

2011

# OIL & GAS SECURITY

Emergency Response of IEA Countries

## NORWAY

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International Energy Agency

# Norway

## Key Oil Data

|                                 | 1985    | 1990      | 1995      | 2000      | 2005      | 2008      | 2009      | 2010      |
|---------------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Production (kb/d)</b>        | 823.6   | 1 717.6   | 2 901.6   | 3 348.6   | 2 979.9   | 2 475.0   | 2 398.2   | 2 169.4   |
| <b>Demand (kb/d)</b>            | 197.0   | 199.4     | 208.2     | 211.4     | 216.7     | 229.4     | 218.1     | 212.7     |
| <i>Motor gasoline</i>           | 36.8    | 41.4      | 38.6      | 37.4      | 36.6      | 31.2      | 29.5      | 27.9      |
| <i>Gas/diesel oil</i>           | 63.5    | 65.6      | 72.3      | 79.3      | 84.4      | 89.3      | 91.9      | 99.7      |
| <i>Residual fuel oil</i>        | 19.8    | 12.5      | 12.2      | 10.4      | 10.0      | 8.4       | 6.9       | 5.7       |
| <i>Others</i>                   | 76.8    | 79.8      | 85.1      | 84.3      | 85.7      | 100.4     | 89.7      | 79.3      |
| <b>Net imports (kb/d)</b>       | - 626.6 | - 1 518.2 | - 2 693.4 | - 3 137.2 | - 2 763.2 | - 2 245.6 | - 2 180.1 | - 1 956.7 |
| <b>Import dependency</b>        | -       | -         | -         | -         | -         | -         | -         | -         |
| <b>Refining capacity (kb/d)</b> | 244     | 295       | 285       | 358       | 310       | 315       | 315       | 316       |
| <b>Oil in TPES</b>              | 40.2%   | 36.1%     | 33.0%     | 32.6%     | 35.4%     | 37.9%     | 36.4%     | -         |

## End-Month Total Oil Stock Levels<sup>1</sup> - Five Year Range



<sup>1</sup> - Primary oil stocks on national territory; these exclude utility stocks and including pipeline and entrepot stocks where known.

## Key Natural Gas Data

|                            | 1985     | 1990     | 1995     | 2000     | 2005     | 2008     | 2009      | 2010 *    |
|----------------------------|----------|----------|----------|----------|----------|----------|-----------|-----------|
| <b>Production (mcm/y)</b>  | 26 699   | 27 642   | 31 449   | 53 293   | 86 946   | 102 040  | 106 301   | 107 117   |
| <b>Demand (mcm/y)</b>      | 1 345    | 2 262    | 3 851    | 4 109    | 5 186    | 5 773    | 5 952     | 6 573     |
| <i>Transformation</i>      | -        | -        | 27       | 34       | 64       | 87       | 784       | -         |
| <i>Industry</i>            | -        | -        | -        | 680      | 818      | 896      | 717       | -         |
| <i>Residential</i>         | -        | -        | -        | -        | 6        | 4        | 4         | -         |
| <i>Others</i>              | 1 345    | 2 262    | 3 824    | 3 395    | 4 298    | 4 786    | 4 447     | -         |
| <b>Net imports (mcm/y)</b> | - 25 354 | - 25 380 | - 27 598 | - 49 184 | - 81 760 | - 96 267 | - 100 349 | - 100 544 |
| <b>Import dependency</b>   | -        | -        | -        | -        | -        | -        | -         | -         |
| <b>Natural Gas in TPES</b> | 5.9%     | 8.8%     | 14.4%    | 15.1%    | 14.7%    | 15.7%    | 18.9%     | -         |

\* based on monthly data submissions to the IEA.

## OVERVIEW

Norway joined the IEA in 1975, on an agreement allowing the government to decide whether and how (on a case-by-case basis) to join an IEA emergency sharing system, including emergency stockdraw response measures. As Norway is a net exporter of oil, it is not bound by the IEA 90-day stockholding commitment.

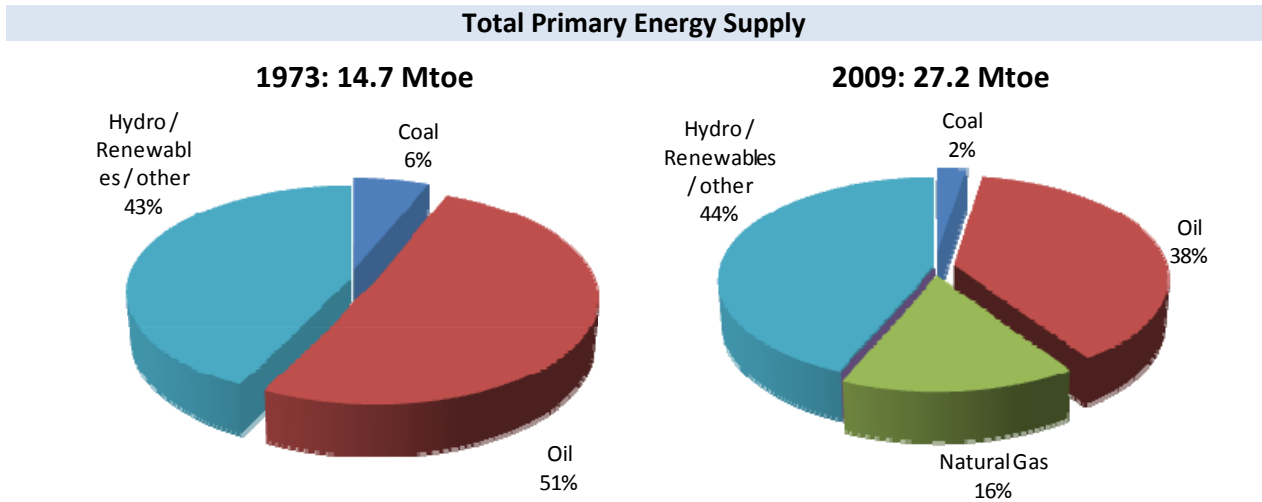
Crude oil and natural gas resources on the Norwegian Continental Shelf (NCS) have been the main driver of the growth of oil and gas production in Norway. Since 2002, however, oil production has been declining; in the absence of significant new discoveries, the peak of oil production may already have been reached.

