THE DUTCH GAS HUB
Connecting Northwest Europe with the global gas market
Connecting Northwest Europe with the global gas market
Foreword

More and more countries are connected into the world wide oil and gas web. The Netherlands plays a pivotal role in this world wide energy web as the oil and gas hub of Northwest Europe. This is all thanks to its open access to gas and oil trading, the ports of Amsterdam and Rotterdam, its strong energy industry, top universities and knowledge centres.

The Netherlands has the largest natural gas field of the European Union. Besides the Groningen field, the Netherlands has a large number of small fields both onshore and offshore. The Netherlands not only produces gas, it is also the main distribution centre of gas in Northwest Europe. The presence of so many gas activities has naturally led to a concentration of knowledge and experience.

For decades, Rotterdam has been the European hub for incoming and outgoing trade in crude oil, oil products and coal. With the new LNG terminal, the Gate Terminal, Rotterdam is now also one of the main entries for liquefied natural gas to continental Northwest Europe.

The government of the Netherlands shares the view of the International Energy Agency that we are entering a “Golden age of gas”. Gas will not only help the Netherlands to guarantee its future energy supply and consumption, it is also crucial for the economy and will help meet the country’s climate goals. Gas is the cleanest fossil fuel. That is why the government of the Netherlands, together with the gas sector, will develop the Netherlands as the Gas Hub of Northwest Europe.

This publication describes in a nutshell what the Netherlands has to offer in the field of gas to countries and companies around the world. Building on its centuries-long tradition of openness and innovation, it is full speed ahead for the Netherlands in making the energy transition.

Maxime Verhagen
Deputy Prime Minister
Minister of Economic Affairs, Agriculture and Innovation of the Netherlands
The Netherlands: the centre of the Northwest European Gas Hub

Since the discovery of the Groningen gas field in 1959, the Netherlands has been a key player in the European gas market. The Netherlands is a major exporter of gas to other EU-countries. It became a supplier of natural gas to a large part of Northwest Europe by means of an extended gas pipeline infrastructure. The Netherlands has built up a large onshore and offshore Exploration and Production (“E&P”) sector and has established a strong gas industry.

The Netherlands has considerable expertise in all areas of the gas supply chain and is a world centre for R&D in natural gas supply and use. More recently, the opening of the Gate terminal in Rotterdam allows the import of Liquid Natural Gas (“LNG”) to the Netherlands and connects it via the North Sea with the rest of the world.

The role of Gas

As the cleanest fossil fuel, gas provides a stable basis for economic and social developments. A gas-fired power plant emits far less CO2 per kWh of electricity produced than a coal-fired plant. At a time when the price of carbon is rising, therefore, gas-fired plants are more cost-effective than coal-fired plants.

Natural gas is vital to our society. Over the next decades, millions
of households, companies and institutions throughout Europe will continue to rely on the availability of natural gas. The government of the Netherlands shares the view of the International Energy Agency that we are entering a “Golden age of gas” and believes that gas is going to play a crucial role in the transition to a sustainable energy system.

Gas will not only help the Netherlands to guarantee its future energy supply and consumption, it is also crucial for the economy and will help meet the country’s climate goals. Gas will continue to be an important fuel at least in the medium term (up to 2030).

In the vision of the government gas-fired power plants offer a natural combination with renewable energy because they can be deployed flexibly. Gas-fired plants are ideally suited for providing reserve capacity for wind and solar-powered electricity generation, because of the relative ease and cheapness with which they can be brought on and off stream.

The government of the Netherlands underlines the analysis of the International Energy Agency that conventional recoverable resources are equivalent to more than 120 years of current global consumption, while total recoverable resources could sustain today’s production for 250 years. All major regions have recoverable resources equal to last 75 years of current consumption. Gas is also relatively cheap. Consequently, gas meets the demands of security of supply and affordability.


**Competitive advantages**

Making optimal use of the natural competitive advantages, the Netherlands aims to serve as a gas junction in the international transport of gas and as a distribution centre for Northwest Europe. These advantages are rooted in:

