FACTS 2014

THE NORWEGIAN PETROLEUM SECTOR

Cover: The first oil field in the North Sea, the Ekofisk field, started production in 1971. The field has been developed and expanded throughout the years. Old facilities have been removed and new ones installed in order to enable production for another 30–40 years. This picture shows the field as it emerges today, after three new facilities were installed in the summer of 2013 *(Photo: Kjetil Alsvik/ConocoPhillips)*

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Cover: The Ekofisk Field in the North Sea
(Photo : Kjetil Alsvik/ConocoPhillips)

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Tord Lien
Minister of Petroleum and Energy

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2013 was yet another good year in the Norwegian petroleum sector. The activity level is high; the shelf is explored, resources discovered, fields developed and hydrocarbons produced and sold. Norwegian oil and gas is finding its way to customers all over the world. Norwegian petroleum activities have been the dominant domestic industry for decades and have contributed to huge value creation, a substantial number of jobs and wide-ranging effects in local communities.

In other words, we have plenty of reasons to be proud. An effective, well-founded regulatory framework stimulates the companies on the shelf to make decisions that maximize the value for the Norwegian society. Our service and supply industry is competitive, highly knowledgeable and in the forefront in many areas. We have an environmentally sound petroleum production, and our reputation as a stable, secure supplier of oil and gas to the markets is strong.

Nevertheless, current realities do not allow us to ease our efforts. In order to generate the greatest possible values from our oil and gas resources, we must continue to improve. We must address future challenges in a serious manner. We will do so with a set of clear ground rules and continuous access to new, promising acreage. A predictable regulatory framework, including taxes and fees, contribute to sound resource management and facilitate both improved recovery from existing fields and development of smaller discoveries.

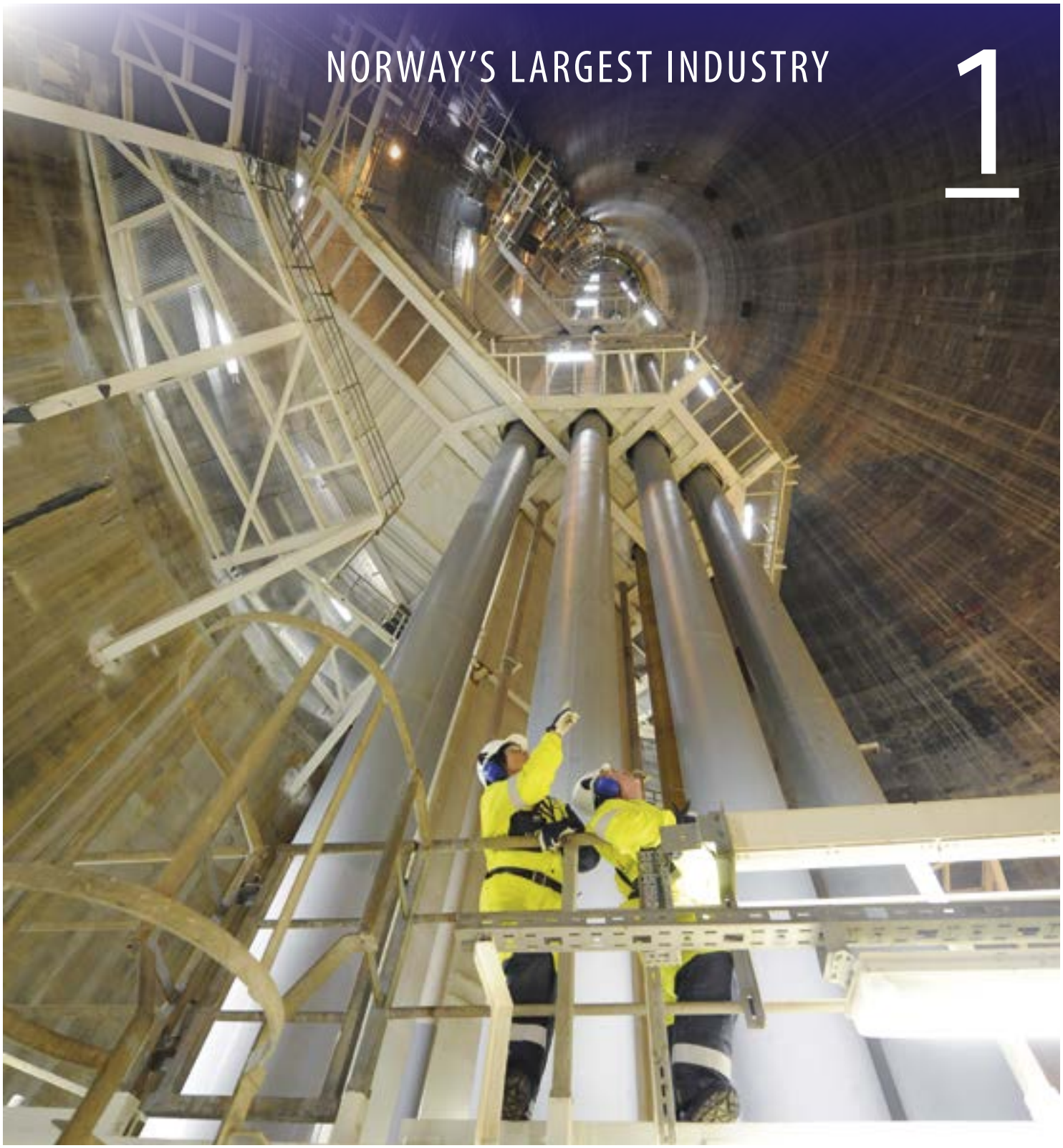
The cost level on the Norwegian shelf has increased in recent years. In spite of new acreage and exciting discoveries, sectors of the Norwegian continental shelf are maturing. This puts pressure on the profitability of both projects and companies. The industry must take action to control these costs. Succeeding with this will be crucial in order to live up to the results from 2013.

The objective of our petroleum policy is to generate the greatest possible values from the resources on the Norwegian shelf in the best interest of the Norwegian society. This will require the best efforts of everyone involved. Within a clear regulatory framework, we will work together in a smarter, more efficient and well organised manner. We must develop knowledge, innovation and new technology. Then, and only then, will we be equipped for the future.

CONTENT

NORWAY'S LARGEST INDUSTRY

1



The Troll A platform has its foundation 303 meters below sea level. The natural gas produced at Troll A is sent to Kollsnes in Hordaland County for processing
(Photo: Harald Pettersen, Statoil)

The petroleum activities have been key to the emergence of Norway's current welfare state. Few believed the industry would have such an immense impact on the Norwegian economy when the first production licences were awarded in the mid-1960s. Fifty years later, the activity level on the Norwegian shelf remains high, and the industry is currently the largest and most important sector of our economy, measured in value creation, State revenues and exports. This chapter will provide an account of the incredible Norwegian petroleum pioneers and what is currently happening on the Norwegian shelf.

Norwegian petroleum history

About 50 years have passed since petroleum activities commenced on the Norwegian shelf, and many of the early fields are still producing. The adventure started in the North Sea and has gradually moved north as the knowledge has increased.

At the end of the 1950s, few people imagined that the Norwegian continental shelf concealed a wealth of oil and gas. However, the gas discovery in Groningen in the Netherlands in 1959 led to newfound optimism regarding the North Sea's petroleum potential.

In October 1962, Philips Petroleum sent a letter to the Norwegian authorities requesting permission to explore for oil in the North Sea. The company wanted a licence for the parts of the North Sea situated on the Norwegian continental shelf. The offer was USD 160 000 per month, and was regarded as an attempt to acquire exclusive rights. The Norwegian authorities refused to sign over the entire shelf to a single company. If the areas were to be opened for exploration, more than one company would be needed.

In May 1963, the Government proclaimed sovereignty over the Norwegian continental shelf. A new act established that the State was the landowner, and that only the King (Government) could grant licences for exploration and production. But even though Norway had proclaimed sovereignty over vast ocean areas, some important clarifications were still needed regarding delineation of the continental shelf, primarily in relation to Denmark and the UK. Agreements to delineate the continental shelf were signed in March 1965 on the basis of the equidistance principle. The first licensing round was announced on 13 April 1965. 22 production licences were awarded, covering 78 blocks. The first exploration well was drilled in the summer of 1966, but turned out to be dry.

The Norwegian oil era started with the discovery of Ekofisk in 1969. Production from the field started on 15 June 1971, and several large discoveries were made in the following years. In the 1970s, exploration activities were concentrated in the North Sea. The area north of the 62nd parallel was opened for petroleum activity in 1979 and exploration was gradually initiated. Only a limited number of blocks were announced for each licensing round, and the most promising areas were explored first. This led to world-class discoveries, and production from the Norwegian continental shelf has been dominated by these large fields. They were given names such as Ekofisk, Statfjord, Oseberg, Gullfaks and Troll. These fields have been, and are still, very important for the development of petroleum activities in Norway. Development of these large fields has also led to the establishment of infrastructure, enabling tie-in of a number of other fields. Production from several of the major fields is now in decline, and the trend is now development of and production from new, smaller fields. Current Norwegian petroleum production is therefore divided among a larger number of fields than before.

In the early days, the authorities chose a model where the petroleum activities were primarily carried out by foreign companies. They dominated exploration activities and developed the first oil and gas fields. Norwegian participation gradually grew over time with the addition of Norsk Hydro, Saga Petroleum. Statoil was established in 1972 with the State as sole owner. A principle was also established to give the State a 50 per cent ownership interest in each production licence. In 1993, this principle was changed so that an assessment is made in each individual case as to whether there will be State participation, and whether the ownership interest will be higher or lower. In 1999, Saga was acquired by Norsk Hydro, and Statoil was partially privatised in 2001. This led to the establishment of Petoro. Petoro took over administration of the State's Direct Financial Interest (SDFI), established in 1985, from Statoil. In 2007, Statoil merged with Norsk Hydro's oil and gas division, and today, about 50 Norwegian and foreign companies are active on the shelf.

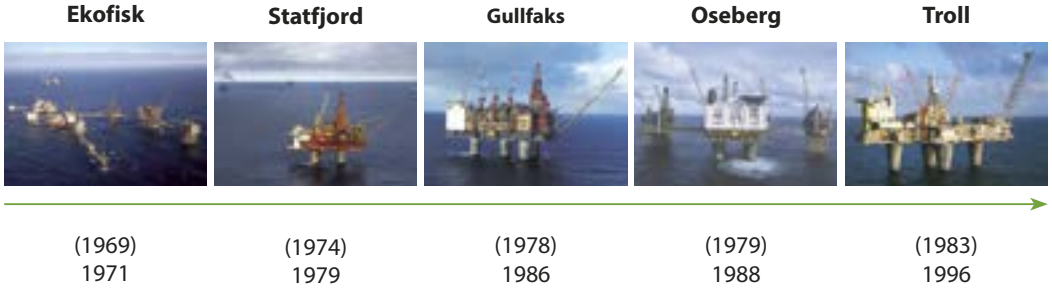


Figure 1.1 Historical timeline. Year of discovery in brackets

Fact box 1.1 What is petroleum?

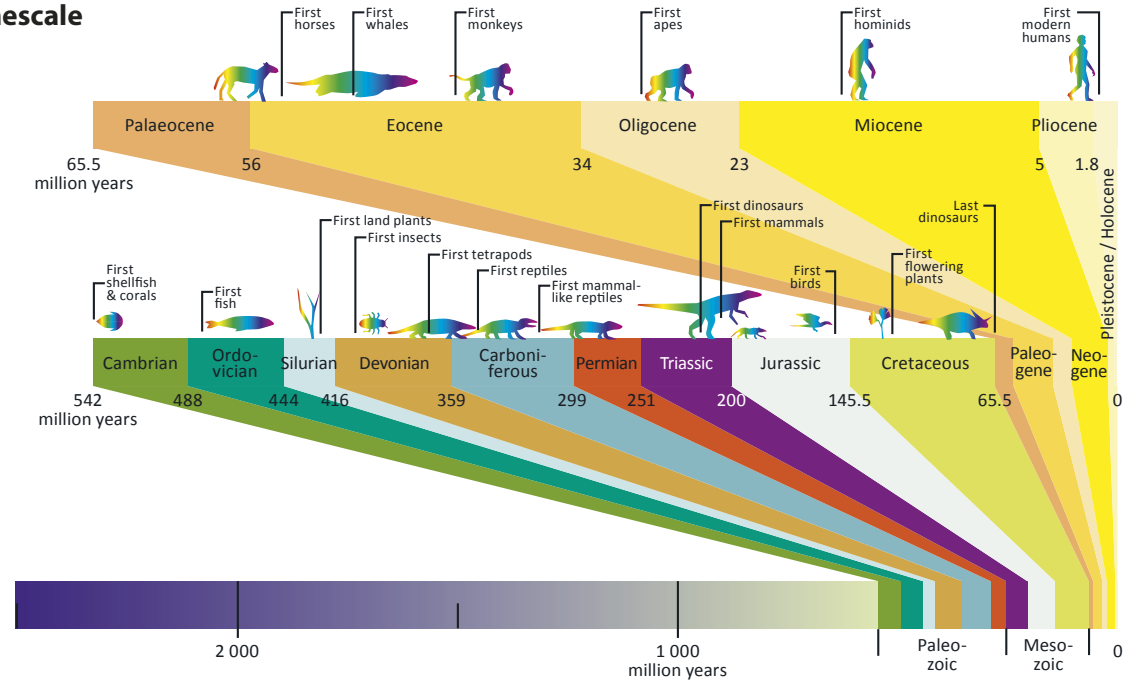
Oil and gas are organic materials, broken down, transformed and deposited in ocean areas over millions of years. Most of the oil and gas deposits on the Norwegian continental shelf originate from a thick layer of black clay that is currently several thousand metres under the seabed. The black clay is a source rock, which means a deposit containing significant organic residue. The clay was deposited around 150 million years ago at the bottom of a sea that covered much of present-day North-Western Europe. This Sea was unique in that the seabed was dead and stagnant, yet the upper water masses were teeming with life. Large amounts of microscopic phytoplankton accumulated in the oxygen-free bottom sediments. Over time, they were buried deeper, and after a long chemical conversion through bacterial decomposition and subsequent thermal effects, liquid hydrocarbons and gas were formed in the source rock.

Oxygen-free decomposition of organic matter produces substances such as kerogen, which in turn releases oil and gas at increased temperatures and pressures. On the Norwegian continental shelf, the temperature increases by 25 degrees per kilometre of depth. After more than one hundred million years of erosion and sedimentation, there can be several kilometres of clay and sand on top of the source rock. Oil is formed when the kerogen's temperature reaches 60 - 120 degrees; at higher temperatures, mainly gas is formed.

As the oil and gas are released, they seep out of the source rock and follow the path of least resistance, determined by pressure and the rock's permeability. Because hydrocarbons are lighter than water, they will migrate upward in porous, water-bearing rocks. The oil and gas migration takes place over thousands of years, and can extend over tens of kilometres until it is stopped by denser layers. Reservoir rocks are porous and always saturated with various compositions of water, oil and gas. Most of Norway's petroleum resources are trapped in reservoir rocks deposited in large deltas formed by rivers that ran into the sea during the Jurassic Age. The main reservoirs on e.g. the Gullfaks, Oseberg and Statfjord fields are in the large Brent delta from the Jurassic Age. Large reserves are also found in sand deposited on alluvial plains from the Triassic Age (the Snorre field), in shallow seas from the Late Jurassic Age (the Troll field) and as subsea fans from the Palaeocene Age (the Balder field). In the southern North Sea, thick layers of chalk, consisting of microscopic calcareous algae, constitute an important reservoir rock.

Clay stone and argillaceous sandstone form dense deposits that affect migration routes from the source rock to the reservoir. They are also essential for keeping petroleum in place in the reservoir over an extended period of time. Dense deposits that form a cap over the reservoir rocks are called cap rocks. In addition, the reservoir rocks must have a shape that collects the oil in a so-called trap. When an area contains source rocks, reservoir rocks, cap rocks and a trap, the preconditions are present for discovering oil and gas deposits.

The Geological Timescale



Current petroleum activities

The petroleum industry is Norway's largest industry measured in value creation, State revenues and export value. Since production started on the Norwegian continental shelf in the early 1970s, the industry has contributed approx. NOK 11 000 billion to the Norwegian GDP, measured in 2013 NOK. The industry has thus been highly important for the Norwegian economy and the financing of the Norwegian welfare state. The State's tax revenues are currently transferred to the Government Pension Fund – Global, which was valued at more than NOK 5000 billion as of 1st of January 2013. However, only 44 percent of the projected recoverable resources on the Norwegian continental shelf have been produced.

Significance to the Norwegian economy

The Norwegian petroleum management system is based on the principle that exploration, development and operations must generate the greatest possible values for society, and that the revenues shall benefit the State and thus the Norwegian society as a whole. The petroleum resources are highly valuable. This is the primary reason why the State claims a large share of the value creation through taxes, fees and the State's Direct Financial Interest (SDFI).

Tax revenues in 2012 totalled approx. NOK 232 billion. The State also receives substantial income from direct ownership in fields through the SDFI scheme. The State's total net cash flow from petroleum activities in 2012 totalled NOK 401 billion, measured in 2013 NOK. Total revenue from the sector amounted to about 29 per cent of the State's total revenues.

The State's revenues from the petroleum activities are transferred to a special fund, the Government Pension Fund – Global. The expected returns from the fund can be spent over the fiscal budget. At the end of 2013, the Fund was valued to NOK 5038 billion. This corresponds to about one million kroner per Norwegian citizen.

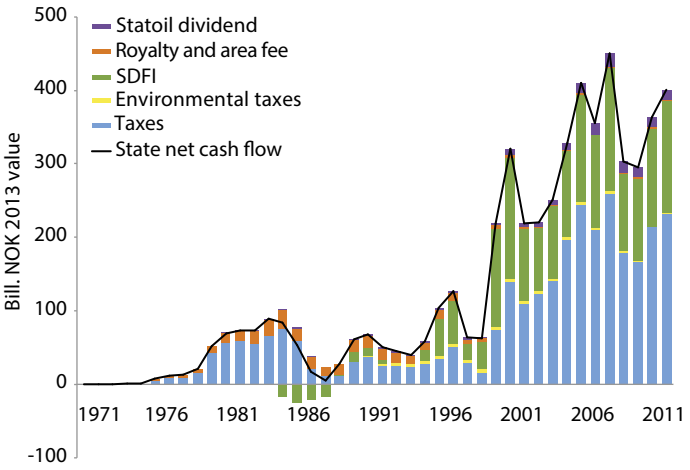


Figure 1.3 The net government cash flow from petroleum activities *(Source: Norwegian Public Accounts)*

Taxes	232.1
Environmental taxes and area fees	4.1
SDFI	151.1
Statoil dividend	14.1
Total:	**401.4**

Figure 1.4 The net government cash flow from petroleum activities in 2012 (bill. 2013-NOK) *(Source: Norwegian Public Accounts)*

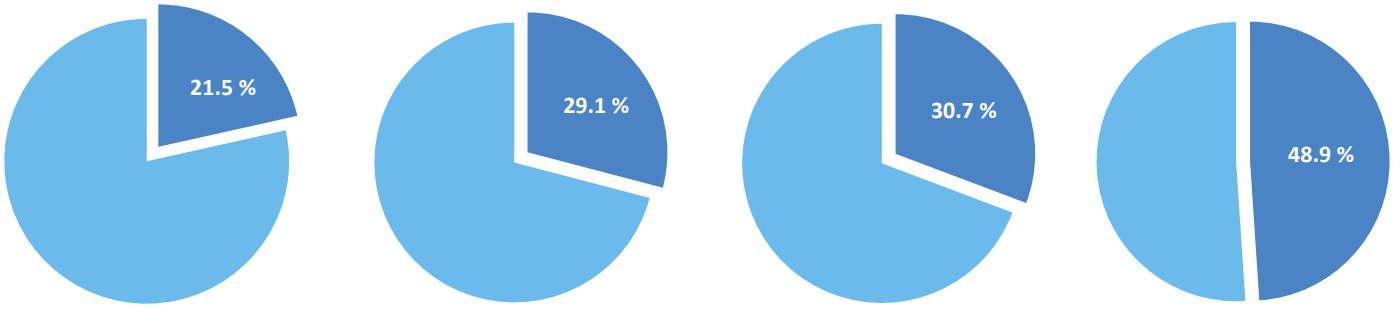


Figure 1.2 Macro-economic indicators for the petroleum sector 2013 *(Source: Statistics Norway, Ministry of Finance)*

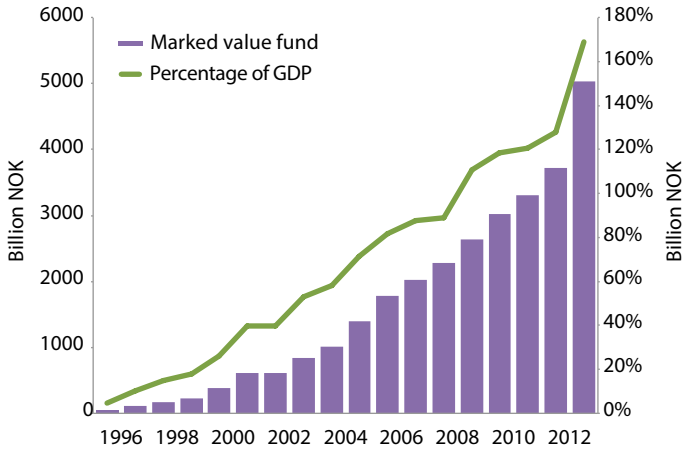


Figure 1.5 The size of the Government Pension Fund - Global
(Statistics Norway, NBIM)

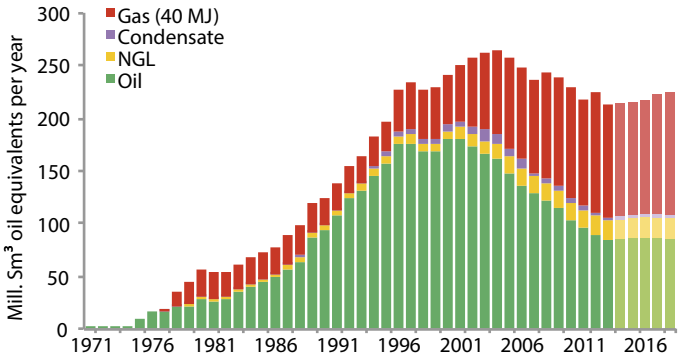


Figure 1.6 Historical production of oil and gas, and prognosis for production in coming years
(Source: The Norwegian Petroleum Directorate)

In addition to direct income to the State, the industry also creates ripple effects both locally and regionally, from south to north. The Norwegian petroleum industry has its roots in Rogaland County, but has developed in time with the offshore activity's gradual expansion northwards. Strong petroleum expertise clusters and internationally competitive supplier services are currently established in many parts of the country.

The industry employs a substantial segment of the Norwegian population. Oil companies and companies that supply the petroleum industry currently employ about 150 000 people. Taking into account the effect of the petroleum industry's demand on the overall economy, the number of people employed is approx. 250 000.

Continuous focus on research and development has helped Norway to recover a large share of the proven resources, compared with other oil provinces. The activity on the Norwegian continental shelf is also subject to strict requirements as regards to health, safety and the external environment. Good interaction between the State, companies, supplier industry, special interest organisations and the R&D sector is an important prerequisite for achieving good results in these areas.

The companies on the Shelf

A broad range of companies carry out petroleum activities on the Norwegian shelf. In the beginning only a few major international oil companies operated on the shelf, but today there are more than 50 companies involved in exploration, production and infrastructure. This diverse set of small and large companies breeds competition, which again promotes efficiency. At the same time, this safeguards interest in a large number of different projects, and various technologies and plays are utilised. Measured by the companies' production volumes in 2013, Statoil is the largest company on the Norwegian shelf, followed by large international companies such as ExxonMobil, Total, Shell, ConocoPhillips and ENI.

Production

In 2012, Norway was the world's third largest gas exporter and the tenth largest oil exporter. The export value of pipeline services and export of crude oil and gas for all companies totalled about NOK 564 billion in 2013, which corresponds to about 49 per cent of Norway's total export value.

In 2012, Norway was ranked the world's 15th largest oil producer and 6th largest gas producer. 213.7 million Sm^3 o.e. of marketable petroleum was produced in 2013. Half of this was gas. This is about five per cent less than in 2012, and 20 per cent less compared with the peak year 2004. A total of 78 fields are currently in production on the Norwegian shelf. Four new fields came on stream in 2013; Jette, Hyme, Skarv and Skuld. Plans for Development and Operation (PDOs) were approved for four new fields in 2013. Three of these fields are in the North Sea (Ivar Aasen, Gina Krog and Oseberg Delta 2) and one is located in the Norwegian Sea (Aasta Hansteen).

Costs

Even minor petroleum projects can be compared with the largest industrial investments on the mainland and vast amounts have been invested in exploration, field development, transport infrastructure and onshore facilities since activity started on the Norwegian continental shelf. Substantial investments are also being made in existing fields in order to increase recovery rates and extend field lifetimes. This requires new wells, facility modification and new infrastructure. Investments, including exploration, totalled approx. NOK 210 billion in 2013, or about 31 per cent of the country's total capital expenditures. Operating costs in 2013 amounted to about NOK 67 billion.

Investment and operating costs have grown in recent years. This is an international trend caused e.g. by the high demand for scarce input factors in the petroleum industry. At the same time, costs on the Norwegian shelf are somewhat higher than in other comparable petroleum provinces.

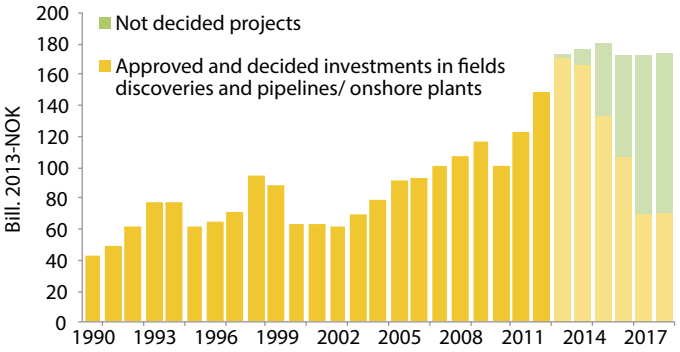


Figure 1.7 Historical investments (exploration costs not included) *(Source: The Norwegian Petroleum Directorate / The Ministry of Petroleum and Energy)*

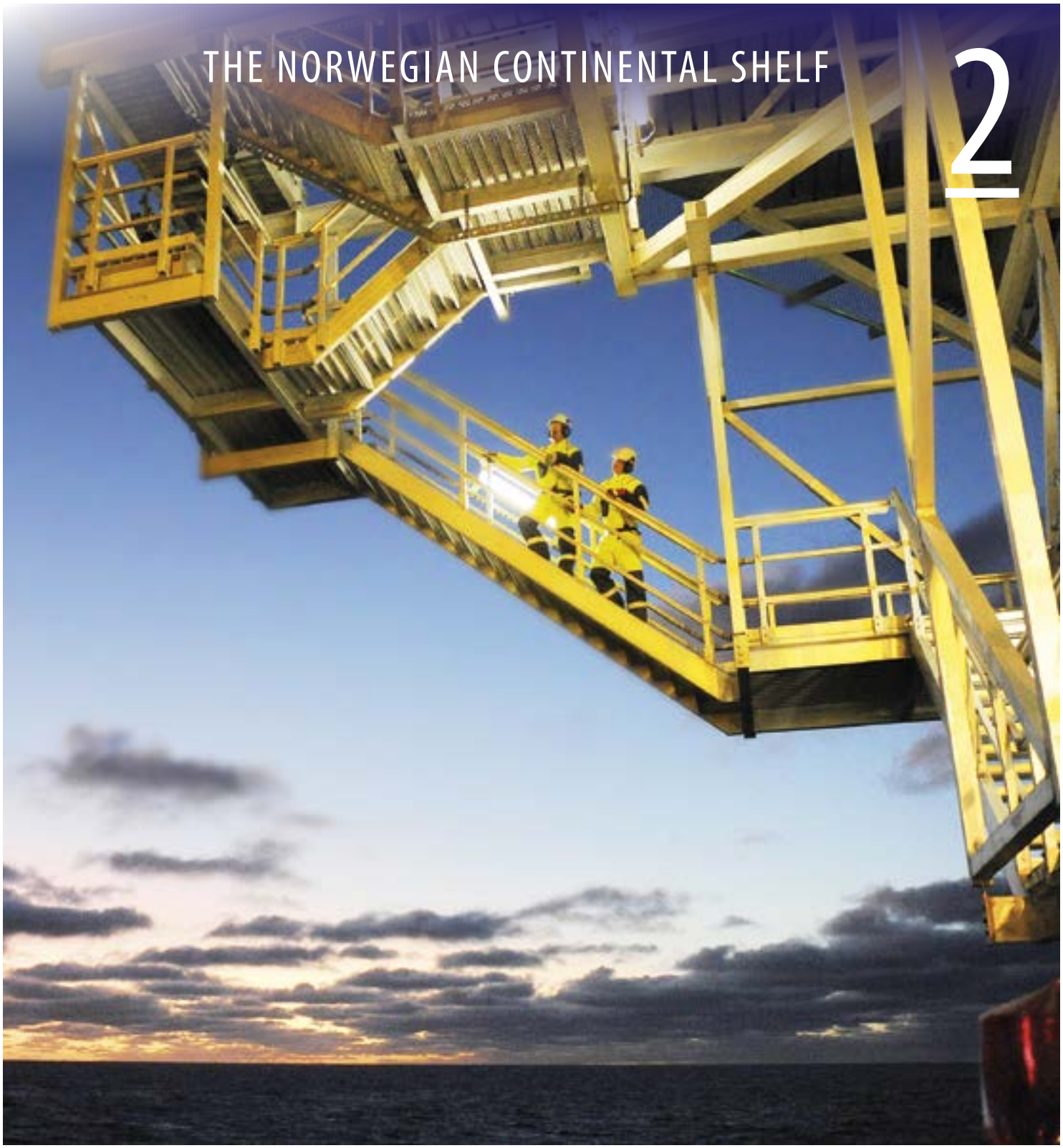
Fact box 1.2 Government Pension Fund – Global

The Government Pension Fund - Global (SPU) was established in 1990 for the purpose of ensuring a long term perspective when using the State's petroleum revenues. Through an investment fund with a very long time horizon, the petroleum wealth can benefit both current and future generations. The first transfer to the SPU took place in 1996. The State's total net cash flow from petroleum activities is transferred to the Government Pension Fund - Global on an annual basis. In addition, the Fund receives income through returns, including interest and yield on the fund's investments.

The petroleum revenues are gradually phased into the economy by covering the structural non-oil deficit in the fiscal budget. In order to alleviate economic fluctuations, ensure sound capacity utilisation and low unemployment, the amount spent will be either higher or lower than the expected real returns. Over the long term, however the phase-in will take place in line with development in the Fund's expected real returns.

Net cash flow from the petroleum activities
– Non-oil deficit in the fiscal budget
+ Return on the Fund's investments
= Revenues for the Government Pension Fund - Global

THE NORWEGIAN CONTINENTAL SHELF 2



The Aker Barents drilling rig exploring for petroleum in the Barents Sea.
(Photo: Harald Pettersen, Statoil)

The Norwegian shelf is an interesting petroleum province. The vast ocean areas of the North Sea, Norwegian Sea and Barents Sea still contain large amounts of oil and gas to be discovered. This chapter will provide more details on the oil and gas fields and the resources in the various ocean areas, both those that have been produced, those covered by developments and those that have yet to be proven.

Areas on the Norwegian shelf

The Norwegian continental shelf comprises a total of 2 039 951 square kilometres. This is nearly three times the area of mainland Norway, including Svalbard and Jan Mayen. The Shelf is divided into the following ocean areas: the North Sea, Norwegian Sea and Barents Sea. The North Sea covers an area of 142 000 square kilometres, the Norwegian Sea covers 287 000 square kilometres and the Barents Sea covers 772 000 square kilometres. The southern part of the Barents Sea that has been opened for petroleum activities covers 313 000 square kilometres.

The North Sea is still the powerhouse of Norwegian petroleum activities. A total of 60 fields are producing oil and gas here. The Norwegian Sea has 16 producing fields and the Barents Sea has one.