Until 2006, Norway held a certain amount of governmental stocks for oil emergencies. These stocks were sold off in 2007 when new legislation was introduced that obliged the industry to hold emergency stocks of 20 days of their sales/imports in the domestic market. Release of company-held stocks is the preferred action in an IEA Collective Action responding to an oil supply disruption.

Norway is a significant gas producer (of over 100 bcm in 2010) but is only a marginal consumer, exporting almost all of its production.

# 1. Energy Outlook

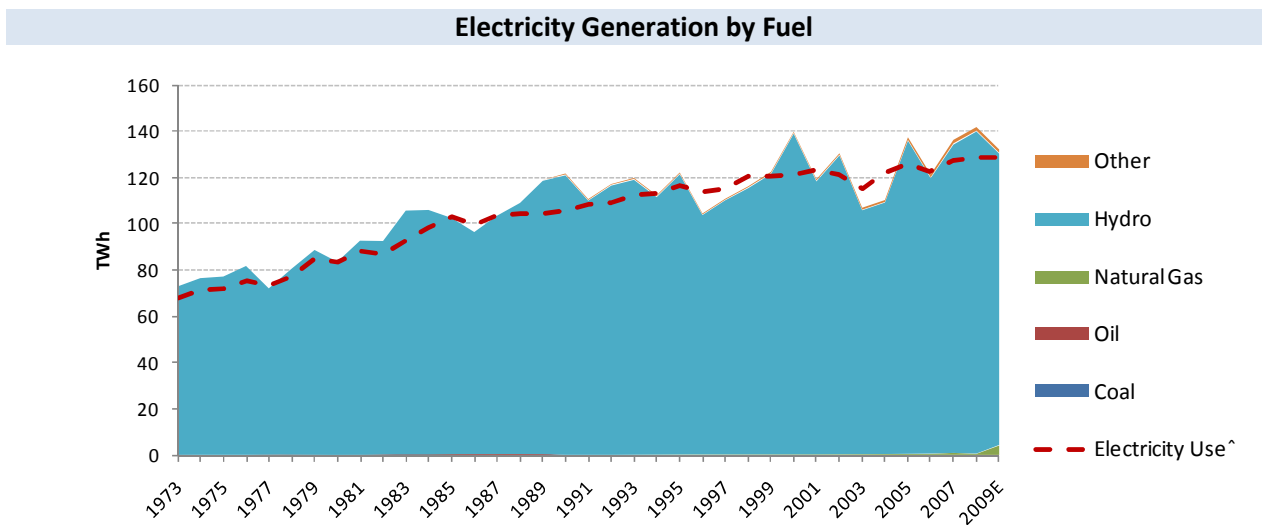
Total primary energy supply (TPES) in Norway stood at 27.2 Mtoe in 2009, reflecting an average annual growth of 1.7% since 1973. Norway is quite unique, in that hydroelectricity is the single biggest energy source in Norway, accounting for 44% of TPES in 2009.



The relative share of oil demand in TPES has decreased progressively over since 1973, and accounts for 38% of TPES in 2009. Just over half of refined oil was consumed in the transport sector.

However, the share of natural gas in TPES has grown regularly since 1973, as Norway progressively developed its large offshore gas fields on the Norwegian Continental Shelf. However, it should be noted that more than 80% of Norway’s gas consumption is actually consumed in the upstream energy production process itself. Industry accounts for a further 15% of domestic gas consumption.

As indicated in the graph below, hydro electricity accounts for virtually all of Norway’s electricity generation, standing at some 96% in 2009.



Source: Energy Balances of OECD Countries, IEA

## 2. Oil

### 2.1 Market Features and Key Issues

#### Domestic oil production

Norway is a major oil producer, and is one of only three net exporters (along with Canada and Denmark) among IEA member countries. The bulk of domestic crude oil is produced from offshore platforms operating on the Norwegian Continental Shelf (NCS). From the platforms, the crude oil is transported to onshore oil terminals either by pipeline or by loading onto oil tankers for transportation to oil refineries. The Mongstad refinery is linked by pipeline to some of the offshore production.

Norway is the fourth-largest OECD oil producer after the United States, Mexico and Canada; it produced 2.16 mb/d in 2010. Norway's crude is both light and sweet, and over three-quarters of its production is exported, with over 90% headed to OECD Europe countries. These volumes put Norway as the seventh-largest world oil producer. Norway's net exports of oil (including products) stood at 1.9 mb/d in 2010.

