2012

OIL & GAS SECURITY
Emergency Response of IEA Countries

The Netherlands

List of Figures

International Energy Agency

Netherlands

Key Oil Data

	1985	1990	1995	2000	2005	2009	2010	2011
Production (kb/d)	72.0	78.7	70.5	48.5	46.8	44.2	36.1	39.2
Demand (kb/d)	609.6	734.5	767.3	854.5	1 021.4	1 005.2	1 009.0	1 005.7
Motor gasoline	*78.6*	*79.8*	*93.1*	*93.1*	*94.8*	*96.7*	*96.6*	*98.6*
Gas/diesel oil	*140.1*	*150.5*	*158.2*	*177.8*	*192.1*	*179.1*	*189.0*	*193.0*
Residual fuel oil	*138.0*	*182.1*	*183.1*	*208.8*	*275.5*	*237.2*	*224.2*	*241.9*
Others	*252.9*	*322.1*	*332.9*	*374.8*	*459.0*	*492.3*	*499.2*	*472.1*
Net imports (kb/d)	537.6	655.8	696.8	806.0	974.6	961.0	972.9	966.5
Import dependency	*88.2%*	*89.3%*	*90.8%*	*94.3%*	*95.4%*	*95.6%*	*96.4%*	*96.1%*
Refining capacity (kb/d)	1 499	1 381	1 187	1 188	1 228	1 208	1 236	1 236
Oil in TPES	33.4%	35.9%	34.5%	36.2%	38.6%	39.0%	37.9%	-

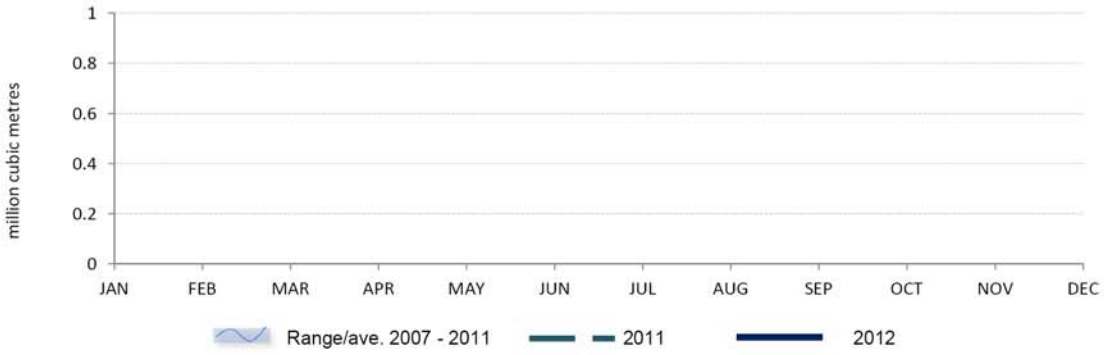
End-Month Total Oil Stock Levels[1] - Five Year Range

Key Natural Gas Data

	1985	1990	1995	2000	2005	2009	2010	2011 *
Production (mcm/y)	85 203	76 249	84 934	72 821	78 510	78 712	88 510	81 088
Demand (mcm/y)	45 998	43 022	48 160	48 851	49 304	48 960	54 849	49 052
Transformation	*11 333*	*9 925*	*11 873*	*14 410*	*16 104*	*17 562*	*18 660*	-
Industry	*11 735*	*12 274*	*12 851*	*12 557*	*11 453*	*9 432*	*10 534*	-
Residential	*14 154*	*10 978*	*12 024*	*11 119*	*10 496*	*10 414*	*12 057*	-
Others	*8 776*	*9 845*	*11 412*	*10 765*	*11 251*	*11 552*	*13 598*	-
Net imports (mcm/y)	- 39 205	- 33 227	- 36 774	- 23 970	- 29 206	- 29 752	- 33 661	- 32 036
Import dependency	-	-	-	-	-	-	-	-
Natural Gas in TPES	*53.7%*	*47.5%*	*49.4%*	*48.9%*	*45.7%*	*45.0%*	*47.1%*	-

** based on monthly data submissions to the IEA.*

End-Month Natural Gas Stock Levels[2] - Five Year Range



1 -Primary oil stocks on national territory; these exclude utility stocks and including pipeline and entrepot stocks where known.
2 -Stocks held on national territory, as reported to the IEA in monthly data submissions.

OVERVIEW

Oil and natural gas represented respectively 38% and 47% of the Netherlands's total primary energy supply (TPES) in 2010. While their share in the energy mix is expected to decline slightly over the next decade, demand for both fuels will rise as total energy demand in the country grows. The Netherlands plans to meet its future energy needs with an "all-in" approach, seeing a role for all fuels including nuclear, and pursuing a goal of increasing renewable energy from the 4% it represented in 2010 to 14% by 2020. In terms of fossil fuels, new coal-fired power plants will come on-line in the coming years while natural gas will remain the country's key fuel, serving as the back-up source for intermittent renewable power generation.

Oil demand in the Netherlands was roughly 1 million barrels per day (mb/d) in 2010, with an import dependency of just over 96%. Domestic oil production is in decline in the Netherlands, and despite the extension of output made possible by new upstream techniques, the country will gradually move towards becoming fully import dependant in meeting its oil needs. At the same time, the Netherlands plays a key role as a major oil-refining centre in Europe, with an extensive supply network of ports, storage facilities and pipeline connections playing a critical role for oil supplies to the continent. Likewise for natural gas, the country plays a regional role for supply security. However unlike for oil, the Netherlands produces more gas than it consumes domestically, making the country a net-exporter. Substantial gas reserves remain and are expected to allow the Netherlands to continue as a net exporter of gas over the coming decade.

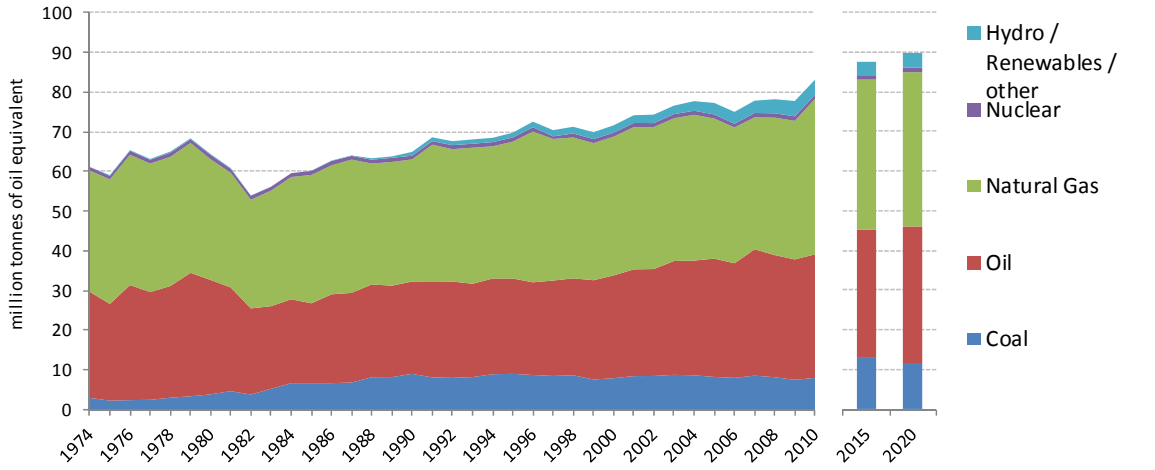
The emergency oil response system of the Netherlands is based on a mixed system of mandatory emergency reserve stocks held by both the industry and the Dutch stockholding agency, COVA. In times of an IEA collective action, the most likely response by the Netherlands would be a drawdown of the public stocks held by COVA. The agency covered 90% of the Netherland's total domestic stockholding obligation in 2011, however this share could decline to 80% in the future, in conjunction with the transposition of the EU directive on emergency oil stockholding by end-2012.