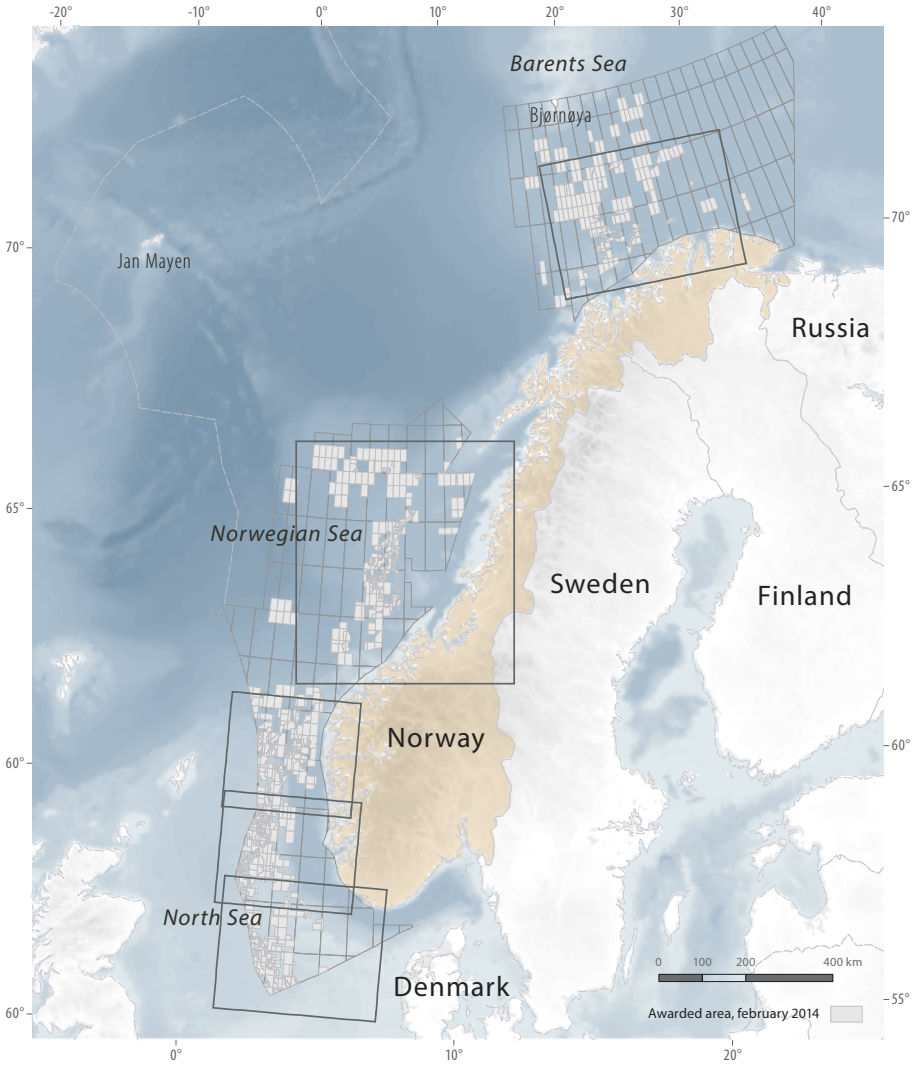


Figure 2.1 Areas on the Norwegian continental shelf *(Source: The Norwegian Petroleum Directorate)*

The southern North Sea

The southern North Sea is still an important petroleum province for Norway, more than 40 years after production started on Ekofisk. According to current plans, the field will keep producing for another 40 years. Thirteen fields are producing in this part of the North Sea. One field, Brynhild, is under development. Ekofisk is a hub for petroleum activities in the area, and many fields are tied in to the infrastructure on Ekofisk for further transport via the Norpipe system. The southern North Sea still contains substantial resources, particularly in the large chalk fields. Oil and gas from the fields in the southern North Sea are transported in part by vessels and in part via pipelines to onshore facilities in the UK and on the Continent.

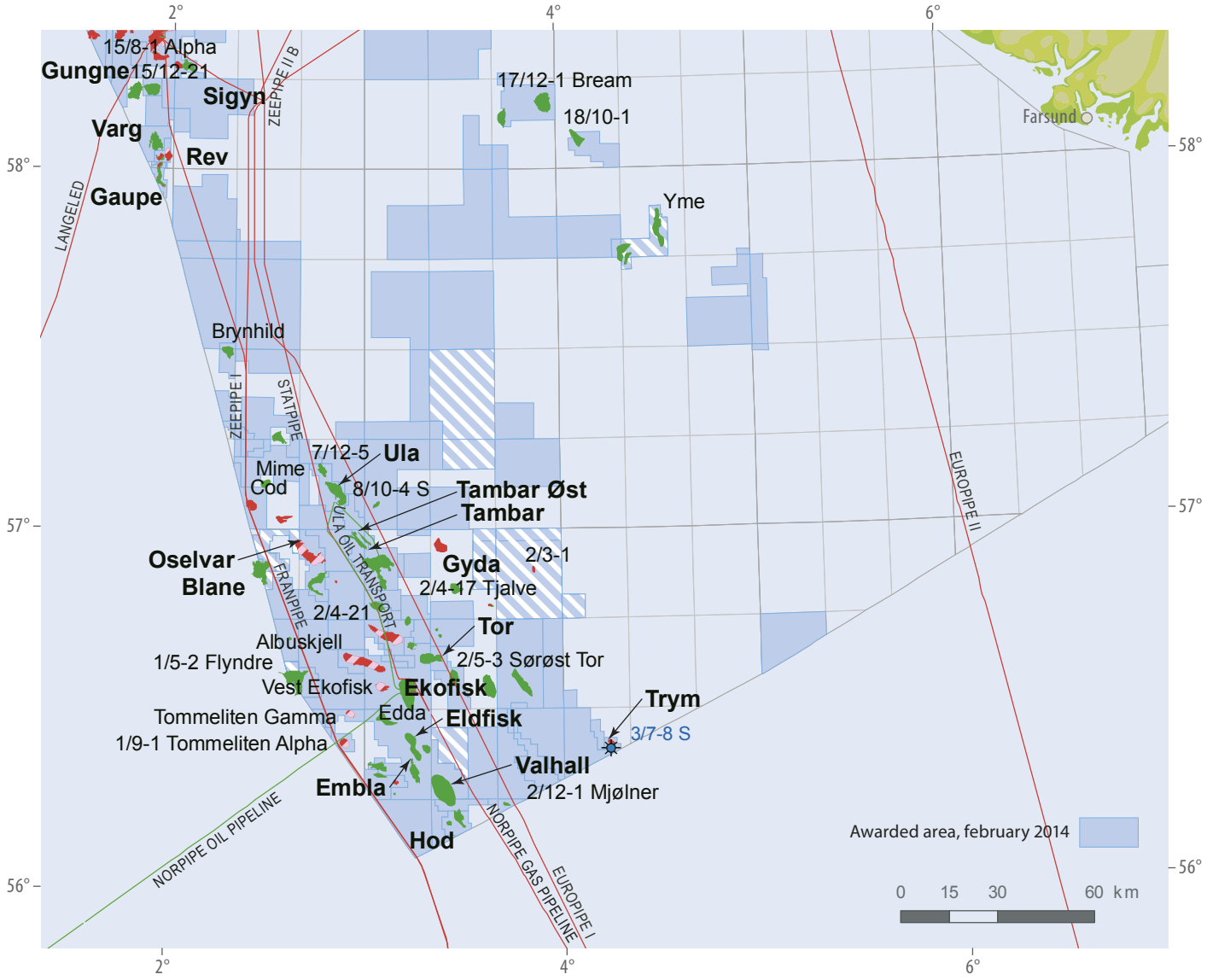


Figure 2.2 Fields and discoveries in the southern North Sea *(Source: The Norwegian Petroleum Directorate)*

The central North Sea

The central North Sea has an extensive petroleum history. Balder, which was proven in 1967, was the first oil discovery on the Norwegian continental shelf; however, it was not developed until 30 years later. The first development in the area was the Frigg gas field, which produced for nearly 30 years until it was shut down in 2004. Twenty-one fields are currently producing in the central North Sea, after Jette came on stream in 2013. One field, Glitne, was shut down in 2013. Six fields, Bøyla, Edvard Grieg, Gudrun, Gina Krog, Ivar Aasen and Svalin are under development. Several discoveries are being planned for development over the next few years, including the major 16/2-6 Johan Sverdrup oil discovery. The licensees plan to submit a Plan for Development and Operation (PDO) in 2015. By the mid-2020s, more than 25 per cent of Norwegian oil production is projected to originate from Johan Sverdrup. Heimdal, which has produced gas since 1985, is a gas nexus that carries out processing services for other fields in the North Sea. The Sleipner fields also represent an important hub in the gas transport system on the Norwegian continental shelf. Oil and gas from the fields in the central North Sea are transported in part by vessels and in part via pipelines to onshore facilities in Norway and the UK.

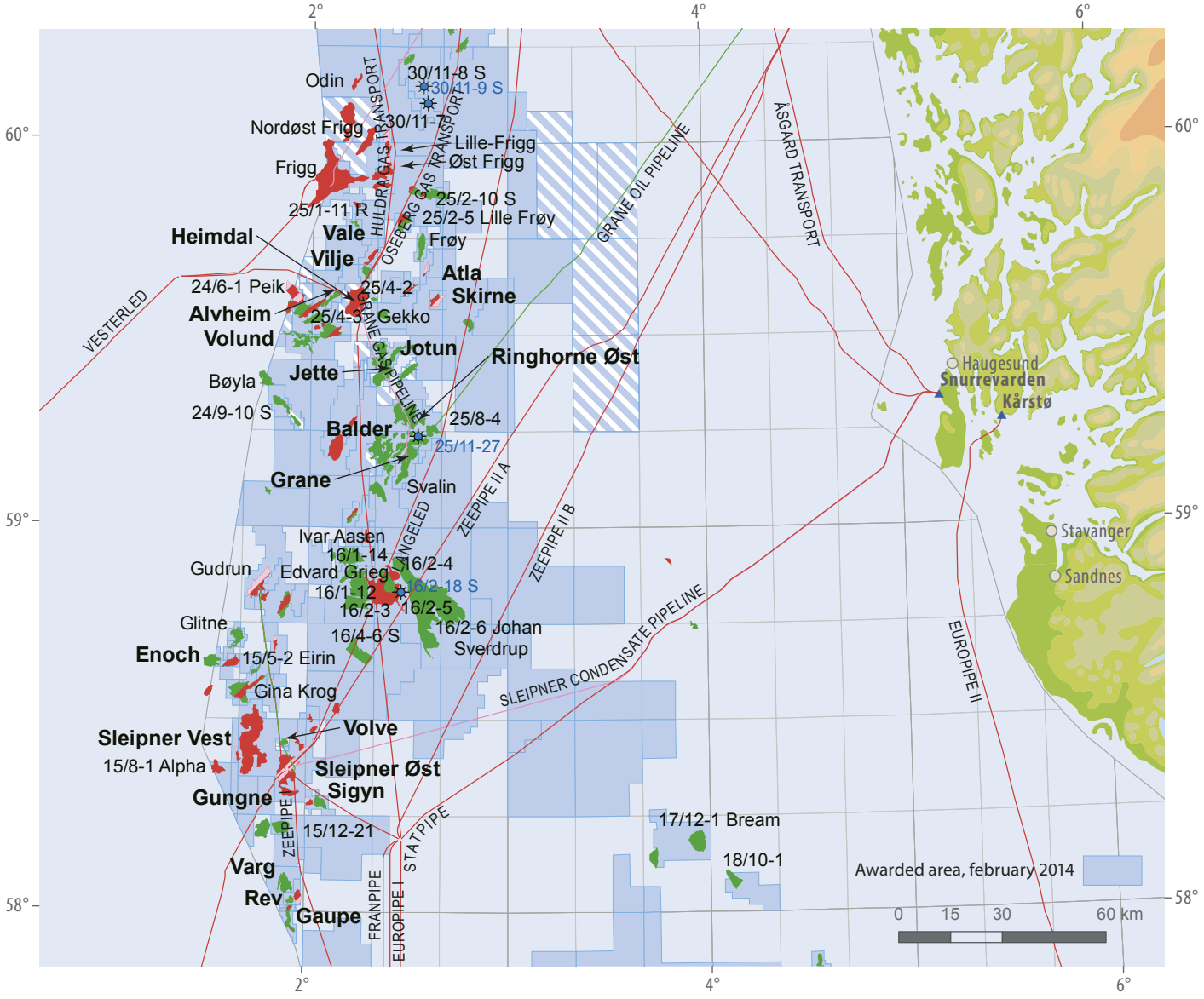


Figure 2.3 Fields and discoveries in the central North Sea *(Source: The Norwegian Petroleum Directorate)*

The northern North Sea

The northern North Sea comprises the two main areas of Tampen and Oseberg/Troll. Twenty-six fields are currently producing in this part of the North Sea. Four fields, Martin Linge, Knarr, Valemon and Fram H North are under development, and multiple discoveries are being planned for development in the future. After 30 years of production from the area, the resource potential is still significant, and the area is projected to keep producing for at least another 30 years. The Troll field fills a very important function for the gas supply from the Norwegian continental shelf, and will be the primary source of Norwegian gas exports in this century. Troll was also the field that produced the most oil on the Norwegian shelf in 2013. When the largest oil fields cease producing oil, significant gas volumes can be produced in a blowdown and low-pressure period. Oil and gas from the fields in the northern North Sea is transported in part by vessels and in part via pipelines to onshore facilities in Norway and the UK.

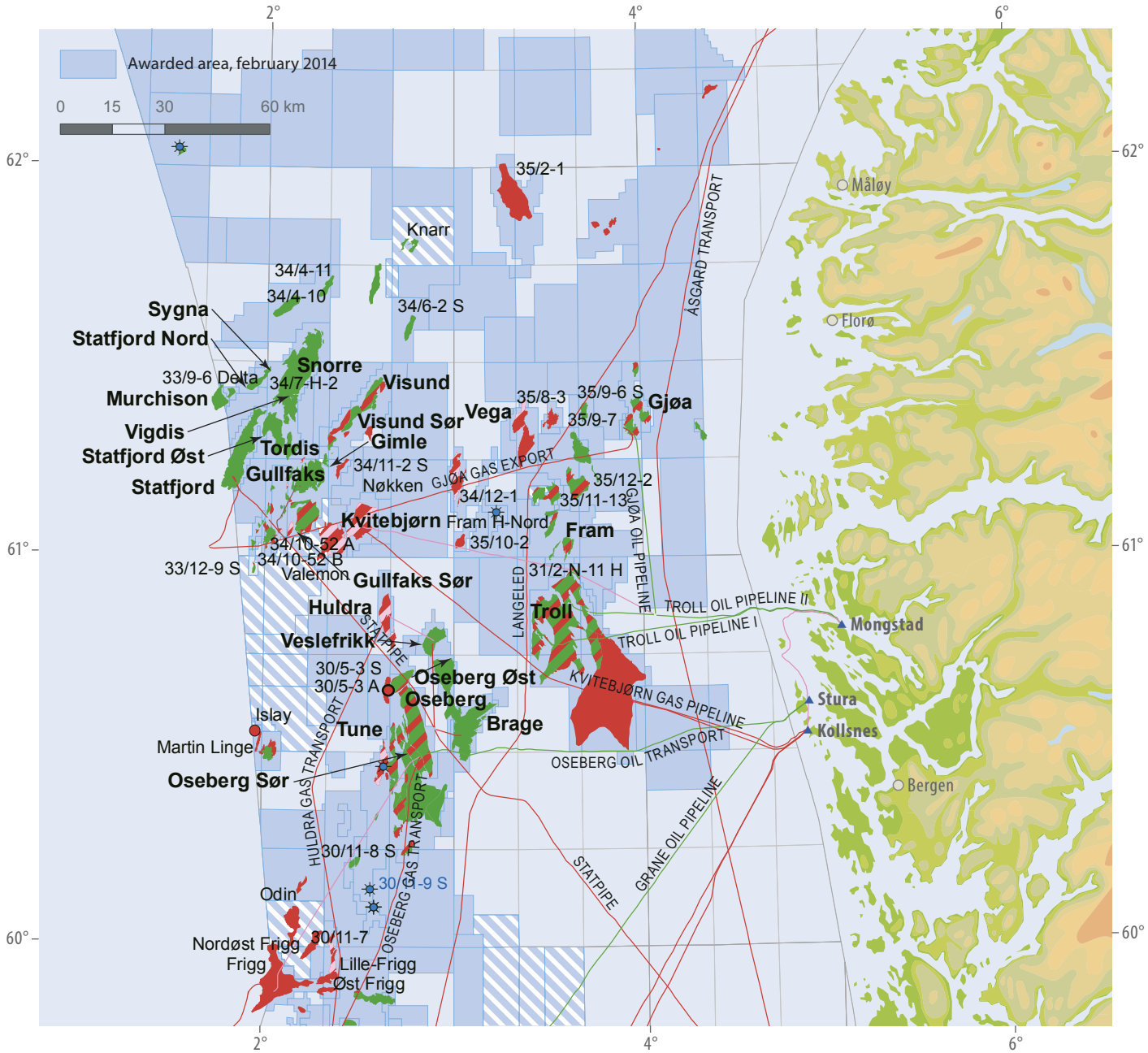


Figure 2.4 Fields and discoveries in the northern North Sea *(Source: The Norwegian Petroleum Directorate)*

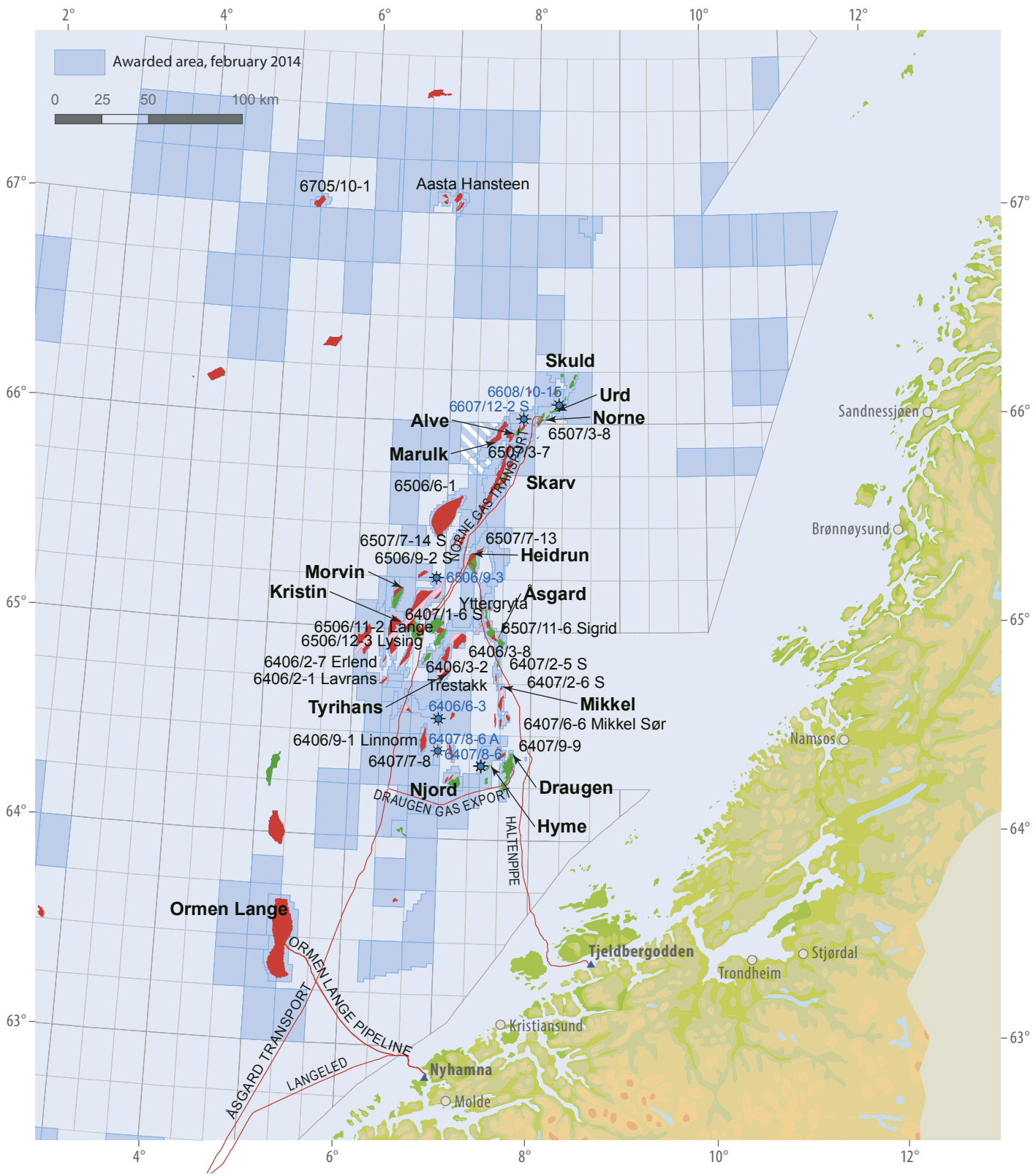


Figure 2.5 Fields and discoveries in the Norwegian Sea *(Source: The Norwegian Petroleum Directorate)*

The Norwegian Sea

The Norwegian Sea is generally a less mature petroleum province compared to the North Sea. Draugen, which was the first field in the Norwegian Sea, came on stream in 1993. After Skarv, Skuld and Hyme came on stream in 2013, there are 16 fields producing in the Norwegian Sea. One field, Yttergryta, was shut down in 2013. The Aasta Hansteen gas field is under development. This is also the case for the Polarled gas pipeline, which will extend the Norwegian gas transport system north of the Arctic Circle for the first time. The Norwegian Sea has substantial gas reserves. Produced gas from the fields is transported via the Åsgard Transport pipeline to Kårstø in Rogaland county, and via Haltenpipe to Tjeldbergodden in Møre and Romsdal county. The gas from Ormen Lange is transported via pipeline to Nyhamna and onward to Easington in the UK. Oil from the fields in the Norwegian Sea is transported by tankers.

The Barents Sea

Most of the Barents Sea is considered a frontier petroleum province, although there has been exploration in the area for more than 30 years. Only one field has been developed in the area, Snøhvit, which came on stream in 2007. The gas from Snøhvit is transported via pipeline to Melkøya, where it is processed and cooled into LNG, which is transported to the market using special vessels. Goliat is under development. The licensees are considering development solutions for the 7220/7-1 and 7220/8-1 Johan Castberg discoveries.

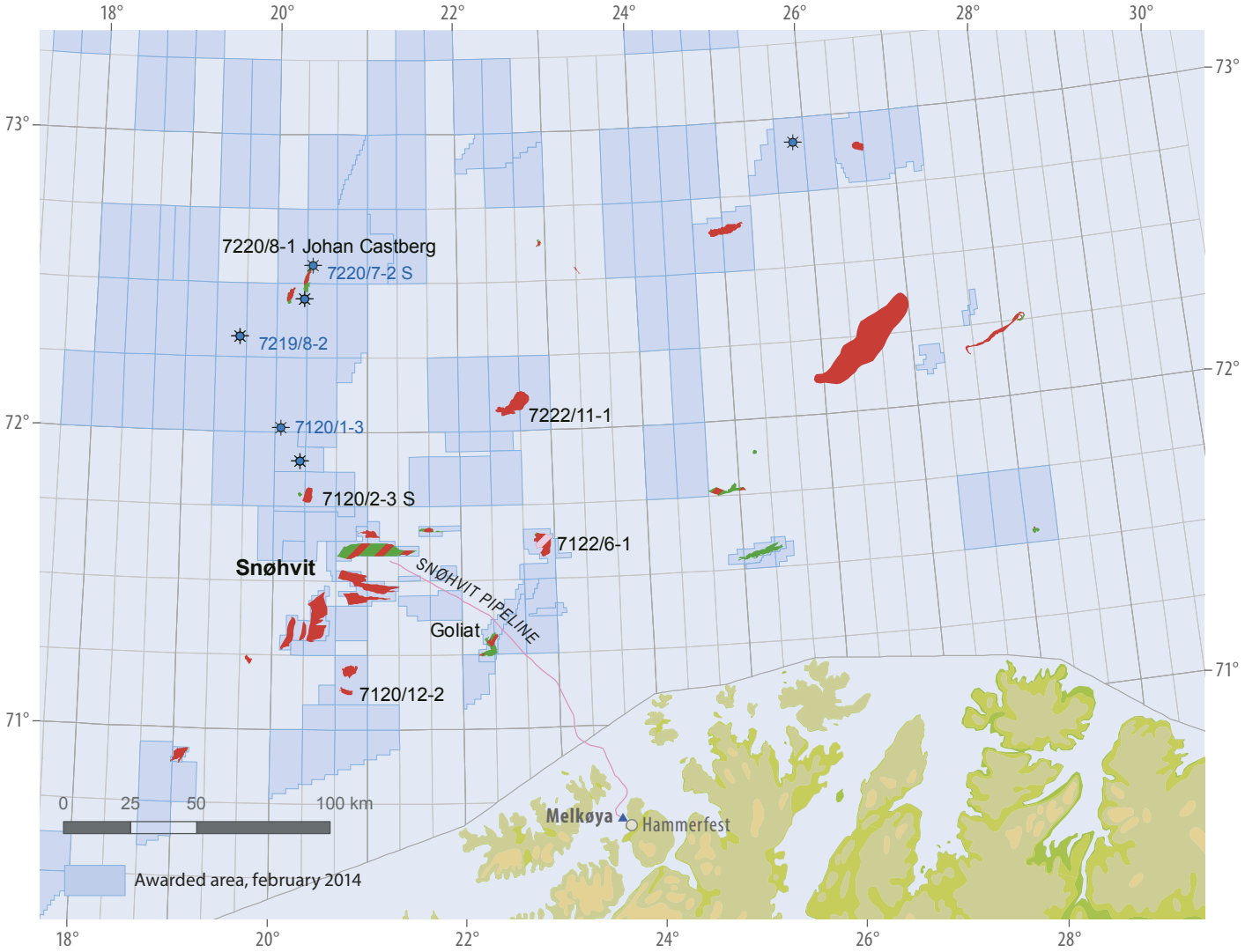


Figure 2.6 Fields and discoveries in the Barents Sea *(Source: The Norwegian Petroleum Directorate)*

Petroleum resources

Resources is a collective term for recoverable petroleum volumes. The resources are classified according to their maturity, see Figure 3b.2. The classification shows petroleum volumes that have been adopted or approved for development (reserves), resources that are contingent on clarification and resolution (contingent resources) and estimated resource volumes that have yet to be discovered (undiscovered resources). The main categories are thus reserves, contingent resources and undiscovered resources.

The Norwegian Petroleum Directorate's basic projections for discovered and undiscovered petroleum resources on the Norwegian continental shelf amount to about 14.2 billion standard cubic metres of oil equivalents (billion Sm^3 o.e.). Of this, a total of 6.2 billion Sm^3 o.e., or 44 per cent of the overall resources, have been sold and delivered. Of the total remaining recoverable resources, 8 billion Sm^3 o.e., 5.1 billion Sm^3 o.e. have been discovered, while the projected undiscovered resources amount to 2.9 billion Sm^3 o.e.

The total growth in discovered resources in 2013 has been estimated at 114 million Sm^3 o.e. Twenty new discoveries were made in 45 exploration wells. Many of the discoveries have not been evaluated, and the estimates are therefore highly uncertain.

After production started on the Norwegian continental shelf in 1971, petroleum has been produced from a total of 91 fields. In 2013, production started from Jette in the North Sea and Hyme, Skarv and Skuld in the Norwegian Sea. Of the fields that were producing at the end of 2013, 60 are located in the North Sea, 16 in the Norwegian Sea and one in the Barents Sea.

Figure 3b.1 shows the estimates for recoverable resources on the Norwegian continental shelf. The volumes are classified according to the Norwegian Petroleum Directorate's resource classification system and show total resources, both liquids and gas.

The detailed resource accounts as of 31 December 2013 are shown in Table 4b.1.

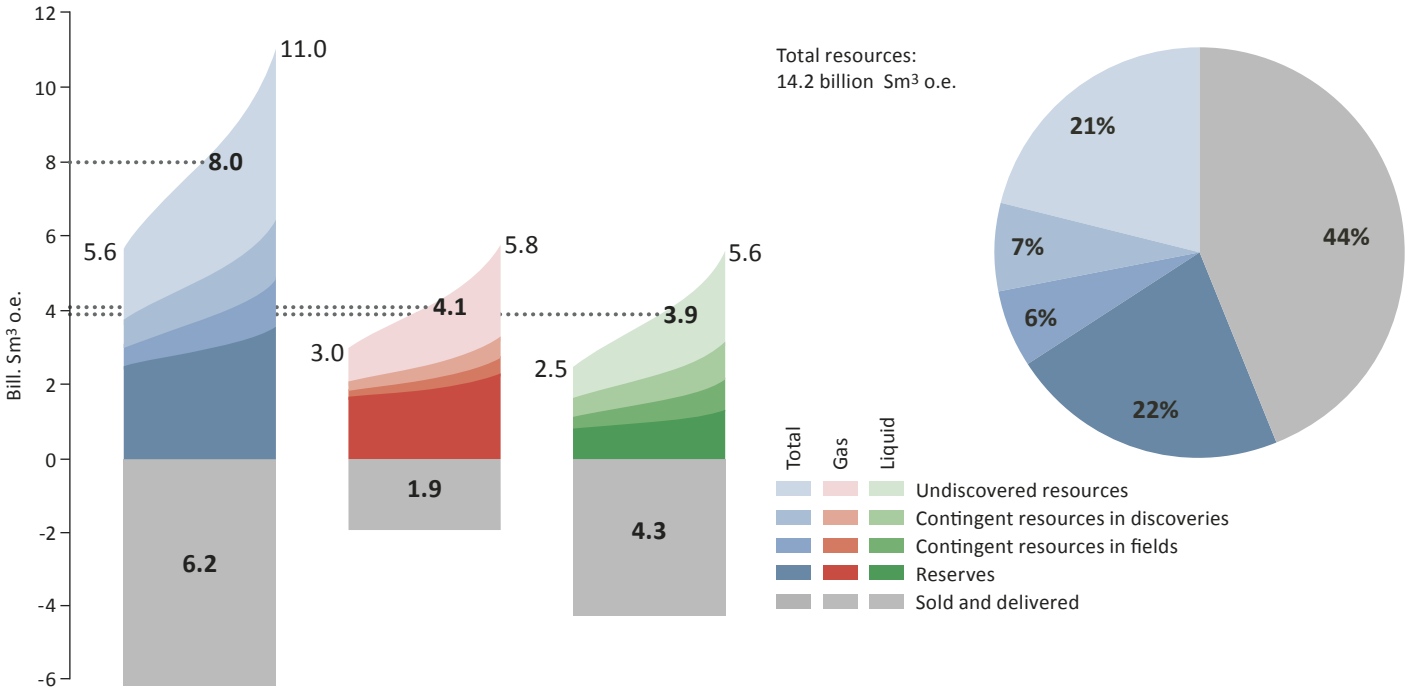


Figure 2.7 Petroleum resources and uncertainty in the estimates per 31.12.2013 *(Source: The Norwegian Petroleum Directorate)*

Reserves

Reserves include recoverable petroleum resources in deposits for which the authorities have approved the Plan for Development and Operation (PDO) or granted PDO exemption, and resources in deposits that the licensees have resolved to produce, but for which a PDO has not been approved by the authorities.

2013 saw resource growth on the Norwegian shelf totalling 102 million Sm^3 o.e. At the same time, 215 million Sm^3 o.e. were produced, sold and delivered. The resource accounts therefore show a reduction of 113 million Sm^3 o.e. in remaining reserves. This corresponds to a decline of about three per cent compared with 2012.

As regards oil reserves, only 29 million Sm^3 of oil was recorded as new reserves in 2013. During the period from 2005 to 2013, the overall reserve growth has totalled 636 million Sm^3 of oil. This means that it may be difficult to reach the authorities' goal to mature 800 million Sm^3 of oil to reserves before 2015.

