development makes it interesting to view the two resources separately, when evaluating market potential and future measurements taken within these different parts of the oil and gas sector.

The map below indicates the volume of undiscovered oil (green) and gas (red) resources in the three main areas of operation today, namely the North Sea, the Norwegian Sea, and the Barents Sea. The number in each figure is the expected volume waiting to be discovered and the green and red curves and especially the steepness of these curves indicate the uncertainty of best case and worst case estimates. For instance the potential of the Barents Sea shows great uncertainty about the estimated volume of undiscovered oil and gas. The figure shows that there may be as much as 1200 million and as little as 50 million scm o.e. of oil yet to be discovered. In the same way it shows that there may be as much as 1350 million scm o.e. and as little as 100 million scm o.e. of gas yet to be discovered.
In order to estimate the number years that it would be possible to maintain the level of production of today, people rely on the formula \( R/P = Y \) or the “R/P ratio”. In this formula \( R \) represents the actual resources remaining in active reservoirs, \( P \) represents the yearly production rate, and \( Y \) is a measure for the number of years the remaining resources will last at the current level of production.

According to global statistical studies done BP in 2008, Norway had an R/P value for oil of 8.8 years and for gas the rate was 33 years at the end of 2007 (www.bp.com). Based on numbers from NPD giving an overview of 2008 these numbers have decreased to 7.5 and 22 years, which only emphasises the need for more efficient extraction methods and new discoveries.

Calculation for Oil:
\[
\frac{919 \text{ million scm}}{122 \text{ million scm}} = 7.53 \text{ years of production}
\]

Calculation for gas:
\[
\frac{2,215 \text{ billion scm}}{101 \text{ billion scm}} = 21.93 \text{ years of production}
\]

Considering these numbers it is easy to see why the Norwegian government, who profits heavily from the oil and gas activity on the Norwegian continental shelf, will want to find new technologies which will help increase the extracted quantities of every existing and future oil and gas field.

### 3.3.1 Type of extraction

All extraction activities on the Norwegian continental shelf are done offshore. There are no oil and gas production activities, but only refining and infrastructure related activities onshore. Furthermore the oil and gas extraction activities mainly take place in shallow waters (up to 300 metres depth) and only few extractions are done in deep water (300 – 1,500 metres depth) amongst these are Ormen Lange which is operated at 800 to 1,100 metres. This means that the Norwegian Continental shelf is currently subject to very little actual deep sea or ultra deep sea extractions.

Other types of extraction is none the less bound to be implemented in the future as environmental struggles and different physical circumstances in the Northern and Arctic seas will most certainly pose new demands and present new solutions. For instance the ongoing dispute between environmentalists and local fishermen on one side and the oil producing companies on the other side, in the Northern parts of Norway have forced some companies to alternate their thinking technologically.

As a result of the uncertainty concerning whether or not regular oil drilling will be allowed, the company Norwegian Energy has announced that they are looking into the possibility of building drilling and production caves underneath the seabed connected to the mainland by tunnels.

(Source: The Norwegian newspaper “Dagens Næringsliv”, Monday the 11th of May 2009)
3.3.2 Production rates today

In May 2009, 18.5 million standard cubic metres oil equivalents (Sm3 o.e.) were produced. This is 1.5 million standard cubic metres less than in May 2008.

<table>
<thead>
<tr>
<th>Period</th>
<th>Oil (mill. Sm³)</th>
<th>Gas (bill. Sm³)</th>
<th>Condensate (mill. Sm³)</th>
<th>NGL (mill. Sm³)</th>
<th>SUM (mill. Sm³ o.e.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2009</td>
<td>8.9</td>
<td>7.9</td>
<td>0.4</td>
<td>1.3</td>
<td>18.5</td>
</tr>
<tr>
<td>May 2008</td>
<td>10.5</td>
<td>7.7</td>
<td>0.3</td>
<td>1.5</td>
<td>19.9</td>
</tr>
<tr>
<td>Difference</td>
<td>-1.5</td>
<td>0.2</td>
<td>0.1</td>
<td>-0.2</td>
<td>-1.5</td>
</tr>
</tbody>
</table>

Several fields have been partly closed due to planned maintenance in May. Production from Valhall and Hod has been closed the whole month due to corrosion problems. So far this year the average daily production has been about 2.0 million barrels of oil and the total liquid production about 2.4 million barrels. The total production so far is about 104.3 million standard cubic metres oil equivalents. This is 0.2 million more than in the same period last year.

<table>
<thead>
<tr>
<th>Period</th>
<th>Oil (mill. Sm³)</th>
<th>Gas (bill. Sm³)</th>
<th>Condensate (mill. Sm³)</th>
<th>NGL (mill. Sm³)</th>
<th>SUM (mill. Sm³ o.e.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan–May 2009</td>
<td>49.0</td>
<td>46.4</td>
<td>2.0</td>
<td>6.8</td>
<td>104.3</td>
</tr>
<tr>
<td>Jan–May 2008</td>
<td>51.0</td>
<td>44.1</td>
<td>1.8</td>
<td>7.2</td>
<td>104.1</td>
</tr>
<tr>
<td>Difference</td>
<td>-2.0</td>
<td>2.3</td>
<td>0.2</td>
<td>-0.4</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Preliminary production figures for June 2009 show an average daily production of about 1.780 million barrels of oil and 0.303 million barrels of NGL and condensate and a total of 7.0 billion Sm3 net gas production in June. Several fields have been partly closed due to planned maintenance in June.

(Source: www.npd.no – press release no. 45/2009)

3.3.3 Growth patterns

As of 2009 there are 35 national and international operators on the Norwegian continental shelf. Furthermore there are additionally 23 other licensees and more apply and are evaluated for every concession round. It has not been possible to gain access to historical data on the development in the number of players on the Norwegian continental shelf, but experts critically emphasise that the number of players on the Norwegian continental shelf has decreased and that the market is becoming increasingly dominated by StatoilHydro, keeping new players out of the market and forcing smaller existing players out as well, which is bad for the competition and development of the industry.

