

The Security of Gas Supply 2009





Foreword

The purpose of this report, named The Security of Gas Supply (VZG), is to demonstrate to what extent the long-term security of gas supply is guaranteed for the Netherlands.

This is the first time the VZG report has been published in its present form. In December 2008 the Minister of Economic Affairs (EZ) asked Gas Transport Services B.V. (GTS) to take steps to perform its monitoring task. This request was made by means of a Decree¹ based on Article 10a, paragraph 1f of the Gas Act. The present VZG contains the results of our findings. It also provides input for the minister's annual monitoring report to the European Commission, as specified by the relevant EU Directives.

Security of supply can be defined as the degree of certainty that sufficient gas will be available at the right time and at the right place to meet market demand in the short and long-term. To this end, an analysis was carried out of relevant developments in the northwest European gas market². Security of supply for the Netherlands was examined in greater detail. This report charts the anticipated evolution of demand for gas and describes developments in relation to the supply of gas. We also studied to what extent the supply of gas in the Netherlands is able to match demand, taking into account the domestic market and export commitments. We additionally considered the gas exchange, which contributes to the liquidity of the gas market, indirectly promoting security of supply and diversification. The report also contains an account of the growing need for flexibility in the market and the development of long and short-term storage facilities. Other topics examined include quality conversion and peak and emergency supply. The high and low calorific gas markets are linked by means of quality conversion. GTS has been given responsibility for peak and emergency supply, so that it can guarantee security of supply for domestic consumers during extreme weather conditions. Finally, the availability of the gas infrastructure is crucial for supplying the market with gas at the right time. That availability is also scrutinised in this report.

Various market players and organisations have helped to compile this report. We sincerely thank them all for their input. Data provided by the shippers has enabled GTS to detail the contracted volumes of gas to, from and through the Netherlands for the next 20 years. The probable³ volumes to be contracted have also been calculated. The aggregated data are summarised in chapter 3. A more detailed account of the inventory is included in annex 1.

GTS has taken great care in compiling this report. However, no rights can be derived from the information contained in it.

¹ Published in the Government Gazette of 11 December 2008 (ET/EM /8194913).

² Northwest Europe covers Belgium, France, Germany, the Netherlands and the United Kingdom.

³ Volumes not yet contracted but anticipated by the shippers.



Summary

The purpose of this report is to show to what extent the short and long-term security of gas supply in the Netherlands is guaranteed. Security of supply can be defined as the degree of certainty that sufficient gas will be available at the right time and at the right place to meet market demand in the short and long-term future.

SUFFICIENT GAS

The analysis has shown that by 2010, 92% of all gas requirements and export commitments in the Netherlands will be met by secure supply (contracted domestic production plus contracted imports). By 2015 this will be 79% and by 2020 it will have fallen to 70%. Shippers have indicated the probable volume of imports they are likely to contract⁴ in the foreseeable future. Up to 2022, the secure and probable supply of gas will roughly match overall demand.

Most of our contracted gas imports come from Norway and Russia. The volume of gas imported from Russia is growing, while that from Norway is decreasing. From 2010, the volume of LNG imported will rise sharply.

RIGHT TIME

In order to respond to seasonal and short-term fluctuations in demand, flexibility is needed to supply gas to the market at the right time. Domestic production has always previously played a key role in this. However, declining flexibility in gas production means that more storage will need to be developed to compensate for this declining flexibility through gas production. In the Netherlands, there are currently plans to open a seasonal storage facility in Bergermeer. An analysis of the development of storage capacity shows that the existing rate of storage development may not be high enough to provide the market with sufficient flexibility in time when it is needed.

RIGHT PLACE

Sufficient infrastructure is needed to supply gas to the market at the right place. Fluctuations in gas supply and demand in northwest Europe are also leading to an expansion of the infrastructure in the Netherlands. Our transport capacity is extensive and is being substantially expanded so that gas can be supplied and delivered to the domestic and export markets. The current market inventory (Integrated Open Season) confirmed the view that the market still needs much more transport capacity. Substantial long-term investments will also be needed for quality conversion, given that the gas supply will consist of more high calorific gas, whereas demand for low calorific gas is not expected to change much.

If we are to supply more imported gas from Russia and in the form of LNG to the West European (i.e. Dutch) market, substantial investments will be needed in time. These investments will not be confined to the infrastructure in the Netherlands but will also extend to the infrastructures in our neighbouring countries.

⁴ Volumes not yet contracted but indicated as 'probably contracted' by the shippers.



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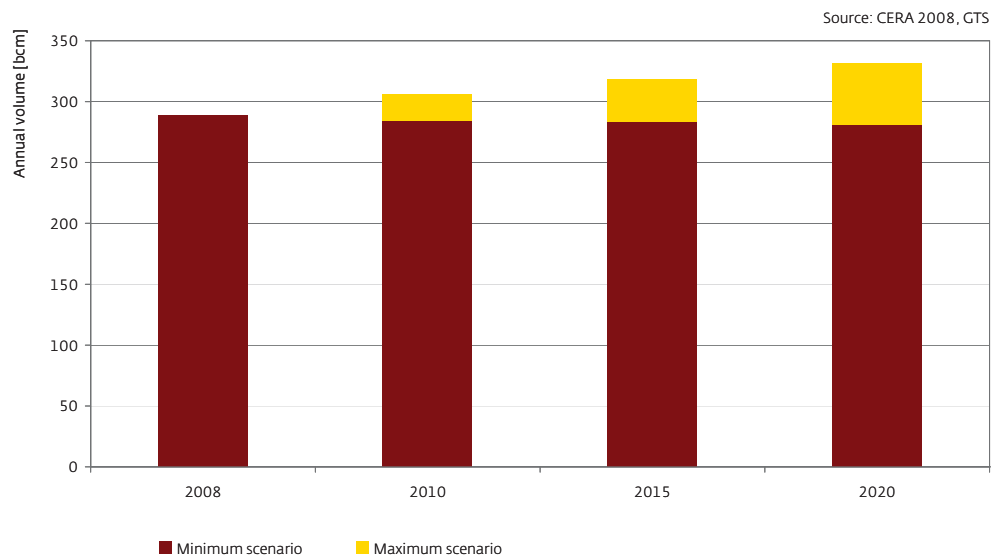
1. Development of natural gas demand

NORTHWEST EUROPE

Demand for natural gas in northwest Europe will rise in the next few years. The diagram below gives minimum and maximum scenario estimations for the likely growth of gas demand.