Since 2002, Norwegian Continental Shelf (NCS) oil production has been decreasing. Should no new resources be exploited, it is expected to have peaked. Production in Norway as of 2010 is down by around 35% on 2000 figures, and by over 25% on 2005 figures. As of 2010, total proven reserves were estimated at 7.1 billion barrels.<sup>1</sup>

In order to meet the challenges related to mature fields, the Norwegian authorities have undertaken several policy changes. The two most important ones are opening the NCS to a wider range of companies and making all exploration areas around mature fields available through annual licensing rounds. There are now two separate systems for awarding new licences in frontier areas and more mature areas on the NCS.

From the outset of the establishment of the Norwegian petroleum industry, the authorities have attracted large international companies which could actively contribute to the development of the resource base on the NCS. Simultaneously, one of the main goals throughout the 1970s and 1980s has been to encourage the development of the Norwegian petroleum competence. As the NCS is gradually maturing, the industry structure is adapting accordingly to reflect this situation. An increasing number of smaller Norwegian and international companies have entered the NCS, with an interest mainly in developing smaller resources or in fields in the tail production phase.

Of note, the acreage off Lofoten has so far not been opened for exploration, and might be the subject of further assessment studies.

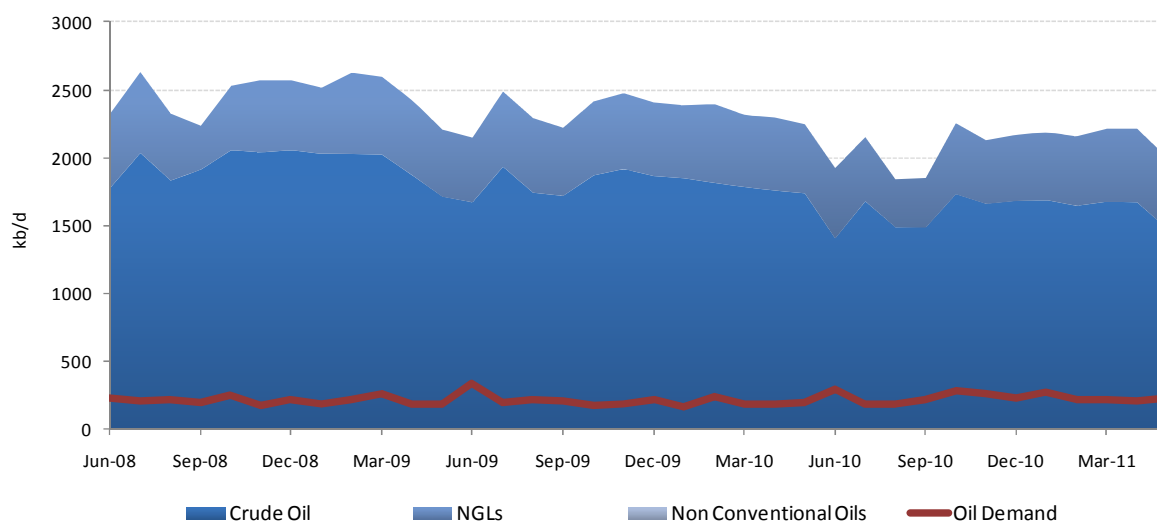
In April 2010, Russia and Norway reached an agreement on the demarcation of their maritime borders in the Barents Sea and the Arctic Ocean. An area of 175 000 square kilometers has been the issue of the dispute between Norway and Russia. The Arctic territories are believed to hold vast untapped oil and gas reserves, and this agreement will allow for new upstream exploration in both Norwegian and Russian waters.

A point of concern is the fact that costs have increased very rapidly on the NCS, as elsewhere in the oil industry. Cost inflation is a major concern for the Government, and cost control is a constant challenge for all oil companies on the NCS.

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<sup>1</sup> BP Statistical Review of World Energy, 2010

Domestic Oil Production and Demand



Source: IEA Monthly Oil Statistics

Oil demand

Total Norwegian oil demand in 2010 stood at 213 kb/d, down from 218 kb/d in 2009 and 229 kb/d in 2008.

Norway's total oil demand has been declining gradually since 2006 (as is the case in many OECD countries), decreasing by a compound average growth rate of 2.7%. Overall demand is expected to continue along this gradual downward trend in the upcoming years, mainly because of a progressive ebbing of gasoline demand.

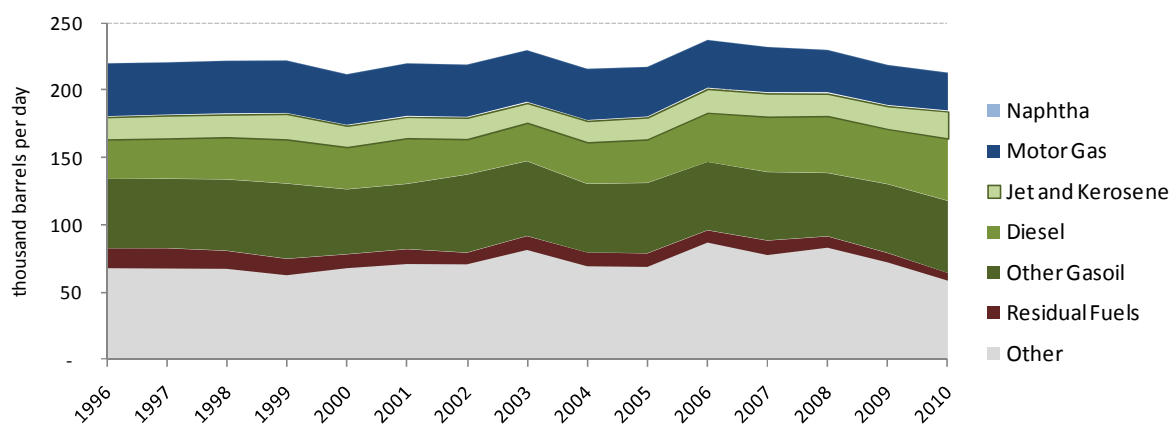
Oil Demand in 2010 (kb/d)

|                       |            |
|-----------------------|------------|
| LPG and Ethane        | 32         |
| Naphtha               | -          |
| Gasoline              | 28         |
| Kerosene              | 20         |
| Diesel                | 46         |
| Heating/other Gasoil  | 53         |
| Residual Fuels        | 6          |
| Other Products        | 27         |
| <b>Total Products</b> | <b>213</b> |