- a high-quality gas transmission network that is well connected to the networks in surrounding countries;
- a coastal location that makes it relatively easy to import LNG;
- various opportunities to develop underground storage reservoirs in depleted gas fields and in salt caverns;
- the Netherlands’ current market position which involves several major producers and sellers of natural gas;
- the largest online Title Transfer Facility (TTF) and a strong APX-Endex gas exchange;
- a liberalised gas market, which increases its appeal for international investors;
- the large number of players already active in the gas sector: shippers, national and international energy distribution companies, and gas producers, including international producers which may or may not have gas extraction activities in the Netherlands;
- the expertise in terms of gas at organisations such as Gasunie/Gas Transport Services, GasTerra, Energie Beheer Nederland (EBN), Nederlandse Aardolie Maatschappij (NAM), Nogepa, Energy Delta Institute, TNO and Clingendael.
In Northwest Europe, demand for gas is rising while production within the region is declining. The security of gas supply in Europe will thus remain high on the political agenda in the coming years. In addition to the need to use existing gas reserves efficiently, the import of gas from Norway and Russia, and increasingly also from the Middle East and Africa, will become more important in the long term. The Netherlands and its gas network offer a good starting point with its central role for natural gas in the European energy supply.
Offering business opportunities

The Gas Hub strategy is a key part of the efforts of the Dutch government to guarantee security of the energy supply. It is also economically significant due to the associated investments, innovations and trading activity. The strategy also promotes the commercialisation of the expertise and experience present in the Dutch gas sector with respect to, for example, gas exploration, gas extraction, storage of gas, transport of gas, gas trading and integration of green gas.

This strategy aims to create the right conditions for companies to make the most of opportunities to procure gas and participate in relevant gas projects. In addition, companies and knowledge institutes will be able to bring existing and future innovations to the market and to export them.

The Gas Hub strategy of the Dutch government has also been enhancing the domestic market and, due to increasing number of market players, the range of choice for end users has been expanded. It also offers major opportunities for innovation, export and valorisation (i.e. the monetisation of scientific knowledge and new technologies) in areas such as natural gas, green gas and electricity.

A study done by The Brattle Group estimates that the Dutch gas sector currently supports about 7,500 jobs directly, 19,900
Supplying gas for Europe

The Netherlands own the largest natural gas field in the European Union which was discovered less than 50 years ago: the Groningen field. A vast reserve of extractable natural gas was found: 2,700 billion m³. This was the second largest discovery in the world. All residential homes and the whole Dutch industry were linked to this gas bubble at an unprecedented rate. For decades, numerous wells in the north of the country have extracted natural gas from the Groningen field at high pressure.

Annual Dutch gas production is currently about 80 billion cubic metres (bcm) per year. At the current rate of production reserves will last around 15 years. In reality Dutch gas production will tail off more gradually, so we expect the Netherlands to be producing gas well into the 2030s.

<table>
<thead>
<tr>
<th>Production</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groningen field</td>
<td>43.5</td>
<td>39.7</td>
<td>53.7</td>
</tr>
<tr>
<td>Small fields onshore</td>
<td>11.2</td>
<td>10.6</td>
<td>10.2</td>
</tr>
<tr>
<td>Small fields offshore</td>
<td>25.2</td>
<td>23.4</td>
<td>22.1</td>
</tr>
<tr>
<td>Production total</td>
<td>80.0</td>
<td>73.7</td>
<td>85.9</td>
</tr>
</tbody>
</table>


3: Average production level of 2008-2010.
The Dutch government aims to make the most of our position as a gas producing country by ensuring that as much as possible of remaining Dutch gas reserves, including the smallest gas fields, are discovered and gas extracted from them. With this purpose the Dutch government is stimulating the production through legislation, innovation policies and financial incentive measures.

Due to the attractive investment climate in the Netherlands, foreign companies play a significant role in the upstream gas sector of this country. Foreign operators produced around 25% of gas produced in the Netherlands, and around 75% of the gas produced offshore on the Dutch continental shelf.

Connecting Northwestern Europe

The Netherlands is home to an open access high-quality gas transmission network that is well connected to the world gas market. The Dutch gas transmission system owns more than 15,500 km of gas pipelines in the Netherlands and in the north of Germany. This is one of the largest high-pressure networks in Europe. No other European country has such a dense gas network. The infrastructure of pipelines and compressor stations is also used for export and transit of natural gas.

The network is owned by the gas infrastructure company Gasunie and operated by the Transmission System Operator Gas Transport Services (GTS), a 100% subsidiary of Gasunie. Since the acquisition of the transport network of BEB in Germany in 2007 (now: Gasunie Deutschland Network), Gasunie is the first European gas transport company with a cross-border network.
Gasunie is expanding its gas transmission capacity to ensure it can continue to meet the growing demand for natural gas. The focus is not specifically on domestic transmission, but also includes interconnections with neighbouring countries.