Contingent resources

Contingent resources include proven petroleum volumes for which production has not yet been resolved. The volume of contingent resources in fields has hardly changed from 2012, while the resources in discoveries have increased by 76 million Sm^3 o.e., to 1056 million Sm^3 o.e. in 2013. The increase can e.g. be explained by the fact that the resource estimate for the 16/2-6 Johan Sverdrup discovery increased by 59 million Sm^3 o.e. in 2013. This is in addition to the resource growth from new discoveries in 2013.

Undiscovered resources

Undiscovered resources include petroleum volumes that are presumed to exist, but which have yet to be proven through drilling (Resource Categories 8 and 9).

The volume of undiscovered resources has been estimated at 2940 million Sm^3 o.e., an increase of 350 million Sm^3 o.e., compared with the 2012 accounts. This includes volumes from the new area in the Barents Sea South-East, totalling 300 million Sm^3 o.e, and from the shelf around Jan Mayen, totalling 90 million Sm^3 o.e. The estimated undiscovered resources in the North Sea, Norwegian Sea and Barents Sea have also been updated. The result of this work is that these resources were reduced by 40 million Sm^3 o.e.

The North Sea

Changes in the accounts show that 143 million Sm^3 o.e. have been sold and delivered from the North Sea in 2013, while the growth in gross reserves was 51 million Sm^3 o.e. This means that the remaining reserves in the North Sea have been reduced by 92 million Sm^3 o.e. Reserve growth from fields in operation provided the largest contribution to the increase in gross reserves. This growth comes e.g. from the drilling of additional wells, wells that exceed their production targets and extended lifetimes for several fields. Contingent resources in fields have increased by 16 million Sm^3 o.e., in part due to new development plans for Gullfaks and Gullfaks Sør. A total of seven new discoveries were made in the North Sea in 2013. Contingent resources in discoveries have increased by 40 million Sm^3 o.e. The most important reason for this is that the resource estimate for 16/2-6 Johan Sverdrup has been upgraded since last year. Development resolutions have been made for the 1/5-2 Flyndre, 15/3-9 Gudrun Øst, 34/8-13 A Titan phase 1 and 34/8-15 S Rhea discoveries, and they have therefore been classified as reserves. Undiscovered resources in the North Sea have been reduced by 35 million Sm^3 o.e., compared with the 2012 accounts. The oil resources have declined, but the gas resources have increased.

The Norwegian Sea

Gross reserves in the Norwegian Sea have been reduced by 5 million Sm^3 o.e., partly due to amended well plans for Njord. In 2013, 67 million Sm^3 o.e. have been sold and delivered from the Norwegian Sea. The remaining reserves in the Norwegian Sea have therefore been reduced by a total of 72 million Sm^3 o.e. Contingent resources in fields have increased by 24 million Sm^3 o.e. due to project maturation and development. Eight new discoveries were made in the Norwegian Sea in 2013. The estimated contingent resources in discoveries have thus increased by 26 million Sm^3 o.e., compared with the 2012 accounts. Undiscovered resources in the Norwegian Sea have been reduced by 20 million Sm^3 o.e., compared with the 2012 accounts. Gas resources have been increased, while oil resources have been reduced. Including the resource estimate for Jan Mayen of 90 million Sm^3 o.e., the undiscovered resources in the Norwegian Sea increase by 70 mill Sm^3 o.e.

The Barents Sea

Remaining reserves in the Barents Sea had a net increase of 52 mill Sm^3 o.e. in 2013. Five million Sm^3 o.e. were sold and delivered, while the increase in gross reserves was 57 million Sm^3 o.e., as a result of the Snøhvit Offshore Compression and Snøhvit CO_2 Injection projects being matured into reserves. For the same reason, among others, contingent resources in fields have been reduced by 47 million Sm^3 o.e. Five new discoveries were made in the Barents Sea in 2013, totalling 57 million Sm^3 o.e. Nevertheless, contingent resources in discoveries have only increased by 9 million Sm^3 o.e. The reason for this is e.g. that it is no longer deemed likely that the resources in 7225/3-1 Norvarg will be developed. Undiscovered resource estimates have increased for both oil and gas. Including the resource estimate for the Barents Sea South-East, the increase amounts to 315 million Sm^3 o.e.

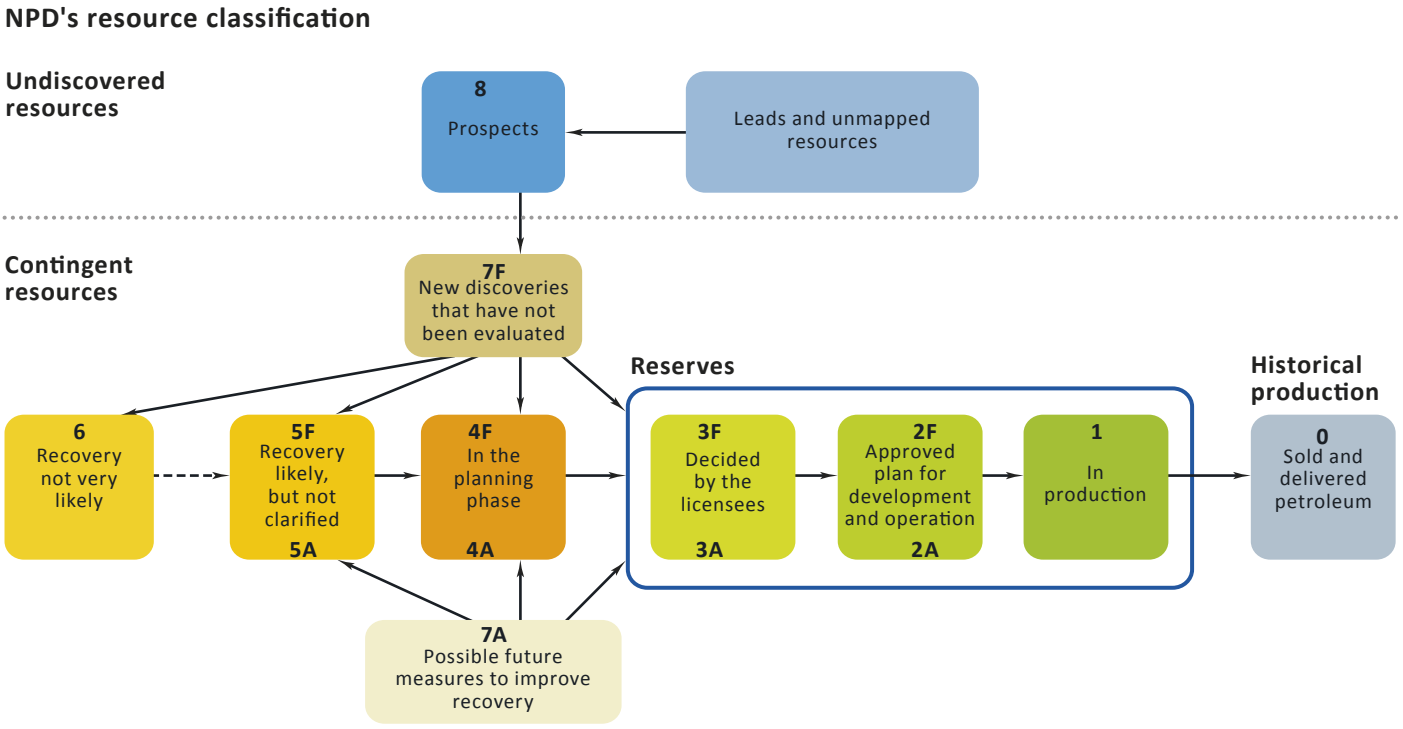


Figure 2.8 The Norwegian Petroleum Directorate's resource classification *(Source: The Norwegian Petroleum Directorate)*

Table 2.1 Resource accounts as of 31 December 2013

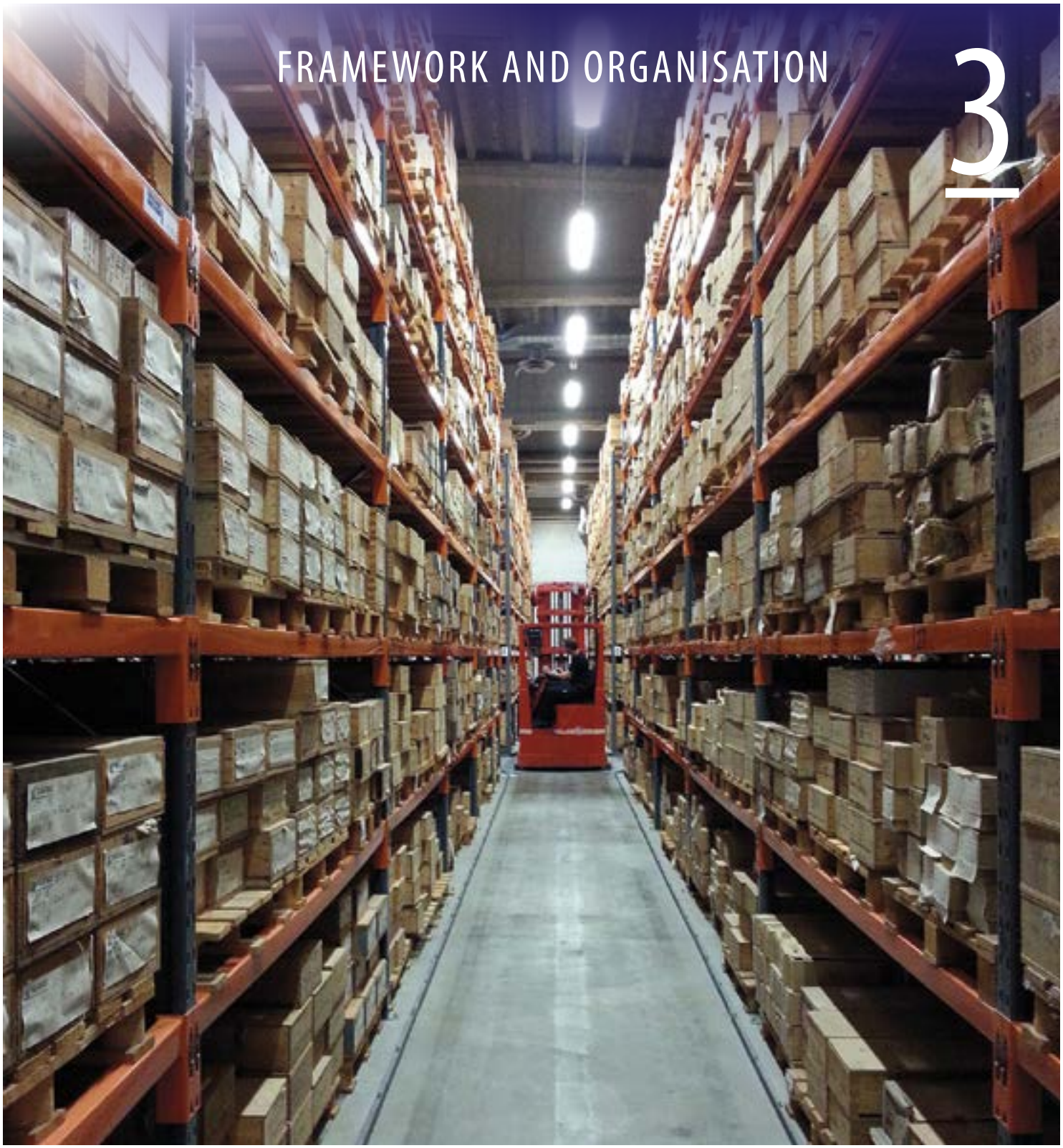
Total recoverable potential Project status category	Resource accounts per 31.12.2013					Changes from 2012				
	Oil mill Sm^3	Gas bill Sm^3	NGL mill tonnes	Cond mill Sm^3	Total mill Sm^3 o.e.	Oil mill Sm^3	Gas bill Sm^3	NGL mill tonnes	Cond mill Sm^3	Total mill Sm^3 o.e.
Produced	3897	1874	160	108	6183	84	108	9	4	214
Remaining reserves*	834	2049	129	40	3167	-55	-41	-10	3	-112
Contingent resources in fields	337	185	22	3	567	5	-18	5	-3	-7
Contingent resources in discoveries	679	330	14	20	1056	90	-14	0	0	76
Potential from improved recovery**	155	90			245	25	40	0	0	65
Undiscovered	1330	1490		120	2940	35	300	0	15	350
Total	**7232**	**6018**	**325**	**290**	**14158**	**185**	**375**	**4**	**19**	**586**
North Sea										
Produced	3364	1516	118	73	5178	66	64	5	2	142
Remaining reserves*	676	1366	83	6	2205	-36	-50	-2	-2	-91
Contingent resources in fields	296	113	12	0	433	4	8	2	0	16
Contingent resources in discoveries	508	138	9	13	676	52	-7	-2	-1	40
Undiscovered	540	250		25	815	-55	15	0	5	-35
Total	**5384**	**3383**	**222**	**117**	**9306**	**31**	**31**	**4**	**3**	**72**
Norwegian Sea										
Produced	533	334	41	31	975	18	40	4	2	67
Remaining reserves*	128	475	39	9	686	-19	-36	-9	-1	-72
Contingent resources in fields	41	60	9	1	119	1	17	3	0	24
Contingent resources in discoveries	53	141	5	6	209	7	14	2	3	26
Undiscovered	340	475		35	850	40	30	0	0	70
Total	**1095**	**1484**	**94**	**81**	**2839**	**48**	**65**	**-1**	**4**	**115**
Barents Sea										
Produced	0	24	1	4	31	0	4	0	1	5
Remaining reserves*	30	208	6	25	276	0	44	1	6	51
Contingent resources in fields	0	12	1	2	15	0	-43	-1	-3	-47
Contingent resources in discoveries	118	51	1	1	171	31	-21	0	-1	9
Undiscovered	450	765		60	1275	50	255	0	10	315
Total	**598**	**1061**	**9**	**92**	**1768**	**82**	**240**	**0**	**12**	**334**

* Includes resource categories 1, 2 and 3

** Resources from future measures for improved recovery are calculated for the total recoverable potential and have not been broken down by area

FRAMEWORK AND ORGANISATION

3



The Norwegian regulatory framework requires oil and gas companies to submit core samples from the drilling of wildcat wells on the Norwegian continental shelf to the Norwegian Petroleum Directorate (NPD). The NPD stores 140 kilometres of core samples and drill cuttings from exploration and production wells in their core store. The industry uses these samples to learn more about the subsurface.
(Photo: The Norwegian Petroleum Directorate)

A predictable and transparent framework is required to enable the oil companies to make good decisions. The organisation of the activities and the allocation of roles and responsibilities must safeguard important social considerations and ensure that the value created benefits society as a whole. This includes consideration for the external environment, health, working environment and safety. Everyone benefits from a framework that gives the petroleum industry an incentive to fulfil the State's goals, while at the same time maximising the companies' own returns.

Legal framework

The Petroleum Act (Act No. 72 of 29 November 1996 relating to petroleum activities) provides the general legal basis for the licensing system that governs Norwegian petroleum activities.

Pursuant to the Act and the Petroleum Regulations (Regulation No. 653 of 27 June 1997), licences can be awarded for exploration, production and transport of petroleum. The Petroleum Act confirms that the State owns the petroleum deposits on the Norwegian continental shelf. Official approvals and permits are necessary in all phases of the petroleum activities, from award of exploration and production licences, in connection with acquisition of seismic data and exploration drilling[1], to plans for development and operation, and plans for field cessation.

Before a production licence is awarded for exploration or production, the area where the activity will take place must be opened for petroleum activities. In this connection, an impact assessment must be prepared that considers factors such as the financial, social and environmental impacts the activity may have. Impact assessments and opening of new areas are governed by Chapter 3 of the Petroleum Act and Chapter 2a of the Petroleum Regulations.

Production licences are normally awarded through licensing rounds. Each year, the Government announces a certain number of blocks for which production licences can be applied for. The announcement is governed in detail by Chapter 3 of the Petroleum Act, and Chapter 3 of the Petroleum Regulations. Applicants can apply individually or as a group. The content of the application and the procedure for applying for production licences is governed by Chapter 3 of the Petroleum Act and Chapter 3 of the Petroleum Regulations. The Norwegian Petroleum Directorate has prepared guidelines on how to formulate the application. These are available on the NPD's website. Based on the applications received, the Ministry of Petroleum and Energy awards production licences to a group of companies. Relevant, objective, non-discriminatory and announced criteria form the basis for these awards. The Ministry designates an operator for the joint venture which will be responsible for the operational activities authorised by the licence. The licensee group also functions as an internal control system in the production licence, where each licensee's role is to monitor the work done by the operator.

The production licence regulates the rights and obligations of the companies vis-à-vis the Norwegian State. The document supplements the requirements in the Petroleum Act and stipulates detailed terms and conditions. It grants companies exclusive rights to surveys, exploration drilling and production of petroleum within the geographical area covered by the licence. The licensees become the owners of the petroleum that is produced. A standard production licence with appendices is available on the MPE's website. More details regarding production licences can be found in Chapter 3 of the Petroleum Act and Chapter 3 of the Petroleum Regulations.

The production licence is valid for an initial period (exploration period) that can last for up to ten years. During this period, a work commitment must be carried out in the form of e.g. geological/geophysical preliminary work and/or exploration drilling. If all the licensees agree, the production licence can be relinquished when the work commitment has been fulfilled. If the licensees want to continue the work in the production licence, the license will enter the extension period, which is the period for development and operation. The exploration period is governed in detail by Chapter 3 of the Petroleum Act and Chapter 3 of the Petroleum Regulations.

If the companies determine that it is commercially viable to develop a field, they are required to carry out prudent development and production of proven petroleum deposits. This means that the companies are responsible for promoting and implementing new projects, while the authorities grant the final approval to start the process. When a new deposit is to be developed, the company must submit a Plan for Development and Operation (PDO) to the Ministry for approval. The impact assessment, which is submitted for consultation to various entities that could be affected by the specific development, is an important part of the development plan. The impact assessment shows how the development is expected to affect the environment, fisheries, and Norwegian society. The processing of this assessment and the development plan itself, ensure that the projects' resource management is prudent, and that the consequences for other general public interests are acceptable. The licensee can, if appropriate, document that the development is covered by an appropriate existing impact assessment. The Ministry has drawn up a guide for Plans for Development and Operation and for Plans for Installation and Operation. The main objective of the guide is to clarify the regulations and the authorities' expectations for developers on the Norwegian shelf. The guidelines can be found on the Norwegian Petroleum Directorate's website.

1 Chapter 4 discusses development and operations. Gas resource management is discussed in Chapter 4.

Development and operation are governed in detail by Chapter 4 of both the Petroleum Act and the Petroleum Regulations.

As a main rule, the Petroleum Act requires licensees to submit a cessation plan to the Ministry two to five years before the licence expires or is relinquished, or before the use of a facility ceases. The cessation plan must have two main sections; an impact assessment and a disposal section. The impact assessment provides an overview of the expected consequences of the disposal for the environment and other factors. The disposal section must include proposals for how cessation of petroleum activities on a field can be accomplished.

Chapter 5 of the Petroleum Act and Chapter 6 of the Petroleum Regulations govern disposal or decommissioning of facilities. In addition to the Petroleum Act, the OSPAR convention (Convention for the protection of the marine environment of the North-East Atlantic) also governs the disposal of our facilities. Under this Convention, only a small number of facilities can be abandoned on-site.

Liability for pollution damage is governed by Chapter 7 of the Petroleum Act. The licensees are responsible for pollution damage, without regard for fault. This is referred to as strict liability.

Safety aspects associated with the petroleum activities are governed by Chapters 9 and 10 of the Petroleum Act, with appurtenant regulations. The petroleum activities shall be conducted in a prudent manner to ensure that a high level of safety can be maintained and developed throughout all phases, in line with the continuous technological and organisational development.

State organisation

The Storting (Norwegian Parliament) sets the framework for the petroleum activities in Norway, in part by adopting legislation. Major development projects and issues involving fundamental principles must be deliberated in the Storting. The Storting also reviews the Government and public administration.

The Government exercises executive authority over petroleum policy, and answers to the Storting as regards policies. To carry out its policies, the Government is assisted by the ministries, underlying directorates and supervisory authorities. Responsibility for the various roles in Norwegian petroleum policy is distributed as follows:

- The Ministry of Petroleum and Energy – responsible for resource management and the sector as a whole, as well as the State's ownership in Statoil and Petoro AS, which is the steward of the State's Direct Financial Interest (SDFI)
- The Ministry of Labour and Social Affairs – responsible for working environment and safety
- The Ministry of Finance – responsible for petroleum taxation
- The Ministry of Transport and Communications – responsible for oil spill preparedness
- The Ministry of Climate and Environment – responsible for safeguarding the external environment

The Norwegian Petroleum Directorate is subordinate to the Ministry of Petroleum and Energy. The Norwegian Petroleum Directorate plays a key role in the petroleum management system, and is an important advisory body for the Ministry of Petroleum and Energy. The NPD exercises administrative authority in connection with the exploration for and production of petroleum deposits on the Norwegian continental shelf. This also includes the authority to stipulate regulations and make decisions pursuant to the petroleum activities regulations.

Gassco AS is a State-owned enterprise responsible for transport of gas from the Norwegian continental shelf. The company is the operator of Gassled. Gassco has no ownership interest in Gassled, but supervises its operatorship in a neutral, efficient manner in relation to both owners and users.

Petoro AS is a State-owned enterprise that handles the commercial aspects of the State's Direct Financial Interest (SDFI) on the State's behalf. Statoil ASA is an international company with activities in 35 countries. The company is listed on the Oslo and New York stock exchanges. The State owns 67 per cent of the shares in the company.

The Ministry of Labour has overall responsibility for regulating and supervising the working environment, as well as safety and emergency preparedness in connection with the petroleum activities. The Petroleum Safety Authority Norway (PSA) is responsible for technical and operational safety, including emergency preparedness and working environment in the petroleum activities.

The Ministry of Finance has the overall responsibility for taxation and fees from petroleum activities. The Petroleum Tax Office is part of the Norwegian Tax Administration, which is subordinate to the Ministry of Finance. The primary task of the Petroleum Tax Office is to ensure correct stipulation and payment of taxes and fees adopted by the political authorities. The Directorate of Customs and Excise ensures correct stipulation and payment of NO_x tax. The Ministry of Finance is also responsible for managing the Government Pension Fund – Global. Responsibility for the operative management has been delegated to the Norwegian central bank.

The Ministry of Transport and Communications is responsible for acute pollution preparedness in Norwegian waters. The Norwegian Coastal Administration is responsible for the State's oil spill preparedness.

The Ministry of Climate and Environment has overall responsibility for managing environmental protection and the external environment in Norway. The Norwegian Environment Agency is e.g. responsible for following up the Pollution Control Act.

The State's revenues from petroleum activities

Norway has a special system for State revenues from the petroleum activities. The main reason for this system is the extraordinary returns associated with producing these resources. Ownership of the petroleum resources belongs to the Norwegian society. The State secures a large share of the created values through taxation and direct SDFI ownership.

The petroleum taxation system is based on the rules for ordinary corporate taxation, but specified in a separate Petroleum Taxation Act (Act No. 35 of 13 June 1975 relating to the taxation of subsea petroleum deposits, etc.). Due to the extraordinary profit associated with recovering the petroleum resources, an additional special tax is levied on this type of commercial activity. The ordinary tax rate is 27 per cent. The special tax rate is 51 per cent. When the basis for ordinary tax and special tax is calculated, investments are subject to straight-line depreciation over six years from the year they are incurred. Deductions are allowed for all relevant costs, including costs associated with exploration, research and development, financing, operations and removal. Consolidation between fields is allowed. To shield normal returns from special tax, an extra deduction is allowed in the basis for special tax, called uplift. This amounts to 22 per cent of the investments (5.5 per cent per year for four years, from and including the investment year).

Companies that are not in a tax position can carry forward deficits and uplift with interest. These rights follow the ownership interest and can be transferred. Companies can also apply for a refund of the tax value of exploration expenses in connection with the tax assessment.

The petroleum taxation system is designed to be neutral, so that an investment project which is profitable for an investor before tax will also be profitable after tax. This characteristic enables both substantial revenues for the Norwegian society, and encourages companies to implement all profitable projects.

In many instances, petroleum produced on the Norwegian continental shelf is sold to affiliated companies. It is important for the State's revenues that oil and gas sold from Norway is taxed at market prices. To assess whether the prices set between affiliated companies are comparable to what would have been agreed between two independent parties, norm prices can be stipulated for use when calculating taxable income for the tax assessment. The Petroleum Price Council (PPR) sets the norm price. The Council receives information from and meets with companies before setting the final norm price. The norm price system applies for various types and qualities of petroleum. For gas, the actual sales price is used as the basis.

Operating income (norm price)
- Operating expenses
- Linear depreciation for investments (6 years)
- Exploration expences, R&D and decom.
- CO_2-tax, NO_X-tax and area fee
- Net financial costs

= Corporation tax base (27 %)
– Uplift (5.5 % of investment for 4 years)
= Special tax base (51 %)

Figure 3.1 Calculation of petroleum tax
(Source: The Ministry of Petroleum and Energy)

The State's Direct Financial Interest (SDFI) is a system in which the State owns a share of many oil and gas fields, pipelines and onshore facilities. The ownership interest in the oil and gas fields is set in connection with award of the production licences, and the size of the interest varies from field to field. As one of several owners, the State covers its share of the investments and costs, and receives a corresponding portion of the income from the production licence. SDFI was established with effect from 1 January 1985. Until then, the State only had ownership in production licences through Statoil, where the State was the sole owner. In 1985, Statoil's participating interest was divided into a State Direct Financial Interest share (SDFI) and Statoil's share. When Statoil was listed on the stock exchange in 2001, management of the SDFI portfolio was transferred to the State-owned management company Petoro. As of 1 January 2014, the State had direct financial interests in 179 production licences, as well as interests in 15 joint ventures in pipelines and onshore facilities.

As a majority owner of Statoil, the State receives dividends which are part of the petroleum activity revenues. The dividend paid to the Norwegian State in 2013 was NOK 14.42 billion.

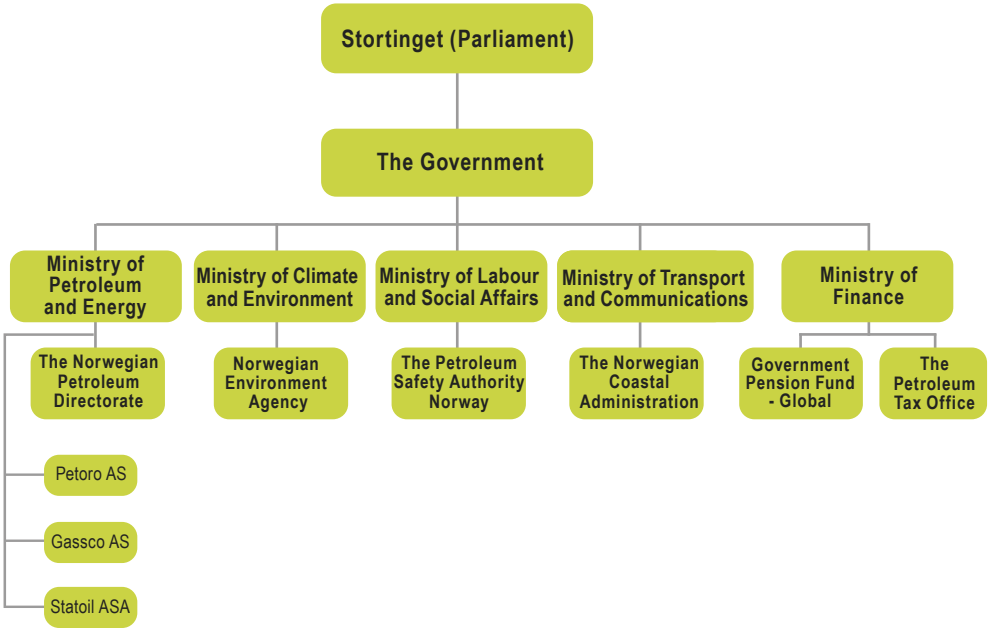


Figure 3.2 State organisation of the petroleum activities *(Source: The National Budget)*

The area fee is intended to help ensure that awarded acreage is explored efficiently, so that potential resources come on stream as soon as possible, within a prudent financial framework, and in a manner which maximises the lifetime of existing fields.

The CO_2 and NO_x taxes represent important environmental taxes for the petroleum activities. Petroleum activities are also subject to emission permit requirements. This entails that the licensees must purchase emission permits for each tonne of CO_2 emitted on the Norwegian continental shelf.

The CO_2 tax was introduced in 1991 and is a policy instrument designed to reduce CO_2 emissions from the petroleum activities. The CO_2 tax is levied per standard cubic metre (Sm^3) of gas that is burned or released directly, and per litre of petroleum burned. For 2014, the tax is set at NOK 0.98 per litre of petroleum or standard cubic metre of gas. The total cost of CO_2 emissions in the industry is high, about 450 NOK/tonne of CO_2.

The Extractive Industries Transparency Initiative (EITI) is an international initiative with the purpose of reinforcing sound management principles by disclosing and verifying revenue flows to the State from oil, gas and mining companies in countries that are rich in natural resources. Greater transparency surrounding cash flows will contribute to better management, and help enable citizens to hold their governments accountable for how these revenues are used. To date, Norway is the only OECD nation to implement EITI. A stakeholder group has been established with participants from the authorities, companies and the general population. The group is actively involved in the process of implementing EITI in Norway. Norway was approved as an EITI country in March 2011. 24 countries have so far been approved as EITI members.

THE NORWEGIAN PETROLEUM INDUSTRY – FROM WELL TO MARKET

4

From the Kollsnes gas processing plant in Hordaland County. Gas from a number of fields, including Troll, is processed here
(Photo: Øyvind Sætre/Gassco)

To ensure that the resources on the Norwegian shelf are efficiently exploited, the process from when a discovery is made until it is developed and production starts, is both long and meticulous. At the same time, the industry must continuously adapt to new information, new technology, changing requirements and market conditions. This chapter briefly describes the cycle from when a field is first discovered until the field is decommissioned. The most important market conditions are also described, and the chapter is concluded with climate and environmental considerations.

Exploration activity

In order to extract the petroleum resources located on the Norwegian continental shelf, the resources must be proven through exploration. Exploration policy is therefore an important part of Norway's long-term resource management and the Government wants to give the companies access to attractive exploration acreage.

The Norwegian Parliament (Storting) has opened most of the North Sea, the Norwegian Sea and the southern Barents Sea for petroleum activities. The Norwegian Petroleum Directorate's estimate of undiscovered resources in areas on the shelf, is approx. 3 billion Sm^3 of recoverable oil equivalents. Undiscovered resources are distributed as follows between the different ocean areas: 28 per cent in the North Sea, 29 per cent in the Norwegian Sea and 43 per cent in the Barents Sea (see Figure 4.2).

A period of low exploration activity was followed by a surge in 2006, see Figure 4.1. A new record was set in 2009 with 65 spudded exploration wells. Fifty-nine exploration wells were spudded in 2013, resulting in 20 discoveries. Recent years have also seen major discoveries such as Johan Sverdrup in the North Sea and Johan Castberg in the Barents Sea.

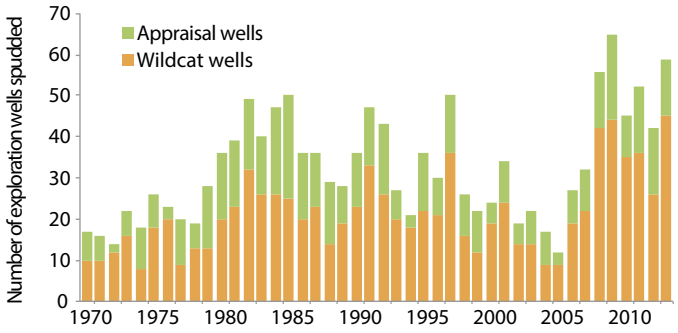


Figure 4.1 Spudded exploration wells on the Norwegian continental shelf 1970–2013 *(Source: The Norwegian Petroleum Directorate)*

Exploration policy in mature and frontier areas

Licensing system

The Norwegian licensing system consists of two types of equal licensing rounds. The first type is the numbered licensing round which comprise less mature parts of the shelf. These rounds have been used since 1965, and have been held every second year in recent years. Numbered licensing rounds start with inviting the oil companies to nominate blocks they want to be announced. Based on this and the authorities' own assessments, a proposed announcement is submitted for public consultation. The Government finally announces the round.