Source: IEA Monthly Oil Statistics

The transportation sector accounted for over half of this demand, with motor gasoline, gas/diesel oil, and jet kerosene being the main transportation fuels. Any future oil demand growth will be the result of increases in the use of these fuels. By contrast, the industrial sector's share was 30%.

Oil Consumption by Product



Source: Monthly Oil Statistics, IEA

## Taxes and maximum price mechanism

Norway has a special surplus taxation system for the production of petroleum and hydro power. The taxation of petroleum activities is based on the rules governing ordinary business taxation. There is considerable excess return (resource rent) associated with the extraction of oil and gas. Therefore, a special tax of 50% on income from petroleum extraction has been introduced, in addition to the ordinary corporate tax of 28%. Consequently, the marginal tax rate on the excess return within the petroleum sector is 78%.

There are specific taxes on the purchase of certain end-products such as gasoline, diesel, heating oil and lubricant oil. As is the case in many OECD countries, taxes on diesel are lower than taxes on gasoline (see Figure below for details), resulting in a progressive “dieselisation” of the vehicle fleets.

### Tax rates on energy products for 2010\*

in Norwegian Kroner (NOK)\*\*

| Petrol tax  |      | Carbon dioxide tax                                 |      |
|---|------|--|------|
| Sulphur-free  | 4.54 | Petroleum activities, per litre or Sm <sup>3</sup> | 0.47 |
| Low-sulphur   | 4.58 | Mineral oil  | 0.58 |
|   |      | Mineral oil for domestic aviation                  | 0.68 |
|   |      | Mineral oil for wood processing & fish industry    | 0.30 |
|   |      | Gasoline   | 0.86 |
|   |      | Natural gas, per Sm <sup>3</sup> - general rate    | 0.45 |
|   |      | Natural gas, per Sm <sup>3</sup> - reduced rate    | 0.05 |
|   |      | LPG, per kg - general rate                         | 0.65 |
|   |      | LPG, per kg - reduced rate                         | 0.00 |
|   |      | Sulphur tax  | 0.08 |
| Auto diesel tax   |      |  |      |
| Sulphur-free  | 3.56 |  |      |
| Low-sulphur   | 3.61 |  |      |
| Biodiesel   | 1.78 |  |      |
| Electricity consumption tax, per kWh                      |      |  |      |
| General rate  | 0.11 |  |      |
| Reduced rate  | 0.00 |  |      |
| Basic tax on heating oil, etc.                            |      |  |      |
| Mineral oil   | 0.89 |  |      |
| Mineral oil for wood processing, prod. colorants/pigments | 0.13 |  |      |
| Lubricant oil tax   |      |  |      |
|   | 1.80 |  |      |

\* per litre, unless if otherwise indicated

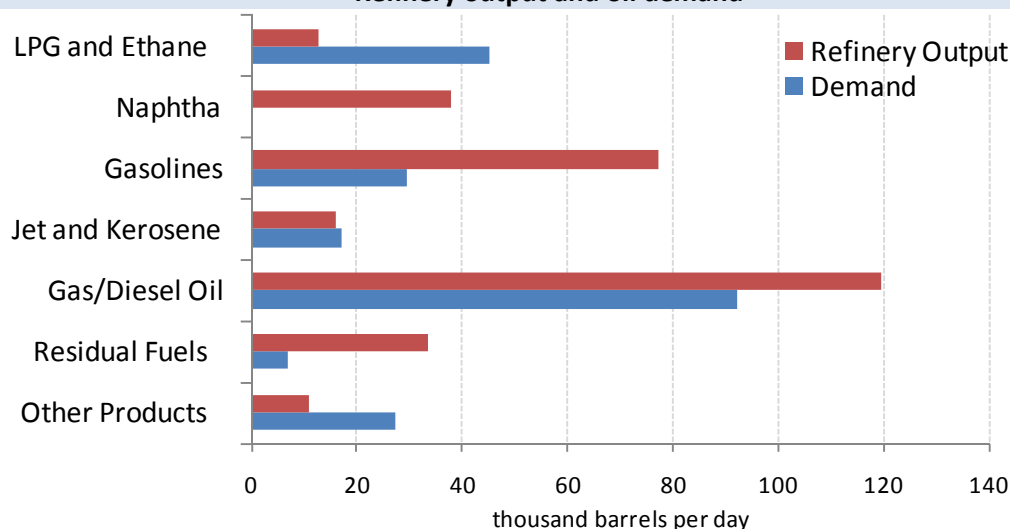
\*\* 1 NOK = Euro 0.12 = USD 0.17 (31/12/2009)

Source: Norwegian government

## Imports/exports and import dependency

Norway’s production stood at 2.39 mb/d in 2009, of which around 90% is exported. With its two refineries producing some 308 kb/d of products in a domestic demand market of only 220 kb/d (2010 figures), Norway is also a net exporter of refined products, including both diesel/gas oil and gasoline.