GAS DEMAND NORTH-WEST EUROPE

(The Netherlands, Belgium, France, Germany, United Kingdom)

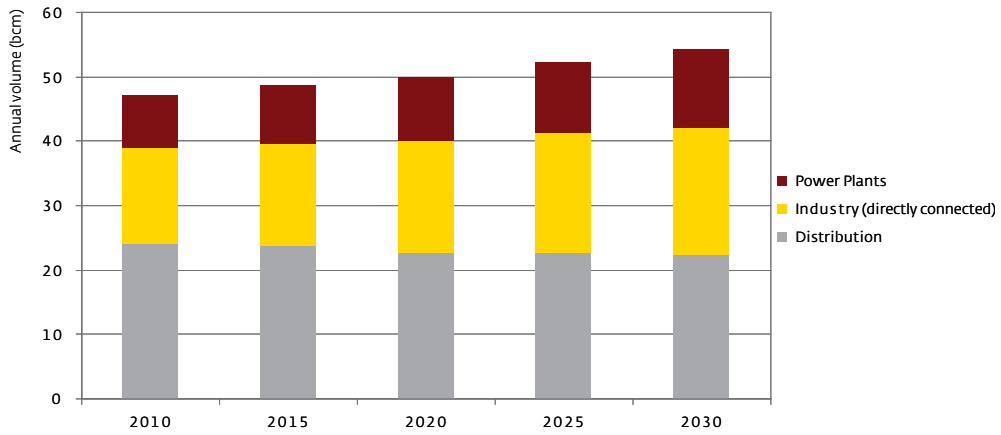


NETHERLANDS

In the Netherlands, GTS yearly consults the regional network operators and consumers who are directly connected to the supply network (mainly industrial users and power plants) about the capacity they are likely to require for the coming winter, plus any related developments. GTS bases its medium-term forecast of domestic demand for gas on expected growth, in line with macroeconomic models compiled by the Netherlands Bureau for Economic Policy Analysis (CPB) and the Energy Research Centre of the Netherlands (ECN). The CPB and ECN publish figures indicating expected demand for energy in the various sectors. To calculate the share of gas in the generation of electricity, GTS uses information supplied by the national electricity network operator (TenneT).

These capacity and volume forecasts can be used to calculate the following picture of the likely evolution of demand for gas in the Netherlands.

GAS DEMAND OUTLOOK FOR THE NETHERLANDS



Source: GTS, CPB, ECN

This diagram shows market demand in the Netherlands during an average winter, in terms of a breakdown of gas distribution companies (primarily domestic plus some industrial), industries that are supplied directly by the Gasunie network in the Netherlands and power plants. Demand for natural gas via gas distribution companies is expected to decrease slightly. This is due to increased efficiency in energy consumption (e.g. better insulation) among domestic consumers. However, demand for gas by industries and power stations is continuing to rise. Overall demand for gas in the Netherlands is therefore expected to increase by approximately 15% by 2030.



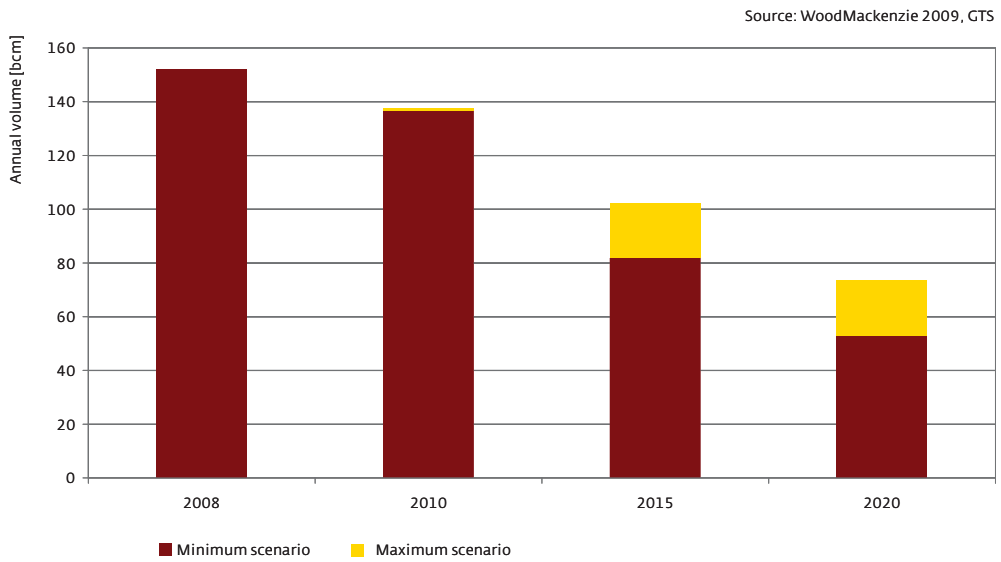
2. Development of natural gas supply

NORTHWEST EUROPE

The main trend in the supply of natural gas to the northwest European gas market is the sharp decline in local production, as illustrated in the diagram below. This decline in local production is the primary cause underlying the rise in gas imports.

INDIGENOUS PRODUCTION NORTH-WEST EUROPE

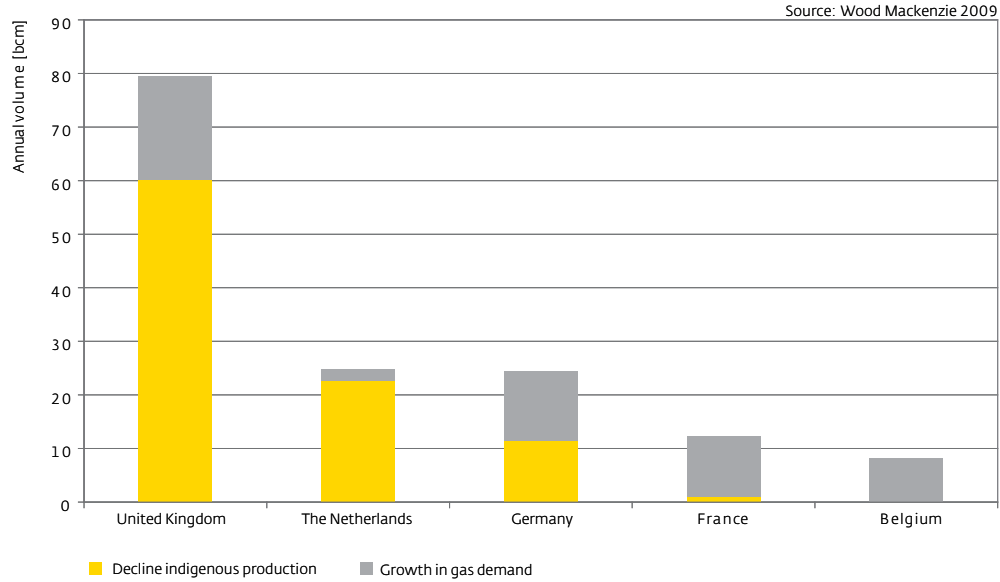
(The Netherlands, Belgium, France, Germany, United Kingdom)



The decline in local supply must be compensated by extra gas imports. In northwest Europe, this will lead to a sharp rise in import and transit flows.

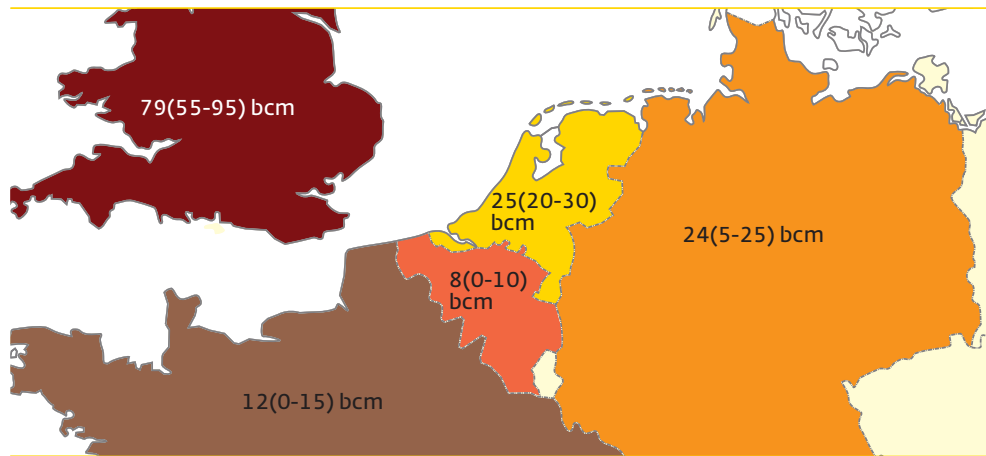
Additional gas imports will also be needed due to a moderate growth of the northwest European gas market. The following diagram shows the extra import volumes per country, in line with a probable scenario. The increase in gas imports is greatest in the United Kingdom, the Netherlands and Germany.