The second type is the Awards in Pre-defined Areas (APA), which was introduced for mature parts of the shelf in 2003. This system entails the establishment of pre-defined exploration areas comprising all of the mature acreage on the shelf. Companies can apply for acreage within this defined area. As new areas mature, the areas will be expanded, but not reduced. A regular, fixed cycle is planned for licensing rounds in mature areas. So far, eleven annual rounds have been held (APA 2003–2013).

Applicants in the licensing rounds can apply as joint ventures or individually. Impartial, objective, non-discriminatory and pre-announced criteria form the basis for award of production licences. Based on the applications received, the Ministry of Petroleum and Energy awards production licences to a group of companies. The Ministry designates an operator for the joint venture, to be responsible for the operational activities authorised under the licence.

The production licence applies for an initial period (exploration period) that can last up to ten years.

Mature areas

Petroleum activities on the Norwegian continental shelf started in the North Sea and have gradually moved north, based on the principle of stepwise exploration. This means that large parts of the North Sea are now considered mature from an exploration perspective. The same applies to the Halten Bank and the area around the Ormen Lange field in the Norwegian Sea, as well as the area surrounding Snøhvit and Goliat in the Barents Sea.

Mature areas are characterised by known geology and well-developed or planned infrastructure. Discoveries in these areas are likely, but new, large discoveries are less likely. It is important to prove and recover the area's resources before the area infrastructure is shut down. If this cannot be done, profitable resources could potentially be left behind if the discoveries are too small to justify independent infrastructure development. Additional resources from the area surrounding a producing or planned field may also increase the field's

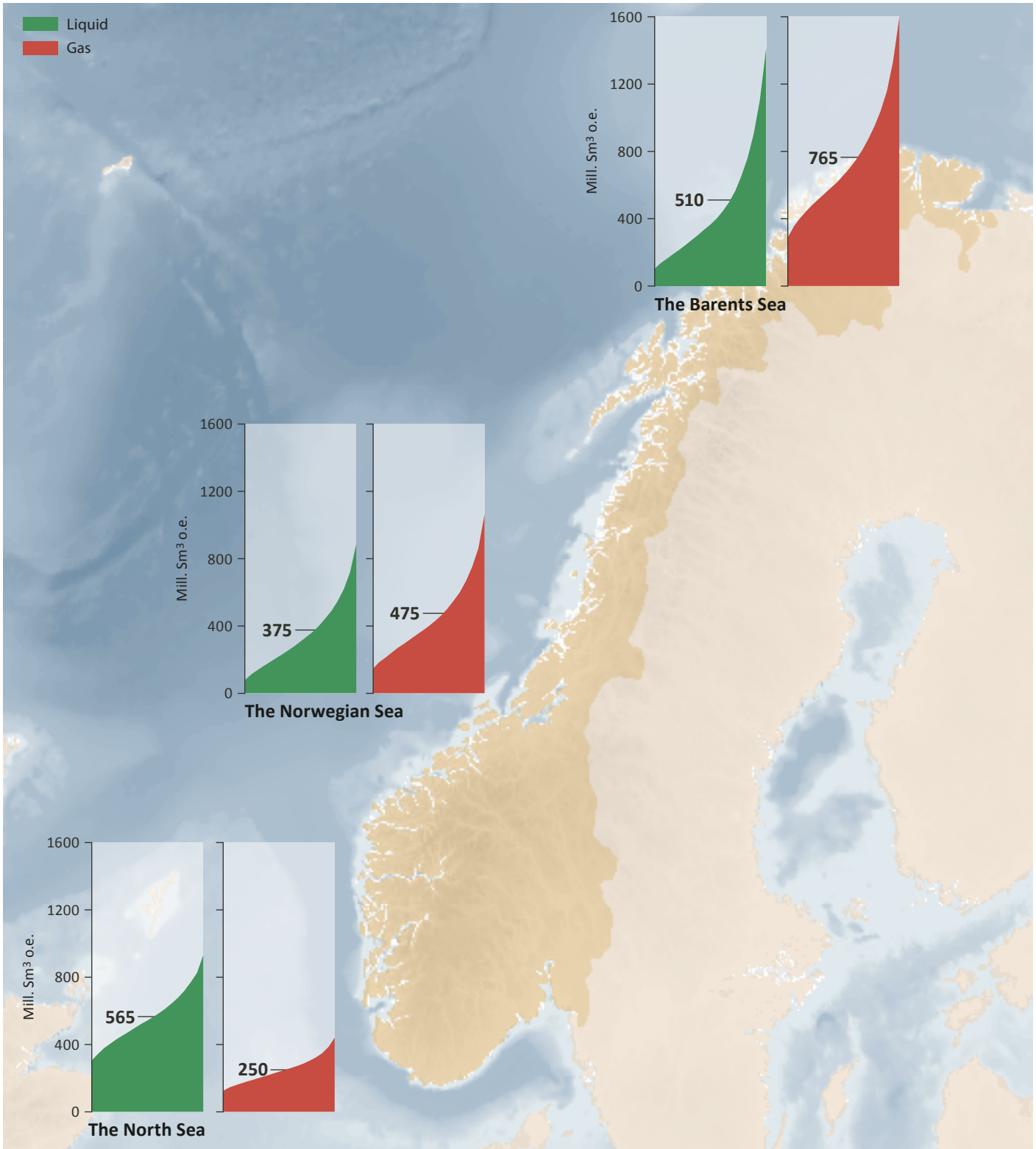


Figure 4.2 Undiscovered resources by area. The figures in each column show expected recoverable volumes and the uncertainty in the estimate is shown in the slanted line; low estimate on the left, high estimate on the right *(Source: The Norwegian Petroleum Directorate)*

Figure 4.3 Area status for the Norwegian continental shelf as of March 2014 (*Source: The Ministry of Petroleum and Energy*)

profitability by e.g. extending the lifetime of main fields in order to produce more of the resources in place.

In the mature parts of the Norwegian Shelf, the authorities have adapted the licensing policy to facilitate optimal production of time-critical resources. This led to the introduction of Awards in Predefined Areas (APA). Figure 4.3 shows the area made available for awards in APA 2014. The APA area is a pre-defined area that cannot be reduced, and will expand as new areas mature. Annual awards are held within the APA area.

It is important for the authorities that licensed area is actively worked with. The area comprised by the production licence to be awarded is tailored so that companies are awarded only those areas for which they have tangible exploration plans. If a group of licensees no longer wants to explore the area covered by the production licence, the acreage must be relinquished. Relinquished acreage can be applied for by new companies that may have a different view of its prospectivity. This leads to faster circulation of acreage and more efficient exploration of the mature areas.

Frontier areas

The areas currently regarded as frontier areas on the Norwegian continental shelf include large parts of the Barents Sea and the Norwegian Sea, as well as minor areas in the North Sea. As regards to the Norwegian Sea, this applies particularly to deepwater areas and the northernmost areas.

Frontier area characteristics include limited geological information, significant technical challenges and lack of infrastructure. Geological uncertainty is greater here, as is the possibility of making major new discoveries. Players that want to explore frontier areas must have broad experience, technical and geological expertise, as well as a solid financial foundation.

In the 18th licensing round in 2004, the principles of relinquishment in frontier areas were amended to make them identical to the principles that apply for mature areas. Exploring for resources in frontier areas is time-consuming. Not all companies that have been awarded production licences in frontier areas are able to submit a development plan at the end of the initial period. The main rule of relinquishment in these areas is linked to delineation of resources proven through drilling. Otherwise, the same changes have been made in frontier areas as in mature areas as regards customising the area and work programmes to be awarded.

Licences in the 22nd licensing round were awarded in the spring of 2013, comprising 24 licences in the Barents Sea and the Norwegian Sea. Ownership interests were offered to 29 oil and gas companies. The 23rd licensing round was started in August 2013 with invitations to nominate areas on the shelf. A licensing round normally lasts 2–3 years. This licensing round will most likely focus on the Barents Sea.

Unopened areas and opening processes

Large areas of the Norwegian continental shelf have yet to be opened for petroleum activities by the Storting. This e.g. includes the entire northern Barents Sea, the north-eastern Norwegian Sea (Troms II, Nordland VII and parts of Nordland IV, V and VI), Skagerrak and the area surrounding Jan Mayen. The general rule for unopened areas is that the Storting must resolve to open an area for petroleum activities before a licensing round can be announced. Part of the basis for such resolutions is an assessment of factors such as the activities' potential financial and social impacts, as well as environmental impact.

The composition of companies

The number and composition of the oil companies that conduct petroleum activities on the Norwegian continental shelf is called the player scenario. The largest international players have central roles, a natural consequence of the extensive, demanding tasks on the shelf. As the area has matured and the challenges have changed and become more diversified, it has been important to adapt the composition of companies to this altered situation. (see Figure 4.6). A system for prequalifying new operators and licensees has been introduced to better pave the way for new players. The new companies currently make significant contributions to exploration and resource growth on the Norwegian shelf, see Figures 4.4 and 4.5.

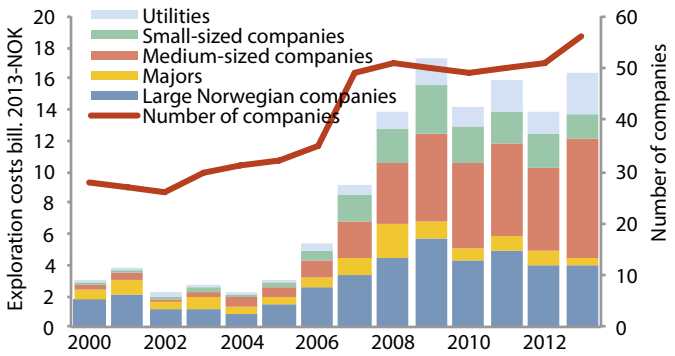


Figure 4.4 Exploration costs in North Sea production licences by size of company *(Source: The Norwegian Petroleum Directorate)*

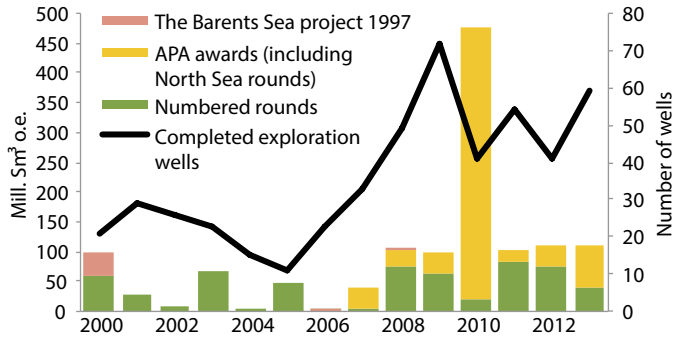


Figure 4.5 Resource growth.
(Source: The Norwegian Petroleum Directorate)

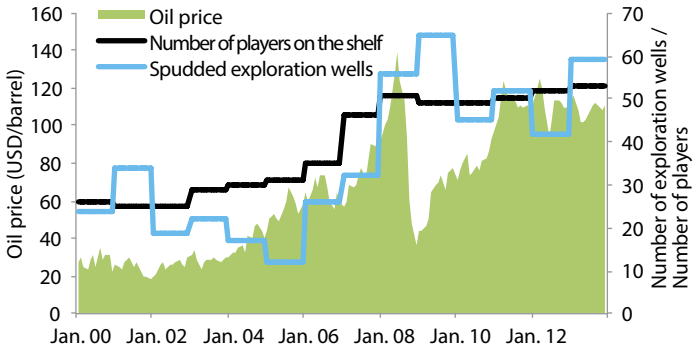


Figure 4.6 Rising oil prices and a broader composition of companies have contributed to high exploration activity.
(Source: The Norwegian Petroleum Directorate)

Development and operation

The authorities have set up a framework for development and operation that aims to ensure sound, long-term management of the petroleum resources, while also safeguarding other public considerations. Long-term, comprehensive and effective solutions must be in focus from field development to decommissioning.

In 2013, the authorities approved the Plans for Development and Operation (PDOs) for the Gina Krog, Ivar Aasen, Aasta Hansteen and Oseberg Delta 2 fields. The Plan for Installation and Operation (PIO) of the Polarled gas pipeline was approved alongside Aasta Hansteen. The development plan for Flyndre has been submitted to the authorities for approval. Submissions of development plans for e.g. Zidane and Maria are also expected in 2014.

Efficient production of petroleum resources

In consideration of the public interest associated with development and operation of oil and gas fields, the authorities have established a framework for these activities. The authorities have created a model characterised by both competition and cooperation between the players. The objective is to create a climate for good decisions that benefit society at large, as well as the companies. See Chapter 3 for more information regarding organisation and framework.

Good resource utilisation in the familiar areas is important. This constitutes a significant potential that can generate substantial value for society if exploited prudently. The Norwegian Petroleum Directorate has assessed this potential and set an objective of reserve growth amounting to 800 million Sm^3 of oil in the ten years leading up to 2015. Reserve growth as of 31 December 2013 was 638 million Sm^3 of oil. This corresponds to about double the original oil resources in the entire Gullfaks field. This is a stretch goal for the industry and for the authorities.

Figure 4.7 shows the annual growth in oil reserves from 1993 to 2013. The 2013 accounts showed a growth of 155 million Sm^3 of oil, recorded as new reserves. The largest increase in oil reserves comes from the Ekofisk, Troll and Gullfaks Sør fields and from the fact that development decisions have been made for resources in the Edvard Grieg, Martin Linge, Gina Krog and Ivar Aasen fields, which have thus matured from resources to reserves.

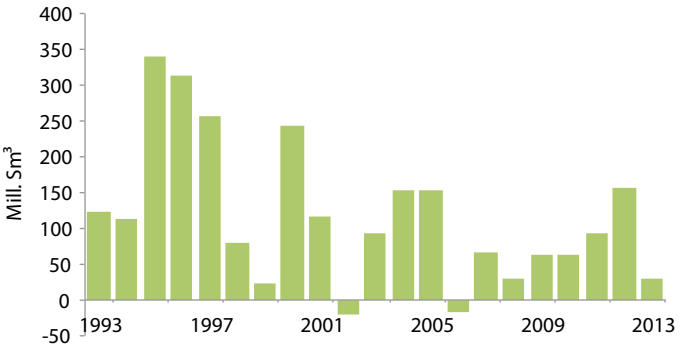


Figure 4.7 Gross reserve growth, oil 1983–2013
(Source: The Norwegian Petroleum Directorate)

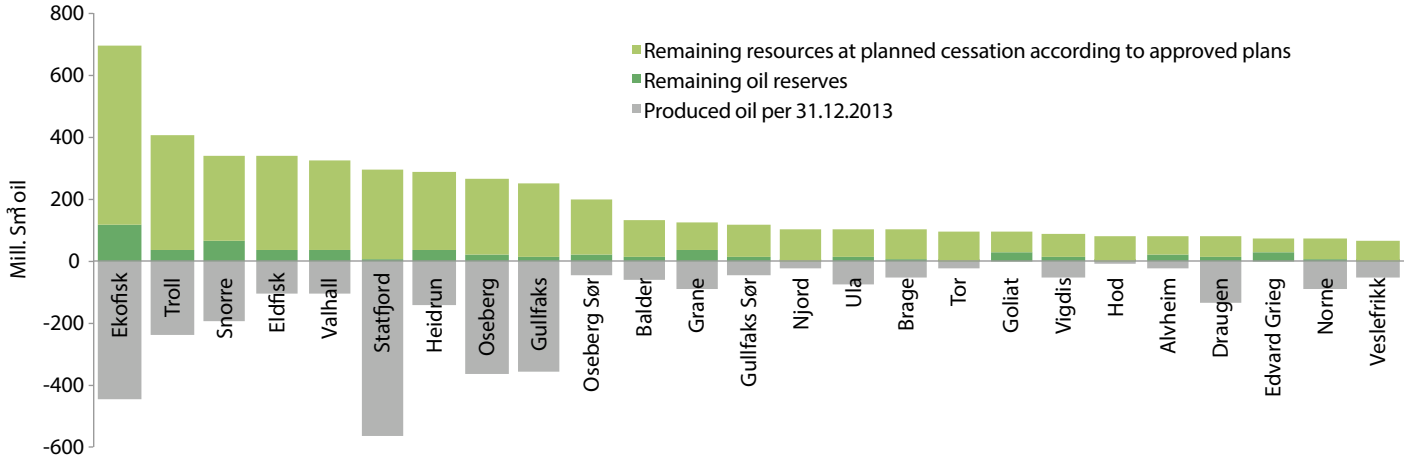


Figure 4.8 Distribution of oil resources and oil reserves in fields *(Source: The Norwegian Petroleum Directorate)*

Improved recovery in mature areas

There is still considerable value creation potential in improving the recovery rate in producing fields, making operations more efficient and exploring for resources close to developed infrastructure.

Figure 4.8 provides an overview of oil resources in the 30 largest fields in production. The resources can be divided into three groups:

- Produced volumes
- Remaining reserves
- Resources that will remain in the ground after the planned shutdown.

Figure 4.8 shows that, under the current plans, vast resources will remain in the ground after the planned shutdown of these fields. Several measures are necessary if more resources are to be produced on the Norwegian shelf. The measures can be divided into two primary groups: Measures to increase resource recovery and streamline operations.

Improved recovery

First and foremost, the licensees must invest in projects that can improve recovery. Examples include drilling more wells, measures to boost production from existing wells, injection in reservoirs to recover more petroleum, and modification of process facilities. Such measures help improve the average recovery rate.

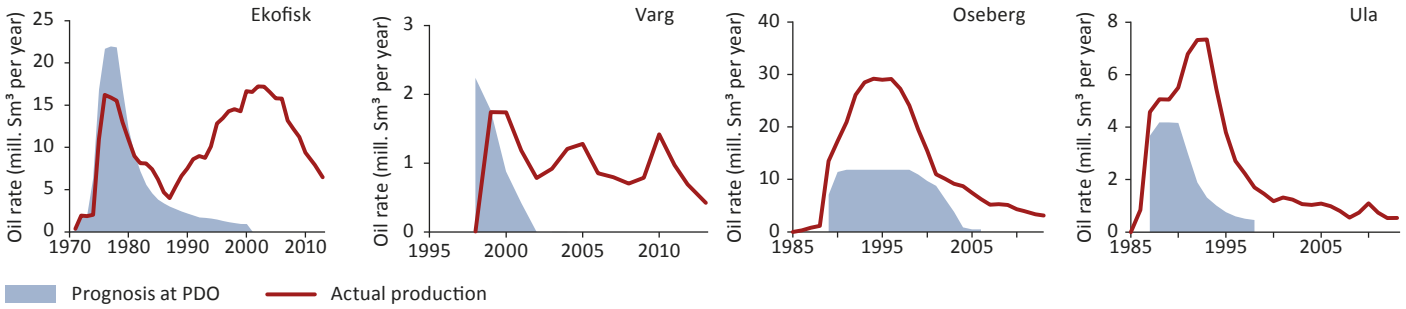


Figure 4.9 Production development for Ekofisk, Varg, Oseberg and Ula *(Source: The Norwegian Petroleum Directorate)*

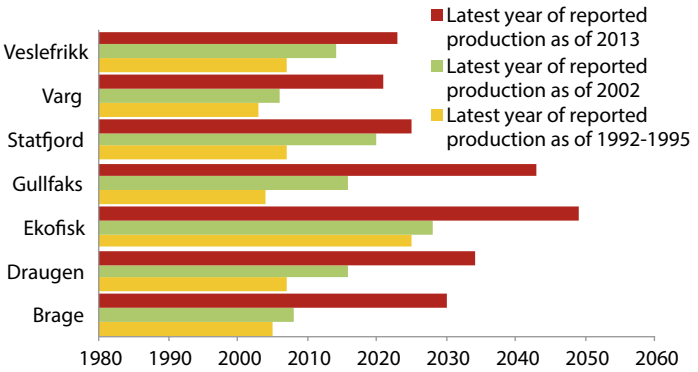


Figure 4.10 Lifetime for selected fields
(Source: The Norwegian Petroleum Directorate)

There are significant differences in recovery rates between fields, which is partly due to geological conditions. Nevertheless, it may be interesting to examine the development of average recovery rates for all fields. In 1995, the expected average oil recovery rate for fields in production was about 40 per cent. Today, the corresponding rate is 46 per cent. The average recovery rate is expected to increase in the years to come. Development and application of new technology has been, and continues to be, highly important in order to improve recovery. Since many fields on the Norwegian shelf are in tail-end production, substantial benefits can be gained from improving recovery and extending operation from these fields. The actual production from fields such as Ekofisk, Varg, Oseberg and Ula has deviated significantly from what was assumed in the original development plans, see figure 4.9.

Longer lifetimes are a good thing: They allow us to produce more and implement improved recovery measures. It also entails that the infrastructure will remain in place for a longer period of time. This improves the likelihood of other discoveries being tied in to this infrastructure, thus extending field lifetimes beyond what was previously assumed, see figure 4.10.

Improved oil recovery is defined as any increase in oil reserves compared with a reference point. The reference point will normally be the Plan for Development and Operation (PDO).

There are significant variations in reservoir and technical solutions between different oil fields. The chosen development solutions will determine which improved recovery measures are feasible at a later date. On certain oil fields, the chosen development solutions provide significant flexibility as regards implementing new improved recovery measures, whereas other fields have chosen development solutions that make increasing recovery at a later date more expensive.

Fact box 4.1 IOR/EOR

Measures to boost oil recovery are defined as any increase in oil reserves in relation to a reference point. The reference point will normally be the Plan for Development and Operation (PDO). These oil volumes have already been discovered, but need to mature e.g. through technology development, in order to be recovered. About half of the remaining oil resources that will be left in the reservoirs under current adopted plans consist of mobile oil. The rest is immobile oil that requires advanced flooding techniques to be recovered.

Measures to boost recovery are defined as Improved Oil Recovery (IOR) and Enhanced Oil Recovery (EOR). IOR entails conventional and mechanical recovery methods aimed at the mobile oil, and is often called production optimisation. On the Norwegian shelf, the drilling of additional, more advanced wells has been the primary IOR measure.

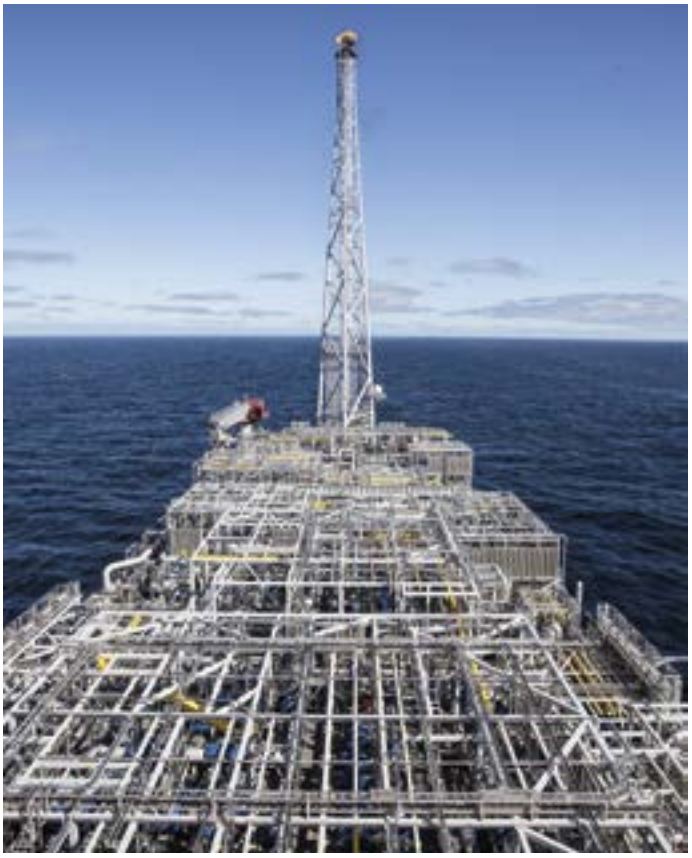
EOR includes advanced flooding techniques where the properties of existing or new injection fluids are altered. The surface tension between oil and water or the reservoir's wettability properties can be altered in order to recover the immobile oil. Examples of such injection fluids include water with reduced salinity, CO_2 and surfactants. Other chemical changes to the injection fluid, such as the addition of polymers, may help recover mobile oil that has not been exposed to injection.

Efficient operations

The most important factor for extending the useful life of a field is production profitable. Efficient operations help reduce and control production costs. Efficient operations also enable profitable production over a longer period of time. Maximum operations efficiency can make production of additional resources profitable. Many fields are in a situation where cost levels must be reduced in order to justify profitable operations and value creation. In spite of the high oil price in recent years, costs have also increased on the Norwegian shelf, leading the companies to focus intently on efficient operations. Efficient operations are also crucial for reducing emissions and discharges from activities on the Norwegian continental shelf.

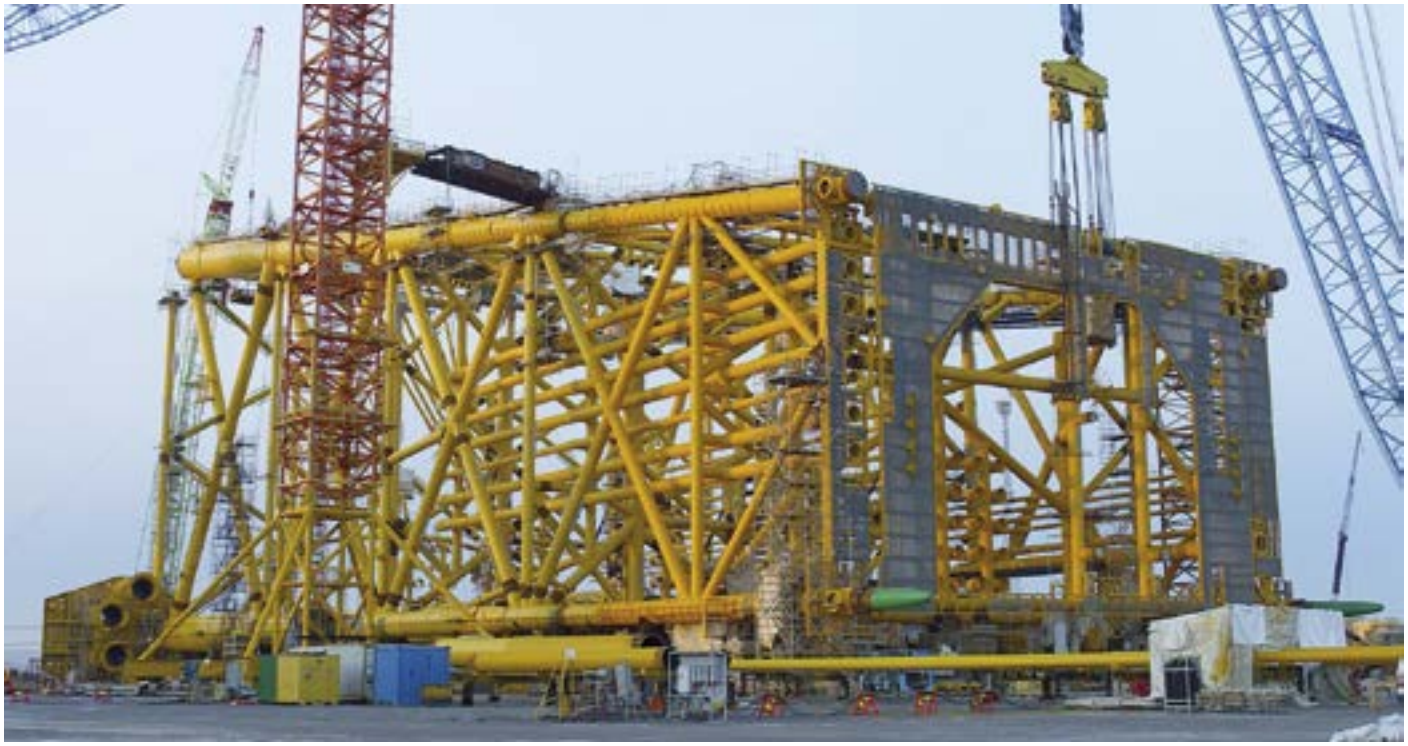
New discoveries – efficient utilisation of infrastructure

Approximately NOK 173 billion was invested on the Norwegian continental shelf in 2013, excluding exploration. Overall, more than NOK 2 600 billion in current NOK has been invested on the Norwegian shelf. These investments have led to the establishment of considerable infrastructure. This infrastructure makes it possible to



Right: The processing plant on the Skarv FPSO. The Skarv field off the coast of Helgeland came into production at the end of 2012 (Photo: BP)

Below: The jacket for the Edvard Grieg platform under construction at Kværner Verdal (Photo: Lundin)



produce and transport petroleum, and also lays the foundation for developing additional resources in a cost-effective manner.

Declining production from a field will release infrastructure capacity. Such capacity can provide efficient exploitation of resources that can be tied into this infrastructure. In certain instances, the use of existing infrastructure is a precondition for profitable development and the production of new, smaller deposits. Exploration for and development of resources in the vicinity of existing infrastructure can generate significant value for the Norwegian society. The authorities encourage the players to collaborate, and e.g. follow the efforts of cooperation forums such as area forums, which are active in specific areas of the Norwegian shelf.

In 2005 effort to contribute to efficient use of existing infrastructure, including existing platforms and pipelines, the Ministry of Petroleum and Energy drew up Regulations relating to the use of facilities by others, effective as of 2006. The objective of the Regulations is to ensure efficient use of infrastructure and thus provide licensees with incentives to carry out exploration and production activities. The objective is met by providing a framework for the negotiation process and formulating tariffs and general terms in agreements regarding the use of facilities by others. The Regulations entail no changes to the principle that commercial players must negotiate good solutions.

Decommissioning after production ends

The petroleum activities merely borrow the ocean, and all phases of the oil and gas activities must consider the environment and other users of the ocean. The point of departure is that the activities cease, the facilities must be removed and the area cleared.

When the authorities make decisions regarding how a facility on the Norwegian continental shelf shall be disposed of, both national and international regulations are applied. Reference is made to Chapter 3, Framework and organisation, for more details concerning the rules for disposal, but please also note in this connection the Petroleum Act's requirement whereby licensees, as a main rule, must present a cessation plan to the Ministry between two and five years before the licence expires or is relinquished, or the use of a facility ends.

So far, the Ministry of Petroleum and Energy has processed a few dozen cessation plans. In most instances, the final decision has been to remove disused facilities and transport them to land, with examples of such facilities including Odin, Nordøst Frigg, Øst Frigg, Lille Frigg and Frøy. During processing of the cessation plans for Ekofisk I and Frigg, permission was given to leave the concrete substructure and protective wall on the Ekofisk tank in place, as well as the TCP2 concrete substructure on the Frigg field.

New discoveries and improved recovery measures have led to extended lifetimes for multiple fields, such as Statfjord A and Varg, thus postponing the submission of cessation plans.

The energy market

Secure access to energy is important to all countries. Increased use of energy can reduce the need for low-productive manual labour, freeing up labour resources for more productive activities. The correlation between energy consumption and GDP growth is therefore strong, particularly for emerging economies. Oil and gas are two of the most important commodities in the world and increased demand in Asia and increased supply from North America will lead to changes in future global trading patterns.

The most important drivers of increased energy consumption are population growth and economic growth. In the time ahead, the growth in demand will generally originate from countries outside the OECD. Emerging economies will account for about 90 per cent of the increase leading up to 2035, and economic growth in China is currently the primary engine. India is likely to take over China's role in the future. Asia's net import of oil and gas in 2012 is shown in figure 4.11.