Concerning the security of natural gas, the Dutch gas production and infrastructure capacities provide a significant level of security for domestic supply. However, as domestic production declines (the Netherlands is expected to become a net importer of gas sometime in the period 2020 to 2025), well timed investments in storage capacities and LNG installations will be necessary to maintain supply flexibility. The transmission system operator, GTS, along with the distribution system operators, must report every two years detailing capacity needs and planned investments in network capacity to ensure security of supply. GTS is also responsible for taking emergency measures in a gas crisis, and would be responsible for assuring gas supplies to priority customers (households and small businesses) in extreme cold conditions.

1. Energy Outlook

Oil and natural gas represented respectively 38% and 47% of the Netherland's total primary energy supply (TPES) in 2010. The combined share of the two fuels in the supply mix has remained relatively stable over the past 2 decades, at 85% of TPES, compared to a combined share of 95% in the mid-1970s. Coal represented 9.5% of TPES in 2010, down from a high of just under 15% in 1990, having been gradually replaced by renewable energy sources (primarily biomass co-fired in coal plants). In 2010, renewable energy provided 4.5% of TPES, while nuclear made up the remaining 1% of the country's energy supply.

Total Primary Energy Supply



Source: Energy Balances of OECD Countries, IEA

The Netherland's TPES has risen steadily since the mid-1980s; in the period from 2000 to 2010 it increased at an average annual rate of 1.5%. Available projections[1] for energy use in the Netherlands imply TPES growing at an annual average rate of just under 1% from 2010 to 2020, rising from 83 million tonnes of oil equivalent (Mtoe) in 2010 to 90 Mtoe in 2020.

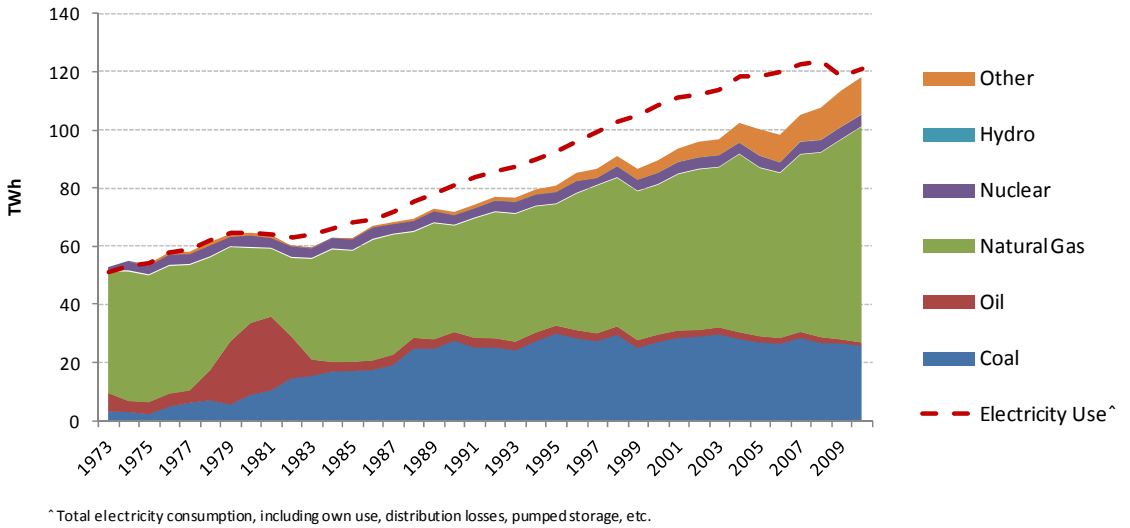
The European directive on renewable energy requires the Netherlands to meet 14% of total energy consumption from renewable energy production by 2020. In its Energy Report 2011, the Dutch government states its intention to meet future energy needs and cleaner energy targets with an "all options open" approach. Natural gas is seen as the natural back-up to the deployment of renewable energy, while new coal fired power plants with biomass co-firing obligations will contribute to the plan of having 30% of electricity generation from renewable energy by 2020. At the same time, the 2011 Energy Report states that nuclear energy is an important pathway to a sustainable energy supply.

A 2010 study[2] on the future of Dutch energy use to 2020 provides a reference projection of how energy demand, the share of renewable energy and emissions of greenhouse gases could potentially evolve under different policy scenarios. In all scenarios, the combined share of oil and natural gas is expected to fall below 80% of total energy use by 2015, while the use of coal is expected to rise substantially in the period to 2015 as new power plants come on-line.

1 Based on growth rates derived from the ECN/PBL report *Reference Projection Energy and Emission 2010-2020* (http://www.pbl.nl/publicaties/2010/Referentieraming-energie-en-emissies-2010-2020); fixed policy scenario.

2 ECN/PBL report *Reference Projection Energy and Emission 2010-2020*

Electricity Generation, by Fuel Source



^ Total electricity consumption, including own use, distribution losses, pumped storage, etc.

Source: Energy Balances of OECD Countries, IEA

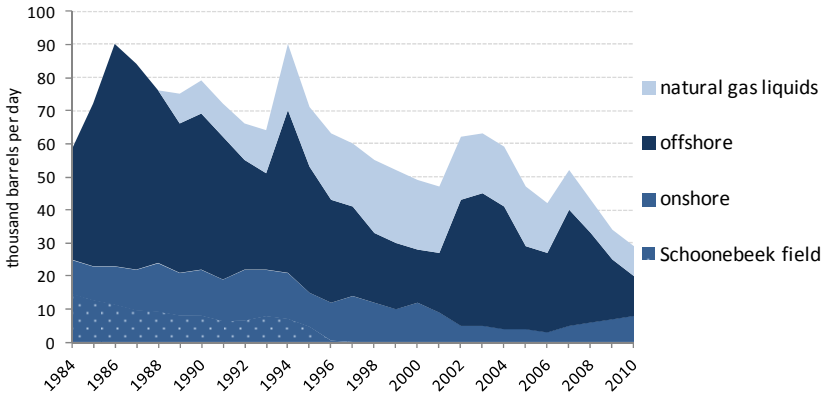
2. Oil

2.1 Market Features and Key Issues

Domestic oil production

Domestic oil production began in the Netherlands following the discovery of oil deposits near Schoonebeek in 1943. Production from other onshore fields in the area of Rotterdam as well as from the Dutch sector of the North Sea beginning in 1982, contributed to total production reaching a peak of 90 kb/d in 1986. In 2011, total indigenous oil production in the Netherlands, including crude oil and natural gas liquids averaged 31 kb/d. Non-conventional oil provided an additional 8 kb/d in domestic production

Crude and natural gas liquids production in the Netherlands– 1984 to 2010



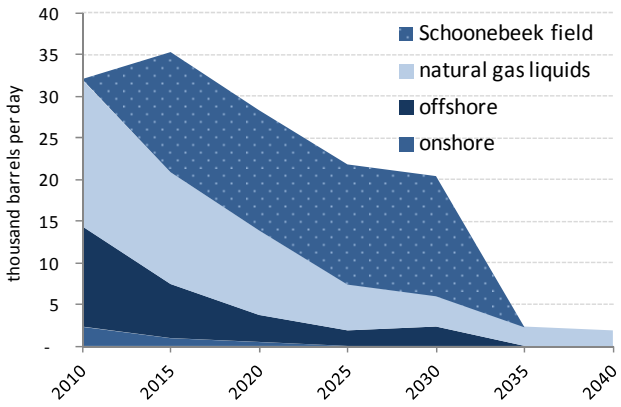
Source: Monthly Oil Statistics, IEA; Dutch Administration

Production at Schoonebeek was stopped in 1996, having produced only a quarter of the fields estimated reserves, as the crude stream was considered too viscous for production to be economically viable. Enhanced oil recovery techniques such as steam injection and horizontal

drilling have reversed this, and in January 2011 the field was officially reopened for production. Production from the field is expected to average some 14 kb/d over the coming 25 years, with all amounts to be exported by rail to the refinery in Lingen, Germany.