Total production

Since the beginning of the 1970s when oil production was first recorded on the Norwegian continental shelf much has happened. Up until 1976 there was only oil production activity in Norway. In 1977 the first gas production became a reality and in 1979 the production of Natural Gas Liquids (NGL) started as well. From 1984 the production of condensate also became part of the activities on the Norwegian continental shelf.

From 1971 Norway experienced a continued increase in the oil production which lasted up until 1997 and represented a change in the oil production from 400,000 Sm3 o.e. in 1971 over the all time high in 2000 of 181.2 million Sm3 o.e. to last years’ oil production rate of 122.7 million Sm3 o.e.
The gas production has also been increasing throughout its activity on the Norwegian continental shelf. The gas production has changed from the starting point of 2.7 billion Sm3 in 1977 to the all time high of 99.2 billion Sm3 in 2008.

Production of natural gas liquids (NGL) has since 1978 increased from 1.1 million Sm3 o.e. to 16 million Sm3 o.e. in 2008. Finally the production of condensate has increased from 100,000 Sm3 o.e. in 1984 to 4.2 million Sm3 o.e. as of 2008.

**Total revenue**

As a measure for the total revenue of the sector we will rely on the numbers for the export value of the produced petroleum resources. In 1971 the export value, which was only based on export of oil, was NOK 12 million. Since then much has happened and gas, Natural Gas Liquids and condensate is now part of the petroleum export. In 2008 the total export reached an all time high of approximately NOK 604 billion.

The figure below depicts the historical development of the four different petroleum resources as well as the change in total revenue (export value).

**Figure 3.8**

![Graph of Petroleum Production on the Norwegian continental shelf](image)

(Source: Own creation, data from FACTS 2009 by NPD)

There is no doubt that the oil and gas sector is the most important industry for Norway as a nation and welfare society. This importance has grown in proportion, as the oil and gas sector tends to make up an even larger part of the economic situation in Norway. As this tendency continues into the future and maybe even increases the importance of the industry and thereby the States dependency of the revenue generated from this industry, it also becomes ever more important to keep developing the oil and gas sector.)
The figure above shows four key macroeconomic indicators for the Norwegian petroleum sector. It is quite obvious from the graph that the oil and gas sector plays an enormous role in the wellbeing of Norway as a nation and the general opinion of politicians is that the government should try to keep this development going for as many years to come as possible.

### 3.4 The Future of the Market

About 38% of the expected total resources on the Norwegian continental shelf have been extracted. The remaining resources represent a huge potential value creation for many years to come. The figure below shows a production forecast for the Norwegian continental shelf. It is based on the Norwegian Petroleum Directorate’s estimate of recoverable petroleum resources and presupposes that the authorities and the industry will implement the necessary measures to recover the remaining volumes.

Petroleum production is expected to remain steady over the next few years. The production of oil and other liquids will fall gradually. Gas export on the other hand is expected to increase and to reach a level between 115 to 140 billion scm within the next decade. From representing approximately 40% of the total Norwegian petroleum production in 2008, the share attributed to gas production will increase...
considerably in the future. In the longer term, the number and size of new discoveries will be a critical factor for the production level.

The level of activity on the Norwegian continental shelf has grown considerably in recent years, and the investment level is expected to reach a record high in 2009. The robust investment activity in spite of the financial crisis is a result of the fact that 2009 investments are largely driven by decisions that have already been made and contracts that have already been signed. The effects of the negative economic trend are expected to manifest themselves in more force later on. The model below shows the historic investment level on the Norwegian continental shelf.

**Figure 3.11**

![Investment Level Chart](Source: Factbook 2009 by the Ministry of Petroleum and Energy)

The oil price is a very important factor as regards the activity level and revenues to the state. The price of oil has increased substantially in recent years, peaking at more than USD 140 per barrel in mid-2008. Since then, the negative change of the world economy has caused demand for oil to decrease dramatically and therefore resulting in a sharp drop in prices. At the beginning of 2009, oil sold for slightly more than USD 40 per barrel. Future oil price developments will amongst other depend on the development of the world economy and how much oil the OPEC production cartel pours into the market in the coming years.

### 3.4.1 Investment Plans

Parts of the Norwegian continental shelf are currently defined as mature areas. This term refers to areas that are characterised by familiar geology, well-developed infrastructure, falling production and increasing unit costs. There is still a considerable potential for value creation in these areas if we are able to increase the recovery rate in producing fields, streamline operations and explore for resources near existing infrastructure.

First and foremost, the licensees must invest in projects for improved recovery. Some examples are drilling more wells, measures to extract more from existing wells, injection into the reservoir to extract more petroleum and adaptations in process facilities. Such measures contribute to increasing the average recovery rate. In 1995, the average recovery rate for oil in producing fields was approximately 40% - today it is 46%. Development and use of new technology has played a very important role in increasing recovery, and it still does.

Many fields are facing a situation where the cost level must be reduced in order to justify profitable operations at a lower production level. Developments in
communications technology have given rise to new working methods. The introduction of integrated operations (IO) in the petroleum activity, entail that information technology is used to alter work processes to achieve better decisions, to remote-control equipment and processes, and to move functions and personnel onshore. The goal is reduced costs and more effective operations.

In 2008, about NOK 130 billion was invested on the Norwegian continental shelf. Total investments on the Norwegian continental shelf have now reached about NOK 2100 billion in current monetary value. These investments have made it possible to establish extensive infrastructure which is a precondition for producing and marketing petroleum, but it also forms a basis for the development of additional resources in a cost efficient manner. The figure below shows the investment development by category in NOK billion until 2012.

**Figure 3.12**

![Investment Development by Category](image)

(Source: Presentation from meeting with Norsk Industri – Federation of Norwegian Industries)

In order to ensure that the potential of producing fields and their surroundings is maximised, it is important that the participating interests are vested with the companies which want to make the most of them. This is why the authorities take a positive view of transfers of participating interests. The Norwegian authorities believe that a diversity of players, making different assessments and setting different priorities, constitutes a positive contribution towards realising the resource potential on the Norwegian continental shelf.