ADDITIONAL IMPORTS NORTH-WEST EUROPE
(2020 compared to 2005)



The growth in imports to the Netherlands and its neighbouring markets, based on a likely market growth scenario and a decrease in production and transport, is shown below, together with minimum and maximum scenarios in brackets.

INCREASE OF THE YEARLY IMPORT TO NORTH-WEST EUROPE IN 2020 COMPARED WITH 2005
Probable (low-high) scenario. Source: Wood Mackenzie 2009; CERA 2008



Increase of yearly import (exclusive transit) per country in North-West Europe according to a probable (low-high) scenario. Source: Wood Mackenzie 2009; CERA 2008

THE NETHERLANDS

The Netherlands is also experiencing a significant decrease in domestic production. The policy of the Dutch government is designed to guarantee the long-term availability of sufficient gas and to promote diversification of energy and gas supply⁵, while maintaining a socially desirable level of depletion of the Netherlands' gas reserves. The desire for a differentiation of both supply (country of origin) and type of transport (pipeline, LNG) plays a role in the diversification scenario.

⁵ Energy Report 2008



3. Balance between supply and demand

Following the introduction, which discussed developments in supply and demand in northwest Europe and the Netherlands in particular, this chapter analyses the term ‘sufficient gas’ as an aspect of security of supply in the Netherlands.

GTS prepared this analysis by asking its shippers to what extent they had covered demand from their domestic and foreign customers up to 2030 by means of contracts. An anonymous and aggregated dataset is created which yielded the following picture.

Existing contracts will expire, leading to uncertainty concerning replacement or supplementary contracts. Moreover, the number of trading partners within the gas market has grown sharply in recent years. The trade conducted between them, either directly or via trading platforms, makes the origin and/or destination of the gas difficult to determine. These uncertainties are reflected in the analysis of the gas supply for the Dutch market.

EXPLANATION OF THE GAS VOLUMES, BASED ON DATA PROVIDED BY THE SHIPPERS

Uncertainty in the contracted volume

Due to the limited length of contracts, the contracted volume will gradually decline over the coming years. At the same time, new contracts will be concluded and/or extended or expanded. For the next 20 years, contracting parties will therefore be asked to distinguish between ‘existing contracts’ (status: ‘certain’) and ‘probable contracts’ (status: ‘probable’). The latter category relates to volumes that have not yet been contracted but are likely to be so according to shippers.

Uncertainty in the country of origin and destination

For some of the contracts, the shippers specifically indicated the country of origin and destination of the gas. This results in a contracted gas flow that is localised. Other contracts contain no clear indication of the country of origin or destination, leading to uncertainty in the allocation of a source or market. This includes, for example, gas that reaches the market via the TTF but which actually originates from domestic production or imports; once it has been traded on the TTF, this gas can be sold on various markets at home or abroad. A direct transfer between trading partners, in which the purchaser is not the end user, also results in an uncertain destination. For example, locally produced gas can thus be transferred to a supplier for the domestic market, but it can also be used for export.

Duplicated and supplementary readings

The period for which contract information on gas purchases and sales was requested and the number of shippers who are active on the Dutch market leads to a risk of duplicated readings for future contracts. GTS is the only party that is able to check consistency within the dataset, since it can ascertain the (historic) relationship between the contracted volume and the contracted transport capacity for each shipper, and because the (historic) consumption figure for each customer is known.

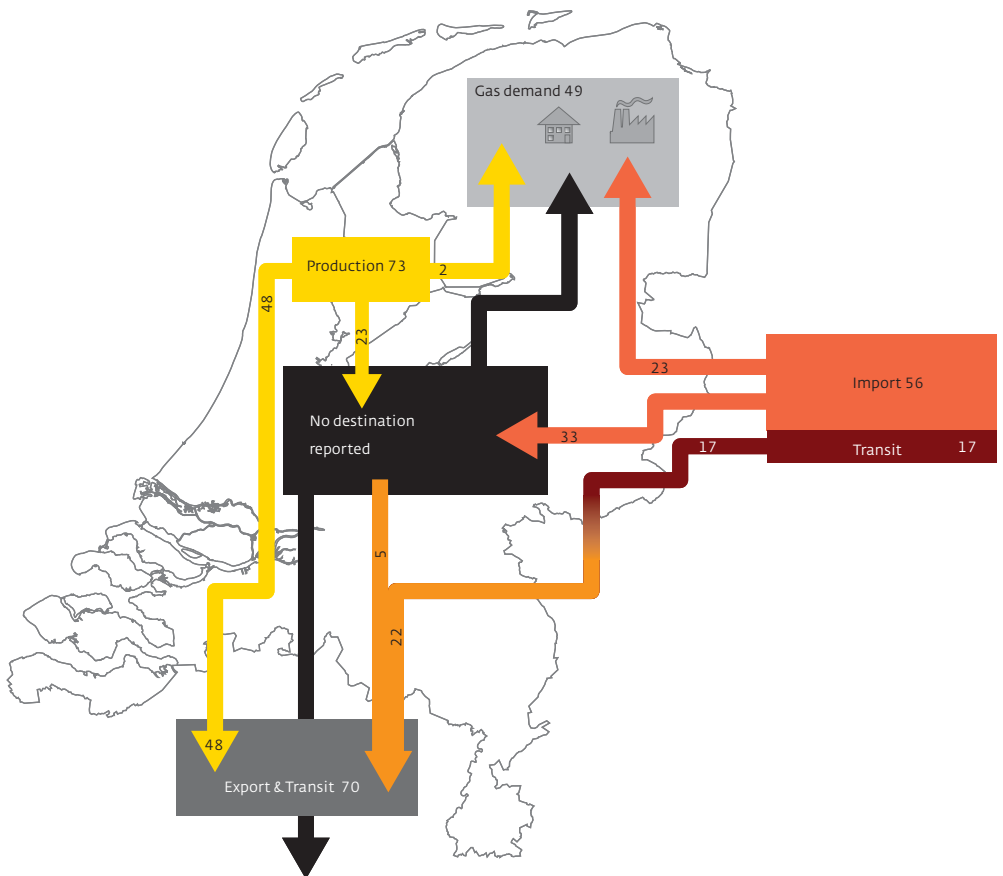
Purchase volumes (supply) based on data provided by shippers

The analysis made a distinction on the supply-side between:

- ▶ Purchase volume from domestic production.
- ▶ Purchase volume from existing import contracts.
- ▶ Purchase volume for which the origin (domestic production and/or import) is unclear. This volume is purchased via a trading relationship or trading platform.