Oil production from fields other than Schoonebeek, both onshore and offshore, is projected to continually decline. Total indigenous production in the Netherlands is forecasted to rise to just over 35 kb/d in 2015 and then decline steadily thereafter. Beyond 2035, only a small amount of natural gas liquids production is expected to continue. Import dependency, which equated to just over 96% in 2010, will therefore decline slightly in the period to 2015. After this period, the Netherlands will gradually move towards becoming fully dependant on oil imports to meet domestic demand.

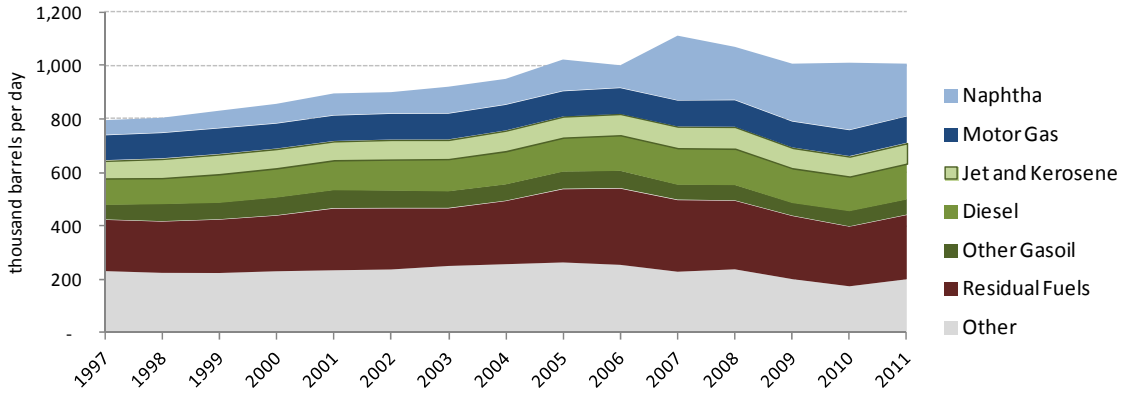
Crude and natural gas liquids production in the Netherlands - outlook to 2040



Source: Dutch Administration

Oil demand

Oil Consumption, by Product



Source: Monthly Oil Statistics, IEA

Oil product demand in the Netherlands averaged just over 1 mb/d in 2011. Total oil use has grown at an annual average rate of 1.5% since 2000. The industry and transformation sectors, which account for over half of all oil used in the Netherlands, have been the primary sectors leading oil demand growth. Oil consumption in these sectors has grown by an average of over 5% per year since 2000. Rising oil use has been primarily in the form of naphtha used by the petrochemical industry in these sectors. Demand for naphtha grew at an annual average rate of 9.5% from 2000 to 2011. Over the same period, demand for diesel grew by an average of 1.8% per year. Residual fuel oil was the second largest component of the oil products going to the Dutch market, however the vast majority of this, 98%, goes to international marine bunkers, fuelling international sea-going ships.

Total oil demand is expected to continue to grow in the coming years at an annual average rate of just under 1%. This rate would infer oil demand reaching 1.1 mb/d by 2020. The industry sector, which accounted for just over 40% of oil demand in 2010 and which includes the petrochemical industry, will continue to be the driving force behind oil demand growth. The transport sector, which accounted for 40% of 2010 demand, is expected to decline due to improved fuel economies and alternative fuel uses such as electricity and bio-fuels.

Oil Demand (kb/d)

	2000	*2011*	*% change p.a.*
LPG and Ethane	67	54	*-1.9%*
Naphtha	73	197	*9.5%*
Gasoline	93	99	*0.5%*
Kerosene	72	76	*0.5%*
Diesel	110	135	*1.8%*
Heating/other Gasoil	68	58	*-1.4%*
Residual Fuels	209	242	*1.3%*
Other Products	163	145	*-1.1%*
Total Products	**854**	**1,006**	*1.5%*

Source: Monthly Oil Statistics, IEA

Imports/exports and import dependency

With total refinery output in the country (1.25 mb/d) greater than domestic demand, the Netherlands is a net exporter of refined products. At the same time, large volumes of crude and oil products enter the country, only to be exported to neighbouring countries, as regional suppliers take advantage of available port and storage infrastructure. Thus the Netherlands is a key link in European oil supply flows, with volumes of oil transiting totalling over four times larger than Dutch oil demand.

In 2011, total imports (not including transit volumes) of crude oil and NGLs were nearly 60 million tonnes (Mt), or an average of 1.27 mb/d. Roughly a quarter of these imports were from the North Sea, a third from Russia and another third from OPEC member countries.

Total output of finished products from domestic refining was 57.4 Mt, or an average of 1.23 mb/d in 2011. The Netherlands also imported 1.8 mb/d of oil products in 2011, compared to just over 2 mb/d of product exports. Net exports of gasoline (109 kb/d in 2011) were primarily to North America while net exports of middle distillates (337 kb/d) were primarily to Germany, Belgium and France. At the same time, the Netherlands was a net importer of fuel oil, naphtha and "other products" for the petrochemical sector (207 kb/d in 2011), mostly from Russia.

Oil company operations

Dana Petroleum and NAM (jointly owned by Shell and ExxonMobil) are the country's main domestic crude oil producers. NAM is also the country's largest natural gas producer.

Five companies operate refineries in the country, with Shell and BP operating the two largest (Pernis and Europoort, respectively), while ExxonMobil and Kuwait Petroleum (KPC) also operate refineries located in the Rotterdam area. Total and Lukoil jointly operate the Zeeland Refinery in Vlissingen.

The Dutch Association of Petroleum Industry (VNPI) represents the 10 main companies operating on the Dutch upstream, retail and wholesale oil market. These companies collectively represent 99% of production and 80% of oil products sold on the Dutch market.

VOTOB is an association representing 14 independent tank storage operators in the Netherlands, defined as companies providing logistic services to customers without having

ownership of the products in custody. These companies temporarily store liquid products for customers, with tanks ranging in size from 100 to 100 000 cubic metres.

Another industry association on the Dutch oil sector is NOVE, which represents independent companies trading, selling, transporting and storing liquid fuels and lubricants on land and water. NOVE has 185 members representing 75% of independent fuel traded by volume.