### Refinery output and oil demand



Source: Monthly Oil Statistics, IEA

## Oil Company Operations

On 1st October 2007, Statoil ASA and Norsk Hydro's petroleum activities merged. The Norwegian State held approximately 62.5% of the shares in the merged entity. However, the stock market listing of Statoil in 2001 was approved by the Norwegian parliament on the understanding that the State should own no less than two-thirds of the company. As a consequence of the merger, the Norwegian State repurchased shares in the open market in mid-2008. On the 5th March 2009, this process was terminated as the state reached a 67% equity stake in the merged company, StatoilHydro ASA. The new company was renamed to Statoil ASA as of 1st November 2009.

Nearly sixty oil companies are currently engaged in the upstream sector of the Norwegian petroleum industry. More than one-third of these are appointed operators of one or more production licences. Statoil alone accounts for almost 70% of all activities on the Norwegian Continental Shelf (NCS). With the maturing of fields on the NCS, there has been a renewed focus on attracting competent new players to the upstream sector. As of end-2009, the State has participating interests in 137 production licences and 14 partnerships relating to pipelines and onshore installations.

The downstream market is highly concentrated in the hands of a few companies, with the four biggest players – Shell, Statoil, Esso and Uno-X Energi – controlling 97% of the combined gasoline and diesel retail market, and the top three alone (Statoil, Shell and Esso) accounting for 80% of the market. Statoil has the single biggest market share, with close to 33% of combined motor fuel sales.

## 2.2 Oil Supply Infrastructure

### Refining

The Norwegian refining industry consists of two refineries: The Mongstad facility close to Bergen, and the Esso plant at Slagen south of Oslo. Their annual capacity totals approximately 310 000 barrels per day. The Mongstad plant (200 kb/d) is roughly twice the capacity of the Slagen plant (110 kb/d).

The two refineries purchase crude oil from and sell products to the world market, so not all feedstocks have to be produced on the NCS. Approximately 30% of the output from these refineries (90 kb/d) is consumed by the domestic market, whereas the rest is exported. Remaining domestic consumption of oil products, amounting to some 140 kb/d, is produced at foreign refineries.

### Pipelines

Norway has established an extensive network of sub-sea oil pipelines to link offshore oil fields with onshore terminals. Statoil (previously Norsk Hydro) operates the Oseberg Transport System (765 kb/d) to connect the Oseberg field with the Sture receiving terminal. Statoil also operates another pipeline (265 kb/d) called Grane, linking its Grane field to Sture. The Sture terminal's storage capacity is 6.3 mb of crude oil.

Statoil also manages the twin pipelines system called Troll I and II (565 kb/d), connecting the Mongstad terminal to offshore oil fields. The terminal can store 9.4 mb of crude oil. Most of the crude is exported from Mongstad by tankers, but the refinery retains a certain amount for its own use.

The Norpipe Oil AS pipeline is operated by ConocoPhillips Skandinavia AS. This oil pipeline (810 kb/d) is about 354 km long, starting at the Ekofisk Centre and crossing the UK Continental Shelf to come ashore at Teeside in the United Kingdom. A tie-in point for UK fields is located about 50 km downstream of Ekofisk.

## Ports

Given the country's long coastline and the fact that most cities are located on the coast, Norway has numerous ports throughout the country, which serve as the main hubs of transport for moving goods around the country.

The main port for the country's oil industry is around Bergen/Stavanger on the west coast, which is linked by pipeline to offshore production, and is connected to the country's main refinery at Mongstad. The region around the capital, Oslo, on the east coast also has notable port activity. The country's other refinery, Slagen, is located at Toensberg, about 100 kilometres south of Oslo.

### Oil Infrastructure Map



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

## Storage capacity

Norway has 26 main storage facilities, spread over 17 localities, as well as about 50 distribution storage facilities. If the sub-storage and inland depots are included, Norway has about 400 storage facilities altogether, all of which are owned by Norwegian oil trading companies.

In addition to the Slagen and Mongstad refineries, which together can store around 15.7 mb of crude oil, Norwegian marketing oil companies have several types of storage facilities, including large storage terminals (supplied by tankers directly from the refineries), distribution storage (supplied by tankers

from the refineries or main storage sites) and coastal storages or sub-storage sites for delivering bunker oil to boats (supplied by boat and operated by independent dealers).

The companies also possess larger storage facilities situated on service bases for offshore activity. These are operated by the service companies themselves. Additionally, there are inland depots for small-scale distribution ("peddlers") which deliver heating oil and auto diesel to households and agriculture. The products from main storage sites, distribution storages and peddler depots are delivered by trucks. For deliveries to large customers, small tankers or barges are also utilised.

Several companies have entered into agreements on stockdraw in each other's storage facilities. The agreements reduce distribution costs and save the companies large amounts of money.

The Ministry no longer collects and maintain information on the volumes of the oil companies' storage capacities.

## 2.3 Decision-making Structure for Oil Emergencies

### Emergency Response Policy

As a crude oil producer and significant net oil exporter Norway has a particular position within the IEA based on the Agreement to the International Energy Program (I.E.P.) concluded in February 1975, by which the Norwegian Government formally has the right to decide whether and how (on a case-by-case basis) it would participate in the IEA sharing system.

Norwegian participation in any coordinated IEA emergency response plan within the framework of the Co-ordinated Emergency Response Measures (CERM) also occurs in accordance with the principles reflected in the Agreement.