The diagram below illustrates the various categories for 2015, including the status 'certain' and 'probable', as indicated by shippers. Supply from domestic production totals 73 bcm and contracted imports totals 56 bcm. Contracted transit flows came to an annual 17 bcm. A proportion of the supply has no established final destination. This volume is available for the domestic market, export market or a combination of both.

REPORTED VOLUMES (SUM OF CERTAIN AND PROBABLE) IN 2015 IN BCM



Sales volumes (demand) based on data provided by shippers

On the demand-side, a distinction is made between:

- ▶ Volume for the domestic market, based on the forecast known to GTS.
- ▶ Volume for export.
- ▶ Volume for which the destination (domestic market and/or export) is unclear. This volume is sold via a trading relationship or trading platform.



Since almost half of the available annual supply does not have a fixed destination, this volume cannot be preferentially allocated to the domestic market or the export market. A balanced analysis can therefore only be made by aggregating all the supply commitments.

BALANCE OF SUPPLY AND DEMAND

Demand for gas

Overall demand for gas is seen as the sum of domestic market requirements and contractual export commitments. This includes that part of the supply without a fixed destination, the allocation of which between the two markets is unknown.

Demand for gas for the Dutch market up to 2030 is based on the forecast used by GTS, which assumes a growth in annual demand from 47 bcm in 2010 to 49 bcm in 2015 and to 50 bcm in 2020 (see chapter 1).

Overall demand for exports (excluding transit flows) was calculated using a sum of the existing export commitments (according to data provided by shippers) and the export volumes that shippers said they would probably contract. The volume of this category is 58 bcm in 2010, decreasing to 53 bcm in 2015 and to 22 bcm in 2025.

Supply of gas

The supply of gas consists of supply from domestic production and supply from import flows. For a part of this supply it is unclear whether it comes from domestic production and/or imports; this proportion is traded via a trading partnership or trading platform and reaches the market as 'non-localised supply'.

Transit flows

Transit flows explicitly designated as such by shippers were omitted from the analysis since they have both a foreign origin and a foreign destination. The total volume of the indicated transit flows will be 10 bcm per annum by 2010, rising to 18 bcm per annum in 2018. Some of these flows consist of LNG. However, additional transit flows can arise due to trading supply from imports, for example on the TTF, and then exporting them.

Annual volume in the Netherlands

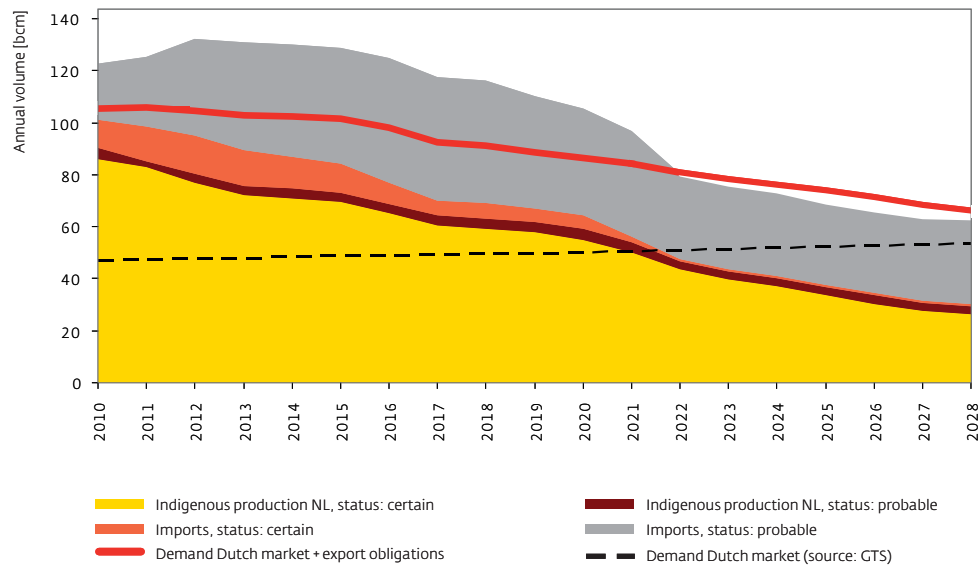
Based on the certain and probable volumes, the total supply of gas (domestic production and imports) will be over 120 bcm by 2010. Some of the probable supply will not be contracted, thereby reducing the annual volume.

Based on the demand for gas for the domestic market and exports, plus the transit flows, an annual volume of over 110 bcm is anticipated by 2010. This is in line with the transport volumes measured by GTS up to and including 2008. The actual annual volume will depend on the temperatures.



COVERAGE OF TOTAL DEMAND FOR GAS IN THE NETHERLANDS (DOMESTIC AND EXPORTS)

THE BALANCE BETWEEN INDIGENEOUS PRODUCTION AND IMPORTS VERSUS DUTCH MARKET AND EXPORTS

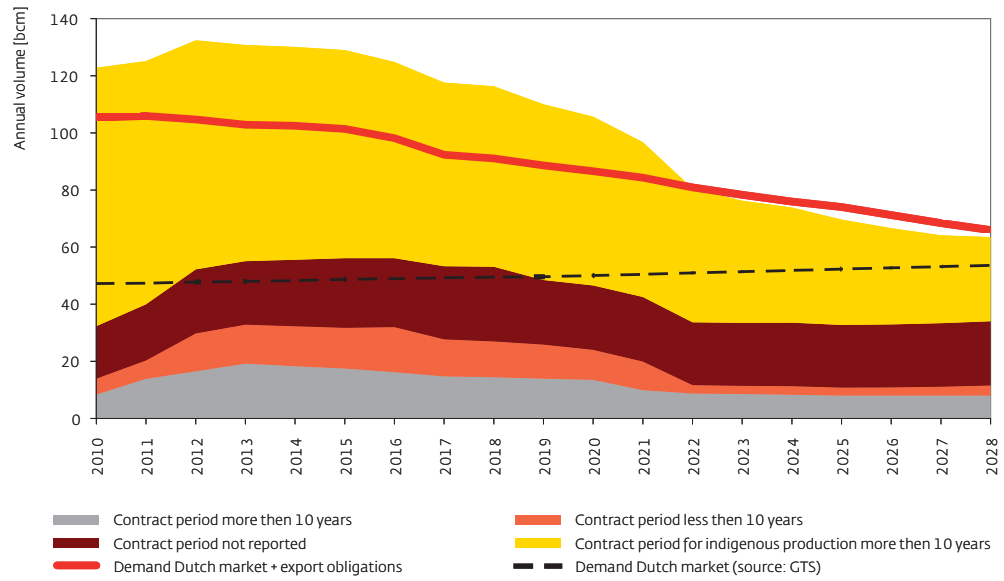


The diagram above shows that by 2010, 92% of demand and total export commitments in the Netherlands will be met by secure supply (contracted domestic production plus contracted imports), compared with 79% in 2015 and 70% in 2020. Up to 2022, domestic gas production plus the additional volume of gas imports which shippers believe will probably be contracted is likely to be more than enough to meet all commitments (domestic and exports). After 2022, the (probable) supply of gas will be more or less equivalent to overall demand.

LENGTH OF CONTRACTS

For the medium-term, the (existing and probable), import contracts with a duration of above and below 10 years were divided roughly equally. Volumes contracted for more than 10 years were relatively stable throughout the period. The supply of gas from domestic production also has a long-term character (more than 10 years).