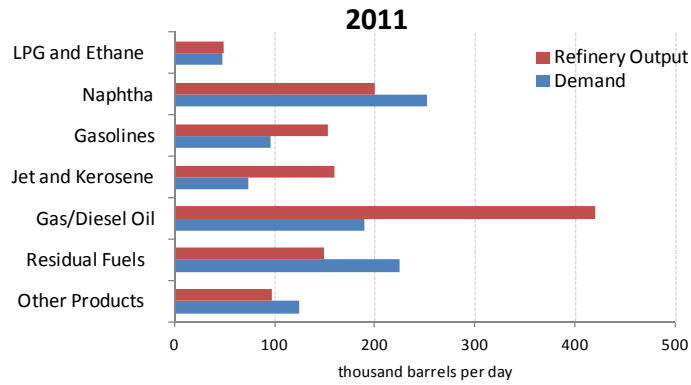
2.2 Oil Supply Infrastructure

Refining

There are five refineries in the Netherlands, with a total crude distillation capacity of roughly 1.2 mb/d. One of the refineries (Total/Lukoil) is located in Vlissingen; the other four (ExxonMobil, KPC, BP, and Shell) are located in the Rotterdam area.

The Dutch refinery industry is primarily focused on exports, with most of its product output (63%) directly exported. Furthermore, another 12% of output from the refineries is exported by the petrochemical industry.

Refinery Output vs. Demand



Source: Monthly Oil Statistics, IEA

European energy legislation places high priority on environmental sensitivity, which has led to very strict sulphur limits for Dutch refineries. Legislation for the international shipping community (IMO) will entail further desulphurisation of vessel fuels (bunker fuels). Worldwide the 4.5% sulphur content will decrease to 3.5% in 2012 and to 0.5% in 2020. In the Baltic and North Sea area, sulphur content will drop to 0.1% by 2015.

A 2011 consultancy study[3] commissioned by the Dutch government notes that more stringent product specifications in the future may jeopardise the competiveness of the Dutch refinery industry as big investments are needed in order to meet compliance regulations. The study notes that the European Commission expects investments required to upgrade European refining capacities in the period 2005 - 2030 will be between € 17.8 and € 29.3 billion, of which between € 3.3 and € 11.7 billion will be used for marine sulphur fuel specification changes.

The main conclusion from the study is that the Dutch refinery industry has to continue improving its competitive advantages in a changing and highly competitive landscape. Rising investment requirements, for example due to desulphurisation, are coming at a time when the regional market is slightly declining, and as refineries act in a global business environment, the competitiveness of refineries might decline sharply due to permit restrictions and legislation. It concludes that "the result will be increasing pressure on margins (which are already low), in the end leading to closures of refineries."

3 Pre study MEE, *Enterprise under restraint "A transition perspective for Dutch refineries towards 2030"*; October 2011. http://www.vnpi.nl/Files/file/EnterpriseunderRestraint.pdf

Ports

Dutch ports are of international importance and the country is the largest hub in Europe for inland waterway bunkering.

Oil Infrastructure Map

The Rotterdam area is well connected with the hinterland, both by river and by pipeline. It is the world's third largest marine bunker harbour, after Singapore and Shanghai. The Rotterdam harbour is eager to develop itself as an Energy Harbour for the future, and is oriented in developing bio-based industries and bio-fuel production and stockholding plants.

The Vlissingen port is where the Zeeland Refinery is located. The port is situated in the area between the Antwerp and Rotterdam ports and is therefore of strategic importance to balance supply to both demand centres.

The Amsterdam port is especially oriented towards oil products and has developed into one of the most important gasoline stockholding sites in the world.

The Delfzijl/Eemshaven port area is undergoing strong development with new tank capacity for strategic stockholding and for bio-fuels.

Pipelines

There are two major crude oil pipelines in the Netherlands: the Rotterdam-Rhine (RRP) pipeline to Germany's Ruhr region has a capacity of 400 kb/d; the Rotterdam-Antwerp (RAP) pipeline to Belgium's Antwerp area has a capacity of 600 kb/d.

There is a major product pipeline, the Rhine-Main (MMP, also referred to as the RMR) pipeline to Germany, with a capacity of 250 kb/d. There are also two pipelines delivering supply to Schiphol Airport: a pipeline from the Amsterdam harbour to Schiphol (APS), and a pipeline from Rotterdam to Schiphol which is part of the pipeline grid of the Central Europe Pipeline System (CEPS) of NATO. This later pipeline is managed and operated by DPO (Defensie Pijpleiding Organisatie) of the Ministry of Defense.

In the Rotterdam area and the south-west of the country there is a huge grid of pipelines between the terminals, depots and the refineries, including the Zeeland Refinery.

Storage capacity

Total storage capacity in the Netherlands is estimated at some 189 mb (30 mcm). Most of this is in the Rotterdam area, but Amsterdam and Vlissingen also have abundant storage capacity. In addition to the large terminals of the oil companies, several independent tank storage companies have large stockholding capacities in the Netherlands. The largest is the Maasvlakte Olie Terminal (MOT) near Rotterdam. A joint venture of BP, ExxonMobil, Kuwait Petroleum, Shell, Total and Vopak, the MOT is one of the world's largest oil terminals comprising crude oil in 39 tanks with a total capacity of 28 mb (4.4 mcm).

Oil Storage Capacity, by Main Storage Areas

Storage area	Number Of Tanks	mcm	mb
Amsterdam	664	5.23	32.92
Delfzijl/Eemshaven	89	1.01	6.33
Geertruidenberg	17	0.06	0.38
Rotterdam	2,309	12.69	79.85
Vlissingen	48	0.15	0.91
at refineries (est.)	*na*	9.85	62.29
Total storage capacity		**30**	**189**

Source: Dutch Administration

In the east of the Netherlands, near Hengelo, there are plans for creating 3 salt caverns for holding up to a total of 2.8 mb of diesel. Each cavern would be 150 000 cm at a depth of 450 meters. The final licenses approvals are still pending.

Due to the relatively large size of storage capacity in the Netherlands, as well as the relatively large number of bilateral agreements that the Administration has concluded (see *2.4 Stocks* section below), Dutch companies are very active in regional stockholding arrangements. Storage capacity in the Netherlands often serves as means for international oil companies to optimize

their stockholding requirements coming from operations in other European countries. At the end of 2011, approximately 1.3 mb of crude oil, and over 35.5 mb of refined product tickets were covered in the Netherlands for the benefit of other countries under bilateral agreements. The crude oil stocks were held for the benefit of Germany, while the bulk of the refined product ticket amounts were held on behalf of Italy and the UK (12 mb and 15 mb respectively). Other countries, for which refined product tickets were also being covered at end-2011, included Belgium, Denmark, Ireland, Luxembourg and Sweden.

2.3 Decision-making Structure for Oil Emergencies

The Minister of Economic Affairs, Agriculture and Innovation (EL&I) is responsible for oil and natural gas emergency policy. Flexibility is a vital component of Dutch emergency response policy. In most crisis situations, the Dutch Administration believes that regular market forces should adequately allocate oil instead of the activation of any sharing system.

The precise mix of emergency measures to be used in the Netherlands in a crisis would be determined according to the nature and expected duration of the crisis and the needs of the markets. However, Dutch oil emergency policy points toward a strong preference for stockdraw in most emergency situations.

The Dutch National Emergency Strategy Organisation (NESO) prepares and advises the Minister of Economic Affairs, Agriculture and Innovation and/or the Cabinet on matters of oil emergency measures and their implementation. In normal times, the NESO comprises officials from the Energy Markets Directorate in the Directorate-General for Energy, Telecom and Competition. In emergency situations (as well as for test purposes), the basic NESO organisation is enlarged to include officials from other relevant departments. Contact between the NESO and industry is co-ordinated through the Oil Industry Advisory Group. The NESO would also be in contact with other departments, international organisations and the Dutch stockpiling agency (COVA).