In the medium term it is important to ensure that the decline in Norway’s oil and gas production is minimised and that the fields’ lifetimes are extended. On the basis of existing plans, we know that large volumes of oil and gas will be left behind when the fields are abandoned. Today, it is not profitable to recover these resources, but they represent a considerable potential that might be unlocked in the future. Realising this potential will require work on many fronts to explore all alternatives that can help in achieving this goal.

In 2005, the Ministry of Petroleum and Energy and the Norwegian Petroleum Directorate started work to develop a new method to follow up the fields in production on the Norwegian continental shelf. The method was first
implemented in 2006 and was called PIAF (Performance Indicator Analysis for Fields). PIAF will be carried out every year. The background for this initiative was that the government wanted a more systematic and closer follow up of how the operators and the licensees work to develop the resources in and around fields in production, including increased recovery, phasing in additional resources and increasing the efficiency of operations.

The objective of PIAF is to ensure that the authorities have a better and more systematic overview of the development of resource growth, recovery, operating costs and investments. Problems that obstruct the fields’ development and possible improvement areas can be identified through PIAF. PIAF also makes it possible to distinguish between the problems concerning the entire continental shelf and the ones concerning specific fields.

At the moment the Norwegian states own oil company Petoro has identified different potential investment projects among the operators the companies on the Norwegian continental shelf of approximately NOK 380 billion over the next ten years. These are projects that have not yet been decided upon and they cover areas such as field expansions, maintenance, modification of existing installations, and drilling of wells.

Especially the CCS project at Mongstad in Hordaland attracts a lot of attention as it is initially set out to be a test centre for carbon cleaning technologies of Norwegian companies such as Aker and Alstom. The test centre is supposed to be up and running in 2011 and the full scale project should be ready in 2014. The total investment is estimated at between NOK 40-50 billion for this project alone.
(Source: The Norwegian newspaper “Dagens Næringsliv”, Saturday the 20th of June 2009)

Such projects are important for the continued development of the Norwegian oil and gas sector, but the operators, who are primarily financed by their cash flow from selling oil are very vulnerable when it comes to the oil price level and even small changes in the oil price can mean the difference between going with or abandoning a given investment project.

3.4.2 Potential Obstacles
The main obstacle for future investment projects are without any doubt the current oil price. These days we are experiencing an oil price that is fluctuating right around the level which is becoming better known as the freezing point of future investment plans. What it means is that even small increases or decreases in the oil price can have a huge effect on current and future investment plans of most oil producing companies.
The figure above indicates the breakeven price level for a number of investment projects primarily planned by StatoilHydro (blue), but other operators as well. As the model shows, most projects are abandoned when the market is experiencing oil prices of less than USD 60 per barrel. This means, that at the moment the Norwegian oil and gas sector is in a very uncertain situation when it comes to the realisation of investment projects and in uncertain times operators tend to hold on to their money and wait for the oil price to go up. Director of Oil & and Gas Technology Suppliers Rolf Hestenes confirms this tendency and adds that the market will need a stable oil price above USD 70 per barrel if investment activity is to accelerate again.

The Norwegian government is speaking very passionately about increasing recovery rates in the oil fields and reducing emissions from the oil and gas sector to air and sea, but at the same time the environmental companies, who have an important role to play in achieving these goals, accuse the government of passiveness in its environmental policies. There is a demand among these environmental companies that the government needs to introduce more regulations and support and promote investment projects towards greater environmental concern in the oil and gas sector. In fact a new report shows that the State itself is not very environmentally friendly when regarding its own purchases.

Another possible obstacle for future investments is the constant “battles” between the oil producing companies and a combination of fishermen and environmental organisations. As the oil producing companies begin to run out of new exploration sites in existing areas, they have to look for new geographic regions to explore. The arctic region have proven great potential for oil and gas, but at the same time this area also functions as the home for many rare animals and furthermore there is a great concern among fishermen, that seismic trawling of the seabed will ruin their fishing business.
3.4.3 Expected Growth 2010 - 2020

The latest Norway Oil & Gas Report from BMI (Business Monitor) forecasts that Norway will account for just 1.61% of Developed European regional oil demand by 2013, while contributing 50.87% to supply. In Developed Europe, overall oil consumption reached an estimated 13.75 million barrels per day in 2008. It is set to rise to around 13.88 million barrels per day by 2013. Norway will remain the only major net exporter in Developed Europe.

Between 2008 and 2018, BMI forecast a decrease in Norwegian oil production of 26.3%, with output dropping at a steady pace from an estimated 2.47 million barrels per day in 2008 to 1.82 million barrels per day at the end of the 10-year forecast period. Given forecast unchanged oil consumption over the period, exports drop from an estimated 2.25 million barrels per day to 1.60 million barrels per day during the forecast period. Gas production should rise from the estimated 2008 level of 95 billion m3 to a peak of 120 billion m3 in 2012-2014, before falling to 100 billion m3 by 2018. Most exports will continue to be in the form of pipeline gas, with some LNG.

Norway's dependence upon oil and gas revenues presents long-term challenges for the country, especially because many industry analysts believe that North Sea oil and gas production has already reached or passed its peak. The latest nationwide election in October 2005 had important repercussions for Norway's future energy policy, because the largest coalition members (Labour and Socialists) disagree on whether or not to pursue exploration activities in the Barents Sea.

In March 2006, the government presented its management plan for the Barents Sea. The plan allows new exploration in some areas of the Barents Sea, but it also places a moratorium on other, ecologically-sensitive parts of the region until 2010. In addition, the plan allows existing exploration activities in the Barents Sea to continue. With declining production from existing areas, Norway must explore these frontier regions in order to maintain oil and natural gas production in the long-term.
(Source: http://www.eia.doe.gov/cabs/Norway/Background.html)

All estimates about the growth of the Norwegian oil and gas industry should be regarded as what they are; speculations with a large degree of uncertainty. Most of the investments made into the Norwegian oil and gas industry are financed by the present cash flow of the operating companies. Operators rely heavily on cash financing of new investments and such investments are therefore carried out or cancelled according to the level of the oil price. The fluctuation of this one factor is a major determinant of the future growth of the industry.