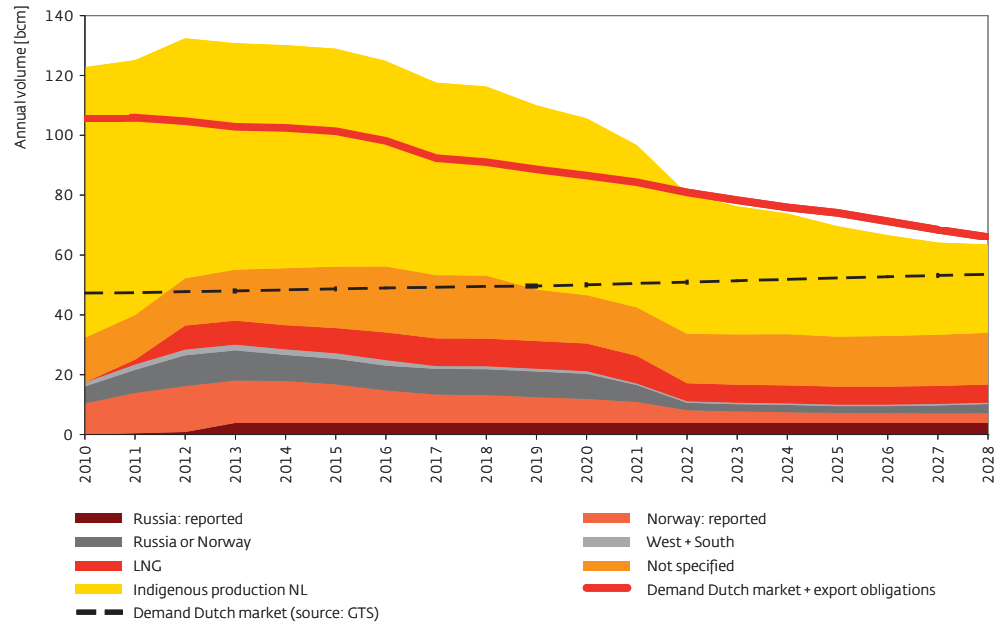
CONTRACT PERIOD FOR GAS SUPPLY IN THE NETHERLANDS



Origin

Contracted imports come mainly from Norway and Russia. The volume of gas from Russia is rising while that from Norway is falling. In 2010, imports of LNG will rise sharply, according to data provided by the shippers.

GAS SUPPLY IN THE NETHERLANDS BY SOURCE



4. Gas exchange

NORTHWEST EUROPE

The expectation is that parties will buy an increasing volume of gas via short-term contracts. A gas exchange or trading platform cannot be regarded as a source of supply in the context of security of supply. However, it is the case that a liquid trade indirectly promotes security of supply and diversification because demand for new transport capacity increases, making the market more accessible.

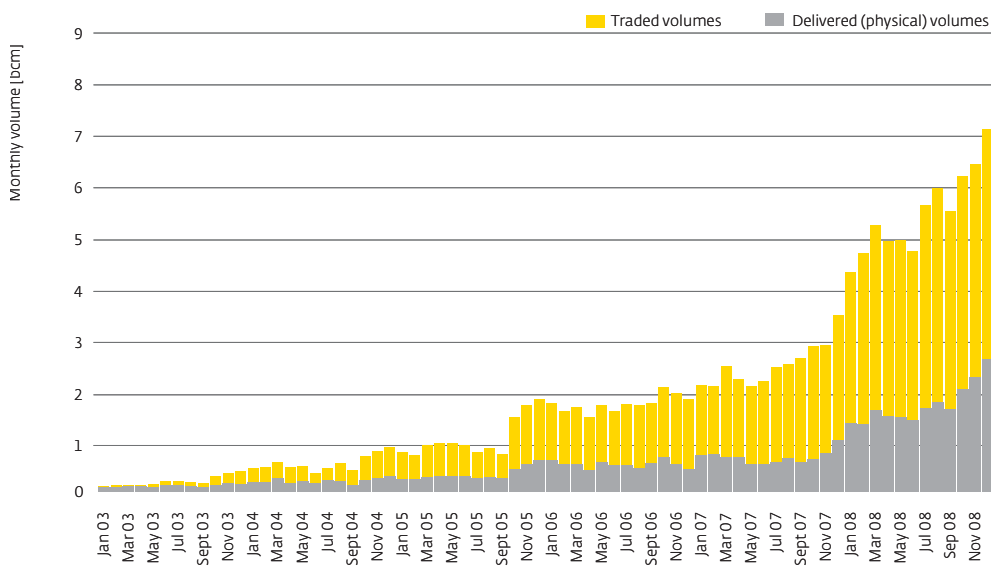
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Gas traders and suppliers are increasingly using the Dutch gas trading platform the Title Transfer Facility (TTF) to buy and sell their gas. In 2008, the TTF underwent dramatic growth, boosting liquidity in the market. In 2008, market players supplied 20.3 bcm of natural gas via the TTF. This was more than double the figure for the previous year (8 bcm). The volume traded on the TTF (65.4 bcm) exceeds the Netherlands' annual consumption and the volume of gas delivered on the TTF represents almost half of annual domestic consumption. The volume of gas traded doubled and thus represents a value of over 15 billion euros. The number of traders active on the TTF rose by 20% to a total of 60. The TTF is thus far ahead of the other gas hubs on the continent of Europe, in terms of both the volume traded and the volume physically delivered. By way of comparison (volume traded / volume physically delivered): TTF: 65/20, Zeebrugge: 52/10, EGT: 16/unknown. These developments in the TTF are shown in the diagram below. The increase in cross-border gas flows described above is expected to further boost the development of the TTF.

	Volume traded (bcm)	Volume delivered (bcm)
2007	29,7	8,0
2008	65,4	20,3
Increase in bcm	35,7	12,3
Percentage increase	120%	154%

Source: GTS

MONTHLY VOLUMES TTF JANUARY 2003 TILL DECEMBER 2008



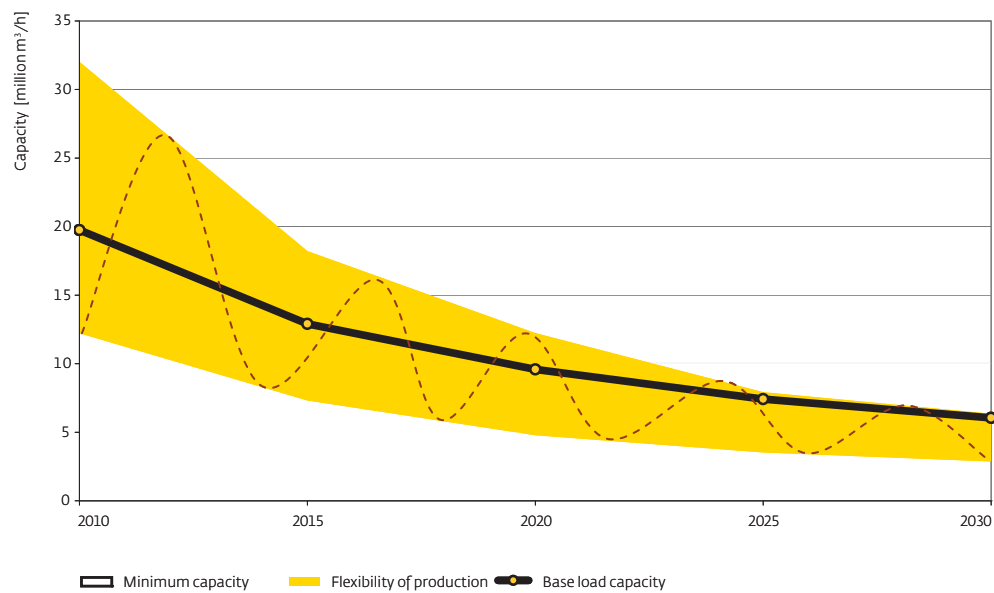
5. Flexibility

In the context of the definition of security of supply, flexibility determines whether the gas will also be available at the right time. This chapter analyses the 'right time' aspect for northwest Europe. An analysis of flexibility for northwest Europe is useful due to the close links between the gas markets in this region and the growing exchange of flexibility between the countries within it. Because flexibility in gas production is declining, more gas storage facilities will need to be developed to compensate. The next chapter looks specifically at storage for the Netherlands in more detail.