During a crisis, the NESO would convene a number of “Measure Groups” to prepare and execute specific measures. These groups would be staffed by representatives from the various ministries and from the oil industry. Industry would be consulted and would have a role in the preparation and implementation of specific measures (e.g. stockdraw and refinery measures), however it would not participate in decision-making within the governmental structure.

2.4 Stocks

Stockholding Structure

The Netherlands has a mixed system, in which both the industry and a government agency COVA are required to hold emergency stocks. Due to their international activities, refining and supplying companies tend to hold unusually high volumes of stocks as part of normal operations. In effect, the Netherlands is always holding well in excess of its obligations under both EU and IEA requirements.

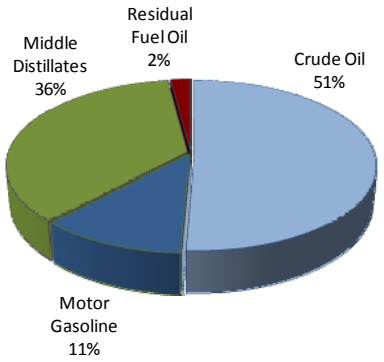
According to Dutch legislation (2001 Oil Stockpiling Act), any company that brings more than 100 thousand tons of qualifying products into the Dutch market (in any given calendar year) is obliged to hold 5% of such excess quantities as compulsory stock. In total, this equates to roughly 13.5 days of net imports. COVA, an independent stockholding agency, is responsible for holding the balance of the total national requirement of 90 days of net imports – i.e. approximately 76.5 days of net imports.

Every year in March, the Dutch authorities calculate the new stockholding obligation of the industry, based on the figures from the previous year. The authorities then calculate the obligation for COVA. COVA must comply with these obligations by 1st July and companies by the 1st April of that year.

For the period of 1st July 2011 to 1st April 2012, the total domestic stock obligation was 5.1 Mt. COVA's stockholding obligation equated to 4.5 Mt while the stockholding obligation on industry was 0.6 Mt (this is roughly 33 mb and 4.4 mb, respectively for the obligations on COVA and industry; exact conversions to volume would depend on the actual mix of crude and products).

Crude or Products

Public Oil Stockholding (COVA), by type, end-2011



31.1 million barrels

Source: Monthly Oil Statistics, IEA

The industry can fulfil stockholding obligations through either crude oil or products. As the obligation stemming from the Stockholding Law is formally calculated in tonnes of products, the industry can use a conversion factor (yield) to calculate from crude oil into products.

To cover its stockholding obligation from July 2011 to April 2012, COVA entered into ticket contracts with the domestic oil industry for 0.71 Mt of oil products. The remaining stock obligation of COVA (3.8 Mt) consists of crude oil, gas oil and motor gasoline which is fully owned by COVA and pledged to the State of the Netherlands. At end-2011, COVA owned stocks equated to some 31 mb. COVA holds just over half of its overall stock obligation as crude oil.

Location and Availability

Due to the high cost of storage in the Rotterdam area, around one-third or some 13 mb (1.8Mt) of COVA crude oil stocks are held in salt caverns near Wilhelmshaven (Germany). The remaining quantities of crude are held in above ground storage in the Netherlands.

Company stock obligations are held as part of normal operating inventories, as the Oil Stockholding Act requires companies to own or fully control certain quantities of stocks but does not require a physical separation or even an administrative distinction between the various types.

Under normal operating conditions, the minimum operating requirements (MOR) of the Dutch oil industry is estimated at approximately 13 days for crude oil (compared to refinery intake average in 2011) and 13 days refined product (compared to 2011 average oil demand). In the case of the MOR for crude oil, this is the equivalent of 13.5 mb (1.8 Mt), compared to industry stock levels in the country which have typically ranged between 40 and 50 mb in recent years.

Many traders on the Dutch market have little to no inventory levels, instead operating just in time deliveries from refineries or depots directly to customers by trucks. In such instances, companies are able to fulfil their stockholding obligation with stockholding ticket contracts. Emergency stocks may also be held abroad, without restriction as to the portion of the obligation, as long as bilateral agreements are in place. The Netherlands has bilateral agreements with 11 countries: Belgium, Luxemburg, Germany, Sweden, Denmark, the UK, Italy, Slovenia, Ireland, Cyprus, and New Zealand.

Monitoring and Non-compliance

Under the 2001 Oil Stockholding Act, companies with stockholding obligations (including both national obligations and/or reserved stock obligations by tickets) are required to submit monthly reports on their relevant stock levels to the Minister of EL&I. The reports are checked by the ministry, which may delegate the Tax Inspection Service of the Ministry of Finance to conduct audits of the records and on-site physical checks. Any suspected infringement is reported to the Fiscal Intelligence and Control Service/Economic Inspection Service (FIOD/ECD) of the Ministry of Finance for further investigation.

If an infringement is confirmed, prosecution will result. Penalties include fines and – in severe cases – the company's board members may be imprisoned. COVA is also subject to monitoring by the Ministry of EL&I. If the ministry believes that COVA is "seriously neglecting its duties", the agency will be given opportunity to rectify its shortcomings within a time period determined by the ministry. If COVA fails to comply, the minister could institute whatever measures were deemed appropriate.

Stock Drawdown and Timeframe

In an oil crisis, all compulsory stocks are at the disposal of the Minister of EL&I, who has the authority to invoke a variety of statutes, depending on the situation. In principle, a decision to authorise a stockdraw could be taken within 24 hours.

In most situations, a stockdraw would firstly focus on making COVA stocks available through a tendering mechanism. It would be carried out in full co-operation and consultation with international bodies and/or other countries.

Once their obligation to hold stocks has been lowered, companies with a stockholding obligation are expected to co-operate through voluntary drawdown of their stocks. An order to companies to drawdown their inventories would only be considered in a very severe crisis.

The time required for physical delivery of stocks would depend on the specific circumstances. In times of great urgency, some smaller volumes could be realised within one day, while more time

would be necessary for the release of more substantial volumes due to, for example, time needed to charter ships or loading times at ports. If normal market procedures are followed (offering process, tender procedures, etc.), the delivery would take some weeks. Repatriating underground crude from Germany would need extra time for transport and processing, and could take about six weeks. In most circumstances, however, the Dutch authorities expect to use stocks swaps as a means of gaining access to stocks held in Rotterdam and Wilhelmshaven.

Financing and Fees

The operational costs and financial expenses of COVA are covered by a stockholding levy which has been defined at a maximum of 5.90 Euro/m³ in the 2001 Oil Stockpiling Act and can be amended by Order of Council. The stockholding levy on gasoline, diesel and heating gas oil was 5.9 Euro/m³ at end-2011.

No levy is charged on domestic deliveries of residual fuel oil because volumes are marginal. The stockholding levies are paid by the consumer to the companies that bring the qualifying products into the domestic Dutch market, and are defined by the payment of excise duty. Both the excise duty and the stockholding levy are collected by the tax authorities; the latter is passed on to COVA. No financial support is given to companies subject to compulsory stockholding obligations. Thus, costs are implicitly passed on to final consumers in market prices.

3. Other Measures

3.1 Demand Restraint

While not likely to initiate demand restraint measures as an initial response to an oil disruption, the Netherlands has defined a programme of demand restraint measures that would help reduce the rate of final oil consumption. In practice, demand restraint measures would only be considered for longer lasting supply disruptions.