Although the formula for the production potential tells us something else, recent estimates by several experts show that the current production level can be maintained for the next 40 years.
(Source: http://www.dn.no/energi/article1719481.ece)
3.5  Market Opportunities

3.5.1  Expected Demands
The tendency towards a much larger focus on the environment in the coming years and the hope for profitable operations in the Arctic Sea will mean a whole new demand for environmental and production technology. Operators on the Norwegian continental shelf have been used to operations in the North Sea and the Norwegian Sea which fall under more less the same type of extraction, but the all new conditions can be expected in the Arctic.

The industry must be able to handle these new environmental issues such as ice conditions, darkness and long distances to markets. The highest level of safety will be required and the oil companies and service industry will have to meet the strictest environmental requirements to be able to conduct petroleum activities in the Arctic.

The OG21 strategy was revised in 2005 to better adjust to today’s challenges. The revised strategy has identified eight core technology areas which will be vital for the future development of the Norwegian petroleum activity. These areas are:

1. Environmental technology for the future
2. Exploration technology and reservoir characterisation
3. Enhanced recoveries
4. Cost-effective drilling and intervention
5. Integrated operations and real time reservoir management
6. Subsea processing and transportation
7. Deep water and subsea production technology
8. Gas technologies
(Source: Factbook 2009 by the Ministry of Petroleum and Energy)

One of the solutions to the goal concerning reduced costs and more effective operations is the implementation of broadband (fibre-optic cable), which has already been laid for transmission of large volumes of data to many of the fields. Integrated operations have already become an important element in many new developments and status reports from the operators indicate a committed effort towards integrated operations on many mature fields. Wherever profitable, existing fields will be linked to the digital infrastructure for implementation of the new technology.

3.5.2  Technological Challenges
The technological challenges of the Norwegian oil and gas sector arise as a result of other challenges concerning the players, the future goals, and the surroundings of the sector. These challenges cover areas like the ones listed below and each result in a need for new technology in order overcome these challenges.

- Maintaining exploration activity
- Securing continued growth of reserves
- Cost efficient extraction and management
- The actors of the industry
- Research and development
- Cleaner and more energy efficient production
- Coexistence between oil producing companies and the local fishing industries.

The authorities’ contribution to petroleum research is largely organised in the PETROMAKS and DEMO 2000 research programs. These programs are intended to contribute to attaining the goals identified in the OG21 (oil and gas in the 21st century) strategy. The funds from the authorities are channelled through the Research Council of Norway, which coordinates the programs.

Figure 3.14

![Diagram of PETROMAKS and DEMO 2000 research programs]

(Source: Factbook 2009 by the Ministry of Petroleum and Energy)

In general there will be a shift in the demand for offshore suppliers. The technological development will be in focus and this will most likely result in a demand for technological expertise for a supplier to have success. Different new technologies within capture and storage of CO2 (CCS) have seen the light of day in recent time. The tendency for the technological focus to move towards the environmental part of the industry is here to stay and companies possessing expertise within this area will have great possibilities in the Norwegian oil and gas sector for years to come.

3.5.3 Products, Technology, and Service Requirements

Requirements for Suppliers
Suppliers for the Norwegian Offshore sector is met by strict requirements both from potential customers as in the oil and gas producing companies like StatoilHydro, but also from more public bodies which focus on the goal to make the sector a symbol of quality and orderly fashions. Although the 1st level players or operators on the Norwegian continental shelf rarely deal directly with Danish suppliers, their demands will still be passed on through the 2nd and 3rd levels as these players are forced to set the same demands for their suppliers as they meet from customers at higher levels.
The Norwegian oil and gas sector is to a large extent controlled through standardized procedures and codes. Therefore only a few examples of the requirements of the sector will be given.

The Norwegian Veritas (DNV)
The DNV offshore codes are based on several decades of knowledge, development, and experience and serves as a consistent set of standards which results in secure and redundant solutions preventing that single errors escalate into bigger accidents. The codes are updated regularly as new experience is acquired and new technological knowledge is developed.

DNV Offshore Codes consist of a 3-level hierarchy of documents:

**Offshore Service Specifications (OSS)** provide principles and procedures of DNV classification, certification, verification and consultancy services.

**Offshore Standards** provide technical provisions and acceptance criteria for general use by the offshore industry as well as the technical basis for DNV offshore services.

**Recommended Practices** provide proven technology and sound engineering practice as well as guidance for the higher level Offshore Service Specifications and Offshore Standards.

DNV Offshore Codes are offered within the following areas:
- Qualification, Quality and Safety Methodology
- Materials Technology
- Structures
- Systems
- Special Facilities
- Pipelines and Risers
- Asset Operation
- Marine Operations
- Wind Turbines
- Subsea Systems

(For more information go to http://www.dnv.no/din_industri/energi/regler_standarder_veiledning)

Requirements by StatoilHydro
StatoilHydro’s activities require extensive use of goods and services procured from suppliers. At present, the annual value of our procurements is just over NOK 100 billion, and the total number of suppliers around the world is approximately 26,000. Our suppliers add significant value to StatoilHydro and to our partners and customers. It is important to cooperate closely with our key suppliers in order to ensure lasting long-term competitive advantages for StatoilHydro.

StatoilHydro runs 80% of the petroleum activities in Norway and their procurement process is based on competitive tendering and on the principles of transparency, non-discrimination and equal treatment of tenders. StatoilHydro develops, integrates and implements procurement strategies to achieve the best possible agreements for the group. This is achieved through a category-based approach to goods and services, based on a coordinated control of demand, the
global market situation and robust analyses in order to minimise risk in the execution phase.