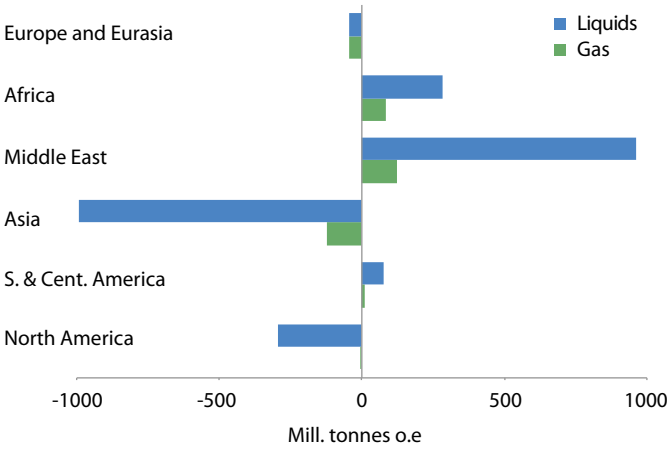


Figure 4.11 Difference between production and consumption for oil and gas by continent, 2012 *(Source: BP Statistical Review 2013)*

Looking at the consumption of energy by source in 2012, oil accounts for the majority, followed by coal and gas. Overall, commercially traded fossil fuel sources cover about 87 per cent of global demand. Renewable energy shows strong growth, but from a low level. Demand for coal has substantially risen in recent years.

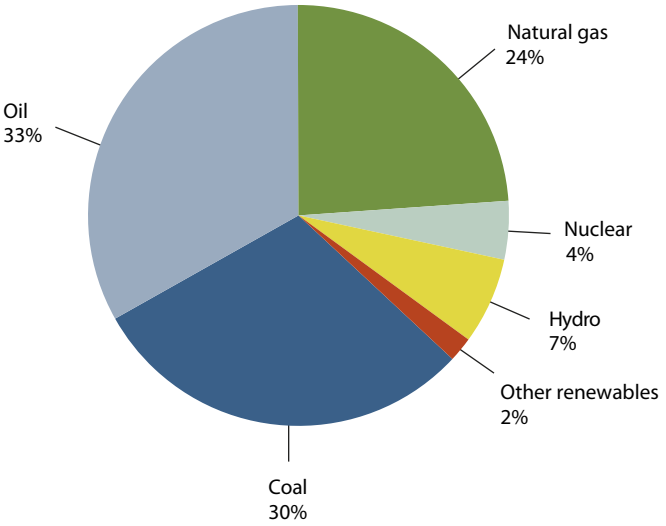


Figure 4.12 World primary energy demand by commercially traded fuel, 2012 *(Source: BP Statistical Review 2013)*

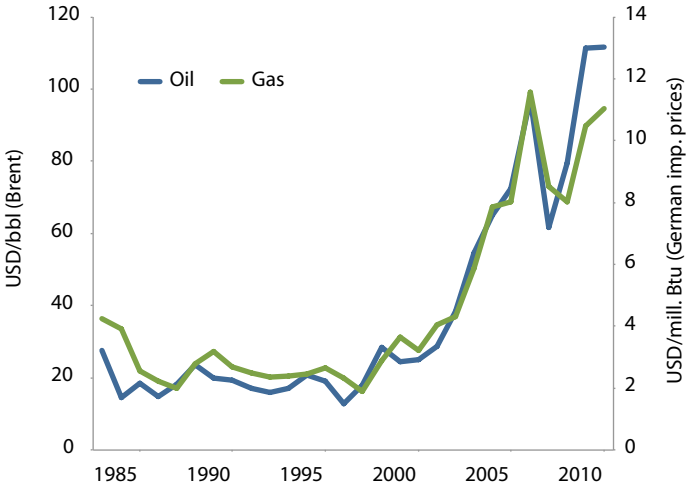


Figure 4.13 Historical oil and gas prices (1985–2012) *(Source: BP Statistical Review 2013)*

Price development

Continued growth in demand from Asia has contributed to strong growth in the price of oil and gas. This has been accompanied by a substantial price increase on input factors. Also, when the most accessible resources are produced first, the remaining resources will be more difficult to recover, or they will be located further from existing infrastructure and markets. This often leads to rising production and transportation costs. In isolation, this contributes to gradually rising prices. Geopolitical factors, such as war and political change, affect production patterns and have had a significant impact on price development in recent years.

The prospect of relatively high oil and gas prices and ever-improving technology lead to the production of resources that were previously not deemed to be commercially viable. Parts of this are unconventional resources that have not previously been profitable to recover. Oil sands in Canada, heavy oil in Venezuela and shale oil and gas in the US are examples of such unconventional resources. Production from these new oil and gas resources will be important on the supply side going forward, although the largest share of production will continue to come from the conventional oil and gas resources.

Economic growth in emerging Asian countries and reduced supply due to political unrest in the Middle East and North Africa in recent years have resulted in historically high prices. Economic growth in Asia, developments in the Middle East and production from new oil and gas resources will continue to be highly important for both supply and demand going forward.

Oil

The transport sector account for more than half of all oil consumption, in the form of fuel for motor vehicles. Oil is also used as a raw material in industrial processes and, to a certain extent, in heat and power production. Oil covered approx. 33 per cent of the global energy demand in 2012. Weak economic development in the OECD and high prices have resulted in slow growth in demand in recent years. Daily global consumption was 89.8 Mbbls in 2012. In comparison, daily oil production on the Norwegian shelf was about 1.9 Mbbls.

The US, China, Japan, India, Russia and Saudi Arabia were the largest oil consumers in 2012, whereas the largest producers were Saudi Arabia, Russia, the US, China, Canada, Iran, the United Arab Emirates, Kuwait and Iraq. Norway was the 15th largest oil producer in 2012.

Much of the remaining oil resources are located in the Middle East. The largest producers in the Middle East, along with a few other producing countries, cooperate within OPEC – Organization of the Petroleum Exporting Countries . By increasing or reducing supply, OPEC member countries attempt to maintain a stable price level that is acceptable to them. The average price of crude oil (Brent blend) in 2012 was USD 111.7, and USD 108.7 per barrel in 2013. These are high levels in a historical perspective.

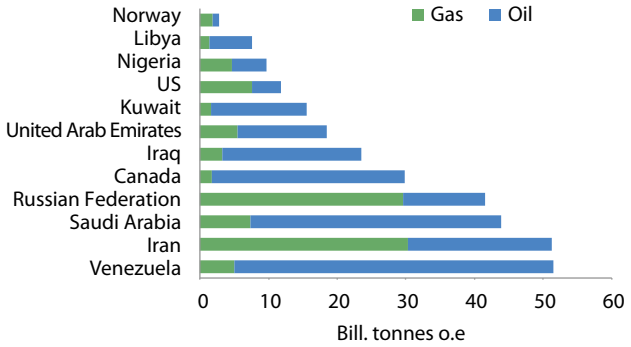
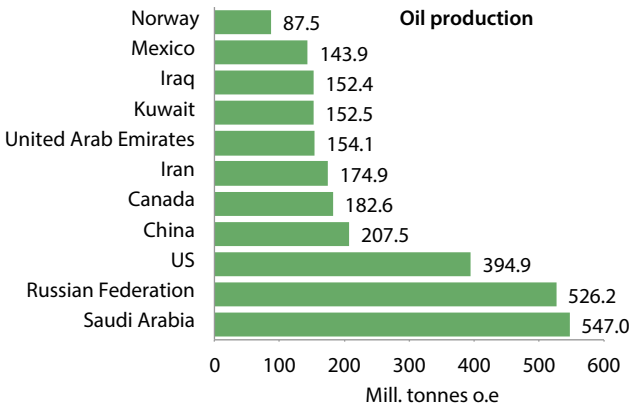


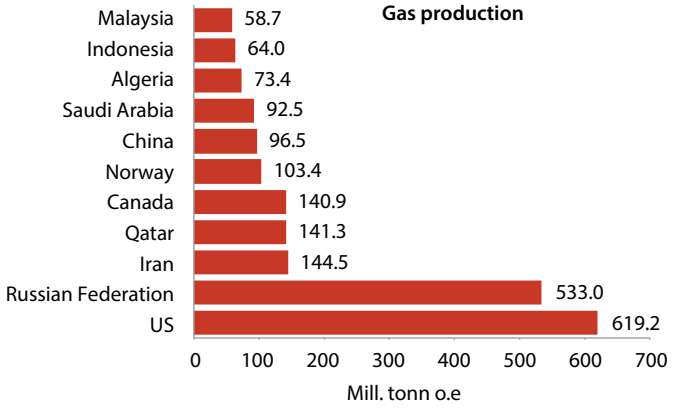
Figure 4.14 Proven oil and gas reserves by country, 2012 *(Source: BP Statistical Review 2013)*

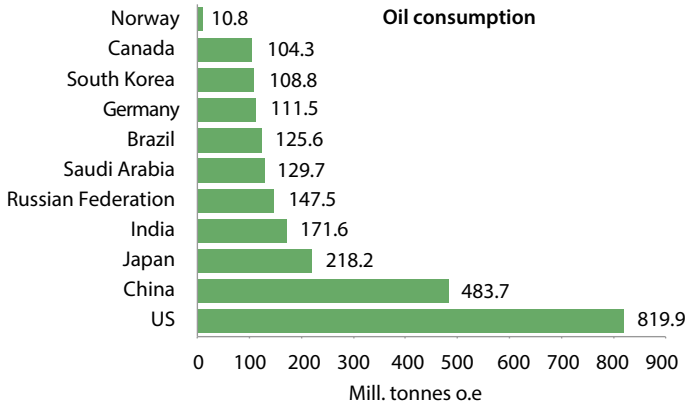
Natural gas

Natural gas accounts for about 24 per cent of the world's total energy demand. Natural gas is generally used in the household sector for heating and cooking, in industry and for electricity generation. In the electricity generation field, gas primarily competes with coal. The most important markets for natural gas are Europe, Asia and North America. The US and Asia (especially China and Japan) accounted for the largest consumption growth in 2012. The largest producers are the US, Russia, Iran, Qatar, Canada and Norway, while the largest consumers are the US, Russia, Iran, China, Japan and Saudi Arabia.

Gas transport takes place either via pipeline or by ship, where the gas is pressurised and cooled to increase the amount of energy per transported volume unit. This is called LNG (liquefied natural gas). Transporting LNG is energy-intensive and expensive. Gas markets







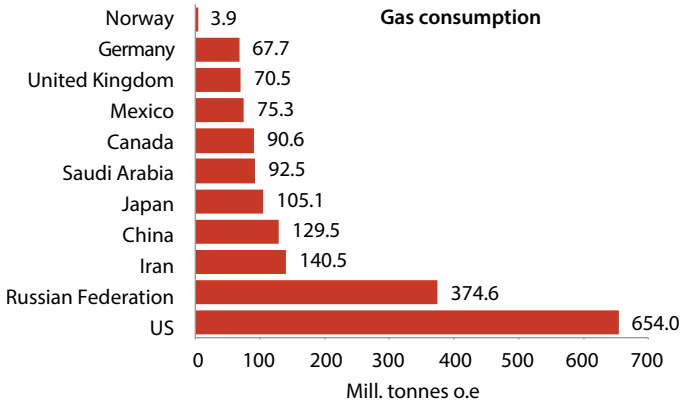


Figure 4.15 Production and consumption by country, 2012 *(Source: BP Statistical Review 2013)*

have therefore had a more regional character, as opposed to the oil market, which is an effective global market. Various players attempt to exploit price differences between regional markets through large investments in transport capacity, either in pipelines or the LNG chain. This makes the markets more integrated.

Increased demand from Asia, the supply of unconventional gas from the US, transport capacity for LNG and the gas price relative to coal are the most important factors that will impact the gas market in the years to come.

Gas exports from the Norwegian shelf

Norway is the third largest gas exporter in the world. Nearly all Norwegian gas is sold on the European market. A well-developed and efficient gas infrastructure and short transport distances make Norwegian gas competitive in the European market.

Gas production has increased in recent years, and therefore accounts for a larger share of petroleum production than before. Norwegian gas is exported to all the major consumer countries in Western Europe and is important for Europe's energy supply. Gas exports in 2013 totalled approx. 107 BCM (bill. Sm^3). Of this, 103 BCM was transported via pipelines and 4 BCM as LNG from the Snøhvit facility. In addition, about 1.5 BCM was delivered for domestic consumption. Some of the produced gas is reinjected; last year this accounted for about 30 BCM. The energy content of the gas production is about ten times the Norwegian normal production of electricity and covers about 20 per cent of European gas consumption. Most of the exports go to Germany, the UK, Belgium and France, where Norwegian gas accounts for between 20 and 40 per cent of total gas consumption.

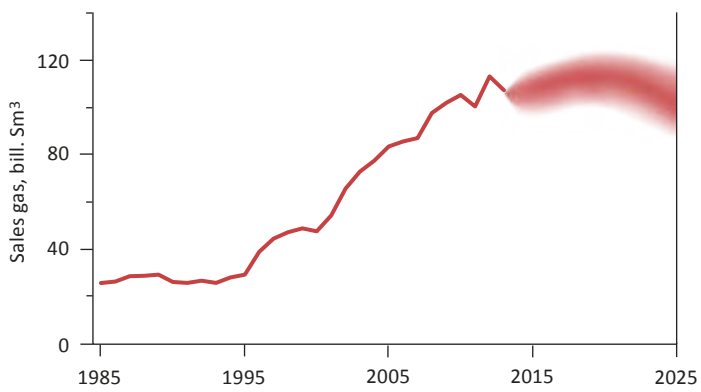


Figure 4.16 Sales gas from Norwegian fields *(Source: The Ministry of Petroleum and Energy / The Norwegian Petroleum Directorate)*

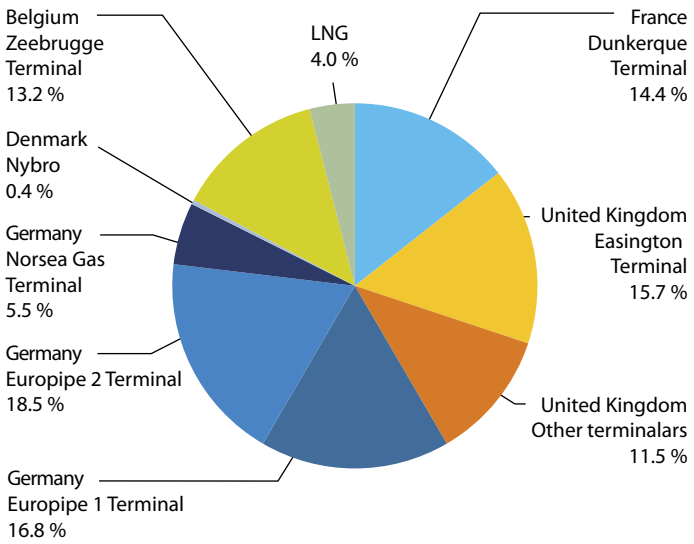


Figure 4.17 Norwegian natural gas exports in 2013 by delivery point *(Source: Gassco / The Norwegian Petroleum Directorate)*

All licensees on the Norwegian continental shelf are responsible for selling their own gas. Statoil sells oil and gas owned by the State, along with its own petroleum, in accordance with special instructions. Overall, Statoil sells about 80 per cent of all Norwegian gas. Upstream companies on the Norwegian Continental Shelf sell gas to buyers in e.g. Germany, France, the UK, Belgium, the Netherlands, Italy, Spain and Denmark. The Snøhvit facility primarily delivers LNG to countries in Europe and Asia. Figure 4.16 shows historical and forecast Norwegian gas sales. Gas sales are expected to reach a level between 105 and 130 billion Sm^3 in 2020, and between 80 and 120 billion Sm^3 in 2025.

Major investments in transport solutions are characteristic of gas production. The Norwegian pipeline system currently has a transport capacity of about 120 billion Sm^3 per year. Three onshore gas facilities are integrated into the pipeline system - Kårstø, Kollsnes and Nyhamna – which receive rich gas from the fields. Dry gas is separated from the rich gas for further transport via pipeline to the receiving terminals. There are four receiving terminals for Norwegian gas on the Continent; two in Germany, one in Belgium and one in France. In addition, there are two receiving terminals in the UK. The Norwegian gas transport system includes a network of pipelines with a total length of more than 8000 km. This roughly corresponds to the distance from Oslo to Beijing. Treaties have been drawn up that govern rights and obligations between Norway and countries with landing points for gas from the Norwegian shelf. More detailed information on pipelines and onshore facilities can be found in Appendix 3.

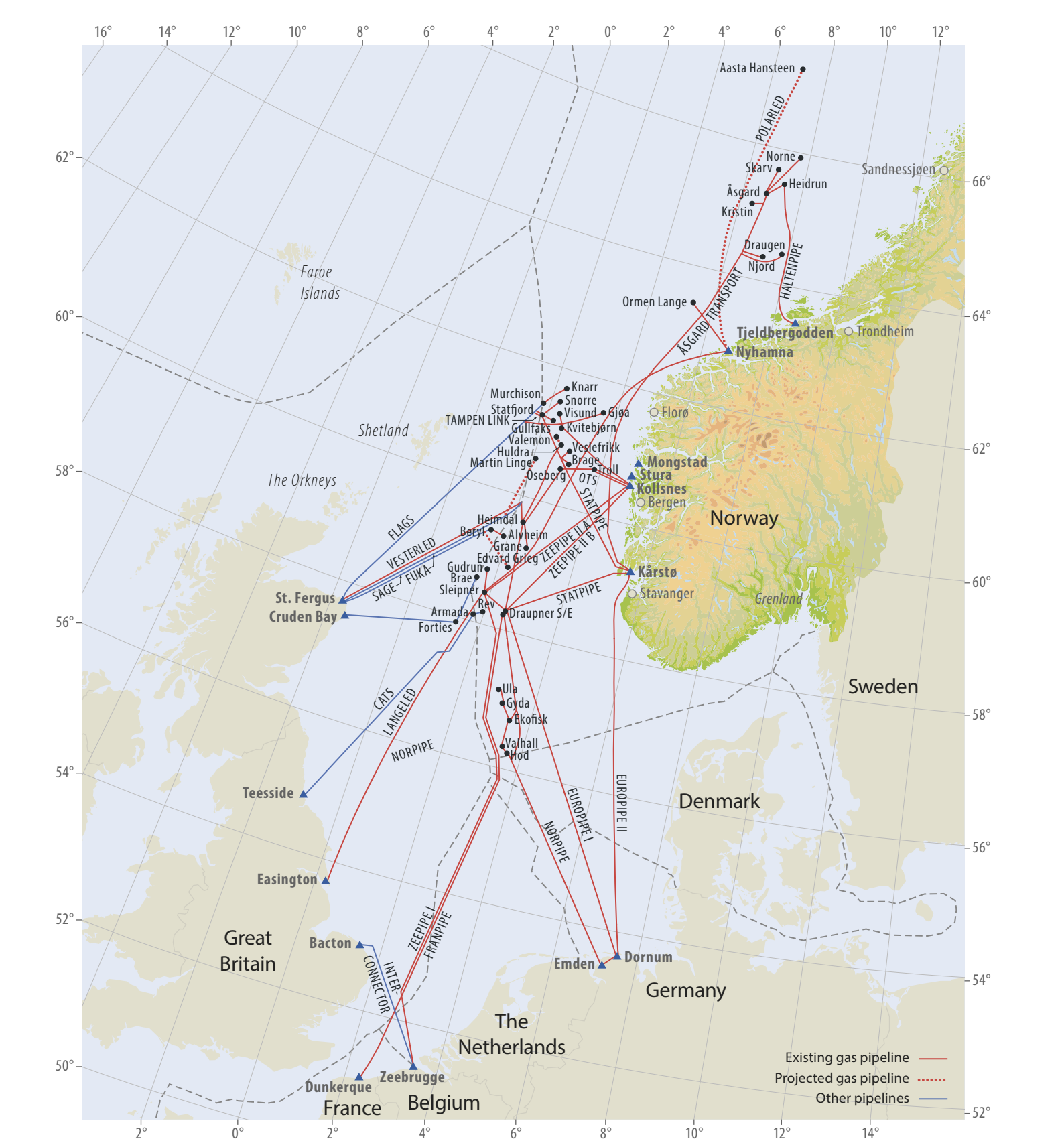


Figure 4.18 Gas pipelines *(Source: The Norwegian Petroleum Directorate)*

Organisation of the gas transport system

The authorities' paramount goal is to achieve the greatest possible value for the Norwegian petroleum resources. Most fields contain both oil and gas, and securing an optimal balance between oil and gas production is key. The authorities take oil recovery into account when awarding gas production permits. The authorities play an important role to ensure that processing and transport capacities are adjusted to future needs. At the same time, it is important to ensure efficient operations in the Norwegian gas transport system. The authorities' toolbox in this regard includes the operating company Gassco, the joint ownership of the Gassled system and regulated access to the transport system.

Gassco

Gassco AS was established in 2001, and is wholly owned by the State. Gassco is a neutral and independent operator of the gas transport system and has both special and normal operatorship. The special operatorship is regulated through the Petroleum Act and regulations, and includes tasks such as developing new infrastructure, managing the gas transport system's capacity and coordinating and managing the gas streams through the pipeline network and to the markets. Normal operatorship means carrying out facility management in pursuance of the Petroleum Act and the health, safety and environment (HSE) legislation. This activity is also regulated in the operator agreement with Gassled. Gassco's role as the neutral and independent operator of the gas transport system is important in order to ensure that all users are treated equally.

Gassco studies transport solutions, and advises the authorities. Gassco shall contribute to a comprehensive further development of Norwegian gas infrastructure. In instances where major developments are considered, this entails that other Norwegian gas beyond fields that trigger a gas transport need, must also be included in the assessments. Further development of the gas infrastructure must take place in a manner that is beneficial for the existing gas infrastructure.

Gassled

Gassled is a joint venture that owns the majority of the gas infrastructure on the Norwegian continental shelf; pipelines, platforms, onshore process facilities and receiving terminals abroad. The infrastructure is used by anyone with a need to transport Norwegian gas. Gassled's activities are regulated by the Petroleum Regulations and tariffs for the individual services are stipulated by the Ministry of Petroleum and Energy. The company has no employees, and is organised through various committees with specific tasks.

At year-end 2013, Gassled was owned by the following companies: Petoro AS, Solveig Gas Norway AS, Njord Gas Infrastructure AS, Silex Gas Norway AS, Infragas Norge AS, Statoil Petroleum AS, Norsea Gas AS, ConocoPhillips Skandinavia AS, DONG E&P Norge AS, GDF SUEZ E&P Norge AS and RWE Dea Norge AS.

Regulated access to the transport system

The pipeline system is a natural monopoly, with significant infrastructure investments. This is why access to and tariffs for use of capacity are regulated by the authorities. In an effort to promote sound resource management, the tariffs are set such that returns from oil and gas production are derived from the fields, while at the same time providing reasonable return on investment for the infrastructure owners. The oil companies have access to capacity in the system based on the need for gas transport. To ensure good resource management, transport rights can be transferred between users when capacity needs change.

Joint ownership of the transport system ensures that the gas is transported as efficiently as possible and generates the greatest value creation, in part by avoiding conflicts of interest regarding which pipeline the gas will be transported through. Gassco also ensures efficient transport of gas in day-to-day operation of the facilities, as part of the special operator responsibility.

Emissions and discharges from the petroleum activities

Environmental and climate considerations are an integrated part of the Norwegian petroleum activities. A comprehensive set of policy instruments safeguards environmental and climate considerations in all phases of the petroleum activities, from licensing rounds to exploration, development, operations and disposal.

Emissions from the petroleum sector are generally exhaust gases from combustion of natural gas in turbines, flaring of natural gas and combustion of diesel (see Figure 4.19). The flue gas contains e.g. CO_2 and NO_x. Other emissions include nmVOC, methane (CH_4) and sulphur dioxide (SO_2). Discharges to sea from the petroleum sector contain remnants of oil and chemicals used in the production processes. There are also discharges of drill cuttings with residue of water-based drilling fluids. There is a comprehensive overview of emissions and discharges; all operators on the Norwegian continental shelf report emission and discharge data directly into a dedicated database, the so called Environmental Web.

Emissions and discharges to sea from the Norwegian petroleum activities are regulated through several acts, including the Petroleum Act, the CO_2 Tax Act, the Sales Tax Act, the Greenhouse Gas Emission Trading Act and the Pollution Control Act. The onshore petroleum facilities are subject to the same policy instruments as

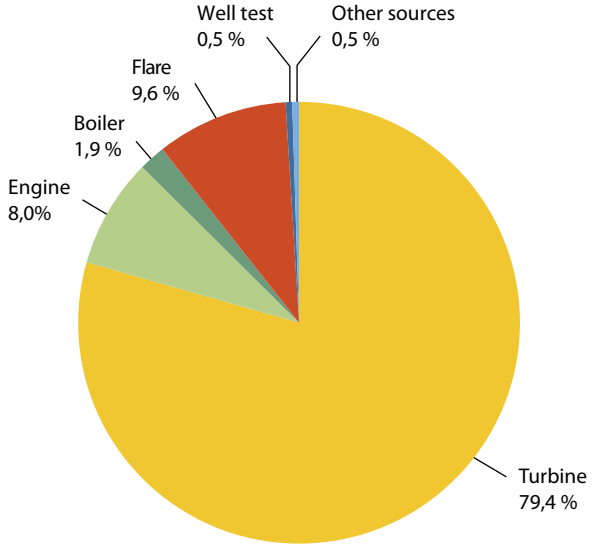


Figure 4.19 CO_2 emissions from the petroleum activities in 2012 by source *(Source: The Norwegian Petroleum Directorate)*

other land-based industry. The processes related to impact assessments and approval of new development plans (PDOs/PIOs) are cornerstones of the petroleum legislation. Onshore facilities or facilities within the baseline are also subject to the requirements of the Planning and Building Act.

Norway, as one of the first countries in the world, introduced a CO_2 tax in 1991. The tax has led to technological development and triggered measures that have yielded considerable emission reductions. The stringent restrictions on flaring under the Petroleum Act help keep the general flaring level on the Norwegian shelf low, compared with the rest of the world. The activities are also subject to the EU Emissions Trading System (ETS). The authorities and the petroleum industry have worked together to reach the goal of zero harmful discharges to sea (the zero discharge goal). This goal is considered to have been achieved for added chemicals.

As a result of strong policy instruments and joint efforts between authorities and oil companies as regards research, technology and expertise development, the Norwegian petroleum activities maintain a very high environmental standard compared with petroleum activities in other countries.

Greenhouse gas emissions

Due to the unique composition of the Norwegian economy and the fact that hydropower accounts for nearly all onshore power generation, activities on the continental shelf represent a significant share

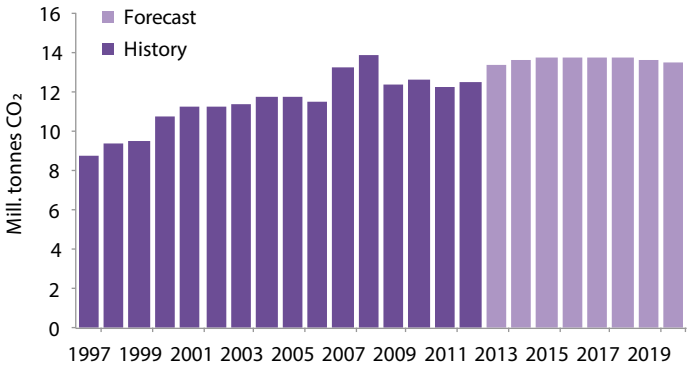


Figure 4.20 CO_2 emissions from the Norwegian petroleum sector *(Source: The Norwegian Petroleum Directorate)*

of the national greenhouse gas emissions. Petroleum activities accounted for about 26 per cent of greenhouse gas emissions in 2012. Based on updated information, emissions from the petroleum sector are expected to increase leading up to around 2017, and then gradually decline, cf. Figure 4.20. Energy consumption and emissions are closely linked. Developments on the Norwegian continental shelf in recent years have headed towards more mature fields and longer distances for gas transport. Reservoir pressure is also declining in gas fields, which means that more energy is needed.

A number of measures have been implemented in order to reduce emissions. Gas combustion is very low, as the facilities' energy supplies have become more efficient, e.g. through the use of heat recovery from turbines or combined cycle power solutions. The gas from certain fields contain a large amount of CO_2 and the CO_2 concentration has to be reduced in order to meet the gas sales requirements on a larger scale. As a consequence, in 1996 Norway was the first country in the world to store large amounts of CO_2 in geological formations under the seabed from the Sleipner Vest field. Currently, up to 1.7 million tonnes of CO_2 from the Sleipner and Snøhvit fields are stored annually. The use of power from shore can reduce emissions on the continental shelf. A number of independent facilities currently receive some or all of their power supply from shore.

The companies operating on the Norwegian shelf are front runners when it comes to utilising environmentally friendly solutions that yield low greenhouse gas emissions. The petroleum activities have been subject to a CO_2 tax since 1991. Norway is part of the EU Emissions Trading System. The third ETS period runs from 1 January 2013 until 2020. This entails that the companies can benefit greatly from reducing their emissions. Other policy instruments are also used, such as terms in PDOs/PIOs, emission permits and production licences (covering e.g. flaring).

Gas flaring is only permitted when necessary for safety reasons. Such flaring must be approved by the Ministry of Petroleum and Energy. Flaring accounted for about 10 per cent of the CO_2 emissions from the petroleum activities in 2012.

All Plans for Development and Operation of oil and gas fields (PDOs/PIOs) must contain a good and efficient energy solution, including an analysis of power supply from shore. This applies to both new field developments and major modifications on existing facilities.

Other emissions to air

NO_x is a term used for a number of nitrogen compounds that contribute to acidification. The environmental effects of NO_x include harm to fish and wildlife through acidification of river systems and soil, as well as damage to health, crops and buildings due to the formation of ground-level ozone. Under the Gothenburg Protocol, Norway has committed to reducing its NO_x emissions.

The emissions of CO_2 and NO_x are closely related. As for CO_2, gas combustion in turbines, flaring of gas and diesel consumption on the facilities are the main emission sources for NO_x. The volume of emissions depends both on the combustion technology and how much fuel is used. For example, combustion in gas turbines results in lower emissions of NO_x than combustion in diesel engines.

The petroleum activities account for about 30 per cent of Norwegian NO_x emissions. The sector's overall NO_x emissions have increased from 1991 (see Figure 4.21), but have stabilised since the early 2000s. Emissions from permanent facilities have been reduced in recent years, while emissions from mobile rigs have increased. This is due to increased activity involving mobile facilities, which, in turn, is linked to the fact that several new developments are taking place on the seabed and in deep water.

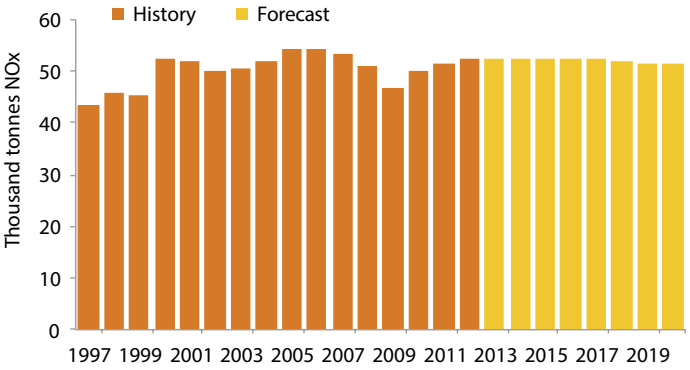


Figure 4.21 NO_x emissions from the petroleum activities
(Source: The Norwegian Petroleum Directorate)

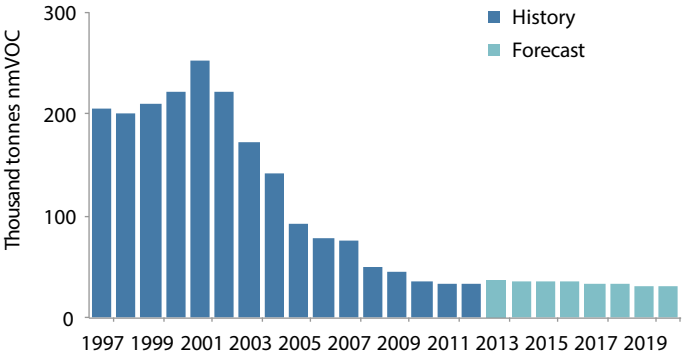


Figure 4.22 NmVOC emissions from the petroleum activities
(Source: The Norwegian Petroleum Directorate)

NO_x emissions linked to the operation of facilities on the continental shelf are regulated by conditions in the PDOs/PIOs. Emission permits pursuant to the Pollution Control Act also cover NO_x-emissions. Finally, NO_x-emissions are subject to a tax. As a result of an environmental agreement between the authorities and industry organisations, companies with activities subject to the NO_x-tax may choose to contribute to a NO_x-fund instead. The NO_x-fund contributes to cost effective NO_x-emissions reduction measures.