The Dutch demand restraint programme focuses first on voluntary measures. If voluntary measures prove to be inadequate, Dutch authorities can proceed to obligatory measures. The NESO would aim to reduce the private and recreational use of petroleum products, while leaving basic economic activities untouched, as much as possible.

Decisions to implement demand restraint measures would be taken by the Minister of EL&I, or by the Cabinet, based on a proposal by this minister. The minister would be advised by the NESO Operational Team (within the ministry) and by an Interdepartmental Policy Team for the Cabinet. On average the preparation of a Cabinet decision may take 2 to 3 weeks, or shorter if urgency so requires. However, after such a decision is made, there are lead times for implementation. In practice, however, both periods may partly run parallel. Time is necessary for preparing all issues related to the implementation, such as communications, control systems, instructions to relevant parties, etc. The necessary time will differ per measure.

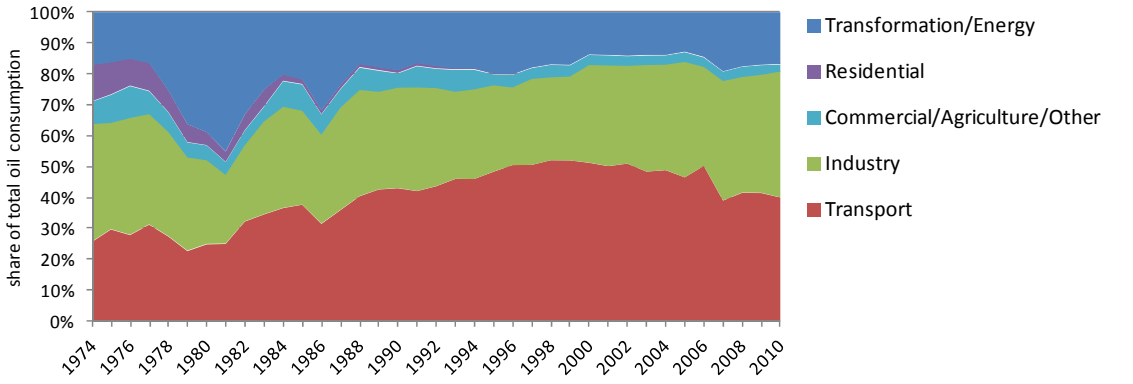
The NESO has prepared the following set of demand restraint measures, which could be implemented on short notice:

- communication to the public, including a call for voluntary reduction of oil consumption;
- reduction of speed limits;
- Sunday driving bans (allied with bans on pleasure boating and flights);
- supply of priority end-users and critical infrastructure sectors;
- request for appropriate refinery action; and
- bans on filling containers to limit hoarding.

A 2010 report by the Energy Research Centre of the Netherlands (ECN) [4] estimated the potential volumetric savings of demand restraint measures related to the transport sector in the Netherlands. This estimated that, because of the relatively low level of the share of the transport sector in total oil use (due to the relatively large share of oil use in petrochemical industry sector), oil demand reduction in road transport of between 20 and 30% would be necessary to achieve a 7 to 10% reduction in total national oil demand. The study assumed that the effect of high prices would be to reduce total oil demand by 2% to 4%. The study further estimated the potential reductions in total oil demand from the following measures: Sunday driving ban (1% to 1.5%); work-trip reduction policies (0.5% to 1%); and carpooling (up to 2.5%).

4 http://www.ecn.nl/nl/nieuws/newsletter-nl/2010/mei-2010/optimaal-rantsoeneren-bij-oliecrisis/

Oil Consumption by Sector[5]



Source: Oil Information, IEA

3.2 Surge Production

Short-term surge production capacity in the Netherlands is considered inconsequential.

Since the Dutch oil fields are normally operated at full capacity, there is little potential for increasing indigenous production in an emergency. Market forces (price-induced optimising of the production profiles during lifetime of the fields) will induce oil producers to increase production during an emergency, for example by postponing maintenance. There is no policy or legislation in place to require surge production in a crisis.

3.3 Fuel Switching

Oil use in the Netherlands is heavily concentrated in sectors which do not provide opportunities for short term switching, such as transportation and industry (petrochemical) sectors. Natural gas is used for heating and boiling in the Netherlands, thus the short term switching from oil to other fuels is hardly an option, with only minor effects.

There is hardly any power generation based on oil left in the Netherlands. If fuel switching happens, most of the time it would be fuel switching from electricity/gas to oil.

5 Total Consumption (including refinery consumption), does not include international marine bunkers.

4. Natural Gas

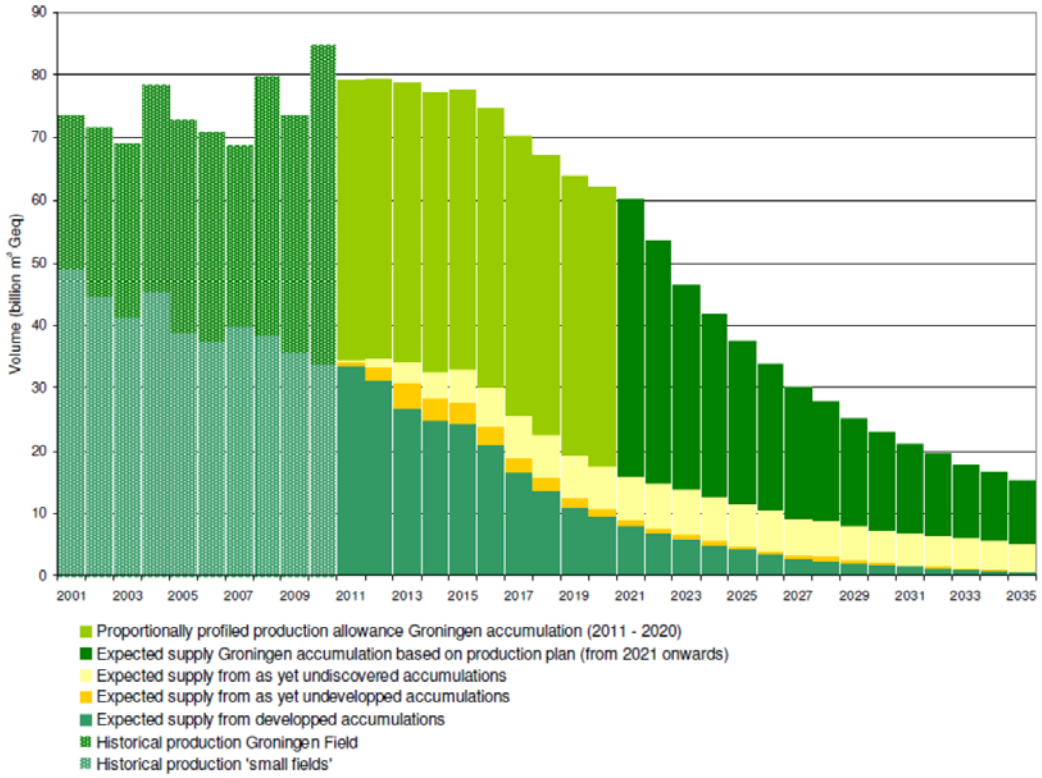
4.1 Market Features and Key Issues

Gas production and reserves

The Netherlands became a significant producer and exporter of natural gas following the discovery in 1959 of a gas field near the village of Slochteren in the northern province of Groningen. Offshore production in the Dutch sector of the North Sea began in the 1970s. As of end-2010, the Netherlands had produced a cumulative total of nearly 3.2 trillion cubic metres (tcm) of natural gas, while remaining gas resources were estimated at 1.3 tcm. Of these remaining resources, the Groningen field accounted for 980 billion cubic metres (bcm), with 160 bcm to be found in other smaller onshore fields and 164 bcm in offshore formations.