The suppliers must be prequalified in order to compete for tenders. StatoilHydro subscribe to the following pre-qualification systems with products and services related to:

- Oil & Gas activities in Norway and Denmark: 
  **Achilles Joint Qualification**

- Generation and distribution of electricity in Norway, Sweden and Denmark: 
  **Sellihca Qualification - Sellihca**

- Oil & Gas activities in UK and Netherlands: 
  **First Point Assessment Ltd**

- Generation and distribution of electricity, distribution grids for gas, heat, cooling, drinking water etc in UK: 
  **Utility Vendor Data Base**

- Construction and building activities in Norway: 
  **StartBANK**

(For more go to http://www.statoilhydro.com/en/OurOperations/Procurement/HowToBecomeASupplier)

**Standard Contracts**

In an attempt to further standardize the Norwegian oil and gas sector, the former Statoil and Hydro (now StatoilHydro) and the Federation of Norwegian Industries (Norsk Industri) have drawn up standard contracts for the oil and gas sector. These contracts can be applied to almost any sort of project and only needs minor adjustments in each case.

This has been done in order to make contract negotiations more streamlined and in order for potential suppliers to know exactly which contractual demands the will have to meet.

(For further info go to www.norskindustri.no/standard-kontrakter)

**3.5.4 Identification of Norwegian Gaps**

Norway has for many years been a front runner technologically and therefore it is difficult to determine areas of the oil and gas technology where there might knowledge or expertise gaps in the Norwegian offshore industry. But one thing is clear. There is an increased focus on the environment and the effect that the oil and gas sector has on the environment. Strict demands from the government have to be met within the coming years forcing oil producing companies to invest in the relevant technologies.

Environmental technologies have so far not been top of mind priorities for Norwegian technology companies and therefore this area presents great possibilities for Danish suppliers. Furthermore the projects in the Arctic region are of such a character that special attention must be paid to security and environmental issues as well as different ways of servicing production facilities. Oil
and gas production on the Norwegian continental shelf has so far not been subject to such demands and therefore represent opportunities for Danish companies.

The environmental gap is by many seen as the result of the Norwegian governments’ lack of investments in and promotion of Norwegian environmental companies. This lack of investments has set back these environmental companies in the race for new technology as they are often smaller of size and dependent on government funding and initiatives. The environmental area especially concerning carbon capture and storage (CCS) shows great potential for Danish suppliers in the time to come.

### 3.6 Entering the Sector

In earlier years there has been a tendency that Norwegian operators but especially the Norwegian government promoted the use of Norwegian suppliers when regarding oil and gas projects on the Norwegian continental shelf. This preference was acceptable for Norwegian operators when times were good and the operating companies were experiencing high oil prices and the following huge and positive cash flows, which are the primary source for new investments.

But as a result of the worldwide financial crisis, the oil price has dropped dramatically since its peak at around USD 140 per barrel not long ago. Although the current oil price level of around USD 60-65 per barrel is not bad if seen form a historical point of view, the oil and gas sector is still suffering from the fact that many operating companies still see the price of USD 100+ as the normal level and this has off course had an effect on the amount invested in new projects.

Now that raw material costs are high and oil prices are low, the operators have to look at other ways of cutting costs on projects. Lately this has resulted in an increase in contracts awarded to foreign suppliers, who mainly due to lower salary expenses can make much lower bids on projects than those of the Norwegian suppliers.

The general tendency for operators to look abroad for suppliers has in some cases resulted in deliveries of a lower quality, which of course is not acceptable in the oil and gas sector. The demand for quality at lower prices than those of Norwegian suppliers could prove to be an excellent opportunity for Danish suppliers if they can keep costs down.

An interview with one of the very large players in the Norwegian oil and gas industry revealed another tool in the battle for lower costs. The way this player tries to go about the matter of keeping costs as low as possible, is by taking the opposite approach compared to other big companies. This company tries to keep the number of permanent suppliers as low as absolutely possible.

The reason for doing this is that long-term supplier relationships usually build on long-term contracts and price settings. This represents a risk of unnecessarily high costs, when the supplier market is bad and prices are accordingly low. Therefore Aker Solutions tend to evaluate every project separately concerning which suppliers to use and this development will make it easier for Danish suppliers to gain access to oil and gas projects on the Norwegian continental shelf.
3.6.1 Contractual Aspects

Oil and gas contracts are traded in two currencies in Norway. Contracts between national companies are usually done in Norwegian kroner (NOK) whereas contracts between a Norwegian company and an international player are done in US Dollars (USD), which is the same pattern in many countries where the home currency is somewhat stable.

Looking at the graph below it is obvious that there have been some serious fluctuations in the exchange rate between NOK and USD. It shows that the value of the NOK was seriously decreased towards the USD at the end of 2008 which in turn meant a decrease in investments. Both the oil price and the strength of the NOK has improved since then making future investments more likely.

Looking at another graph representing the exchange rate between NOK and DKK there was a more or less stable period from late 2004 up until 3rd quarter of 2008 where we only saw little fluctuations in the exchange rate. But 4th quarter of 2008 presented a dramatic change when the exchange rate dropped from 0.93 to 0.79 representing a decrease of 15%. This made Danish products and services much more expensive for Norwegian companies, but luckily this has improved as well.
3.6.2 Possible Market Entry Barriers

The Norwegian oil and gas industry is not considered an industry dominated by political, economical or cultural barriers. As a supplier to this industry you are one of many competing for contracts. Some of the suggested barriers of the past, such as Norwegian companies only buying from national suppliers, has been put to shame, and in these times of cost cutting, suppliers are to a much larger extent evaluated on project basis, making it easier for new and international suppliers to gain a foothold.

Instead Danish suppliers to the Norwegian oil and gas industry should view the paragraphs below as a list of aspects to keep in mind when defining the company’s market strategy for Norway. The market strategy becomes highly relevant especially when considering topics like operator demands for pre-qualifications.