As demonstrated in 1991 and 2005 and also in specific situations when other IEA response plans have been put together but not implemented, Norway has thus far contributed to such plans with volumes of the magnitude as calculated on the basis of its inland consumption, like for all other IEA member countries. So although the Agreement gives Norway formal and special rights compared to other IEA member countries, Norway has not made use of this special position.

### Emergency Organisation

The Norwegian emergency response organisation was re-organised in 2006 and renamed the Oil Emergency Organisation (EO). The re-organisation included the abandonment of the former National Emergency Sharing Organisation (the former NESO), reflecting the Norwegian policy change to give priority to the use of stock release rather than implementing demand restraint measures.

The EO and its tasks are reflected in a Royal Decree of 1982. At present, the EO comprises officials from:

- The Ministry of Petroleum and Energy (MPE – which has the emergency measures at disposal and the legal authority to put them into effect);
- The Ministry of Foreign Affairs (MFA);
- The Ministry of Finance (on a consultative basis);
- Statistics Norway;
- The Oil Emergency Board (high-level representatives from Norwegian oil companies).

MPE's Section for Development and Production acts as a secretariat for the EO, responsible for liaison with the IEA. The EO would be manned according to the nature and magnitude of the oil supply deficit.

## Decision-making

In an emergency, the formal decision of adherence to an IEA Collective Action will be made by the Minister of Foreign Affairs after consultations with the Minister of Petroleum and Energy. The other cabinet members will be informed in an appropriate way. Depending upon the actual situation, a decision on Norwegian participation might be made within 24 hours after the receipt of a proposal for an IEA Collective Action.

Following a decision to participate in an IEA Collective Action, the Minister of Petroleum and Energy decides on the measures in an emergency. Under the new compulsory stocks regime, companies are required to release the stocks in an effective and immediate manner.

The stockdraw process (release of industry stocks) will formally be headed by the MPE minister. He will use the Oil Emergency Board (OEB) as his instrument for the administration of the process, as the Board is made up of high ranking representatives from Norwegian oil companies and chaired by the MPE. The operational stock release would be undertaken by Statoil ASA and/or Esso Norway (the two refining companies). The Administration indicates that on request, Statoil's and/or Esso Norway's stockholding commitments of petroleum products can be lowered progressively, in line with the stockdraw rate and the sales process, the latter of which is organised as a tender process.

## 2.4 Stocks

### Stockholding Structure

Despite being a net exporter, Norway held government stocks until 2006, based on laws established in 1956 (the Act of Supply and Contingency Measures, subsequently amended in 1975).

In August 2006, Norway introduced new legislation with the Act of Petroleum Product Storing for Emergency Purposes, which imposed an obligation on companies to hold stocks of products equivalent to 20 days of their sales/imports in the domestic market, and also an obligation to implement stockdraw upon the Government's request, should a situation of supply deficit occur. The Act was provided with supplementary regulations, instituted in September 2006. As a consequence of this new legislation, the government stocks were sold in 2007.

Previous legislation allowed government control of company stocks only in case of war. In contrast, the new regulations mandate government control of company stocks during peacetime in the event of a supply disruption. The new stocks legislation covers only petroleum products; however, in wartime, the government can still take control of all crude oil stocks as well as industry-held product stocks.

The new compulsory stocks are commingled with commercial stocks. While there are no restrictions on location of stocks outside of Norway, no stocks are currently held abroad. Norway has no bilateral stockholding arrangements with other countries.

According to the Royal Decree of 1st September 2006 (Regulation relating Petroleum Product Storing for Emergency Purposes), the products comprised by the compulsory stockholding obligation embrace the three existing EU categories (§3 of the Royal Decree), namely gasoline (Cat.1), middle distillates (Cat.2) and heavy fuels (Cat.3). At least 40% of the stored products must be made up of these three categories (§6 of the Royal Decree), and "up to 40% of the total stockholding commitment may consist of crude oil, condensate or semi-finished products".

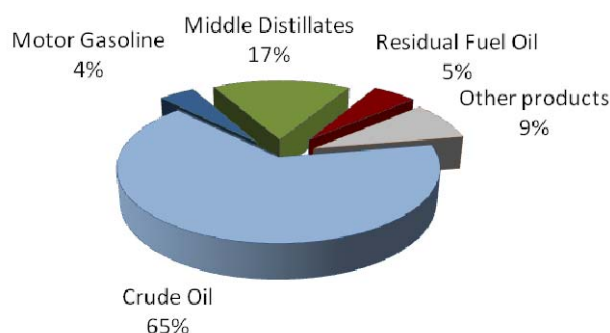
As stipulated in the Royal Decree (§10), "Compulsory stockholders or anyone storing petroleum products on behalf of the compulsory stockholder are bound to provide the Ministry with information

about imports, sales and stocks, etc. on a specific scheme. The report must be submitted four times a year (i.e. before 15th January, 15th April, 15th July and 15th October).

As of end-January 2011, total stocks (all industry-held) in Norway stood at 23 mb.

The new legislation includes provision for fines of up to EUR 1.27 million (NOK 10 million) per infringement of the obligation. There is no financial support to cover the cost of the company stock obligations; companies are allowed to pass on any additional costs through consumer prices.