NORTHWEST EUROPE

Domestic gas production in the Netherlands and the UK has played an important role in accommodating seasonal fluctuations in market demand. The decline in gas production in northwest Europe will result in less flexibility for the market. The production profile will become flatter, making it more difficult to meet seasonal fluctuations in demand for gas. Over the next decade, production capacity in northwest Europe will decline by half. Flexibility will also halve over the coming ten years, from approximately 20 million m³/hour in 2005 to approximately 12 million m³/hour in 2015. It should also be pointed out that the decrease in the flexibility of production capacity is closely linked to the decline in production volume: the higher the production, the more readily and rapidly flexibility of production will decline.

PRODUCTION CAPACITY IN NORTH-WEST EUROPE (2010-2030)

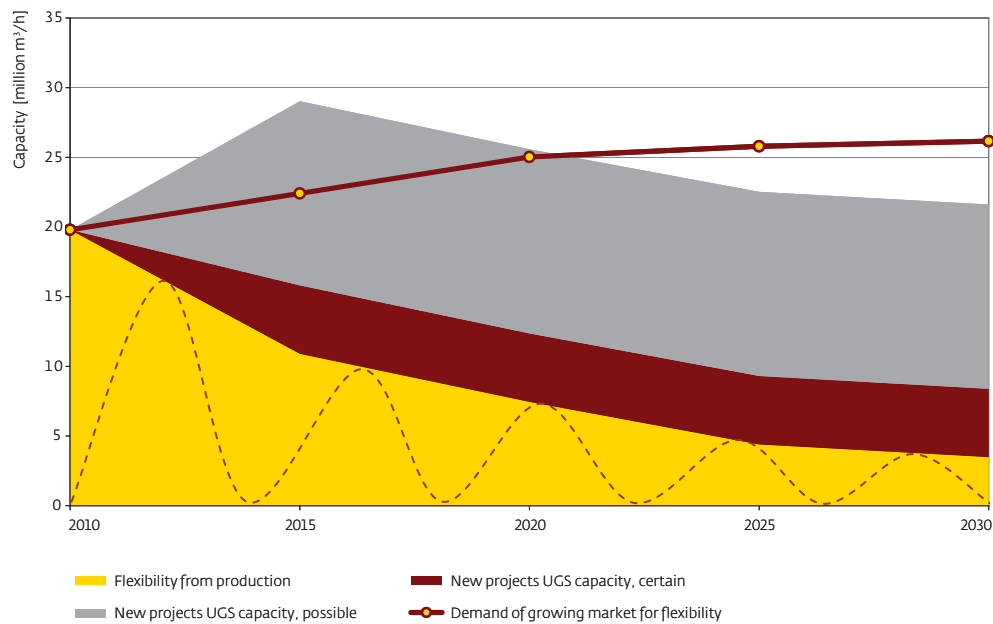


Source: GTS

The probable decline in production flexibility is also shown in the diagram below, based on the assumption that the current production ceiling in Slochteren will be maintained and assuming an estimated swing in depletion. This decline must be compensated by the creation of new storage capacity to meet future demand for flexible capacity. Taking account of the growth of the gas market in northwest Europe based on the maximum scenario described in chapter 1, demand for flexible capacity could develop in accordance with the trend shown below⁶. The two coloured areas represent certain projects⁷ and possible projects⁸ to build new storage facilities.

An analysis of the development of storage capacity shows that the existing development of storage may not be keeping pace with the market need for flexibility. Projects whose implementation is certain are not providing enough capacity to accommodate the decline in production flexibility. If all the possible projects are to be implemented, there is likely to be sufficient capacity until 2020 to satisfy demand for flexibility in line with the maximum growth scenario of the gas market. The long throughput time for such new-build storage projects is an aspect to be borne in mind.

PRODUCTION CAPACITY VERSUS GAS DEMAND IN NORTH-WEST EUROPE (2010-2030)



Source: GTS, CERA

National borders are progressively less of a barrier to the use of storage facilities, as shown by the example of the storage caverns near the Dutch-German border. These facilities provide flexibility for both the Dutch and German markets. The trend of importing and exporting flexibility through the use of storage facilities is expected to grow further over the coming years. In future, facilities in the Netherlands could play an even greater role in the flexibility services on the gas markets of neighbouring countries such as the United Kingdom, Belgium and France.

6 The assumption is that the growth in demand for gas will be due to a 70% increase in power stations which will be flexibly deployed, and a 30% growth in other consumers with a relatively flat profile.
 7 Certain projects: new storage facilities that have been approved and/or are under construction.
 8 Possible projects: new storage facilities that are known to GTS but whose approval and implementation are as yet uncertain.

6. Storage facilities

There are various types of storage facilities. In this chapter, we distinguish between depleted gas fields and salt caverns. Depleted gas fields are highly suited to accommodate the seasonal fluctuations of traditional production. In particular, salt caverns ensure short-term flexibility for trading purposes or for peak situations where demand for gas is exceptionally high. Salt caverns with a very large storage capacity, in which the opportunities for injection and extraction are favourable, can also be used to better match seasonal supply and demand.