The Netherlands produces two types of natural gas, one with a low-range calorific value below 10.5 kWh/m³ (L-gas), mainly from Groningen, and one with a high calorific value from 10.5 to 12.8 kWh/m³ (H-gas), from smaller fields. H-gas and L-gas must be transported on separate networks. Both residential and commercial gas users in the Netherlands are equipped to burn the Groningen-quality L-gas, while industry and power generators use mostly H-gas.

Natural gas production in the Netherlands – 2001 to 2035



Source: Natural Resources and Geothermal Energy in the Netherlands, Annual review 2010

In 2010 total production of natural gas in the Netherlands was over 85 bcm. The Groningen field is by far the largest source of Dutch gas production, and accounted for some 54 bcm of the 2010 total. The natural geology of the field allows for a great amount of flexibility in adjusting the

field's output flow in order to respond immediately to actual demand from end-users. This allows the field to play a role of swing producer in order to meet seasonal fluctuations in demand.

Indigenous gas production in the Netherlands is expected to continually decline over the coming decades. Future production levels are linked to a Dutch gas policy provision, which sets a maximum allowance for Groningen total output to ensure that the Groningen field can continue to fulfil its function as a swing producer for the longest period possible. For the period from 2011 to 2020, this cap is set at to 424.7 bcm Groningen-equivalent gas (Geq). This implies an annual production of 44.6 bcm (Geq), however the flexibility role for the Groningen field necessarily implies some uncertainty as to its annual output over this period.

Based on the Dutch Administration's outlook for indigenous production and domestic use of natural gas, the Netherlands is expected to shift from being a net-exporter to being a net-import of gas in the period between 2020 and 2025.

Upstream regulations and incentives

The Dutch Administration's "small fields policy" seeks to preserve the longer term production potential from the Groningen field by encouraging production from more marginal fields.

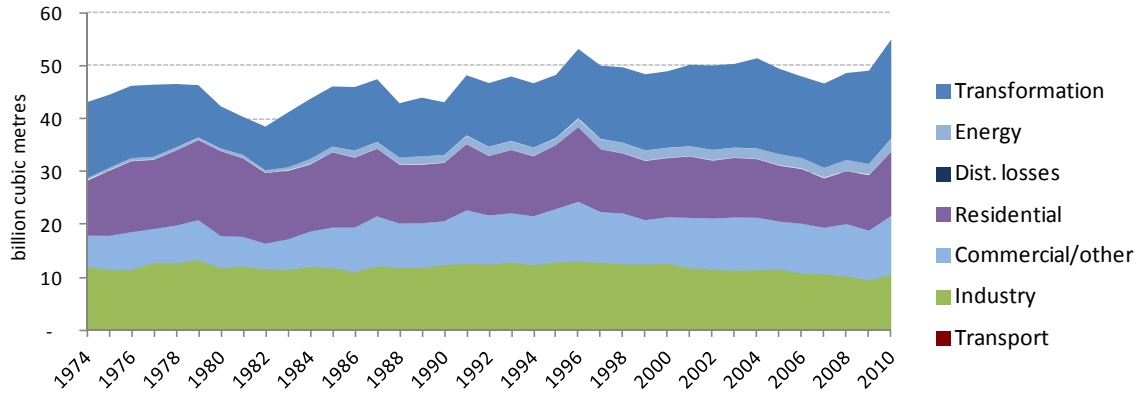
Upstream oil and gas production is governed by the Mining Act of 2003. Articles of the Act related to investment for marginal gas accumulations offshore and a corresponding Decree on investment deduction for marginal gas accumulations on the Continental Shelf entered into force in September 2010. These aim to encourage industry to develop production from the remaining small, marginal gas fields on the Dutch continental shelf before the existing critical infrastructure becomes aged and obsolete. Investors in offshore resources are able to deduct up to a quarter of their investment from payments of State Profit Share made under the Mining Act. It is considered that without this measure the marginal offshore gas fields involved could not be explored or developed profitably.

At the same time, the Dutch Administration has sought agreement with companies active on the Dutch continental shelf, to either actively use their production permits within a reasonable time frame for exploration or to voluntarily make these available to others. Under the Mining Act, the Minister of Economic Affairs, Agriculture and Innovation has the power to reduce the area of the licence where the licence holder is inactive.

Gas demand

Domestic gas consumption in the Netherlands totalled some 54.8 bcm in 2010. Over a third of total gas use was consumed in the transformation sector. With some 96% of all households connected to gas supplies, the residential sector accounted for a substantial share, at 22% of the total, while the commercial and industry sectors each accounted for another 20% of gas use.

Natural Gas Consumption, by Sector



Source: Natural Gas Information, IEA

Almost all space heating in the Netherlands is from natural gas, and over 60% of electricity is from gas-fired generation, thus causing a strong seasonal pattern in gas use. Daily gas consumption in 2010/11 ranged from some 88 million cubic metres per day (mcm/d) in the summer to around 165 mcm/d in the winter. On the basis of the European standard of a 1 in 20 year for exceptional cold weather causing peak demand, the Netherlands maximum daily gas demand is calculated at 476 mcm (with a national average temperature of -15.5° C).

Natural gas demand is projected to grow steadily over the coming two decades. Growth in demand will be driven primarily by the use of gas for electricity generation and to a lesser extent by the industry sector. Demand in the residential and commercial sectors is expected to decline slightly due to greater energy efficiency measures such as better insulation.

Gas import dependency

The Netherlands is the largest gas producer within the European Union. At the same time, the Netherlands imports and exports large volumes of gas, with roughly 40% of the total volume of gas flows used domestically.

In 2010, the Netherlands exported 57.8 bcm of natural gas. The largest portion of these exports, 21.6 bcm, went to Germany while Belgium and the UK were the destinations of some 10 bcm each. Substantial volumes were also exported to Italy (8.7 bcm) and France (7.4 bcm). In the same year, the Netherlands imported nearly 25.8 bcm of gas, primarily from Norway, the UK and Russia.

Gas company operations

The gas market was liberalised in July 2004, with supply and management of the gas networks legally separated. Gasunie, a Dutch infrastructure company fully owned by the State, owns and operates the gas transportation network through its affiliate, GTS. A trading and supply company GasTerra, which is half owned by the State (10% directly and 40% through EBN, a state owned company) and half by Shell and Exxon (25% each) sells domestically produced gas in the Netherlands. GasTerra remains the major player in the wholesale market, with a share of between 70-75%. GasTerra is also very active on the European gas market, and has import contracts with suppliers from Russia, Norway and Germany.

On the upstream side, NAM (Shell and ExxonMobil each own half) is the largest gas producer and is notably in charge of the Groningen field. Several other oil and gas producers operate small fields onshore and offshore in the North Sea, including GDF SUEZ E&P Nederland BV, Vermillion and Wintershall.

There are around 30 companies operating on the Dutch retail gas market, including NEM, E.ON, DONG, Electrabel, Eneco, RWE (formerly Essent), Vattenfall (formerly Nuon), and Delta. Suppliers operate under a license regime, overseen by the Dutch competition authority. A "retail" license is necessary for supplying gas to residential customers and small and medium-sized enterprises (SMEs), defined as customers with a connection transit flow of 40 cm or less per hour.