NmVOC is a term used for volatile organic compounds, with the exception of methane, which evaporate from substances such as crude oil. The environmental effects of nmVOC include the formation of ground-level ozone, which can result in health hazards and damage to crops and buildings. NmVOCs can also damage the airways in the event of direct exposure, and contributes indirectly to the greenhouse effect through formation of CO_2 and ozone when nmVOCs react with air in the atmosphere. The emissions of nmVOCs from the petroleum activities mainly originate from storage and loading of crude oil offshore. Minor emissions also occur at the gas terminals.

Norwegian nmVOC emissions in 2012 totalled 132 000 tonnes. These emissions have been more than halved since 1990. The petroleum sector has traditionally been the primary source of nmVOC emissions; however, the sector has reduced its nmVOC emissions substantially since the early 2000s. The main cause of the decline in emissions is the implementation of emission-reducing technology that recovers the evaporated substances. The prognoses indicate that nmVOC emissions will remain low for years to come (see Figure 4.22).

Operational discharges to sea

Discharges are mainly produced water, drill cuttings and remnants of chemicals and cement from drilling operations. These discharges are deposited in the subsurface or handled as hazardous waste, or treated before they are discharged.

Water produced along with oil and gas contains remnants of oil in droplet form (dispersed oil) and other organic components (including loose oil fractions). The produced water is treated before being discharged or reinjected into the subsurface.

Oil and chemical discharges from produced water may have local effects close to the facilities, and are regulated nationally through discharge permits pursuant to the Pollution Control Act. The discharges are also regulated internationally through the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention). The goal of zero environmentally harmful discharges from the petroleum activities was established in 1997. This is considered to have been achieved for added substances.

Chemicals are a collective term for all additives and excipients used in drilling and well operations, and in production of oil and gas. The main rule is that environmentally harmful substances shall not be discharged, regardless of whether they are added or naturally occurring. The contribution from the petroleum sector to the national discharges is less than three per cent of the environmental toxins on the Norwegian Environment Agency's priority list.

The companies must apply for a discharge permit in order to discharge chemicals. The Norwegian Environment Agency issues discharge permits pursuant to the provisions of the Pollution Control Act.

Most of the chemical discharges are related to drilling activities (see Figure 4.23), and the discharge amounts vary according to the activity level. The chemicals that are not discharged, either dissolve in the oil, are deposited underground or are treated as hazardous waste.

The total discharges of oil from the Norwegian petroleum activities account for a small share of total discharges to the North Sea. The primary discharges of oil to the North Sea are from shipping and from the mainland through rivers. It is assumed that about five per cent of the total discharges of oil to the North Sea are from the Norwegian petroleum activities.

In the same manner as for chemicals, companies must apply for a discharge permit to discharge oil. The Norwegian Environment Agency issues discharge permits pursuant to the provisions of the Pollution Control Act. See figure 4.24 regarding the total number of discharges of chemicals for Norwegian petroleum activities.

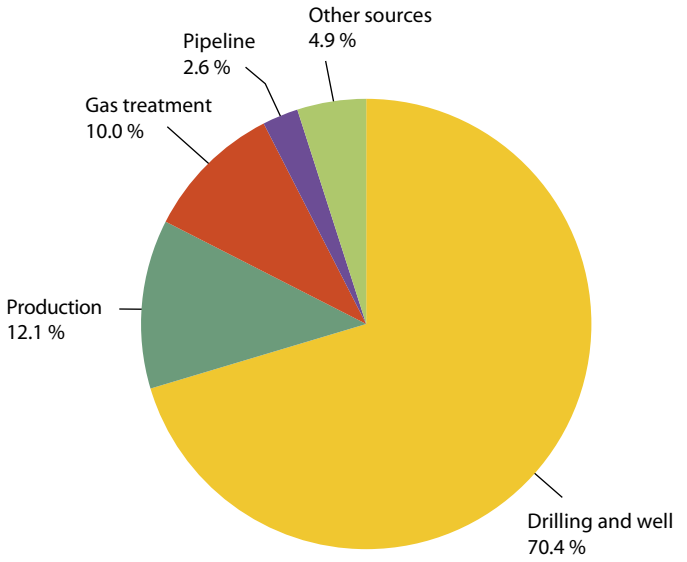


Figure 4.23 Chemicals discharged from the Norwegian petroleum activities, by source, 2012 *(Source: The Norwegian Petroleum Directorate)*

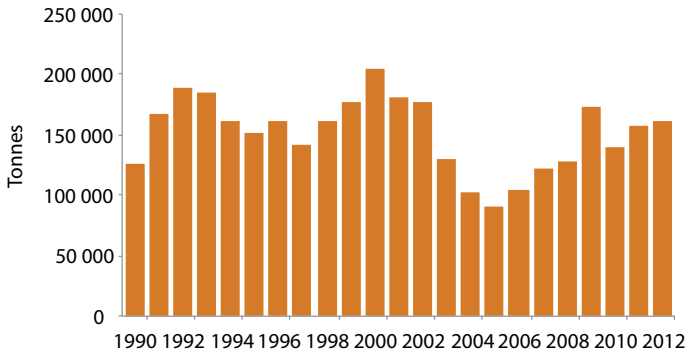


Figure 4.24 Total discharge of chemicals from Norwegian petroleum activities *(Source: The Norwegian Petroleum Directorate)*

Acute discharges

The petroleum activities have not caused major acute discharges of oil that have led to environmental damage. In the 40 years of Norwegian petroleum production, discharges from the activities have never reached shore. In 2012, the total acute oil discharges to sea amounted to 16.3 m^3.

Pursuant to the Pollution Control Act, the operators themselves are responsible for, and have a duty to establish, necessary emergency preparedness to respond to acute pollution. This is in addition to municipal and State emergency preparedness. All acute discharges from facilities on the continental shelf are reported to the Norwegian Coastal Administration, and the causes are investigated.

Acute oil discharges can harm fish, sea mammals, seabirds and beach zones. In Norway, the most serious acute discharges are from ships along the coast.

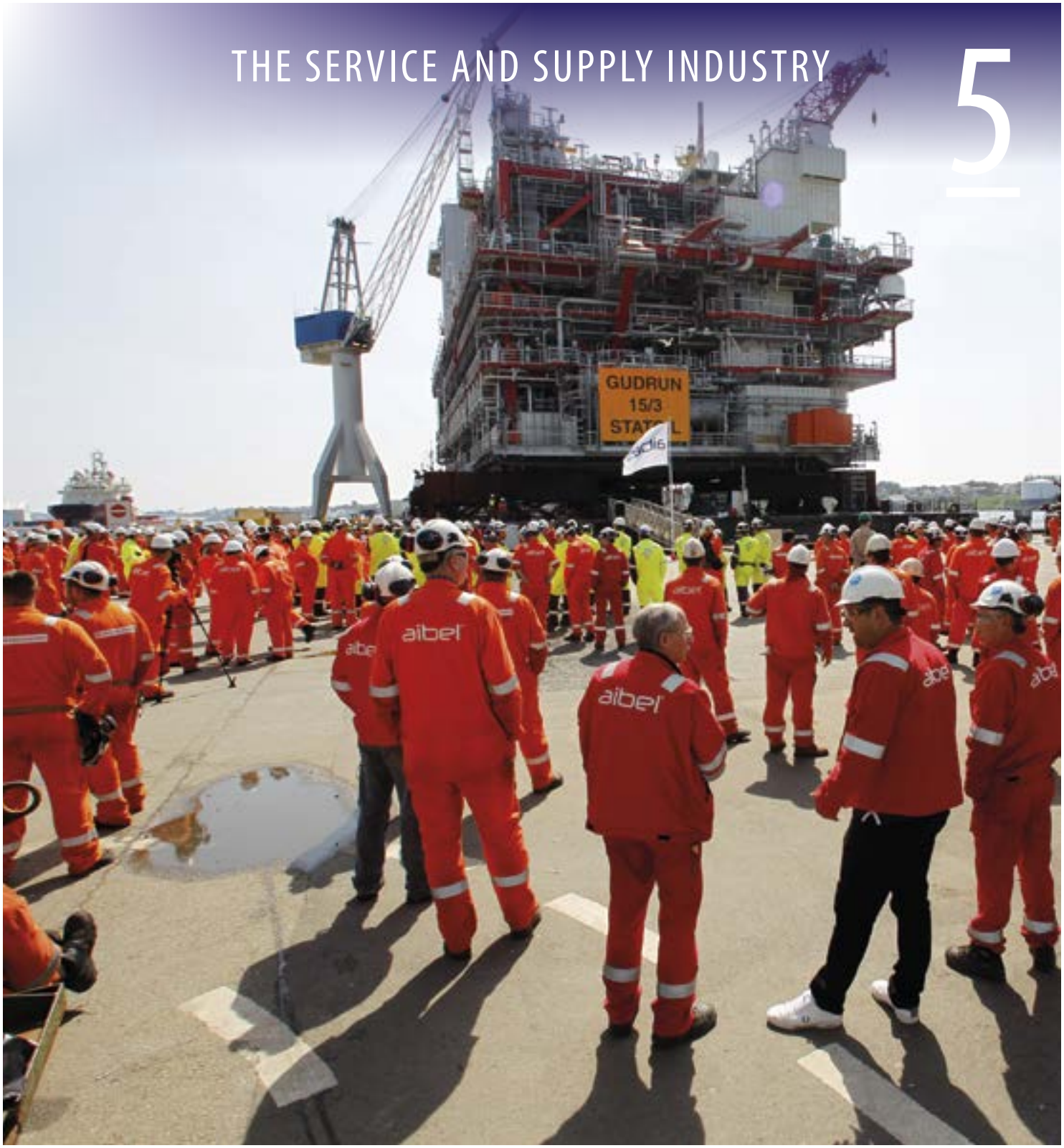
Fact box 4.2 Oil spill preparedness

In Norway, the emergency preparedness against acute pollution is made up of private preparedness, municipal preparedness and State preparedness. The Ministry of Transport and Communications, through the Norwegian Coastal Administration, is responsible for coordinating the collective national oil spill preparedness, as well as the State's preparedness against acute pollution. The Ministry of Climate and Environment is responsible for stipulating requirements for emergency preparedness against acute pollution in municipal and private enterprises. The Norwegian Environment Agency approves preparedness plans and ensures compliance with the requirements.

The oil companies, represented by the operator, are responsible for handling acute incidents resulting from their own activities, with appropriately dimensioned emergency preparedness. The Norwegian Clean Seas Association for Operating Companies (NOFO), which is owned by several companies that are licensees on the Norwegian shelf, has also established regional plans that take into account reinforcement of seagoing emergency preparedness and preparedness along the coast and in the beach zone. NOFO administers and maintains preparedness that includes personnel, equipment and vessels. NOFO has five bases along the coast: Stavanger, Mongstad, Kristiansund, Træna and Hammerfest. In addition, some fields have permanently deployed NOFO equipment. NOFO has a total of 16 oil spill response systems and carries out joint exercises every year.

THE SERVICE AND SUPPLY INDUSTRY

5



The topside for the Gudrun field, ready for sail away from Aibel's yard in Haugesund, July 2013
(Photo: Harald Nordbakken/Haugesunds Avis)

Norway has a highly skilled and internationally competitive petroleum related service and supply industry, developed over more than 40 years of petroleum activities in Norway. This is a result of a deliberate policy. In 2012[1], the specialised and high tech service and supply industry employed about 125 000 people all over the country. The industry contributes to a knowledge base from which society as a whole can benefit in the future.

Development and employment

Rough weather conditions in the North Sea, stringent regulations, as well as demanding operators are among the factors that have contributed to the development of Norway's technologically world-leading petroleum service and supply industry. The Norwegian shelf has functioned as a technology laboratory, resulting in the development of innovative solutions. A continued high activity level on the Norwegian continental shelf will further contribute to the industry's opportunity to boost its competitiveness. The Norwegian shelf is currently the world's largest offshore market and thus provides Norwegian service and supply companies with a vast home market.

Of the 125 000 directly employed by the supply and service companies, about 26 000 are permanently stationed offshore. In comparison, approx. 27 000 people work in the oil companies.

Revenues

The Norwegian service and supply industry had a revenue totalling NOK 461 billion[2] in 2012, which makes it Norway's second largest industry, after oil and gas sales. In this context, the service and supply industry includes companies that supply oil and gas related products or services to the upstream oil and gas industry, either directly to oil companies or to other service and supply companies. Norwegian subsidiaries of international companies are also included.

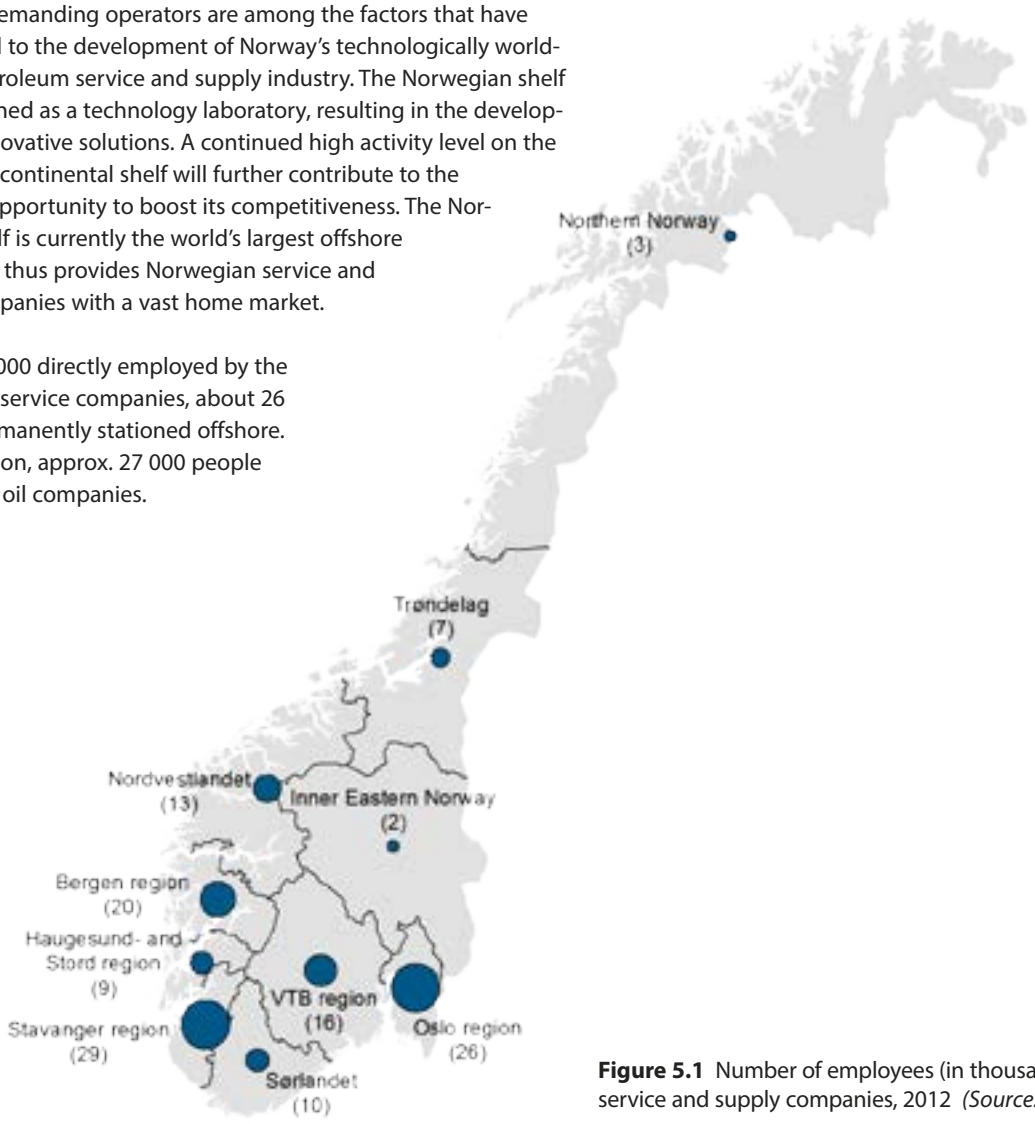


Figure 5.1 Number of employees (in thousands) in Norwegian service and supply companies, 2012 *(Source: Rystad Energy)*

1 *Eirik Vatne, SNF, 02/13. Den spesialiserte leverandørindustrien til petroleumsvirksomhet. Omfang og geografisk utbredelse i Norge. See also Rystad Energy, October 2013: "Aktiviteten i den petroleumsrettede leverandørindustrien i landets ulike regioner". Report commissioned by the Ministry of Petroleum and Energy. (Both in Norwegian only).*

2 *Rystad Energy, November 2013. "Internasjonal omsetning fra norske oljeserviceselskap" (in Norwegian only). Report commissioned by the Ministry of Petroleum and Energy. See page 6 for a definition of company and market.*

Deliveries throughout the value chain

The service and supply industry currently consists of more than 1300 companies across the entire value chain: From seismic and drilling rig equipment, through valves, nuts and hoses for the shipyard industry, to advanced offshore supply and service vessels and subsea technology, cf. Figure 5.2.

The service and supply industry is present in virtually all parts of the country. In many ways, the Stavanger region is a reflection of Norway as a whole: This region employs the most people within oil and gas and represents a broad range of products and services for upstream activity. In other parts of the country, there are multiple companies within limited geographic areas and within the same segment. In the Oslo area, we find a cluster of seismic companies, in addition to a well-established engineering environment. Trondheim is a powerhouse as regards research and education, while the Bergen region has become a centre for maintenance of platforms and subsea equipment.

Some geographic clusters have also been formalised through Innovation Norway's cluster programme "Norwegian Centres of Expertise" (NCE):

- NCE Systems Engineering in Kongsberg and NCE Subsea in Bergen, which are both focused on the subsea segment.
- NCE NODE in Southern Norway, which is a world leader in drilling technology, was built on the foundation of expertise from ship cranes and hydraulics and has developed over decades.
- NCE Maritime in Møre og Romsdal County, which represents a complete shipbuilding and outfitting network for e.g. advanced offshore vessels.

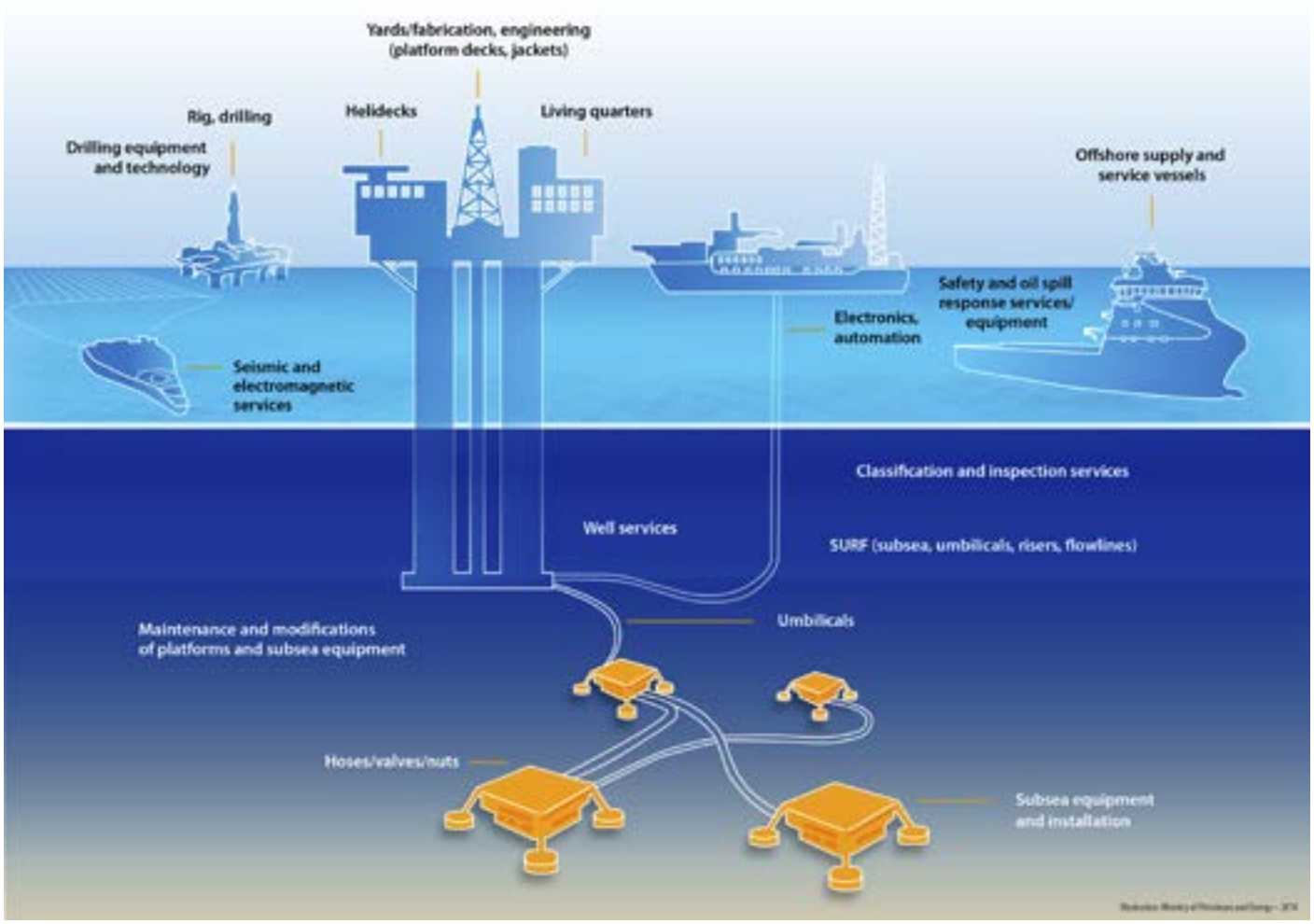


Figure 5.2 The diversity of the Norwegian service and supply industry: Outline of a field in development and operation

International success

About 40 per cent of the NOK 461 billion of revenues in the Norwegian service and supply industry originates in international markets, i.e. about NOK 186 billion. International revenues have grown by about 11 per cent annually since 2006. The rig and drilling services segment accounts for the largest share of international revenue. The topside and process equipment segment is a close second, followed by subsea equipment and installation.

The five most important markets in 2012 were South Korea, the UK, Brazil, the US and Singapore, cf. Figure 5.3. The 20 largest companies had international revenues totalling slightly more than NOK 143 billion in 2012; in other words, about three-quarters of the international revenues of all Norwegian service and supply companies. In comparison, these 20 companies had revenues of about NOK 69 billion in Norway in 2012. In other words, 68 per cent of their revenues originate from international activities. The remaining companies' Norwegian revenues totalled NOK 206 billion and their international revenues therefore amount to 17 per cent.

In 1997 the government and the industry established INTSOK with the aim to promote Norwegian oil and gas industry in overseas markets.

Overall, the petroleum resources on the Norwegian Continental Shelf have laid the foundation for a highly competent and internationally competitive oil and gas supply and service industry. It is a great national advantage having such an outstanding, world class industry.

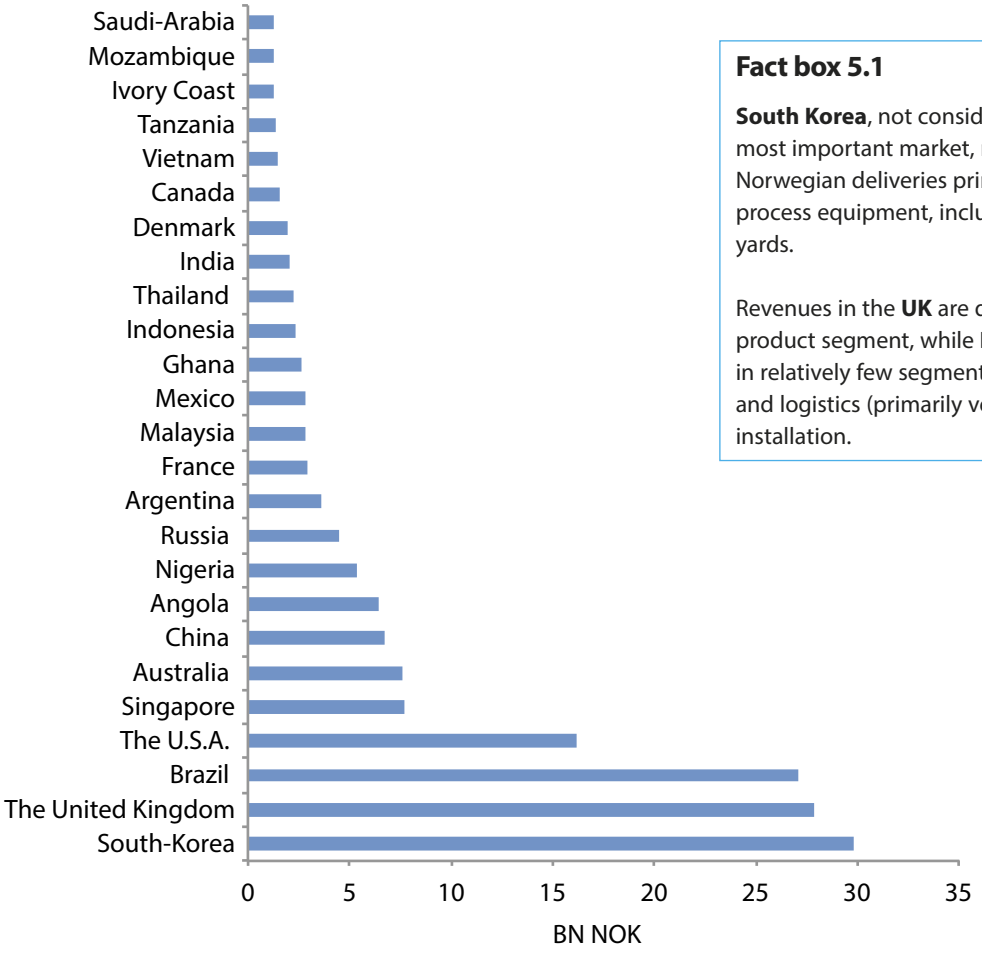


Figure 5.3 International revenues in 2012, 25 largest countries *(Source: Rystad Energy)*

Fact box 5.1

South Korea, not considered a typical petroleum province, is the most important market, measured in revenues. This is due to Norwegian deliveries primarily consisting of platform decks and process equipment, including drilling packages, to Korean shipyards.

Revenues in the **UK** are distributed across a larger range of the product segment, while **Brazil** is characterised by high revenues in relatively few segments: Rig and drilling services, transport and logistics (primarily vessel hire) and subsea equipment and installation.

THE FUTURE PETROLEUM INDUSTRY

6

Installation of subsea compression equipment on the Åsgard field in the Norwegian Sea. This is innovative technology that will contribute to a substantial increase in gas and condensate production from the field
(Photo: Øyvind Hagen, Statoil)

With the prospect of rigorous activity on the Norwegian shelf, the petroleum industry will remain Norway's largest and most important industry for years to come. Only 44 per cent of the projected total recoverable resources on the Norwegian continental shelf have been extracted. Development of the remaining resources will generate substantial values in Norway. Continuous focus on know-how and technology will be key success criteria in these efforts. This chapter describes the significance of research and development, and the prospects for the Norway petroleum activities.

R&D in the oil and gas industry

Knowledge and technology are cornerstones in the management of Norway's petroleum resources. Since the start of the petroleum activities, R&D, development and operations have been the primary tools used to find good solutions. Today, the Norwegian petroleum sector is founded on broad technical expertise, substantial implementation of new technology, and is capable of handling large, complex challenges. Continued research and development is necessary in order to maintain and develop this expertise, and the Ministry stimulates this effort through research programmes and strategy networks.

New technology has played an important role in achieving an optimal and environmentally friendly recovery of the resources on the Norwegian continental shelf. Favourable framework conditions provided by the authorities have given the companies incentives to carry out research and technology development. Close collaboration between oil companies, the suppliers and research institutions has been a precondition for this development. Technology developed on the Norwegian shelf has also given the Norwegian supplier industry a competitive advantage on the global stage.

Figure 6.1 The Ministry of Petroleum and Energy's involvement in petroleum research *(Source: Research Council of Norway)*

The Norwegian shelf is facing several new challenges. There are fewer large discoveries and developments than before. It is more demanding to produce the fields' remaining resources than it was to recover the resources that have already been produced. It is thus more difficult for individual projects to finance technological development. A continued focus on research and development is needed from the players on the Norwegian shelf and the State as resource owner. Figure 7a.1 shows how the Ministry is involved in Norwegian petroleum research.

The Ministry of Petroleum and Energy established the strategy "Oil and Gas in the 21st Century" (*OG21*) in 2001 in an effort to resolve the challenges associated with efficient and prudent petroleum activities. OG21 has helped oil companies, universities, research institutions, the supplier industry and the authorities agree on a joint national technology strategy for oil and gas, cf. www.OG21.no. The strategy has been revised several times, most recently in 2012.

The State provides its incentives for research and technological development mainly through the regulatory framework and direct allocations to the Research Council of Norway. The allocations to the Research Council are mainly directed at the research programmes PETROMAKS 2 and DEMO 2000. These programmes and the two centres will contribute towards reaching the goals established through the OG21 strategy.

PETROMAKS 2

PETROMAKS 2 funds a broad range of projects, from basic research at universities to innovation projects in the industry. PETROMAKS 2 has comprehensive responsibility for research that leads to the best possible management of Norwegian petroleum resources and agile business development in the sector. At the start of 2014, there were 167 projects in the programme's portfolio. The programme also funds a number of engineering projects carried out by small and medium-sized businesses in order to stimulate more innovation in the supplier industry. The programme has an annual budget of approx. NOK 260 million. PETROMAKS 2 is an important policy instrument used to promote long-term research and expertise development, and with considerable focus on education in the programme period, e.g. by funding PhDs. The programme has a broad international interface, including North America, Russia and Brazil.

DEMO 2000

DEMO 2000 is an important policy instrument for testing new technology solutions in the petroleum industry. The purpose of the programme is to reduce costs and risk for the industry by supporting pilot projects and demonstrations. DEMO 2000 functions as a collaborative arena between the oil and supplier companies, and is particularly important for the suppliers. The programme is open to all

Norwegian businesses that supply technology to oil companies on the Norwegian shelf. The programme has two annual awards and funds projects that satisfy the requirements in the technology strategy laid out by OG21. The annual project funding totals approx. NOK 60 million and accounts for 25 per cent of the projects' total costs. At the start of 2014, the portfolio included 43 active projects.

PETROSENTER - Petroleum research centres

A research and expertise centre focusing on Arctic challenges was established at the University of Tromsø in 2013. The objective of this establishment was to build a high-quality research environment that is relevant for the oil industry in Northern Norway and the High North. The centre is funded by the Ministry of Petroleum and Energy and the Ministry of Foreign Affairs.

A research centre for improved recovery has also been established at the University of Stavanger. The new centre will contribute to industry-relevant research, researcher training and long-term expertise development for improved recovery on the Norwegian shelf. It will also facilitate cooperation between the industry and research communities in order to quickly apply new solutions. Improvement of existing and development of new recovery methodologies are key focus areas.

These centres will be in full operation for up to eight years, starting in 2014, and will be subject to evaluation after five years.

Other research programmes

Several other petroleum-relevant research programs receive public support. ProofNy, a sub-program under the Ocean and Coast, targets research on the long-term effects on the ocean as a result of the petroleum activities. PETROSAM 2 supports petroleum research within the social sciences. The Research Council of Norway has also established several Centres of Excellence (SFFs) and Centres for Research-driven Innovation (SFIs). Several of these centres are relevant for the petroleum industry, such as FACE within multi-phase research at Sintef/IFE, the Center for Integrated Operations in the Petroleum Industry at the Norwegian University of Science and Technology (NTNU), the Drilling and Well Center for Improved Recovery (CDWR) at IRIS (in cooperation with Sintef), the Centre for Sustainable Arctic Coastal and Marine Technology at NTNU, AMOS within regulation and marine technology at NTNU and CAGE within gas hydrates in Arctic regions at the University of Tromsø. The Centres for Research-driven Innovation can receive support for up to eight years, and the Centres of Excellence can receive support for up to ten years.