In response to calls from market parties, the subsidiaries of the gas transport provider Gasunie – Gas Transport Services and Gasunie Deutschland – are actively working to maximise the integration and efficiency of their transport services and joint investment planning. The networks of these companies in turn play a pivotal role in the Northwest European gas network. This helps to optimise services to customers who themselves operate in cross-border markets. The Netherlands is well-established as a gas-trading country and is firmly connecting to the global gas market. Due to rising demand for gas and growing imports and exports within Europe, more gas will be offered at a number of border points in the Dutch gas transmission network over the coming years.

- **North-South route: Connecting Northern Europe with Southern Europe.** In 2008, the initial phase of a substantial expansion of the gas transmission network of Gasunie in the Netherlands was launched. The construction of this North-South route, which covers a total of 485 kilometres, has been subdivided into nine subsidiary routes. The first section was ready for use in 2010 and the second phase was completed in 2011.

- **The BBL: Connecting the UK with the Continent.** In December 2006, the Balgzand-Bacton Line (BBL) was taken into operation. The BBL is a 235-kilometre pipeline running between the Netherlands and the United Kingdom which helps to ensure that customers in the United Kingdom can continue to rely on natural gas. The capacity is expanded to about 19 bcm of natural gas per year. A virtual reversed flow from the UK to the Netherlands is available since 2010.

- **Nord Stream: Connecting Europe with Russia.** Gasunie is a minority shareholder in the Nord Stream pipeline, a major new pipeline system which supplies gas from Russia directly to the gas grid in Germany, which is well connected to the Dutch gas grid. Nord Stream can transport 55 bcm of natural gas annually. Natural gas from the major reserves in Russia can thus be transported directly to Germany and other member states of the European Union, in particular the Netherlands, Belgium, France and the UK.

- **Gate terminal: Connecting Europe with the global gas market.** To connect to the expanding global LNG market, Gasunie and Royal Vopak built the Netherlands’ first import terminal for LNG in the Port of Rotterdam. Gate terminal (Gas Access to Europe) was officially opened by the Queen in September 2011. The Gate terminal is capable of handling up to 12 billion m3 of LNG, with the possibility of a further expansion to 16 bcm in the future. It is one of the few terminals in Europe where Q-maxes, the world’s largest LNG ships, can dock. Gate connects the Northwest European gas market to the world LNG market, fostering competition and increasing security of supply.
Delivering flexibility

Due in large part to the Groningen gas field, the Netherlands is currently able to supply gas flexibly. This benefits not only the Netherlands itself, but also our neighbouring countries (within a 500 kilometre radius). This offers considerable added value, as it enables us to respond immediately to actual demand for gas from end users which, for example, is much higher in winter than in summer.

However, the flexibility of production options of the Groningen field is decreasing. During the last years, substantial investments in gas storage haven been made to meet seasonal fluctuations in demand for gas in both the long and the longer term. Seasonal storage will be essential to ensure the supply flexibility of gas in Northwest Europe.

The Dutch government aims to make optimal use of the fact that the subsoil is suitable for gas storage. Several measures are being developed by the Dutch government to promote investment in gas storage. These measures involve:

- a different price structure for gas transmission to gas storage,
- the improved availability of depleted gas fields for new investors and
- clarity regarding the conditions for storage facility permits.

Due to these measures, the Netherlands has an attractive investment climate for gas storage.

New flexibility

- **Zuidwending:** Gasunie officially opened its underground gas storage facility at Zuidwending in January 2011. The natural gas buffer consists of a gas plant and four caverns at a depth of between 1,000 and 1,500 metres. The caverns are around 300m high and 50 to 60m across. Each cavern is as high as the Eiffel Tower. Each cavern can supply the market with over 50 million m³ natural gas (working gas volume). The construction of the fifth cavern is well underway. This cavern will be one-and-a-half times as big as the largest of the four existing caverns and it will come into operation in 2013.

- **Bergermeer Gas Storage** will provide the Northwest European gas market with 4.1 bcm of seasonal storage, thereby almost doubling the Netherlands’ total storage capacity. Situated near the Dutch city of Alkmaar, and located 2,500 metres underground, the Bergermeer gas reservoir once held 17 bcm of natural gas. In the last 40 years the Netherlands has extracted the gas from the reservoir to provide energy, power and heat. The Bergermeer reservoir has the ideal geological characteristics for gas storage and is in a strategically excellent location: well connected to the gas transport network, close to major cities and industrial centres and only 20 km from the BBL pipeline transporting gas between the Netherlands and the UK. In May 2011, TAQA received the final statutory approvals and permits to construct and operate the facility. The Bergermeer Gas Storage facility will begin operations in April 2014 with partial capacity. Full commercial operations are scheduled to start in April 2015.
Trading for Europe

Just like networks and energy flows, marketplaces do not stop at national borders. The Dutch energy market is connected to those of our neighbouring countries. We know the gas market very well, being a producer, trader and market maker. The principles of the free market and the valuable public private partnership are well known.