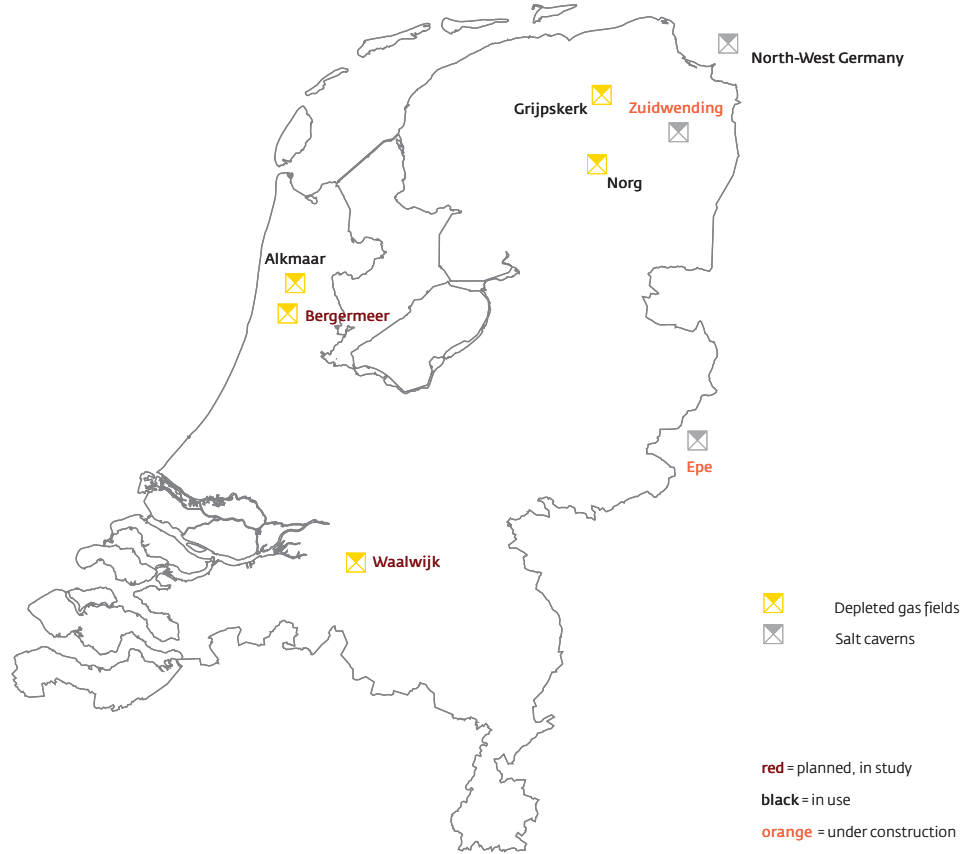
THE NETHERLANDS

The Netherlands gives access to over 5,000 million m³ of effective gas volume in seasonal storage and 584 million m³ of storage for peak situations or short-term use. Most of the seasonal storage is provided by the depleted gas fields in Norg and Grijpskerk. The storage facility in Alkmaar (former gas reservoir) is used during periods of high demand for gas in winter. There are plans to significantly extend the gas storage facilities in Norg and Grijpskerk, and specific plans to construct a large-capacity seasonal storage facility in Bergermeer. The final investment decision governing this facility is likely to be taken in 2009. A study will also be carried out on the deployment of the depleted gas field at Waalwijk as a storage facility.

Salt caverns with a proposed or existing direct connection with the Dutch transport network are located in Zuidwending, Epe and northwest Germany. Short-term flexibility is exported to the Netherlands from the salt caverns at Epe and Etzel, just over the border with Germany. During the third quarter of 2009, a start will be made on expanding the salt caverns in Epe. The LNG terminal which is under construction and the proposed terminals could eventually contribute to capacity provision in the future. However, this is uncertain due to the fact that the availability of LNG for seasonal flexibility depends heavily on the global LNG market.



GAS STORAGE CAPACITY IN THE NETHERLANDS



Various activities are planned to boost flexibility in the near future. They include a project for salt caverns to accommodate peak demand and short-term use. In the Netherlands, only one new construction project for seasonal storage has reached the advanced study phase; the outlook for more new seasonal storage construction projects is as yet unclear. The Netherlands has a number of depleted gas fields which could be suitable for extra seasonal flexibility. Long-term demand for flexible storage in northwest Europe will grow. Regionally, the decline in production capacity may not be compensated for by sufficient storage which is suitable for balancing seasonal fluctuations.



7. Peak supply

THE NETHERLANDS

GTS is responsible for the peak supply of gas to domestic households in the -9 °C to -17 °C temperature band. The Decree on Gas Security of Supply (Government Gazette 2004, no. 170) was adopted to this end. To prevent domestic consumers from experiencing power cuts during extremely cold weather due to a shortage of production and transport capacity, the Decree specifies that the national network operator is responsible for the reservation of (additional) volume and capacity to meet the increased demand of domestic consumers whenever the effective daily temperature falls below -9 °C.

Peak supply is restricted to those hours in which the hourly consumption by domestic households exceeds the maximum hourly consumption on a typical -9 °C day. The license-holder is obliged to obtain the volume and capacity required via the national network operator. Together with the freely contractable basic supply of gas for temperatures down to -9 °C, the license-holder can thus offer a complete supply of gas down to temperatures of -17 °C to domestic consumers. The national network operator is obliged to obtain the volume required for peak supply as efficiently as possible. The NMa monitors the provision of peak supply services.

A proposed redefinition of the target group (domestic household consumers) will result in a slight reduction in the volume of peak supply requirements (the Senate is expected to approve the proposal in 2009). On the strength of this amendment, a capacity of 2.47 million m³/h and a volume of 102 million m³ has been reserved for the peak supply of gas in winter 2010/2011. Since the introduction of the peak supply provision, however, it has not yet been cold enough to justify its use.

GTS uses two provisions to guarantee the production capacity required for peak supply:

1. Gasunie's LNG installation on the Maasvlakte (the LNG peak shaver; not to be confused with the LNG terminal which is being developed by GATE nearby).
2. Capacity purchased on the market by means of an annual tender.

Since the revised definition of 'domestic consumers' will result in a slight reduction in the total capacity required, and since the use of the capacity of the LNG peak shaver is largely unchanged, reliance on the supply of external capacity will also decrease. There are currently four storage facilities in the Netherlands and in the outlying cross-border regions which satisfy the necessary technical requirements for external contracted capacity. In the near future, this supply will be further expanded to include a number of additional installations. Flexibility from domestic production can also be used for the external contracted capacity.

EMERGENCY SUPPLY

The emergency supply procedure is activated if a license-holder cannot supply gas to domestic consumers. In such situations, GTS has measures to guarantee temporary supply to domestic consumers as long as they have failed to find an alternative supplier.

8. Available infrastructure

In the interests of security of supply in the Netherlands, it is also important that the right infrastructure is in place to transport the gas to the domestic market. GTS is monitoring developments in the gas market which could have an impact on gas flows in the Dutch gas transport network, and for the related demand for transport capacity. GTS is using its existing infrastructure and necessary expansions to contribute to the strong positioning of the Netherlands as the northwest European gas roundabout.

Changes in supply and demand in the Netherlands and in northwest Europe are creating a need for more import capacity at cross-border points for the Dutch market and are enlarging demand for the transit of gas through the Netherlands. The construction of the Nord Stream pipeline and the LNG terminal(s) are also leading to a change in gas flows. From a European perspective, transit flows through the Netherlands are primarily expected from east to west and from north to south.

Due to the growing need for flexibility (seasonal and short-term flexibility), various market players are now developing storage facilities and caverns which will be connected to the GTS gas transport network.

All these developments call for investments to expand the Dutch gas network. In 2007 Gasunie decided on an investment programme based on long-term transport contracts to realise phase 1 of the gas roundabout. These were concluded with 17 commercial entities participating in an Open Season. These projects started implementation in 2007 and involved the construction of two compressor stations and the laying of more than 300 kms of pipeline. The aim is to offer this transport capacity to the market from October 2010.

The development of the gas roundabout is still under way. Contracts with 23 commercial entities for transport capacity in the context of the Open Season 2012 have led to a substantial new investment programme. GTS has coordinated this investment programme with the network operators in neighbouring countries, to ensure that the relevant shippers on cross-border transport routes can make immediate use of the extra capacity from 2012. The programme includes a further expansion of the gas transport network because of the supply of liquefied natural gas (LNG), new gas storage capacity and extra facilities for quality conversion.