An industry geared towards the future

Over the next ten years, production on the Norwegian shelf is expected to remain relatively stable, and may potentially increase somewhat. The reason for this is that major fields such as Johan Sverdrup and Johan Castberg will come on stream, along with contributions from other smaller fields that will be developed. The production ratios for gas and oil, including NGL and condensate, are expected to remain relatively stable in the years to come. Long term production levels will depend on the number and the size of new discoveries.

Many of our old fields that are still in production have significant remaining reserves. The resource base also increases as new satellite fields are tied into these older fields. Activity on producing fields will therefore remain high and will account for the majority of production in the immediate future. It is also possible to improve resource utilisation from many of these fields, beyond what is currently planned. About 165 projects are currently underway with the objective of improving resource exploitation. The fact that we are able to improve recovery from existing fields, streamline operations and make new commercial discoveries that can be tied in to existing infrastructure will be crucial for whether we can exploit the resource potential in mature areas going forward.

Thirteen fields are currently being developed on the Norwegian shelf and the authorities expect to receive Plans for Development and Operation (PDOs) for an additional 13 fields over the next few years. Beyond these projects, 75 discoveries are currently being considered for development, most of which are small. Today, the majority of discoveries with a potential for independent development have either been realised or are in the planning phase. New commercial discoveries are needed in order to ensure steady activity going forward. This means that the exploration activity must be maintained.

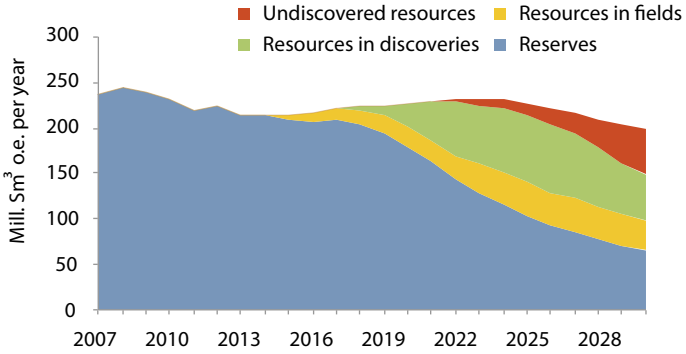


Figure 6.2 Production forecast for oil and gas *(The Norwegian Petroleum Directorate / The Ministry of Petroleum and Energy)*

The largest single project on the Norwegian shelf in the immediate future is the Johan Sverdrup field, which is located on the Utsira High in the North Sea. This is the fifth largest field ever discovered on the Norwegian shelf. Within ten years, the Sverdrup discovery is expected to account for approx. 25 per cent of Norwegian oil production. The Utsira High is also home to other significant discoveries; the Ivar Aasen and Edvard Grieg fields are currently under development. Based on current development plans, total resources being developed in these fields amount to 365 million Sm^3 o.e.

The Sverdrup discovery and the other fields show that the mature areas on the Norwegian shelf contain significant undiscovered assets. This has helped to maintain substantial interest in the APA rounds. Awards in the most recent APA round were at record levels, with a total of 65 new production licences distributed among 48 companies. Thirty-eight of the awards are in the North Sea, 19 in the Norwegian Sea and eight in the Barents Sea.

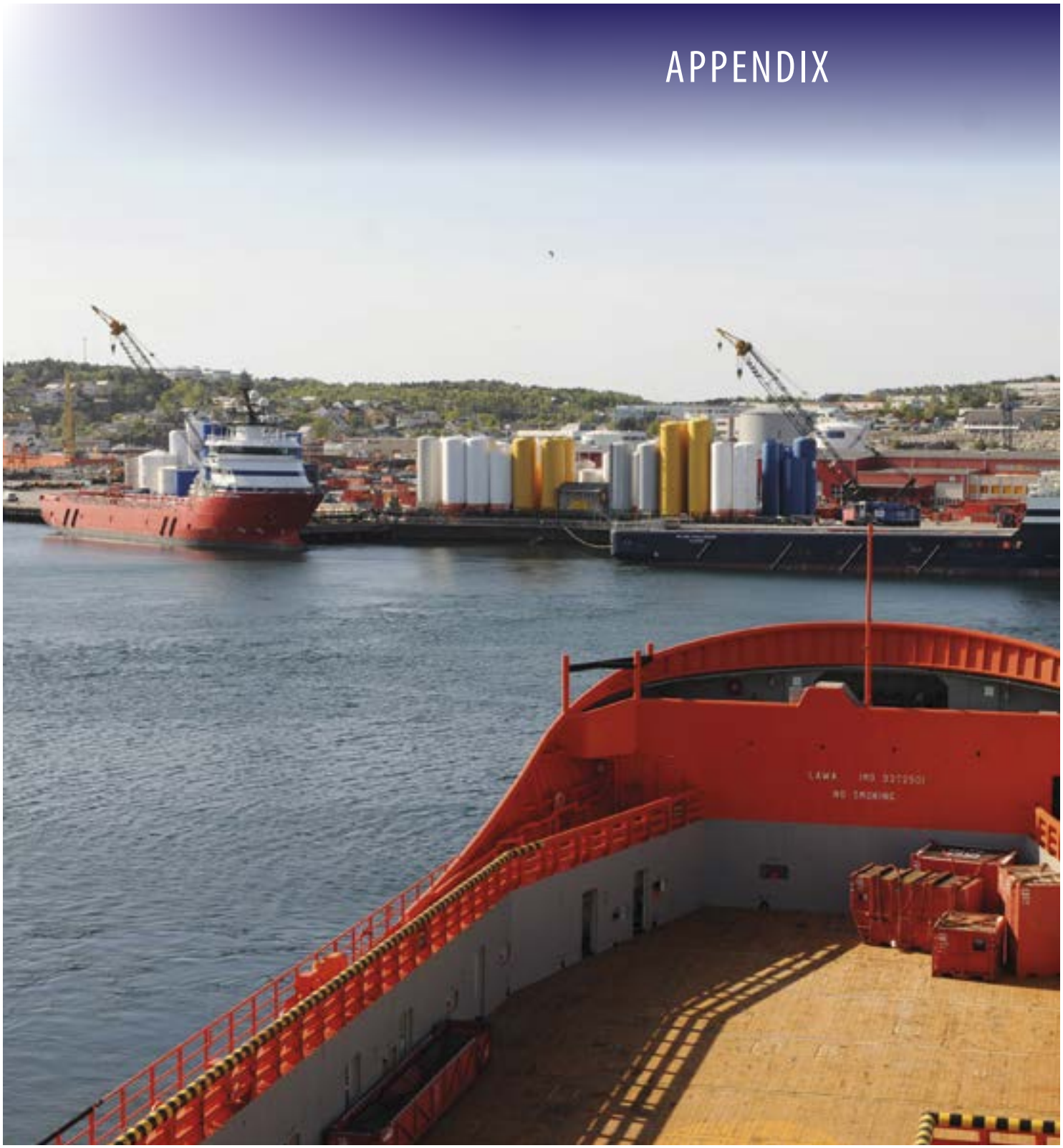
A large share of the remaining resources on the Norwegian shelf are located in frontier areas. Frontier areas are characterised by factors such as sparse or undeveloped infrastructure and unknown geology. New production facilities and new infrastructure both onshore and offshore require substantial reserves in order to justify the major investments required to develop discoveries. Minor fields will remain undeveloped until infrastructure is in place in frontier areas. In order for this to take place, exploration must be facilitated, the industry must have good framework conditions and sufficient commercial discoveries must be made. The most exciting discovery in frontier areas in recent years is the Johan Castberg discovery in the Barents Sea, which is still in the planning phase.

A total of 59 exploration wells were spudded in 2013, which is a historically high level. These wells resulted in twenty discoveries in total. Total exploration costs amounted to approx. NOK 37 billion in 2013, and future exploration costs are expected to be around NOK 34 billion, measured in 2013 NOK. A high number of discoveries in recent years, as well as generally healthy interest from the companies in both mature and frontier areas will result in continuity and a stable activity level in the years to come.

Future investment costs will remain relatively stable. Excluding exploration, investment costs will total about NOK 170–180 billion leading up to 2018. The investment linked to Johan Sverdrup will account for a significant share of these costs in the immediate future.

In conclusion, the industry will be characterised by a combination of major new fields coming on stream, new profitable development of old discoveries and extended production on existing fields. This will take place alongside substantial exploration in new, interesting areas and with continuous focus on R&D. With the prospect of a sustained high activity level, the petroleum activities will remain Norway's largest and most important industry for the foreseeable future.

APPENDIX



Vestbase, Kristiansund
(Photo: Harald Pettersen – Statoil)

APPENDIX 1
Historical statistics

Table 1.1 The State's revenue from petroleum activity (mill. NOK)

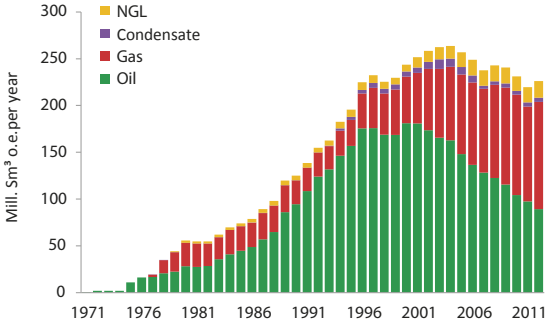
Year	Ordinary tax	Special tax	Production fee	Area fee	Environmental taxes	Net cash flow from SDFI	Dividend Statoil
1971			14				
1972			42				
1973			69				
1974			121				
1975			208				
1976	1 143	4	712	99			
1977	1694	725	646	57			
1978	1 828	727	1 213	51			
1979	3 399	1 492	1 608	53			
1980	9 912	4 955	3 639	63			
1981	13 804	8 062	5 308	69			0.057
1982	15 036	9 014	5 757	76			368
1983	14 232	8 870	7 663	75			353
1984	18 333	11 078	9 718	84			795
1985	21 809	13 013	11 626	219		-8 343	709
1986	17 308	9 996	8 172	198		-11 960	1 245
1987	7 137	3 184	7 517	243		-10 711	871
1988	5 129	1 072	5 481	184		-9 133	0
1989	4 832	1 547	7 288	223		755	0
1990	12 366	4 963	8 471	258		7 344	800
1991	15021	6 739	8 940	582	810	5 879	1 500
1992	7 558	7 265	8 129	614	1 916	3 623	1 400
1993	6 411	9 528	7 852	553	2 271	159	1 250
1994	6 238	8 967	6 595	139	2 557	5	1 075
1995	7 854	10 789	5 884	552	2 559	9 259	1 614
1996	9 940	12 890	6 301	1 159	2 787	34 959	1 850
1997	15 489	19 582	6 220	617	3 043	40 404	1 600
1998	9 089	11 001	3 755	527	3 229	14 572	2 940
1999	5 540	6 151	3 222	561	3 261	25 769	135
2000	21 921	32 901	3 463	122	3 047	98 219	1 702
2001	41 465	64 316	2 481	983	2 862	125 439	5 746
2002	32 512	52 410	1 320	447	3 012	74 785	5 045
2003	36 819	60 280	766	460	3 056	67 482	5 133
2004	43 177	70 443	717	496	3 309	80 166	5 222
2005	61 589	103 294	360	224	3 351	98 602	8 139
2006	78 015	133 492	42	2 308	3 405	125 523	12 593
2007	70 281	116 233	0	764	3 876	111 235	14 006
2008	88 802	150 839	0	1 842	3 684	153 759	16 940
2009	61 501	103 733	0	1 470	2 262	95 339	15 489
2010	58 830	96 779	0	1 373	2 186	104 053	12 818
2011	78 243	127 693	0	1 517	2 225	127 775	13 350
2012	85 803	142 868	0	1 781	2 255	148 889	13 887

(Source: Norwegian Public Accounts)

Table 1.2 Petroleum production on the Norwegian continental shelf, millions standard cubic meter oil equivelents

Year	Oil	Gas	Condensate	NGL	Total production
1971	0.4	0.0	0.0	0.0	0.4
1972	1.9	0.0	0.0	0.0	1.9
1973	1.9	0.0	0.0	0.0	1.9
1974	2.0	0.0	0.0	0.0	2.0
1975	11.0	0.0	0.0	0.0	11.0
1976	16.2	0.0	0.0	0.0	16.2
1977	16.6	2.7	0.0	0.0	19.4
1978	20.6	14.6	0.0	0.0	35.3
1979	22.5	21.1	0.0	1.1	44.8
1980	28.2	25.6	0.0	2.4	56.3
1981	27.5	25.3	0.0	2.2	55.0
1982	28.5	24.1	0.0	2.3	54.9
1983	35.6	23.2	0.0	2.7	61.5
1984	41.1	25.6	0.1	2.6	69.4
1985	44.8	25.5	0.1	3.0	73.3
1986	48.8	26.1	0.1	3.8	78.8
1987	57.0	28.4	0.1	4.1	89.5
1988	64.7	28.6	0.0	4.8	98.2
1989	86.0	29.1	0.1	4.9	120.0
1990	94.5	26.0	0.0	5.0	125.6
1991	108.5	25.6	0.1	4.9	139.0
1992	124.0	26.5	0.1	5.0	155.5
1993	131.8	25.6	0.5	5.5	163.4
1994	146.3	27.9	2.4	7.1	183.7
1995	156.8	29.1	3.2	7.9	197.0
1996	175.5	38.7	3.8	8.2	226.3
1997	175.9	44.4	5.4	8.1	233.7
1998	168.7	47.1	5.0	7.4	228.2
1999	168.7	48.7	5.5	7.0	229.9
2000	181.2	47.4	5.4	7.2	241.2
2001	180.9	54.1	5.7	10.9	251.6
2002	173.6	65.5	7.3	11.8	258.3
2003	165.5	72.9	10.3	12.9	261.6
2004	162.8	79.1	8.7	13.6	264.2
2005	148.1	85.7	8.0	15.7	257.5
2006	136.6	88.2	7.6	16.7	249.1
2007	128.3	89.5	3.1	17.3	238.2
2008	122.7	99.5	3.9	16.0	242.1
2009	114.9	103.7	4.4	16.9	239.9
2010	104.4	106.5	4.1	16.3	231.3
2011	97.5	100.3	4.6	16.3	218.6
2012	89.2	113.1	4.5	17.8	224.6
2013	*84.9*	*107.1*	*4.0*	*17.7*	*213.7*

(Source: The Norwegian Petroleum Directorate)



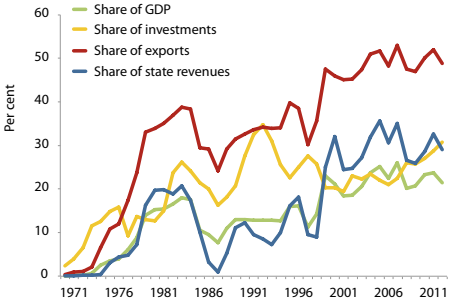
Total petroleum production
(Source: The Norwegian Petroleum Directorate)

Table 1.3 Value creation, exports, employment, investments and exploration costs

Year	Gross domestic product (mill. NOK)	Export value (mill. NOK)	Number of employees**	Total investments (mill. NOK)	Exploration costs (mill. NOK)
1971	12	119	-	704	
1972	207	366	300	1 274	
1973	258	553	400	2 457	
1974	1 056	1 221	1 000	5 313	
1975	4 218	4 022	2 400	7 227	
1976	6 896	7 231	3 000	10 421	
1977	8 617	8 567	4 400	12 621	
1978	14 835	14 108	6 900	6 912	
1979	23 494	23 113	8 800	10 792	
1980	44 285	42 492	10 900	11 000	
1981	55 189	49 906	13 700	12 262	4 133
1982	61 891	55 224	14 600	16 148	5 519
1983	73 298	65 768	15 100	28 883	5 884
1984	90 092	80 274	17 300	34 029	7 491
1985	97 347	87 574	19 600	32 730	7 831
1986	59 988	54 844	19 800	33 302	6 716
1987	59 574	55 799	19 700	34 247	4 951
1988	49 966	50 548	20 700	29 522	4 152
1989	76 768	75 776	20 700	31 777	5 008
1990	95 400	91 808	21 300	31 976	5 136
1991	101 346	99 777	21 800	42 634	8 137
1992	102 578	100 238	23 100	49 196	7 679
1993	107 542	107 357	24 700	57 168	5 433
1994	112 623	111 567	24 900	54 189	5 010
1995	120 198	119 671	24 000	48 583	4 647
1996	165 444	164 806	24 500	47 878	5 456
1997	180 594	175 025	26 700	62 495	8 300
1998	129 098	124 896	27 500	79 216	7 576
1999	176 591	168 693	27 300	69 096	4 992
2000	340 640	321 216	25 700	53 590	5 272
2001	325 333	315 139	29 400	57 144	6 815
2002	283 462	275 041	32 400	54 000	4 475
2003	295 356	281 054	32 200	64 362	4 135
2004	361 262	337 468	32 700	71 473	4 010
2005	465 341	428 265	34 800	88 478	7 536
2006	548 837	498 585	36 900	95 750	11 718
2007	519 174	480 210	44 300	109 895	16 854
2008	666 391	622 230	47 500	124 242	23 314
2009	481 380	440 808	50 500	135 825	27 269
2010	528 968	471 179	52 800	125 421	24 926
2011	630 888	568 428	55 700	146 290	26 769
2012	681 059	610 794	59 000	172 465	24 480
2013	684 972*	564 3678*		209 575*	35 200*

(Source: Statistics Norway)

* Preliminary numbers.
** The number of employees does not include all petroleum related industries.



Macroeconomic indicators for the petroleum sector
(Source: Statistics Norway, Ministry of Finance)

APPENDIX 2
The petroleum resources
(per 31.12.2013)

Table 2.1 Sold and delivered volumes from fields in production and fields where production has ceased

Field	Oil mill. Sm³	Gas bill. Sm³	NGL mill. tonnes	Condensate mill. Sm³	Oil equiv.[1] mill Sm³ o.e.	Year of discovery[2]
Albuskjell	7.4	15.5	1.0	0.0	24.8	1972
Cod	2.9	7.3	0.5		11.2	1968
Edda	4.8	2.0	0.2		7.2	1972
Frigg		116.2		0.5	116.6	1971
Frøy	5.6	1.6		0.1	7.3	1987
Glitne	8.9	0.0	0.0	0.0	8.9	1995
Lille-Frigg	1.3	2.2		0.0	3.5	1975
Mime	0.4	0.1	0.0		0.5	1982
Nordøst Frigg		11.6		0.1	11.7	1974
Odin		27.3		0.2	27.5	1974
Tommeliten Gamma	3.9	9.7	0.6		14.6	1978
Vest Ekofisk	12.2	26.0	1.4		40.8	1970
Yttergryta	0.3	1.7	0.3	0.0	2.6	2007
Øst Frigg		9.2		0.1	9.3	1973
Sold and delivered from fields where production has ceased	**47.5**	**230.3**	**4.0**	**0.9**	**286.4**	
33/9-6 Delta[3]	0.1		0.0		0.1	1976
ALVE	1.2	3.3	0.6		5.6	1990
ALVHEIM	23.2	2.7			25.9	1998
ATLA	0.1	0.1			0.2	2010
BALDER	57.8	1.4			59.2	1967
BLANE	0.6	0.0	0.0		0.6	1989
BRAGE	55.8	3.3	1.2		61.5	1980
DRAUGEN	133.3	1.6	2.5		139.6	1984
EKOFISK	445.8	142.5	13.0		613.1	1969
ELDFISK	102.5	39.6	3.9		149.6	1970
EMBLA	10.4	3.9	0.4		15.2	1988
ENOCH	0.3	0.0			0.3	1991
FRAM	27.2	3.1	0.3		30.8	1992
GAUPE	0.2	0.3	0.0	0.0	0.5	1985
GIMLE	2.7	0.7	0.1		3.7	2004
GJØA	7.1	8.8	1.9	0.4	20.0	1989
GRANE	94.0				94.0	1991
GULLFAKS	356.5	23.1	2.8		384.9	1978
GULLFAKS SØR	44.5	35.7	4.5		88.9	1978
GUNGNE		14.1	2.0	4.4	22.2	1982
GYDA	35.8	6.2	1.9		45.6	1980
HEIDRUN[4]	145.5	15.5	0.6		162.0	1985
HEIMDAL	6.5	45.2			51.8	1972
HOD	9.5	1.6	0.3		11.7	1974
HULDRA	5.2	17.1	0.1		22.5	1982
HYME	0.4	0.0	0.0		0.4	2009
ISLAY	0.0	0.1	0.0		0.1	2008
JETTE	0.2	0.0			0.2	2009
JOTUN	22.9	0.9			23.8	1994
KRISTIN	17.7	20.1	4.3	2.1	48.0	1997
KVITEBJØRN	19.6	46.2	4.0		73.4	1994

Field	Oil mill. Sm³	Gas bill. Sm³	NGL mill. tonnes	Condensate mill. Sm³	Oil equiv.[1] mill Sm³ o.e.	Year of discovery[2]
MARULK	0.1	0.8	0.1		1.0	1992
MIKKEL	3.5	16.9	4.5	2.2	31.2	1987
MORVIN	5.0	1.2	0.2		6.6	2001
MURCHISON	13.9	0.3	0.3	0.0	14.8	1975
NJORD	25.8	8.4	1.9		37.8	1986
NORNE	87.8	6.7	0.8		96.0	1992
ORMEN LANGE		120.1		9.2	129.3	1997
OSEBERG	364.9	38.6	8.1		419.0	1979
OSEBERG SØR	46.3	8.9	0.7		56.5	1984
OSEBERG ØST	19.1	0.3	0.2		19.8	1981
OSELVAR	0.3	0.1	0.0		0.4	1991
REV	0.7	2.6	0.0		3.4	2001
RINGHORNE ØST	10.0	0.2			10.2	2003
SIGYN		6.4	2.5	6.0	17.2	1982
SKARV	2.1	3.0	0.4		5.8	1998
SKIRNE	1.8	9.4			11.2	1990
SKULD	0.5	0.1	0.0		0.7	2008
SLEIPNER VEST		118.9	8.4	29.4	164.3	1974
SLEIPNER ØST		66.7	13.1	26.8	118.4	1981
SNORRE	190.4	6.3	4.6		205.5	1979
SNØHVIT		24.1	1.2	4.2	30.7	1984
STATFJORD	567.7	67.5	17.3	0.6	668.7	1974
STATFJORD NORD	36.7	2.3	0.8		40.5	1977
STATFJORD ØST	36.4	4.0	1.4		42.9	1976
SYGNA	9.9				9.9	1996
TAMBAR	9.1	2.0	0.2		11.6	1983
TAMBAR ØST	0.3	0.0	0.0		0.3	2007
TOR	24.1	10.9	1.2		37.2	1970
TORDIS	55.8	4.3	1.6		63.0	1987
TROLL[5]	234.9	477.5	7.2	4.3	730.3	1979
TRYM	0.9	1.5			2.4	1990
TUNE	3.5	18.9	0.1		22.7	1996
TYRIHANS	19.4	1.1	0.2		20.9	1983
ULA	72.8	3.9	2.6		81.7	1976
URD	5.3	0.2	0.0		5.5	2000
VALE	1.5	1.3			2.8	1991
VALHALL	107.7	20.8	3.3		134.8	1975
VARG	15.5				15.5	1984
VEGA	2.5	3.3	0.8	0.2	7.5	1981
VESLEFRIKK	52.8	2.5	1.3		57.8	1987
VIGDIS	53.5	1.8	1.0		57.2	1981
VILJE	8.7	0.4			9.1	1986
VISUND	23.5	7.6	0.5		32.0	2003
VISUND SØR	0.5	0.5	0.1		1.1	1986
VOLUND	6.5	0.6			7.1	1994
VOLVE	8.2	0.8	0.2	0.1	9.3	1993
YME	7.9				7.9	1987
ÅSGARD	85.0	133.3	24.4	17.1	281.7	1981
Producing fields	**3849.2**	**1643.9**	**155.8**	**107.2**	**5896.4**	
Total sold and delivered	**3896.7**	**1874.2**	**159.9**	**108.2**	**6182.8**	

[1] The conversion factor for NGL tonnes to Sm³ is 1.9
[2] The year the first discovery well was drilled
[3] 33/9-6 Delta has test production
[4] Heidrun also includes Tjeldbergodden
[5] Troll also includes TOGI

Table 2.2 Reserves in fields in production and fields with approved plans for development and operation

Field	Original reserves mill. Sm^3 o.e.	Year of discovery[2)]	Operator per 31.12.2013	Production licence/ unit area
AASTA HANSTEEN[1)]	46.0	1997	Statoil Petroleum AS	218
ALVE	9.0	1990	Statoil Petroleum AS	159 B
ALVHEIM	48.5	1998	Marathon Oil Norge AS	203
ATLA	1.5	2010	Total E&P Norge AS	102 C
BALDER	70.7	1967	ExxonMobil Exploration & Production Norway AS	001
BLANE	0.9	1989	Talisman Energy Norge AS	BLANE
BRAGE	65.7	1980	Wintershall Norge AS	BRAGE
BRYNHILD[1)]	3.6	1992	Lundin Norway AS	148
BØYLA[1)]	3.6	2009	Marathon Oil Norge AS	340
DRAUGEN	155.3	1984	A/S Norske Shell	093
EDVARD GRIEG[1)]	29.2	2007	Lundin Norway AS	338
EKOFISK	753.4	1969	ConocoPhillips Skandinavia AS	018
ELDFISK	188.6	1970	ConocoPhillips Skandinavia AS	018
EMBLA	20.4	1988	ConocoPhillips Skandinavia AS	018
ENOCH	0.4	1991	Talisman North Sea Limited	ENOCH
FRAM	42.7	1990	Statoil Petroleum AS	090
FRAM H-NORD[1)]	1.7	2007	Statoil Petroleum AS	FRAM H-NORD
GAUPE	0.6	1985	BG Norge AS	292
GIMLE	5.0	2004	Statoil Petroleum AS	GIMLE
GINA KROG[1)]	35.7	1978	Statoil Petroleum AS	GINA KROG
GJØA	63.1	1989	GDF SUEZ E&P Norge AS	153
GOLIAT[1)]	38.1	2000	Eni Norge AS	229
GRANE	131.8	1991	Statoil Petroleum AS	GRANE
GUDRUN[1)]	28.9	1975	Statoil Petroleum AS	025
GULLFAKS	398.3	1978	Statoil Petroleum AS	050
GULLFAKS SØR	148.0	1978	Statoil Petroleum AS	050
GUNGNE	23.3	1982	Statoil Petroleum AS	046
GYDA	46.5	1980	Talisman Energy Norge AS	019 B
HEIDRUN	234.9	1985	Statoil Petroleum AS	HEIDRUN
HEIMDAL	51.8	1972	Statoil Petroleum AS	036 BS
HOD	12.8	1974	BP Norge AS	033
HULDRA	22.5	1982	Statoil Petroleum AS	HULDRA
HYME	4.4	2009	Statoil Petroleum AS	348
ISLAY	0.1	2008	Total E&P UK PLC	043 CS. 043 DS
IVAR AASEN[1)]	25.0	2008	Det norske oljeselskap ASA	001 B
JETTE	1.5	2009	Det norske oljeselskap ASA	JETTE
JOTUN	24.6	1994	ExxonMobil Exploration & Production Norway AS	JOTUN
KNARR[1)]	13.7	2008	BG Norge AS	373 S
KRISTIN	65.1	1997	Statoil Petroleum AS	HALTENBANKEN VEST
KVITEBJØRN	141.2	1994	Statoil Petroleum AS	193
MARTIN LINGE[1)]	30.0	1978	TOTAL E & P Norge AS	MARTIN LINGE
MARULK	9.0	1992	Eni Norge AS	122
MIKKEL	55.2	1987	Statoil Petroleum AS	MIKKEL
MORVIN	17.9	2001	Statoil Petroleum AS	134 B
MURCHISON	14.2	1975	CNR International (UK) Limited	MURCHISON
NJORD	47.1	1986	Statoil Petroleum AS	NJORD
NORNE	105.0	1992	Statoil Petroleum AS	NORNE
ORMEN LANGE	332.0	1997	A/S Norske Shell	ORMEN LANGE
OSEBERG	523.8	1979	Statoil Petroleum AS	OSEBERG
OSEBERG SØR	83.8	1984	Statoil Petroleum AS	OSEBERG
OSEBERG ØST	26.6	1981	Statoil Petroleum AS	OSEBERG

Field	Original reserves mill. Sm³ o.e.	Year of discovery[2)]	Operator per 31.12.2012	Production licence/ unit area
OSELVAR	4.2	1991	DONG E&P Norge AS	274
REV	3.5	2001	Talisman Energy Norge AS	038 C
RINGHORNE ØST	14.2	2003	ExxonMobil Exploration & Production Norway AS	RINGHORNE ØST
SIGYN	18.4	1982	ExxonMobil Exploration & Production Norway AS	072
SKARV	68.6	1998	BP Norge AS	SKARV
SKIRNE	12.5	1990	Total E&P Norge AS	102
SKULD	10.4	2008	Statoil Petroleum AS	128
SLEIPNER VEST	184.9	1974	Statoil Petroleum AS	SLEIPNER VEST
SLEIPNER ØST	120.3	1981	Statoil Petroleum AS	SLEIPNER ØST
SNORRE	272.8	1979	Statoil Petroleum AS	SNORRE
SNØHVIT	268.2	1984	Statoil Petroleum AS	SNØHVIT
STATFJORD	699.4	1974	Statoil Petroleum AS	STATFJORD
STATFJORD NORD	43.8	1977	Statoil Petroleum AS	037
STATFJORD ØST	44.9	1976	Statoil Petroleum AS	STATFJORD ØST
SVALIN[1)]	12.3	1992	Statoil Petroleum AS	169
SYGNA	11.2	1996	Statoil Petroleum AS	SYGNA
TAMBAR	12.4	1983	BP Norge AS	065
TAMBAR ØST	0.3	2007	BP Norge AS	TAMBAR ØST
TOR	37.9	1970	ConocoPhillips Skandinavia AS	TOR
TORDIS	71.5	1987	Statoil Petroleum AS	089
TROLL	1755.7	1979	Statoil Petroleum AS	TROLL
TRYM	5.8	1990	DONG E&P Norge AS	147
TUNE	22.2	1996	Statoil Petroleum AS	190
TYRIHANS	91.8	1983	Statoil Petroleum AS	TYRIHANS
ULA	94.1	1976	BP Norge AS	019
URD	7.0	2000	Statoil Petroleum AS	128
VALE	5.0	1991	Centrica Resources (Norge) AS	036
VALEMON[1)]	30.4	1985	Statoil Petroleum AS	VALEMON
VALHALL	184.5	1975	BP Norge AS	VALHALL
VARG	17.6	1984	Talisman Energy Norge AS	038
VEGA	32.4	1981	Statoil Petroleum AS	VEGA
VESLEFRIKK	63.0	1981	Statoil Petroleum AS	052
VIGDIS	73.7	1986	Statoil Petroleum AS	089
VILJE	13.4	2003	Marathon Oil Norge AS	036 D
VISUND	99.0	1986	Statoil Petroleum AS	VISUND INSIDE
VISUND SØR	12.2	2008	Statoil Petroleum AS	VISUND INSIDE
VOLUND	10.8	1994	Marathon Petroleum Norge AS	150
VOLVE	10.8	1993	Statoil Petroleum AS	046 BS
YME[1)]	18.5	1987	Talisman Energy Norge AS	316
ÅSGARD	398.8	1981	Statoil Petroleum AS	ÅSGARD

[1)] Fields with approved development plans where production had not started per 31.12.2013
[2)] The year the first discovery well was drilled