• **The Title Transfer Facility (TTF)** is the virtual trading hub in the GTS system. TTF is a smart system in which gas can be transferred to another party without the gas actually having to be transported from vendor to buyer. TTF controls the availability of gas and ensures that supply and sale are in balance. The buyer can take delivery of the gas at any point in the network and the vendor can supply gas at any point in the network. Gas traders and suppliers in Northwest Europe increasingly turn to the TTF. In terms of market volumes and numbers of trades, TTF is breaking record after record. TTF is fast becoming the benchmark for gas trade in continental Europe. As a result, TTF is outpacing other trading centres on the European continent in terms of both the physical volume supplied and the volume traded.

• **APX-ENDEX** is one of Europe’s most experienced energy exchanges, operating spot and futures markets for electricity and natural gas in the Netherlands, the United Kingdom and Belgium. APX-ENDEX facilitates the development of the liberalised and integrated energy
markets in Northwestern Europe. It provides an efficient, secure and transparent electronic trading environment for the trading of electricity and natural gas. Based on its position as the most experienced and most liquid gas exchange in Europe by trading on three gas hubs (TTF, NBP and Zeebrugge), APX-ENDEX aims at creating an integrated gas market for Europe. In October 2010, APX-ENDEX merged with Belpex, the Belgian Power Exchange. Belpex is a full subsidiary of APX-ENDEX. The integration merger is seen as an important contribution to the consolidation of energy exchanges in Europe. APX-ENDEX’s offices are located in Amsterdam, Brussels, London and Nottingham. It has over 400 memberships from more than 15 countries.
Innovating the gas sector

Innovations and new technologies will determine the position of gas in the future. The Netherlands has been one of Europe’s key gas producing countries for 50 years. As a result, we have a well-developed knowledge infrastructure in this sector. New technologies will allow the Netherlands to explore and exploit new fields and new varieties of gas. New gas applications should be developed and this will generate more economic activities.

The figure on the left page shows a geographic picture of important knowledge institutions and companies in the Netherlands. This global picture shows that the LNG organisations are mainly found in the western, biogas organisations in the eastern and natural gas organisations in the northern part of the Netherlands.

Fostering game-changing innovation is an essential part of the Top Sector policy of the Dutch Government. The gas industry has been selected as one of the main topics in the top sector “Energy”. Stimulating cooperation between the gas industry and knowledge institutions and expanding R&D efforts related to gas is an important priority for the Dutch Government.
Due to a strong maritime history, our continuous struggle against the sea and a strong position as offshore gas producer, the Dutch oil and gas supply industry belongs to the top five of the world, the four other countries being the USA, UK, Norway and France.

The Netherlands as a logic hub with an excellent infrastructure to transport goods to destinations all over the world contributes to the top position of the Dutch oil and gas supply industry. There are about 500 companies in the Netherlands supplying goods and services for gas and oil exploration. These companies employ about 20,000 people in the design and maintenance of infrastructure, construction and manufacturing, engineering, research and development and the supply of materials and equipment. The Dutch oil and gas supply industry especially distinguishes itself in gas and offshore technology. With regard to offshore the Dutch excel in the design and construction of advanced drilling rigs, drilling vessels, jack-up barges, diving support vessels, crane vessels and other mobile offshore units.

Although about 85% of the Dutch oil and gas supply industry consist of SME companies, there is a small league of leader firms, for instance: Allseas Engineering, Dockwise, Fugro, Gusto MsCm, Heerema Marine Contractors, Heerema Fabrication and Huisman.
Notes:
Colophon

**Publication:** Published in the Netherlands by the Ministry of Economic Affairs, Agriculture and Innovation

**Content:** Ministry of Economic Affairs, Agriculture and Innovation (Rodrigo Pinto Scholtbach & Annemieke Schouten) with a contribution of Gasunie (Hansch van der Velden & Jetty Havinga), IRO (Marloes Kraaijeveld-van der Winden) and Shell (Michael Nord)

**Concept:** DesignThinkers, Amsterdam (www.designtthinkers.nl)

**Printed by:** Divendal Repro, Haarlem

All rights reserved, 2011