OVERVIEW MAP OF THE GAS TRANSPORT GRID EXTENSION



Source: GTS. Status 15 May 2009

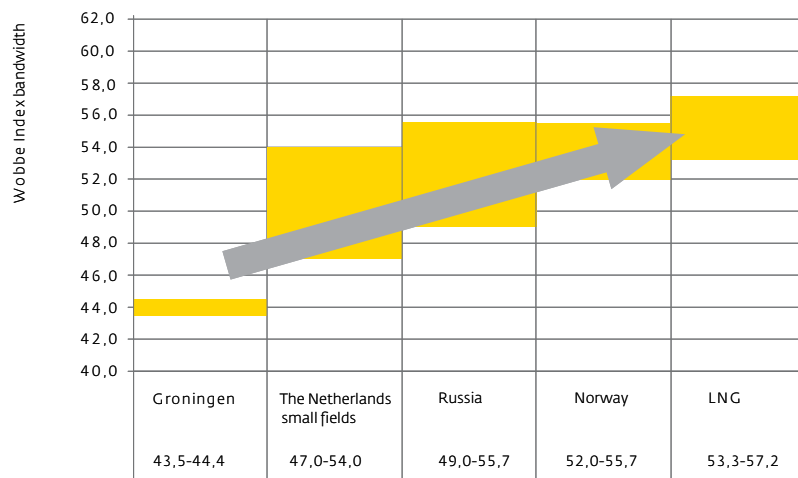
GTS is taking steps to improve the international gas transport between the Netherlands and Germany in cooperation with Gasunie Deutschland. At the end of 2008, an integrated Open Season was launched, meaning an open season procedure has been conducted for the networks of both GTS and Gasunie Deutschland. During an initial market survey (the market screening phase), approximately 40 shippers showed interest in additional transport capacity, both for the individual networks and for the two combined. This confirms the impression that the market still asks for much more transport capacity.

QUALITY CONVERSION

In the Netherlands, quality conversion forms the link between the high calorific and low calorific gas markets⁹. GTS carries out physical quality conversion in two ways: first, by mixing gas of different qualities, and second, by mixing high calorific H-gas with nitrogen. GTS will be offering quality conversion as a system service as soon as the Office of Energy Regulation has taken the tariff decision; market players will then no longer need to book quality conversion in advance.

In future, the transport of Groningen gas and gas from small fields will reduce and the transport of gas from other sources are expected to increase. Due to the diversification of gas supply from different production areas, GTS will need to be able to facilitate a changing portfolio of gas qualities in the gas transport system. G-gas from Groningen and H-gas from Russia differ markedly in quality; this difference is usually expressed in terms of the Wobbe index. The diagram below shows the different gas qualities. The increase in imports and transit in the Netherlands will eventually result in a need for more quality conversion.

WOBBE INDEX RELATED TO ORIGIN OF GAS SUPPLY



Source: GTS

⁹ There is a limited low calorific market in Germany, Belgium and France. Low calorific gas comes mainly from the Netherlands (and from a small and shrinking annual production of low calorific gas in Germany). Converting gas quality is only possible in the Netherlands.



NEW INVESTMENTS

Substantial investments are needed in time (i.e. made when the market requires them) to supply more imported gas from Russia and in the form of LNG to the West European market (i.e. the Netherlands). These investments are not confined to the Dutch infrastructure but have also an effect on the infrastructure in our neighbouring countries. Substantial investments are also needed for (the connection of) storage facilities and the expansion of capacity for quality conversion.

LONG-TERM INFRASTRUCTURE DEVELOPMENTS

GTS periodically draws up long-term strategies for the northwest European gas market, based on a range of market studies and an EU gas transport model which is constantly fed with relevant data about the European gas market (supply, demand, planned pipelines and pipelines under construction, planned and potential storage facilities and LNG terminals). This is used to estimate the overall consequences for gas transport network in the Netherlands. In the interests of an optimal development of the gas transport network, it is also considered whether new investment programmes would fit into the long-term strategy.

Quality and state of maintenance of the networks

In accordance with the provisions contained in the Ministerial Decree on the Quality Aspects of Electricity and Gas Network Management, GTS sends a report to the Office of Energy Regulation (Energiekamer) by 1 March each year on the quality of transport services during the previous year. The report is based on a registration of quality indicators. More information can be found in the Report on Quality Indicators 2008.¹⁰

Under the same Ministerial Decree, GTS is also required to submit a quality and capacity document to the Office of Energy Regulation by 1 December during odd calendar years. In it, GTS:

- ▶ Provides evidence to support the effectiveness of its quality management for transport services.
- ▶ Provides evidence to show that it has sufficient capacity (both now and in the future) to meet the total gas transport requirements.

More information can be found in the Quality and Capacity Document 2007.¹¹

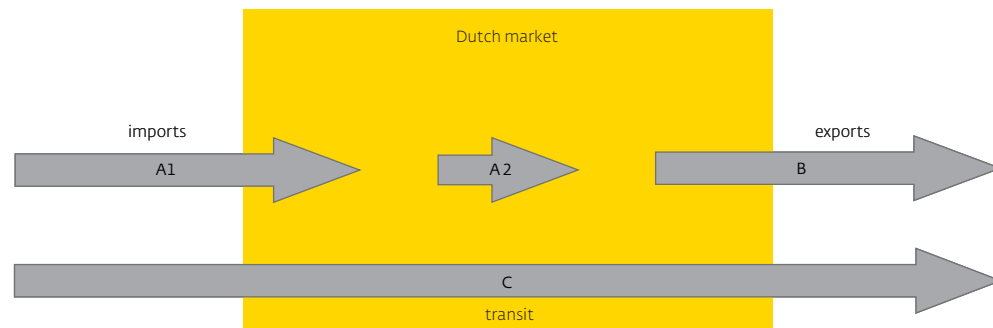
¹⁰ See www.gastransportservices.nl

¹¹ See www.gastransportservices.nl

Annex 1 Shipper information

On 20 January 2009, 52 shippers were sent a letter inviting them to contribute to the VZG report. They were asked to provide information about the contracted volumes of gas to the Dutch market (A1 and A2), from the Dutch market (B) and through the Dutch market – transit (C) for the next 20 years (status: ‘certain’). A similar inventory was compiled of probable volume contracts during the same period (status: ‘probable’).

SHIPPER INFORMATION



A To Dutch market	
A1 From foreign country	To Dutch market (trade relation, HUB/TTF, end users)
A2 From Dutch market (production, trade relation, HUB/TTF)	To Dutch market (end users)
B From Dutch market	
B From Dutch market (production, trade relation, HUB/TTF)	To foreign country
C Through Dutch market (transit)	
C From foreign country (via The Netherlands)	To foreign country (via The Netherlands)

In particular, the shippers indicated:

- ▶ The country of origin of the gas.
- ▶ The country of destination of the gas.
- ▶ The type of transport used (LNG, pipeline).
- ▶ The quality of the gas.
- ▶ The duration of the contract: longer or shorter than 10 years.

The contracted volumes reported cover approximately 90% of the total contracted volumes. GTS extrapolated these volumes into total volumes based on the related transport capacities that were booked with GTS.

GTS has taken great care in processing the information provided by the shippers. One important consideration was to identify and eliminate possible duplicate readings. We believe that we have succeeded in this, but cannot provide any guarantees.