The Netherlands have a market oriented balancing model with virtual trading possible on its wholesale hub, TTF. Liquidity on the TTF is second only to the NBP (UK) on the NW-European market, where it is possible for shippers/traders to compose their supply portfolios. The market share of the incumbent shipper (GasTerra) has steadily decreased during the past years. Contrary to most European countries, the Netherlands have regional net operators (distribution system operators) which in almost all cases are independent from producers and market suppliers.

4.2 Natural gas supply infrastructure

Ports and Pipelines

Natural Gas Transmission System

Source: Gas Transport Services

Gas Transport Services B.V. (GTS) has been the operator of the national transmission system since July 2004. GTS is responsible for all national transport infrastructure operation and

development. The Dutch gas network comprises 12,050 km of pipelines, 50 entry points (mainly from Dutch gas fields), 1 100 delivery stations and 25 interconnection points.

The Dutch network consists of separate networks in order to accommodate the transportation of the two different qualities of gas, H-gas and L-gas. Nearly all residential and commercial consumers use (blended) low-calorific gas, while industry and power generators use mostly high-calorific gas. Some L-gas used by final consumers comes from H-gas, having been converted to L-gas in blending stations. L-gas is also exported through dedicated transmission pipelines to customers in Belgium, France and Germany.

The Dutch transport network is directly connected to four European countries via 25 interconnections. Gas can be both exported and imported via connections with Belgium and Germany. Gas can only be exported via the connection with the United Kingdom (the BBL pipeline) and gas can only be imported via the connection with Norway.

Maximum interconnection capacity for the Netherlands (mcm/d) - 2012

	Entry capacity	Exit capacity
Belgium	38	114
Germany	43	188
Norway	84	
United Kingdom		46
Total Netherlands	165 mcm/d	348 mcm/d

Source: Dutch Administration

Since September 2011, the Netherlands has the potential to supply gas to the market via the LNG terminal, the GATE terminal, on the Maasvlakte in Rotterdam. The initial throughput of the terminal is 12 bcm/y, with the potential to be expanded to 16 bcm/y. Maximum technical capacity of the facility is 37 mcm/d (Geq; 365 GWh/d)

Storage

At end-2011 there were 4 underground natural gas storage facilities in the Netherlands with a total capacity of 5.2 bcm of working gas. Additionally, there are ten caverns in Epe, Germany, connected to the Dutch transmission system providing a further 1.5 bcm of working capacity.

Natural gas storage capacity

Storage site	Type	Working Capacity[1] (mcm)	Peak Output[2] (mcm/day)	Peak Intput[3] (mcm/day)	*Calorific value*
Norg	depleted gas field	3 000	51	30	*L*
Grijpskerk	depleted gas field	1 500	55	12	*H*
Alkmaar	depleted gas field	500	36	3.6	*L*
Zuidwending	cavern	200	38	19	*L*
Bergermeer (2013)	depleted gas field	4 100	57	42	*H*
Total Netherlands		**9 300**	**237**	**107**	

1 Working Gas Capacity = total gas storage minus cushion gas
2 Peak Output = the maximum rate at which gas can be withdrawn from storage
3 Peak Input = the maximum rate at which gas can be injected into storage

Source: GTS Report: The Security of Gas Supply 2011

The role of storage capacity will become increasingly important in maintaining supply flexibility as domestic production declines. As noted above, gas production from the Groningen field plays an important role in accommodating seasonal fluctuations in market demand. As production from the field declines, so too will this flexibility. Storage which can accommodate summer/winter variations, such as from converting depleted gas fields, will be increasingly important for compensating for this decrease in production flexibility. Future storage capacity needs will also be augmented by the growing role of natural gas fired power plants to back-up electricity generation from intermittent renewable sources such as solar and wind.

New underground storage capacity is being developed which will add substantially to storage capacity in the coming two years. The Bergermeer gas Storage Project will convert a depleted gas field (near the BBL pipeline connection to the UK) into seasonal storage with a working capacity of 4.1 bcm. This was being filled with cushion gas in 2012, and the site is expected to enter into operation in 2013. There is also work underway to expand the capacity of the salt caverns at Zuidwending, adding nearly 1 bcm in storage at the site by 2015.

4.3 Emergency Policy for Natural Gas

In the case of natural gas crisis, measure have been put in place to protect households and other small consumers, while the Netherlands seeks to assure security of gas supplies by establishing itself as a gas junction in the international transport of gas and as a distribution centre for Northwest Europe.

The 2004 Gas Act establishes responsibilities related to gas crises with the Ministry of Economic Affairs, Agriculture and Innovation (EL&I). As provided for under the Act, the Minister appoints GTS, as the national gas transmission system operator, to perform certain tasks specified in the Act, however ultimate responsibility remains with the Minister. Tasks allotted to GTS include performing the specific tasks established in related EU regulations[6], such as making and updating every two years a risk assessment, a preventive action plan and emergency plan. Emergency supply procedures are activated if a licence-holder/supplier cannot supply gas to small consumers (residential customers and small and medium-sized enterprises, defined as customers with a connection transit flow of 40 cm or less per hour). In such situations, GTS has measures to guarantee temporary supply to these consumers as long as they have failed to find an alternative supplier.

Retail suppliers of small consumers in the Netherlands are responsible for acquiring both the capacity and volumes necessary to supply their customers. GTS is statutorily responsible for the reservation of necessary additional volumes and capacities to meet the increased demand of domestic consumers whenever the effective daily temperature falls to between -9°C and -17°C.

Peak supply standard

The European standard of 1 in 20 years established in its 2010 regulation can be translated for the Netherlands into a temperature of -15.5°C. The existing Dutch standard for infrastructure and security of supply under peak circumstances is more strict, as it is related to a situation occurring when there is an average daily temperature of -17°C, corresponding to a probability of once every 50 years. This supply standard is established under the "Decision on Security of Supply Gas Act".[7]

The Act also contains general clauses in case a supplier does not meet its obligations. In such cases, GTS has a coordinating task to make sure that the customers of the non-compliant supplier continue to receive supply. Non-compliance of a supplier does not imply shortage of gas, and therefore can be solved by the market. In this way these customers can choose a new supplier within a reasonable time without an interruption in their gas supply.

6 EU Regulation no. 994/2010 of the European Parliament and of the Council of 20 October 2010.
7 Staatsblad nr 170, volume 2004, Decision of 13 April 2004, Decision Security of Supply Gas Act

Total capacity of 2.44 mcm/h and a volume of 101 mcm was contracted for the peak supply of gas at end-2011 (2011/2012 season). This provides an operating time of 41.4 hours at maximum capacity. However, only part of the total consumption is supplied via peak supply i.e. the additional maximum hourly capacity necessary when the effective daily temperature is -9°C or lower. Depending on how the temperatures actually progresses during the course of a day, gas will only be supplied from peak supply for part of the day, notably during the morning peak and the evening peak. Thus the maximum contracted capacity will only be necessary for a limited number of hours in the event of an effective daily temperature of -17 °C. Hence, in practice, it will be possible to ensure peak supply for several days.

GTS uses two facilities to guarantee the production capacity required for peak supply: Gasunie's LNG installation on the Maasvlakte (the LNG peak shaver), and external capacity purchased on the market by means of an annual tender. The peak shaver is partly allocated for peak supply use as described in the Decree on Gas Security of Supply. GTS uses the other part of this installation for transport support. Hence it may be the case that this installation is in fact being used even though the limit under which peak supply takes place, -9°C, has not yet been reached.

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.

IEA member countries:

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The European Commission also participates in the work of the IEA.

International Energy Agency

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