Regulatory framework

- **Norway is part of EEA not the EU**
  Although the EEA agreement (EØS aftale) does provide free movement of labour it does not provide free movement for services and products imported to Norway with purpose of carrying out a contract job. Value added tax (VAT) must be paid when bringing such products into Norway even though you plan on bringing them back out again. There are exceptions regarding the time the tools or products stay in Norway, which may lead to a refund of the value added tax upon leaving Norway.
  (For more info go to [www.toll.no](http://www.toll.no))

- **Taxes and fees on operations on the Norwegian continental shelf**
  - Ordinary tax
  - Special tax
  - Environmental tax
  - Production fee
  - Area fee
  (For more info go to [www.regjeringen.no](http://www.regjeringen.no))

- **Relevant legislation concerning establishment**
  Many foreign companies decide to engage in business in Norway through a NUF. A NUF is a branch of a foreign company. Foreign companies who has business activity in Norway must register in the Company Registry (Foretaksregistret) according to the law ([foretaksregisterlovens § 2-1, 2 ledd](http://foretaksregisterlovens § 2-1, 2 ledd)). The company will then get a Norwegian organisation number and have the right to go under the description NUF.

  The NUF arrangement has lately been very popular for small entrepreneurs in who find themselves in the earliest stage of their activities. As there tend to be a lack of money in this phase, the NUF presents an easy way to work around the monetary demand of NOK 100,000 and yearly fees of a shareholders company. This does not limit the economic risk though.
  (For more info go to [www.justorget.no](http://www.justorget.no))
National competitors to Danish suppliers
The Norwegian sub-supplier market is a very important industry and is spread all over the Southern part of the country grouped in different clusters of expertise. The map below shows the location of the different clusters and the number of companies and employees within the different cluster.

Figure 3.15

As it shows on the map, the Norwegian oil and gas industry is facing a great challenge in building new clusters of expertise in the Northern part of Norway as focus turns to these areas concerning future production. Due the environmental hazards and special technological demands, clusters within these areas of expertise are expected to develop in the Northern areas in the future.

Because of the greater environmental focus in these very prosperous parts of Norway, there will be a great demand for environmental solutions especially concerning the risk of oil spills and other kinds of leaks from production facilities. The coastal areas North of Trondheim are dominated by rough country and very remote geographic areas where not many oil and gas companies have established themselves from an organisation point of view.

If the oil and gas activities become as intense in these areas as some experts believe, then there will be great possibilities for Danish suppliers within all parts of construction and services as all new clusters will have to emerge.
Other National Regulation Authorities

*Achilles* – Achilles Joint Qualification System *(JQS)* is a unique collaboration between Norwegian and Danish oil and gas operators and management contractors. The participating organizations use the system to provide information and to select suppliers and contractors when buying goods and services. Those buyers not subject to the EC procurement directives are actively using the system as a joint vendor database.

Achilles Joint Qualification System is a cost effective system where suppliers in an easy and uniform way can advice details on their company and products/services to potential customers. The oil companies and main contractors together represent an annual market of approximately 80 billion NOK. The system is developed to cover most procurement needs within the participating companies. It is the subscribers’ objective to establish the majority of tender lists based on this qualification system.

Suppliers are identified by searches in the database. The searches are based on criteria that the buyer finds relevant for the particular procurement he is making. The participating companies’ objective is to establish the majority of tender lists on the basis of the qualification system. Each company is however free to use all the procurement procedures available according to Norwegian/ Danish law and the EU/EEC procurement rules.

Suppliers who wish to qualify in the system return their order form to Achilles Information Centre along with their pre-payment. Qualification material is forwarded as soon as the payment or a bank receipt is received. Qualification costs NOK 6,000 excl. VAT per year. This includes registration of up to 40 product and/or service categories.

The qualification is normally valid for 12 months, and must be renewed within the expiry to maintain continuous qualification. The supplier automatically receives an invitation to update the registration in due time. A fee of NOK 6,000 excl. VAT accrues at each annual update. Additional updates are performed at the suppliers own discretion and initiative and cost NOK 500 excl. VAT each. *(For more info go to [www.achilles.com/en/Norway](http://www.achilles.com/en/Norway))*

Being qualified by the Achilles is not an absolute demand if you wish to become a supplier to the Norwegian oil and gas industry and off course the expense connected to being qualified can seem large to some companies, but the qualification can be a way to ease access to oil and gas contracts. For some of the main players in the industry a preliminary evaluation of different supplier bids on a project can sometimes be done upon whether or not the supplier is qualified by Achilles. In that sense being qualified the Achilles can shorten the process of winning supplier contracts and should be viewed as a good investment.

**HSE – the Health, Environmental and Safety legislation** is a Norwegian standardised way of doing CSR. The regulations, called HMS (Helse, Miljø og Sikkerhet) in Norwegian, came into force on 1 January 1997 and function as a tool for companies to organise health, environmental issues, and safety in the work place. HSE is part of a company’s daily operations, and HSE work contributes to
making companies profitable. To ensure that the objectives are achieved, the regulations shall promote efforts to improve conditions in enterprises in regard to:

- The working environment and safety
- Prevention of damage to health or disturbances to the environment from products or consumer services
- Protection of the external environment against pollution and improved treatment of waste

(Source: [http://www.arbeidstilsynet.no/c28863/artikkel/vis.html?tid=28622](http://www.arbeidstilsynet.no/c28863/artikkel/vis.html?tid=28622))

The HSE works from a zero-accident philosophy to avoid serious negative consequences from all aspects of the industry’s activities. Furthermore, a high HSE standard is important for the industry’s reputation and goodwill.

(Source: [www.olf.no](http://www.olf.no))

The regulations cover public and private sector enterprises of all kinds and all types of commercial activity, including consumer services. The public administration and public services are also included. Private individuals/consumers, on the other hand, are not covered by the regulations. It is a precondition that the costs attached to working with HSE should not deprive small companies the opportunity to gain a HSE-certificate.