**Total Oil Stocks by Type  
End January 2011**



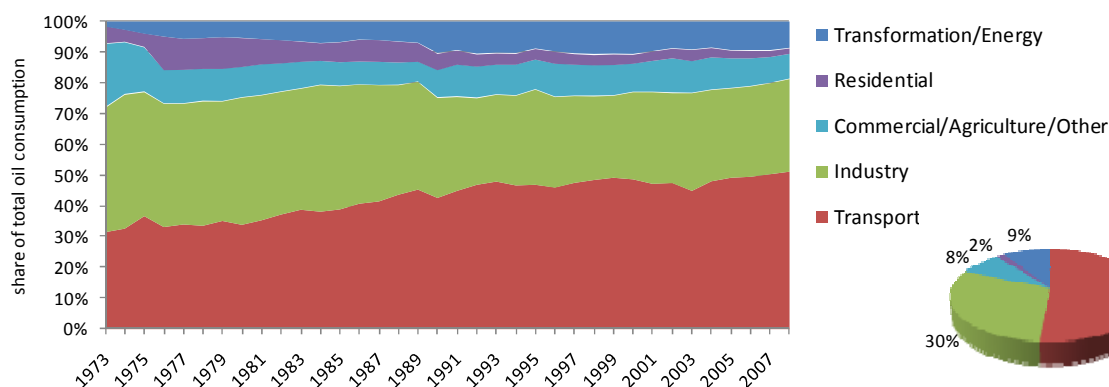
Source: Monthly Oil Statistics, IEA

### 3. Other Measures

#### 3.1 Demand Restraint

The transport sector makes up the majority of oil consumption in Norway, representing 51% in 2009. Thus the likely, most effective demand restraint measures would be targeted at the use of transport fuels.

**Oil Consumption by Sector<sup>2</sup>**



2009

Source: Oil Information, IEA

In accordance with the Act on Supply and Contingency Measures, the MPE established a set of regulations for a comprehensive demand restraint programme for oil products in 1983 (revised in 1999). The programme consists of three phases: saving campaigns (based on persuasion), restrictions (light and heavy-handed as well) and rationing by cards.

Norway considers that, in today’s oil market, traditional demand restraint measures (such as restrictions on deliveries) are less reliable as measures in an IEA emergency response, and the Norwegian policy is to implement stockdraw measures. This is mainly because of the lengthy preparation time and uncertain effects. However, the legal arrangements from 1983 that allow for the implementation of the demand restraint system have not been formally abolished.

<sup>2</sup> Total Consumption (including refinery consumption), does not include international marine bunkers.

Rationing by cards has always been regarded as a last resort in Norway and would only be implemented if the Government believed that the actual crisis would last at least for six months and domestic consumption had to be cut by 20% or more. Before implementation, a preparation phase of about three months would be required in order to prepare the necessary technical arrangements and make extensive preparations for the implementation and control of the effects of the rationing system. Other more light-handed demand restraint measures, such as saving campaigns and restrictions, would already have been put into effect during the preparation phase.

Norwegian authorities consider the oil rationing system to be a sub-optimal measure for mastering of peacetime oil supply crises, notably because of the long timeframe needed to prepare for the implementation and the building up of a huge apparatus on local and regional levels. The system is not yet formally abolished, but has been put into a dormant status.

## 3.2 Other measures

Norway does not have any potential for increased indigenous production in an emergency.

Fuel switching from oil is very limited and is not an issue on which Norway has focused. Norway's contribution to the IEA's fuel switching potential would thus be minimal. Of note, no legal powers exist or are deemed necessary.

# 4. Natural Gas

## 4.1 Market Features and Key Issues

### Gas production and reserves

Norway is a significant gas producer (production stood at 105.9 bcm in 2009) and is forecast to remain so for the upcoming decades. As such, all supplies are sourced directly from domestic production on the Norwegian Continental Shelf.

The Norwegian Administration estimated "remaining gas resources" at 4.0 tcm, of which 69% are discovered and 31% are undiscovered resources. The BP Statistical Review of World Energy 2010 puts Norway's gas reserves at 2.05 tcm.

In 2009, the Norwegian Administration indicated that total "marketed" gas production was 103.2 bcm,<sup>3</sup> of which 96.6 bcm was exported to Europe by pipeline and 3.4 bcm produced and exported from the Snøhvit LNG plant in the Barents Sea. The IEA estimates total indigenous production (including gas used for upstream oil and gas production) for 2009 at 105.9 bcm, up from 102 bcm in 2008.

The Norwegian Administration expects production to range between 105 bcm and 130 bcm over the 2010-2020 period, depending on exploration results and when new projects come on stream.

The Snøhvit LNG project was constructed to exploit the resources of three gas fields in the Barents Sea – Snøhvit, Albatross and Askeladd (240m to 345m deep) – which lie about 140 km northwest of Hammerfest in Norway. The LNG export terminal was completed in August 2007; its annual export capacity is 5.75 bcm (in gas equivalent).