Table 2.3 Original and remaining reserves in fields

	Original reserves[1]					Remaining reserves[4]				
Field	Oil mill. Sm³	Gas bill. Sm³	NGL mill. tonnes	Condensate mill. Sm³	Oil equiv. [2] mill Sm³ o.e.	Oil mill. Sm³	Gas bill. Sm³	NGL mill. tonnes	Condensate mill. Sm³	Oil equiv. [2] mill. Sm³ o.e.
AASTA HANSTEEN[3]	0.0	45.1	0.0	0.9	46.0	0.0	45.1	0.0	0.9	46.0
ALVE	1.7	5.4	1.0	0.0	9.0	0.5	2.1	0.4	0.0	3.4
ALVHEIM	41.2	7.3	0.0	0.0	48.5	18.0	4.6	0.0	0.0	22.6
ATLA	0.3	1.2	0.0	0.0	1.5	0.2	1.1	0.0	0.0	1.3
BALDER	68.9	1.8	0.0	0.0	70.7	11.1	0.4	0.0	0.0	11.5
BLANE	0.9	0.0	0.0	0.0	0.9	0.3	0.0	0.0	0.0	0.3
BRAGE	58.9	4.2	1.4	0.0	65.7	3.0	0.9	0.2	0.0	4.2
BRYNHILD[3]	3.6	0.0	0.0	0.0	3.6	3.6	0.0	0.0	0.0	3.6
BØYLA[3]	3.4	0.2	0.0	0.0	3.6	3.4	0.2	0.0	0.0	3.6
DRAUGEN	148.2	1.7	2.8	0.0	155.3	14.9	0.1	0.4	0.0	15.7
EDVARD GRIEG[3]	26.2	1.8	0.6	0.0	29.2	26.2	1.8	0.6	0.0	29.2
EKOFISK	563.3	161.6	15.0	0.0	753.4	117.5	19.1	1.9	0.0	140.3
ELDFISK	135.6	45.4	4.0	0.0	188.6	33.2	5.7	0.1	0.0	39.1
EMBLA	12.0	7.3	0.6	0.0	20.4	1.5	3.4	0.1	0.0	5.2
ENOCH	0.4	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.1
FRAM	32.5	8.8	0.8	0.0	42.7	5.3	5.7	0.5	0.0	11.9
FRAM H-NORD[3]	1.7	0.0	0.0	0.0	1.7	1.7	0.0	0.0	0.0	1.7
GAUPE	0.2	0.4	0.0	0.0	0.6	0.0	0.1	0.0	0.0	0.1
GIMLE	3.0	1.4	0.3	0.0	5.0	0.3	0.7	0.2	0.0	1.3
GINA KROG[3]	15.3	12.5	3.3	1.6	35.7	15.3	12.5	3.3	1.6	35.7
GJØA	11.8	34.1	9.0	0.0	63.1	4.8	25.3	7.1	0.0	43.6
GOLIAT[3]	30.2	7.3	0.3	0.0	38.1	30.2	7.3	0.3	0.0	38.1
GRANE	131.8	0.0	0.0	0.0	131.8	37.7	0.0	0.0	0.0	37.7
GUDRUN[3]	14.5	10.9	1.9	0.0	28.9	14.5	10.9	1.9	0.0	28.9
GULLFAKS	369.9	23.1	2.8	0.0	398.3	13.4	0.0	0.0	0.0	13.4
GULLFAKS SØR	61.0	68.6	9.7	0.0	148.0	16.5	32.9	5.2	0.0	59.1
GUNGNE	0.0	14.7	2.1	4.6	23.3	0.0	0.6	0.1	0.2	1.1
GYDA	36.4	6.4	1.9	0.0	46.5	0.6	0.2	0.0	0.0	0.9
HEIDRUN	183.3	47.3	2.2	0.0	234.9	37.8	31.8	1.7	0.0	72.9
HEIMDAL	6.5	45.2	0.0	0.0	51.8	0.0	0.0	0.0	0.0	0.0
HOD	10.3	1.8	0.4	0.0	12.8	0.7	0.1	0.1	0.0	1.2
HULDRA	5.1	17.2	0.1	0.0	22.5	0.0	0.1	0.0	0.0	0.1
HYME	3.5	0.6	0.1	0.0	4.4	3.2	0.5	0.1	0.0	4.0
ISLAY	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
IVAR AASEN[3]	18.3	4.7	1.1	0.0	25.0	18.3	4.7	1.1	0.0	25.0
JETTE	1.5	0.0	0.0	0.0	1.5	1.3	0.0	0.0	0.0	1.3
JOTUN	23.6	1.1	0.0	0.0	24.6	0.7	0.2	0.0	0.0	0.9
KNARR[3]	11.2	0.4	1.1	0.0	13.7	11.2	0.4	1.1	0.0	13.7
KRISTIN	22.9	28.8	6.0	2.1	65.1	5.2	8.7	1.7	0.0	17.2
KVITEBJØRN	27.8	90.7	12.0	0.0	141.2	8.2	44.5	7.9	0.0	67.9
MARTIN LINGE[3]	6.0	19.7	0.7	3.0	30.0	6.0	19.7	0.7	3.0	30.0
MARULK	0.5	7.2	0.7	0.0	9.0	0.5	6.4	0.6	0.0	8.0
MIKKEL	5.9	31.0	8.4	2.2	55.2	2.4	14.1	3.9	0.0	23.9
MORVIN	10.5	4.7	1.4	0.0	17.9	5.5	3.5	1.2	0.0	11.3
MURCHISON	13.9	0.4	0.0	0.0	14.2	0.0	0.0	0.0	0.0	0.0
NJORD	27.5	13.8	3.1	0.0	47.1	1.7	5.4	1.2	0.0	9.4
NORNE	91.0	11.3	1.5	0.0	105.0	3.2	4.6	0.7	0.0	9.1
ORMEN LANGE	0.0	314.6	0.0	17.4	332.0	0.0	194.5	0.0	8.2	202.7

Field	Original reserves[1]					Remaining reserves[4]				
	Oil mill. Sm^3	Gas bill. Sm^3	NGL mill. tonnes	Condensate mill. Sm^3	Oil equiv.[2] mill Sm^3 o.e.	Oil mill. Sm^3	Gas bill. Sm^3	NGL mill. tonnes	Condensate mill. Sm^3	Oil equiv.[2] mill Sm^3 o.e.
OSEBERG	389.1	111.9	12.0	0.0	523.8	24.2	73.3	3.9	0.0	104.8
OSEBERG SØR	64.1	16.7	1.6	0.0	83.8	17.7	7.7	0.9	0.0	27.3
OSEBERG ØST	25.7	0.4	0.3	0.0	26.6	6.6	0.1	0.1	0.0	6.8
OSELVAR	2.6	1.7	0.0	0.0	4.2	2.3	1.5	0.0	0.0	3.8
REV	0.7	2.7	0.0	0.0	3.5	0.0	0.1	0.0	0.0	0.1
RINGHORNE ØST	13.9	0.3	0.0	0.0	14.2	4.0	0.1	0.0	0.0	4.0
SIGYN	0.0	6.5	3.1	6.0	18.4	0.0	0.1	0.6	0.0	1.2
SKARV	13.9	44.5	5.4	0.0	68.6	11.7	41.5	5.0	0.0	62.8
SKIRNE	2.3	10.3	0.0	0.0	12.5	0.5	0.9	0.0	0.0	1.4
SKULD	9.5	0.8	0.1	0.0	10.4	8.9	0.7	0.1	0.0	9.8
SLEIPNER VEST	0.0	133.5	9.7	32.9	184.9	0.0	14.7	1.3	3.4	20.5
SLEIPNER ØST	0.0	67.7	13.5	26.9	120.3	0.0	1.0	0.4	0.1	1.9
SNORRE	257.2	6.6	4.7	0.0	272.8	66.9	0.3	0.1	0.0	67.3
SNØHVIT	0.0	225.1	7.3	29.1	268.2	0.0	201.0	6.1	24.9	237.5
STATFJORD	573.0	79.5	24.0	1.3	699.4	5.3	12.1	6.7	0.6	30.7
STATFJORD NORD	39.6	2.1	1.1	0.0	43.8	3.0	0.0	0.3	0.0	3.6
STATFJORD ØST	36.6	4.1	2.2	0.0	44.9	0.2	0.2	0.8	0.0	1.9
SVALIN[3]	12.3	0.0	0.0	0.0	12.3	12.3	0.0	0.0	0.0	12.3
SYGNA	11.2	0.0	0.0	0.0	11.2	1.3	0.0	0.0	0.0	1.3
TAMBAR	9.5	2.0	0.5	0.0	12.4	0.4	0.0	0.2	0.0	0.9
TAMBAR ØST	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
TOR	24.4	11.3	1.2	0.0	37.9	0.3	0.4	0.0	0.0	0.7
TORDIS	63.2	4.8	1.8	0.0	71.5	7.5	0.5	0.2	0.0	8.4
TROLL	269.4	1432.8	27.4	1.5	1755.7	34.5	955.3	20.2	-2.8	1025.4
TRYM	1.7	4.0	0.0	0.0	5.8	0.8	2.6	0.0	0.0	3.4
TUNE	3.3	18.5	0.2	0.0	22.2	0.0	0.0	0.0	0.0	0.1
TYRIHANS	33.1	42.5	8.5	0.0	91.8	13.7	41.4	8.3	0.0	71.0
ULA	84.2	3.9	3.2	0.0	94.1	11.4	0.0	0.6	0.0	12.5
URD	6.9	0.1	0.0	0.0	7.0	1.6	0.0	0.0	0.0	1.5
VALE	2.6	2.4	0.0	0.0	5.0	1.1	1.2	0.0	0.0	2.3
VALEMON[3]	4.6	23.6	1.2	0.0	30.4	4.6	23.6	1.2	0.0	30.4
VALHALL	146.7	27.4	5.5	0.0	184.5	39.0	6.6	2.2	0.0	49.7
VARG	16.1	1.0	0.3	0.0	17.6	0.6	1.0	0.3	0.0	2.1
VEGA	7.9	15.6	4.7	0.0	32.4	5.4	12.3	3.9	0.0	25.1
VESLEFRIKK	54.4	5.2	1.8	0.0	63.0	1.5	2.8	0.5	0.0	5.2
VIGDIS	69.4	1.9	1.2	0.0	73.7	15.9	0.2	0.3	0.0	16.5
VILJE	13.4	0.0	0.0	0.0	13.4	4.7	0.0	0.0	0.0	4.7
VISUND	34.9	52.3	6.2	0.0	99.0	11.5	44.7	5.7	0.0	67.0
VISUND SØR	2.7	7.7	0.9	0.0	12.2	2.3	7.2	0.9	0.0	11.1
VOLUND	9.9	0.9	0.0	0.0	10.8	3.3	0.3	0.0	0.0	3.6
VOLVE	9.5	0.9	0.2	0.1	10.8	1.3	0.1	0.0	0.0	1.5
YME[3]	18.5	0.0	0.0	0.0	18.5	10.6	0.0	0.0	0.0	10.6
ÅSGARD	102.4	206.7	38.1	17.1	398.8	17.5	73.5	13.7	0.0	117.1
Total	**4683.0**	**3691.7**	**284.3**	**146.8**	**9061.7**	**834.0**	**2048.9**	**128.8**	**40.2**	**3167.8**

[1] The table shows expected value, the estimates are subject to uncertainty.
[2] The conversion factor for NGL tonnes to Sm^3 is 1.9.
[3] Fields with approved development plans where production had not started per 31.12.2013.
[4] A negative remaining reserves figure for a field is a result of the product not being reported under original reserves. This applies to produced NGL and condensate.

Table 2.4 Reserves in discoveries the licensees have decided to develop

Discovery	Oil mill. Sm³	Gas bill. Sm³	NGL mill. tonnes	Condensate mill. Sm³	Oil equiv.[1] mill. Sm³ o.e.	Year of discovery[2]
1/5-2 FLYNDRE	0.4	0.1	0.0	0.0	0.5	1974
33/9-6 DELTA	0.1	0.0	0.0	0.0	0.1	1976
Total	**0.5**	**0.1**	**0.0**	**0.0**	**0.6**	

[1] The conversion factor for NGL tonnes to Sm³ is 1.9.
[2] The year the first discovery well was drilled.

Table 2.5 Resources in fields and discoveries in the planning phase

Discovery	Oil mill. Sm³	Gas bill. Sm³	NGL mill. tonnes	Condensate mill. Sm³	Oil equiv.[2] mill. Sm³ o.e.	Year of discovery[3]
FRØY[4]	8.7	0.0	0.0	0.0	8.7	1987
1/9-1 TOMMELITEN ALPHA	6.2	13.7	0.5	0.0	20.8	1977
8/10-4 S (Butch)	7.5	0.7	0.0	0.0	8.2	2011
15/8-1 (Alpha)	0.0	2.3	0.5	1.6	4.8	1982
16/2-6 JOHAN SVERDRUP	354.1	10.6	4.8	0.0	373.8	2010
17/12-1 BREAM	6.4	0.0	0.0	0.0	6.4	1972
18/10-1 (Mackerel)	2.1	0.0	0.0	0.0	2.1	1980
24/6-1 PEIK	0.6	2.0	0.0	0.0	2.5	1985
25/2-10 S (Frigg-GammaDelta)[5]	12.5	3.5	0.0	0.0	16.0	1986
30/11-7 (Fulla)	0.9	5.5	0.0	0.0	6.3	2009
30/11-8 S (Krafla)[6]	8.5	5.3	0.6	0.0	14.9	2011
31/2-N-11 H	0.6	0.0	0.0	0.0	0.6	2005
35/11-13 (Astero)	3.4	0.6	0.0	0.0	4.1	2005
6406/2-7 ERLEND	0.9	1.0	0.2	0.0	2.3	1999
6406/3-2 TRESTAKK	7.9	1.8	0.4	0.0	10.5	1986
6406/3-8 (Maria)	19.5	2.1	1.0	0.0	23.6	2010
6407/6-6 MIKKEL SØR[7]	0.6	2.2	0.5	0.0	3.8	2008
6506/9-2 S (Fogelberg)	1.4	8.1	0.8	0.0	11.0	2010
6507/7-14 S (Zidane)[8]	0.0	17.9	0.2	0.4	18.8	2010
6705/10-1 (Asterix)	0.0	17.8	0.0	0.3	18.1	2009
7122/6-1 (Tornerose)	0.0	3.7	0.0	0.2	3.9	1987
7220/8-1 JOHAN CASTBERG[9]	78.1	9.7	0.0	0.0	87.7	2011
Total	**511.2**	**108.3**	**9.6**	**2.5**	**640.3**	

[1] Names in brackets are not official discovery names
[2] The conversion factor for NGL tonnes to Sm³ is 1.9
[3] The year the first discovery well was drilled
[4] The licensees consider a re-development of the field. The volume is included in category 4A for fields
[5] 25/2-10 S (FriggGammaDelta) includes 25/2-17 - discovery year 2009
[6] 30/11-8 S (Krafla) includes 30/11-8 A - discovery year 2011. Resources in RC 4F and RC 7F
[7] 6407/6-6 Mikkel Sør includes 6407/6-7 S - discovery year 2009
[8] 6507/7-14 S (Zidane) includes 6507/7-15 S - discovery year 2012
[9] 7220/8-1 Johan Castberg includes 7220/7-1 - discovery year 2012.The resources include gas resources in RC 7F

Table 2.6 Resources in discoveries where development is likely but not clarified

Discovery[1]	Oil mill. Sm^3	Gas bill. Sm^3	NGL mill. tonnes	Condensate mill. Sm^3	Oil equiv.[2] mill. Sm^3 o.e.	Year of discovery[3]
15/12-21 (Grevling)	7.7	0.1	0.0	0.0	7.8	2009
15/5-2 EIRIN	0.0	7.0	0.1	0.4	7.6	1978
16/1-12 (Edvard Grieg Sør)	5.1	0.5	0.2	0.0	5.9	2009
16/1-14 (Apollo)	5.2	0.2	0.1	0.0	5.5	2010
2/12-1 MJØLNER	3.0	0.8	0.1	0.0	4.0	1987
2/5-3 SØRØST TOR	3.1	0.9	0.0	0.0	3.9	1972
24/9-10 S (Caterpillar)	1.0	0.1	0.0	0.0	1.0	2011
25/1-11 R (Storklakken)	1.5	0.0	0.0	0.0	1.5	2010
25/2-5 LILLE FRØY	3.0	1.6	0.0	0.0	4.6	1976
25/4-3 GEKKO	0.5	4.2	0.0	0.0	4.7	1974
25/8-4 (D-struktur)	1.0	0.0	0.0	0.0	1.0	1992
3/7-8 S (Trym Sør)	0.2	0.8	0.0	0.0	1.0	2013
30/5-3 S (Corvus)	0.4	5.5	0.0	0.0	5.9	2009
33/12-9 S (Skinfaks Sør)	0.6	0.5	0.1	0.0	1.2	2012
34/10-52 A	0.0	0.2	0.0	0.0	0.3	2011
34/10-52 B	0.1	0.2	0.0	0.0	0.3	2011
34/11-2 S NØKKEN	1.8	4.0	0.5	0.0	6.7	1996
34/4-11 (Beta)	12.2	1.4	0.0	0.0	13.6	2010
35/2-1 (Peon)	0.0	19.5	0.0	0.0	19.5	2005
35/8-3 (Aurora)	0.6	2.7	0.0	0.0	3.2	1988
35/9-6 S (Titan)	5.4	4.0	0.0	2.5	12.0	2010
6406/2-1 LAVRANS	2.4	9.3	0.8	0.0	13.2	1995
6406/9-1 LINNORM	0.0	24.4	0.0	0.6	24.9	2005
6407/7-8 (Noatun)	0.5	2.0	0.3	0.0	3.0	2008
6407/9-9 (Hasselmus)[4]	0.0	0.0	0.0	0.0	0.0	1999
6506/11-2 LANGE	0.5	0.2	0.1	0.0	0.9	1991
6506/12-3 LYSING	1.2	0.2	0.0	0.0	1.4	1985
6506/6-1 (Victoria)	0.0	26.8	0.0	0.0	26.8	2000
6507/11-6 SIGRID	0.4	1.9	0.3	0.0	2.9	2001
6507/3-8 (Gjøk)	0.0	1.4	0.2	0.1	1.9	2009
6507/7-13	0.9	0.0	0.0	0.0	1.0	2001
6607/12-2 S (Alve Nord)	0.9	4.9	0.0	1.3	7.0	2011
7120/12-2 (Alke)[5]	0.0	11.4	0.6	0.4	12.9	1981
Total	**59.0**	**136.5**	**3.4**	**5.2**	**207.3**	

[1] Names in brackets are not official discovery names
[2] The conversion factor for NGL tonnes to Sm^3 is 1.9
[3] The year the first discovery well was drilled
[4] The discovery has no salable resources. Produced gas will be used as fuel on Draugen
[5] 7120/12-2 Alke includes 7120/12-3 - discovery year 1983

Table 2.7 Resources in discoveries that have not been evaluated

Discovery[1]	Oil mill. Sm³	Gas bill. Sm³	NGL mill. tonnes	Condensate mill. Sm³	Oil equiv. mill. Sm³ o.e.[2]	Year of discovery[3]
7/12-5 (Ula Nord)	0.8	0.2	0.0	0.0	1.0	1981
16/2-18 S (Cliffhanger Nord)	2.6	0.4	0.0	0.0	3.0	2013
16/2-3 (Ragnarrock)	2.9	0.4	0.0	0.0	3.3	2007
16/2-4	0.0	1.9	0.0	0.3	2.2	2007
16/2-5	0.0	1.9	0.0	0.2	2.1	2009
16/4-6 S (Luno II)	10.5	3.0	0.0	0.0	13.5	2013
2/3-1	0.0	1.8	0.0	0.0	1.8	1969
2/4-17 TJALVE	0.6	0.8	0.0	0.0	1.4	1992
2/4-21 (King Lear)	0.0	8.1	0.0	5.5	13.6	2012
25/4-2 (Heimdal Øst)	0.8	0.1	0.0	0.0	0.9	1973
25/11-27	3.3	0.0	0.0	0.0	3.3	2013
30/11-9 S (Askja West)	0.0	2.2	0.0	0.5	2.7	2013
34/12-1 (Afrodite)	0.0	9.2	0.9	1.2	12.1	2008
34/4-10	4.8	0.7	0.0	0.0	5.5	2000
34/6-2 S (Garantiana)	6.0	0.2	0.0	0.0	6.2	2012
34/7-H-2 (Ørneskate)	0.3	0.0	0.0	0.0	0.3	2013
35/10-2	0.0	2.8	0.3	0.5	3.9	1996
35/12-2 (Grosbeak)	4.8	0.7	0.0	0.0	5.5	2009
35/9-7 (Skarfjell)	16.2	5.3	0.0	0.0	21.5	2012
6406/6-3 (Mjøsa Sør)	0.0	0.2	0.0	0.0	0.2	2013
6407/1-6 S	0.0	7.6	0.0	1.9	9.5	2013
6407/2-5 S (Nona)	2.9	1.3	0.0	0.1	4.3	2009
6407/2-6 S (Flyndre-tind)	0.0	1.9	0.0	0.5	2.4	2010
6407/8-6 (Snilehorn)	9.3	3.1	0.0	0.0	12.4	2013
6506/9-3 (Smørbukk Nord)	0.0	3.6	0.0	1.1	4.7	2013
6507/3-7 (Idun N)	0.0	0.8	0.0	0.0	0.8	2009
6507/3-10 (Klara)	1.3	0.2	0.0	0.0	1.5	2013
6608/10-15 (Svale)	2.3	0.1	0.0	0.0	2.4	2013
7120/1-3 (Gotha)	15.7	11.9	0.0	0.0	27.5	2013
7120/2-3 S (Skalle)	0.0	5.0	0.0	0.0	5.0	2011
7219/8-2 (Iskrystall)	0.0	2.3	0.0	0.2	2.5	2013
7220/7-2 S (Skavl)	6.1	0.9	0.0	0.0	7.0	2013
7222/11-1 (Langli-tinden)	0.0	6.0	0.0	0.0	6.0	2008
7324/8-1 (Wisting Central)	17.9	0.7	0.0	0.0	18.6	2013
Total	**109.0**	**85.4**	**1.2**	**12.0**	**208.6**	

[1] Names in brackets are not official discovery names
[2] The conversion factor for NGL tonnes to Sm^3 is 1.9
[3] The year the first discovery well was drilled

APPENDIX 3
Pipelines and onshore facilities

Table 3.1 Gas pipelines

Pipeline	Operator	From – to	Start-up (year)	Capacity (mill. Sm^3/d)	Dimension (inches)	Length (km)	Investment Billion NOK 2013
Europipe	Gassco AS	Draupner E–Emden in Germany	1995	46	40	620	24,3
Europipe II	Gassco AS	Kårstø–Dornum in Germany	1999	71	42	658	10,9
Franpipe	Gassco AS	Draupner E–Dunkerque in France	1998	55	42	840	11,4
Norpipe	Gassco AS	Ekofisk–Norsea Gas Terminal in Germany	1977	32	36	440	30,1
Oseberg Gas Transport (OGT)	Gassco AS	Oseberg–Heimdal	2000	35	36	109	2,3
Statpipe (rich gas)	Gassco AS	Statfjord–Kårstø		25	30	308	
Statpipe (dry gas)	Gassco AS	Kårstø–Draupner S		21	28	228	
Statpipe (dry gas)	Gassco AS	Heimdal–Draupner S		31	36	155	
Statpipe (dry gas)	Gassco AS	Draupner S–Ekofisk		30	36	203	
Statpipe (all)	Gassco AS		1985				52,0
Tampen Link	Gassco AS	Statfjord–FLAGS-pipeline in the UK	2007	10–27	32	23	2,3
Vesterled	Gassco AS	Heimdal–St. Fergus in the UK	1978	39	32	360	36,8
Zeepipe	Gassco AS	Sleipner–Draupner S		55	30	30	
Zeepipe	Gassco AS	Sleipner–Zeebrugge im Belgium	1993	42	40	813	
Zeepipe IIA	Gassco AS	Kollsnes–Sleipner	1996	74	40	299	
Zeepipe IIB	Gassco AS	Kollsnes–Draupner E	1997	73	40	301	
Zeepipe (all)	Gassco AS						27,4
Åsgard Transport	Gassco AS	Åsgard–Kårstø	2000	70	42	707	12,0
Langeled (northern pipeline)	Gassco AS	Nyhamna–Sleipner	2007	75	42	627	
Langeled (southern pipeline)	Gassco AS	Sleipner–Easington in the UK	2006	72	44	543	
Langeled (both)	Gassco AS						19,4
Norne Gas Transport System (NGTS)	Gassco AS	Norne–Åsgard Transport	2001	7	16	128	1,4
Kvitebjørn Gas Pipeline	Gassco AS	Kvitebjørn–Kollsnes	2004	27	30	147	1,3
Gjøa Gas Pipeline		Gjøa–FLAGS in the UK	2010	17	29	131	2,0
Draugen Gas Export	AS Norske Shell	Draugen–Åsgard Transport	2000	2 bn. Sm^3/yr.	16	78	1,3
Grane Gas Pipeline	Statoil Petroleum AS	Heimdal–Grane	2003	3,6 bn. Sm^3/yr.	18	50	0,3
Haltenpipe	Gassco AS	Heidrun–Tjeldbergodden	1996	2 bn. Sm^3/yr.	16	250	3,3
Heidrun Gas Export	Statoil Petroleum AS	Heidrun–Åsgard Transport	2001	4 bn. Sm^3/yr.	16	37	1,0

Tabell 3.2 Oil and condensate pipelines

Pipeline	Operator	From – to	Start-up (year)	Capacity (Sm^3/d)	Dimension (inches)	Length (km)	Investment Billion NOK 2013
Grane Oil Pipeline	Statoil Petroleum AS	Grane–Sture Terminal	2003	34 000	29	220	1,8
Kvitebjørn Oil Pipeline	Statoil Petroleum AS	Kvitebjørn–Mongstad (connected to the Y-connection on Troll Oil Pipeline II)	2004	10 000	16	90	0,5
Norpipe Oil	Norpipe Oil AS	Ekofisk–Teeside in the UK	1975	53 mill. Sm^3/yr.	34	354	18,5
Oseberg Transport System	Statoil Petroleum AS	Oseberg A–Sture Terminal	1988	121 000	28	115	10,9
Sleipner Øst Condensate Pipeline	Statoil Petroleum AS	Sleipner A–Kårstø	1993	32 000	20	245	1,8
Troll Oil Pipeline I	Statoil Petroleum AS	Troll B–Mongstad	1995	42 500	16	86	1,4
Troll Oil Pipeline II	Statoil Petroleum AS	Troll C–Mongstad	1999	40 000	20	80	1,3
Huldra Condensate	Statoil	Huldra-Veslefrikk	2001	7900	8	16	0,4
Gjøa Oil Pipeline	GDF SUEZ E&P Norge AS	Gjøa – Troll Oil Pipeline II	2010	5,4 mill. Sm^3/yr.	16	55	

Tabell 3.3 Onshore facilities in Norway

Onshore facility	Location	Description and products
Kollsnes gas treatment facility	Øygarden municipality in Hordaland	The gas treatment plant at Kollsnes is part of Gassled. At Kollsnes, the wellstream is separated into gas and condensate. The gas is dehydrated and compressed before it is shipped to the Continent through two pipelines to Sleipner and Draupner. The capacity is 143 million Sm3 of dry gas per day and 9780 Sm3 of condensate per day.
Kårstø gas processing and condensate facility	Tysvær municipality in Rogaland	Rich gas and unstabilised condensate arrive at Kårstø. In the process facility, these raw materials are separated into dry gas which is transported via two pipelines from Kårstø to Europe and six different liquid products which are stored and shipped out from Kårstø. The gas processing facility can handle 88 million Sm^3 of rich gas per day. The condensate facility has a capacity of about 5.5 million tonnes of non-stabilised condensate per year. The capacity for ethane recovery at Kårstø is 950 000 tonnes per year.
Mongstad Terminal	Lindås and Austrheim municipalities in Hordaland	Three quay facilities for ships up to 400 000 tonnes. 3 mountain caverns totalling 1.5 million m3 of crude oil. Receives crude oil by ship from e.g. Gullfaks, Statfjord, Draugen, Norne, Åsgard and Heidrun and is the landing terminal for the oil pipelines from Troll B, Troll C, Fram, Kvitebjørn, Gjøa, Vega and Vega Sør.
Nyhamna gas treatment facility	Aukra municipality in Møre og Romsdal	The process facility for Ormen Lange at Nyhamna is a conventional facility for gas dehydration, compression, gas export, condensate separation/stabilisation/storage as well as fiscal metering of gas and condensate. The facility has a capacity of 70 million Sm3 of dry gas per day at a receiving pressure of 90 bar.
Melkøya LNG facility	Hammerfest municipality in Finnmark	The untreated wellstream from the Snøhvit field is routed through a 143-kilometre long pipeline to the facility on Melkøya for processing and ship transport. At the onshore facility, condensate, water and CO_2 are separated from the wellstream before the natural gas is cooled to liquid form (LNG) and stored in dedicated tanks. The pipeline has an available technical capacity of 7.7 million Sm3 per year. The CO_2 that is separated from the natural gas is returned to the Snøhvit field where it is injected into a separate formation under the oil and gas.
Sture Terminal	Øygarden municipality in Hordaland	The Sture terminal receives oil and condensate through the pipeline from Oseberg A, from the Oseberg, Veslefrikk, Brage, Oseberg Sør, Oseberg Øst, Tune and Huldra fields. The terminal also receives oil from the Grane field through the Grane oil pipeline. The Sture facility includes two quay facilities that can receive oil tankers up to 300 000 tonnes, five crude caverns with a capacity of 1 million Sm3, an LPG cavern holding 60 000 Sm3 and a ballast water cavern holding 200 000 m3. A fractionation plant processes unstabilised crude from the Oseberg field into stable crude oil and LPG blend.
Tjeldbergodden	Aure municipality in Møre og Romsdal	Methanol plant. The gas deliveries through Haltenpipe amount to about 0.7 billion Sm3 per year, which yields 830 000 tonnes of methanol. An air gas plant has been built in connection with the methanol plant. Tjeldbergodden Luftgassfabrikk DA also has a smaller fractionation and LNG facility with a capacity of 35 million Sm3 per year.
Vestprosess	Lindås municipality in Hordaland	The Vestprosess DA company owns and operates a transport system and separation facility for wet gas (NGL). Through a 56-kilometre long pipeline, unstabilised NGL is shipped from the gas terminal at Kollsnes via the oil terminal at Sture and on to Mongstad. At Mongstad, naphtha and LPG are separated first. The naphtha is used as a raw material in the refinery, while the LPG is fractionated in a separate process facility. The fractionation products, propane and butane, are stored in caverns for subsequent export.

APPENDIX 4
Conversion factors

Oil equivalents (abbreviated o.e.) is a term used to sum up volumes of oil, gas, NGL and condensate. Such a total can be arrived at by applying a common property, such as energy, mass, volume or sales value. The Norwegian Petroleum Directorate uses a volumetric conversion of NGL to liquid and an energy conversion factor for gas, based on typical properties (*) on the Norwegian continental shelf.

** The properties of oil, gas and NGL vary from field to field and over time, but a common and constant conversion factor is used in the resource accounts for all discoveries and fields.*

1 Sm^3 oil	=	1.0 Sm^3 o.e.
1 Sm^3 condensate	=	1.0 Sm^3 o.e..
1000 Sm^3 gas	=	1.0 Sm^3 o.e.
1 tonne NGL	=	1.9 Sm^3 o.e.

Gas	1 cubic foot	1 000.00 Btu
	1 cubic metre	9 000.00 kcal
	1 cubic metre	35.30 cubic feet

Crude oil	1 Sm^3	6.29 barrels
	1 Sm^3	0.84 toe
	1 tonne	7.49 barrels
	1 barrel	159.00 litres
	1 barrel per day	48.80 tonnes per year
	1 barrel per day	58.00 Sm^3 per year

Approximate energy content

	MJ
1 Sm^3 natural gas	40
1 Sm^3 crude oil	35 500
1 tonne coal equivalent	29 300

Conversion factors for volume

1 Sm^3 crude oil	=	6.29 barrels
1 Sm^3 crude oil	=	0.84 tonnes crude oil
	=	(average for oil from the Norwegian continental shelf)
1 Sm^3 gas	=	35.314 cubic feet

Conversion factors between various units of energy

		MJ	kWh	BTU
1 MJ	Megajoule	1	0.2778	947.80
1 kWh	kilowatt hour	3.6	1	3412.10
1 BTU	British thermal unit	0.001055	0.000293	1

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