(Source: [http://www.arbeidstilsynet.no/c28863/artikkel/vis.html?tid=28622](http://www.arbeidstilsynet.no/c28863/artikkel/vis.html?tid=28622))

The working Environment Act, section 3-5, obligates top executives to complete and document HSE-training. The content and scope of this training is defined in the Norwegian Labour Inspection Authority’s guide, “Employer’s obligation to complete HSE-training” [only available in Norwegian]. Courses which satisfy the requirements stipulated in the Norwegian Labour Inspection Authority’s guide are offered and available on [www.trainingportal.no](http://www.trainingportal.no).


In addition, AOF Norge, FB Fjernundervisning, and Teknologisk Institut offer information, training and consultancy on HSE:

**AOF Norge** [in Norwegian]:
[www.hms-portalen.no](http://www.hms-portalen.no)

**FB Fjernundervisning** [in Norwegian]:

- Offer courses at the Internet.

**Teknologisk Institut** [in Norwegian and some in English]:

- Offer courses in English as well.
HSE regulations for the petroleum activities
The Petroleum Safety Authority Norway (PSA) is responsible for developing and enforcing regulations which govern safety and working environment in the petroleum activities on the Norwegian continental shelf and associated land facilities.

The regulations assume that petroleum activities are prudent with respect to health, safety and the environment. They have been developed to serve as a good tool for the industry and for the authorities' supervision.

The design of the HSE regulations for the petroleum activities on the shelf emphasises the development of unified regulations stipulated and enforced by the PSA, the Norwegian Pollution Control Authority, the Directorate for health and social affairs and the Norwegian Board of Health. The HSE regulations are risk-based and must be seen in relation to the specific risks faced by the individual player.
(Source: http://www.ptil.no/regulations/about-the-hse-regulations-for-the-petroleum-activities-article4243-87.html?lang=en_US)

All companies having petroleum activities have to work systematically with HSE in compliance with the requirements of the Framework Regulations (Rammeforskriften). The Framework Regulations provide a framework for coherent and prudent petroleum activities and contain provisions on, inter alia, scope, obligated party (responsibility), principles relating to risk reduction, application of maritime legislation as an alternative to technical marine requirements in the regulations, principles relating to health, safety and the environment, including requirements to a favourable HSE culture; working hours, periods of stay and off-duty time.
(Source: http://www.ptil.no/regulations/the-continental-shelf-article4246-87.html?lang=en_US)

Oil and Gas Forums
A great way to learn more about the possibilities in the Norwegian oil and gas sector and to expand your professional network is by participating in forums around the country. Such forums are held several times a year and deal with anything from business opportunities to discussions on new technological developments.

Below are some examples of very popular forums and conferences that take place every year in the Norwegian oil and gas sector:

INTSOK representing the capabilities of the Norwegian oil and gas cluster has held eight International Oil & Gas Business Days outside Oslo and will without doubt invite business to join a 9th conference in 2010.

The topics this year are:
- General market trends
- Major oil company challenges
- Arctic/ cold climate
- Key project examples
(For more info go to http://www.intsok.no/index.php?id=2234)
The “Offshore Strategikonferansen” presented by Norsk Industri and Conventor which has been held for the 15th consecutive time in 2009 and drew almost 200 companies representing between 60-80,000 employees will most likely be an upcoming event in 2010 as well.
(For more info go to http://www.strategikonferansen.org)

Arena (Innovation Norway)
Innovation Norway offers products and services intended to help boost innovation in business and industry nationwide, foster regional development and promote Norwegian industry and Norway as a tourist destination. With offices in all counties and in more than thirty countries worldwide, we are easy to get in touch with. Our staff’s knowledge of local and international conditions will help turn customers’ ideas into business successes.

According to its objects clause, Innovation Norway is to be backer and promoter of entrepreneurs, newly-founded and small and medium-sized enterprises that seek to grow, as a rule in an international market. The organisation’s role is to provide or arrange financing, link customer enterprises to know-how and help them build networks for their innovation projects.

As of 1 January 2004, Innovation Norway assumed the duties of the Norwegian Industrial and Regional Development Fund (SND), the Norwegian Trade Council, the Norwegian Tourist Board and the Government Consultative Office for Inventors (SVO).
(For more information go to www.innovasjonnorge.no)
4 Final Considerations

During the coming months many very important decisions will be made and the possible formation of a new Norwegian government could change the development plans of the entire industry.

With economic challenges still playing a significant role within the oil and gas industry, focus from Danish companies, who are interested in winning contracts on the Norwegian continental shelf should, should be on building long-term relations and not so much on making deals here and now. The sector is “holding its breath” and not many projects are carried out right now. But future expectations and the right development of the oil price could boost the activity quickly and that is why building relations for tomorrow is so important.

4.1 Specific Market Opportunities

Specific market opportunities for Danish suppliers in existing production areas on the Norwegian continental shelf:

- Environmental technologies like Carbon Capture and Storage (CCS)
- Removal of old rigs in fully exploited oil fields
- Exploration technology and reservoir characterisation
- Enhanced recoveries
- Cost-effective drilling and intervention
- Integrated operations and real time reservoir management
- Gas technologies
- Supply of skilled workers on project basis

Specific market opportunities for Danish suppliers in future production areas on the Norwegian continental shelf:

- Onshore or sea level operated robots
- Transportation of Liquid Natural Gas (LNG)
- Subsea processing and transportation
- Deep water and subsea production technology
- Miljøberedskab i de nye områder mod Nord
- Environmental technologies like Carbon Capture and Storage (CCS)
- Removal of old rigs in fully exploited oil fields
- Exploration technology and reservoir characterisation
- Enhanced recoveries
- Cost-effective drilling and intervention
- Integrated operations and real time reservoir management
- Gas technologies
- Supply of skilled workers on project basis

Danish companies within environmental technologies and services will have a strong position in the future development areas in the far Northern regions of
Norway. Existing Norwegian companies within this field have described themselves as falling behind international companies, because of the lack of government attention to these technologies for many years. Great potential lies within this part of the supply business and Danish companies have to be ready to react to this expected demand.