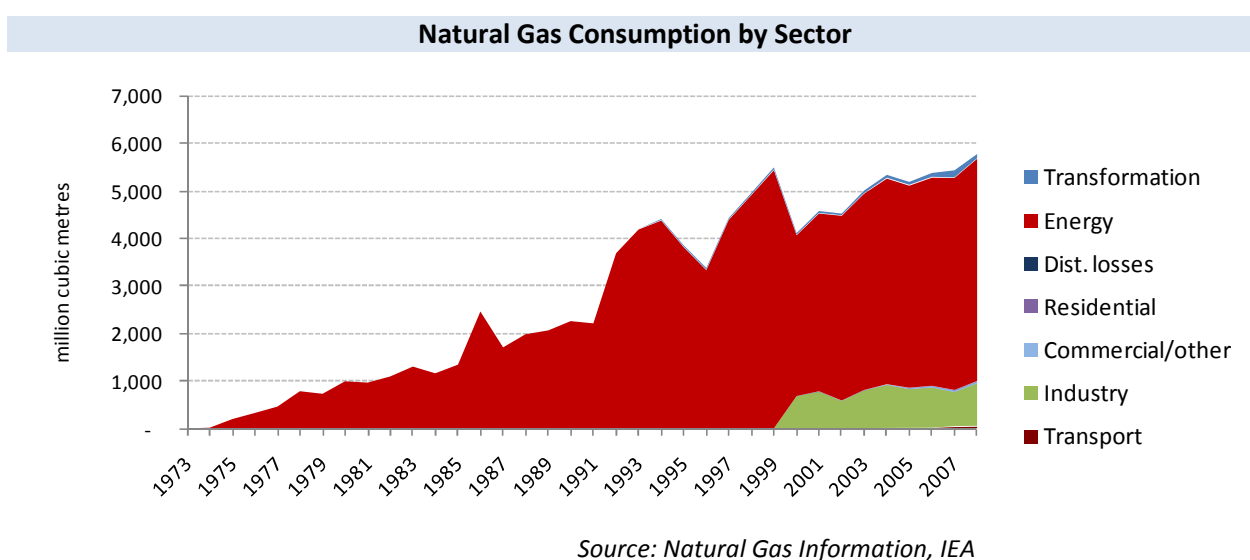
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<sup>3</sup> Total "marketed" gas does not account for most of the gas consumed by the upstream business.

## Gas demand

Norway is a major producer and exporter of gas, but not a large consumer. Indeed, domestic use of gas amounts to a very small percentage of the country's gas production (around 5%). Total gas consumption stood at approximately 5.9 bcm per year in 2009. Around 80% of the consumption, or about 4.7 bcm, occurs in the energy sector itself, in the upstream oil and gas extraction process.

Gas use for power is very small, standing at 767 mcm in 2009 – accounting for 3.5% of total power input. Total final consumption stands at around 1 bcm, of which the biggest consuming sector is industry, notably as natural gas is used as a raw material in chemical production. Consumption is minimal in all other sectors.



## Gas import dependency

Norway consistently exports almost 95% of its gas production (99.9 bcm in 2009, out of 105.9 bcm produced). Exports have traditionally been to Europe by direct pipeline (to the United Kingdom, France, Belgium and Germany). With the opening of the Snøhvit LNG terminal, Norway's exports will be further diversified.

## Gas company operations

In Norway, there are two main natural gas distributors, Gasnor AS and Lyse Gass AS. Gasnor operates in the south-western part of Norway, and Lyse Gass operates in the Stavanger area. Lyse Gass AS has reported deliverance of 59 million cubic meters (580 GWh)<sup>4</sup> of gas in 2009. Gasnor has reported deliverance of 206.5 million cubic meters<sup>5</sup> in 2009, of which 51.7 mcm was by distribution pipeline.

## 4.2 Natural Gas Supply Infrastructure

There is no integrated national downstream natural gas infrastructure or a natural gas market covering Norway in a comprehensive manner. There is also no public or strategic storage of natural gas or LNG in Norway.

<sup>4</sup> This figure also includes some energy which is not produced with natural gas

<sup>5</sup> The Norwegian administration uses standard cubic meters (SM3)



## 4.3 Emergency Policy for Natural Gas

The Norwegian Water Resources and Energy Directorate is the national independent regulatory authority for the downstream natural gas market, and Norway has implemented the relevant EU directives.

Despite large upstream production, the Norwegian downstream natural gas market is small, with total domestic consumption of natural gas in 2009 standing at 5.9 bcm, equivalent to less than 20% of the total domestic use of energy. Of note, over 80% of natural gas is consumed in the upstream oil and gas industry. Consumption in the residential, commercial and transport sectors is minimal.

According to the Norwegian Administration, security of supply is not an issue in the poorly developed Norwegian downstream gas market. Indeed, natural gas customers in Norway will always be connected to the electricity grid, thereby supplying them with energy for various needs.

Unlike in many other IEA countries, natural gas is not a key source of power generation. Indeed, hydro alone consistently accounts for over 96% of electricity production.

However, during the 2002-2003 winter, Norway experienced a drought followed by a cold wave, severely depleting its hydro reserves and making electricity rates rise fourfold in a matter of weeks. In response to this, Norway's first commercial onshore gas-fired power plant was built by Naturkraft at Kårstø. Interestingly, the 420 MW plant claims to have the lowest climate-gas emissions of any fossil fuel-based power plant in Europe, at a cost of around EUR 253 million (NOK 2 billion).

The Kårstø plant uses the vast gas resources from the Norwegian Continental Shelf, and started electricity production in the winter of 2007. The project can theoretically deliver up to around 3% of Norway's total electricity production (equivalent to around 175 000 households). The plant can use up to 600 mcm of natural gas per year, or approximately 0.5% of Norway's annual gas exports.

Of note, five gas turbines also provide power to Statoil's LNG plant from gas from the Snøhvit field.

## INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its primary mandate was – and is – two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply, and provide authoritative research and analysis on ways to ensure reliable, affordable and clean energy for its 28 member countries and beyond. The IEA carries out a comprehensive programme of energy co-operation among its member countries, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency's aims include the following objectives:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
  - Improve transparency of international markets through collection and analysis of energy data.
    - Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
    - Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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