Furthermore estimates show that a great deal of maintenance has to be done to existing oil rigs and other installations over the coming years and also more oil fields are abandoned creating a demand for removal of old rigs and connected installations. Danish companies have had great success within these areas of expertise in the past and this will represent a great opportunity for companies within these areas.

4.2 Success Stories

Smaller Danish companies have had great success for many years supplying quality products and services to the Norwegian oil and gas industry. Some of these successful examples are:

**Danske Rigger & Stilladsservice** has supplied their expertise within mounting scaffolds in difficult and dangerous conditions such as the Norwegian offshore, and oil and gas industries. (For more information go to [www.drs-aps.com](http://www.drs-aps.com))

**Fugro Denmark** provides geotechnical and geo-scientific products and services for the oil and gas industry to help determining the contents of fossil fuels hidden deep in the Norwegian continental shelf. (For more information go to [www.fugro.no](http://www.fugro.no))

**Nordisk Højtryk** provides high pressure equipment and pumps for the offshore industry as well as chemical injection systems for the oil and gas industry. (For more information go to [www.nh-as.dk](http://www.nh-as.dk))

**Ropenhagen A/S** (former Usha Martin Scandinavia) supplies steel wirers to amongst other the Norwegian oil and gas industry. (For more information go to [www.roopenhagen.eu](http://www.roopenhagen.eu))

**Scan Con** has provided high quality manning solutions for offshore operators in Norway and other countries. (For more information go to [www.scan-con.dk](http://www.scan-con.dk))

**Semco Maritime A/S** is one of the larger players in the supplier segment and offers a lot of different products and services to companies within the Norwegian oil and gas, and offshore industries. (For more information go to [www.semco.dk](http://www.semco.dk))

Denmark is also represented by some larger players in the offshore industry. Companies like DONG Norge, Maersk Oil & Gas Norge, Ramboll Oil & Gas,
Semco, Danfoss and others are all represented by in the Norwegian offshore industry through subsidiaries.

Common to all Danish companies who have had success in the Norwegian oil and gas industry is that delivering quality products and services has been one of the most important values within each company. The offshore, and oil and gas businesses set strict and very high standards for suppliers and therefore all companies who are serious about becoming regular suppliers to these industries should seriously consider acquiring the certifications such as ISO and Achilles.

4.3 The Natural Next Step

For many of the members of OCD the interest in the Norwegian oil and gas sector is more than just an interest in acquiring information about new and unknown territory. The historic bonds between Norway and Denmark makes the Norwegian market one of the most lucrative for Danish exporters. Below a couple of suggestions will be presented to those of OCD’s members who should wish to engage in more hands on strategic development of their internationalization process.

4.3.1 Export to the Norwegian Oil and Gas Sector

Many companies find themselves in need of assistance when pursuing new market opportunities abroad. To a large part of these Danish companies the total process of such an internationalization process can be overwhelming both with regards to marketing their company in Norway and deciding upon the right mode of entry.

The Danish Trade Council as part of the Danish Embassy offers to help such companies in various ways. This could be through tailored customer search projects or searches for suitable partners in the form of distributors, agents or possible joint venture candidates.

Some general and limited inquiries are handled free of charge and other more concrete and company specific inquiries are charged according to the given standards. For small and medium size companies there are special arrangements providing the possibility for discounts on the hourly consultancy fee.

All companies who should be interested in hearing or reading more about the services provided by the Danish Trade Council in Norway are more than welcome to make use of the contact details below.

The Royal Danish Embassy
Martin Amdi Pedersen
Export Advisor, Oil and Gas
Tel: +47 2254 0791/E-mail: marped@um.dk
4.3.2 Establishing a Company in Norway

Some companies might have gotten a bit further in the internationalization process and have already established the first customer or partner contacts in Norway. A possible next step for such companies could be to establish a subsidiary in Norway in order to increase market presence.

In many cases the Danish Embassy will be able to assist companies in their inquiries concerning market related issues and establishment of a subsidiary, but in other cases the Danish Embassy will be able to link companies to other authorities who are better equipped to help.

There are eight different types of companies which Danish exporters are able to set up in Norway:

- *Aksjeselskap* (AS) (Limited Liability Company)
- *Allmennaksjeselskap* (ASA) (Public Limited Liability Company)
- Filial af udenlandsk aktieselskab (NUF)
- Repræsentationskontor (Representational Office)
- *Ansvarlig selskap* (ANS)
- *Selskap med delt ansvar* (DA)
- *Kommandittselskap* (KS)
- *Indre selskap* (IS)

Details about the above mentioned company types such as liability and demand for equity investment can be provided by The Danish Embassy in Norway through the Report on Establishment which thoroughly describes different topics related to the establishment of a company in Norway. This report deals with all the relevant steps and provides all information needed in order to set up a company in Norway.

To learn more about the contents of the report and to place an order for the report please contact Embassy representative:

**The Danish Embassy**
Anniken Richardsen
Tel: +47 2254 0792
E-mail: anniri@um.dk

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4.3.3 Other Useful Contacts

The Norwegian Toll system
www.toll.no

The Norwegian Tax Authorities
www.skatt.no

The Danish Embassy Website
www.amboslo.um.dk

The Danish Trade Council
www.eksportraadet.dk

Olje- og Energidepartementet
http://www.regjeringen.no/nb/dep/oed.html?id=750

Oljedirektoratet
www.npd.no

Norsk Industri
www.norskindustri.no

Norsk Offshore
www.offshore.no
The Trade Council of Denmark is a part of the Ministry of Foreign Affairs and is the official export and investment promotion agency of Denmark. The Trade Council benefits from around ninety Danish Embassies, Consulates General and Trade Commissions abroad. The Trade Council advises and assists Danish companies in their export activities and internationalisation process according to the vision: We must be a partner preferred by enterprises in international trade and investment activities.

The Work in the Trade Council of Denmark follows specific procedures and quality guidelines. In this way our customers are secured the best possible quality under the varying working and market conditions at any given point of time.