

Annexes to the draft application for an exemption

ANNEX 1.

Open season Brochure



BBL – *Balgzand*
(The Netherlands)
Bacton (UK)
Pipeline Project



Gastransport Services

BBL – a gas pipeline from Balgzand (The Netherlands) to Bacton (UK)

Contents

Introduction	3
European supply and demand	4
Technical information	7
Regulatory aspects and commercial structure	11
Transmission services	12
Indicative terms and conditions	16
Timetable	17
If you want to become a shipper	18



Introduction

The project Gastransport Services (GTS), part of N.V. Nederlandse Gasunie, is currently planning the construction of a gas pipeline system between the UK and the Netherlands, connecting Balgzand and Bacton, referred to by the Dutch acronym BBL. The gas flow direction is from the Netherlands to the UK. This document provides a general introduction to the project. The aim is to inform the market and to establish the level of interest in contracting transmission capacity in the BBL. Market demand will determine the ultimate capacity of the pipeline. This document marks the start of the 'open season'.



The company

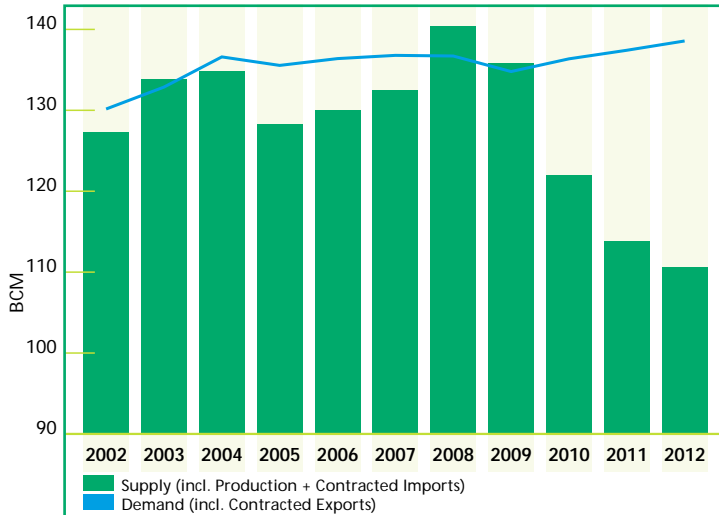
In the context of the liberalisation process in the Netherlands and the European Union, N.V. Nederlandse Gasunie (owned by EBN, Shell, Exxon Mobil and the Dutch State), has been unbundled in GTS and Gasunie Trade & Supply. Preparations are being made for a legal separation. GTS is the gas transmission company, responsible for gas transport and related services in the Netherlands. GTS operates the country's gas transmission network; modifying and expanding the system as necessary.

European supply and demand

The European natural gas market is changing rapidly: markets are opening up and demand is rising, providing a basis for interconnections between gas networks. The import dependence of Europe is growing fast, from one-third now rising to two-thirds by 2020. The latest predictions from the UK government (Department of Trade and Industry/Ofgem) indicate that the UK's import dependency could increase significantly beyond 2010. These predictions call for action in diversifying the routes by which natural gas can enter the UK gas market.

The BBL offers an opportunity to bring gas from continental sources to the United Kingdom via a route of just 230 kilometres. The BBL could play an important role in security-of-supply issues for the UK by offering supply diversification. The European Commission has identified that one of the missing links in the main gas infrastructure is an interconnection between the Netherlands and the UK. The proposed BBL could provide that missing link and meet the need for gas in the UK. In the more distant future, it may even play an important role in connecting Russian gas volumes to the UK.

UK Natural Gas Balance



UK supply and demand

UK volume balance

According to many different studies, the United Kingdom will face serious supply-side challenges if the UK Continental Shelf (UKCS) production rate goes down as expected. The graph shows the GTS perception of the UK gas balance over the next ten years. It shows the imbalances for the years 2004 - 2007 and in 2010 and beyond. The supply includes the published Centrica deals with Gasunie Trade & Supply and Statoil. Compared with Transco data, this supply scenario is optimistic.

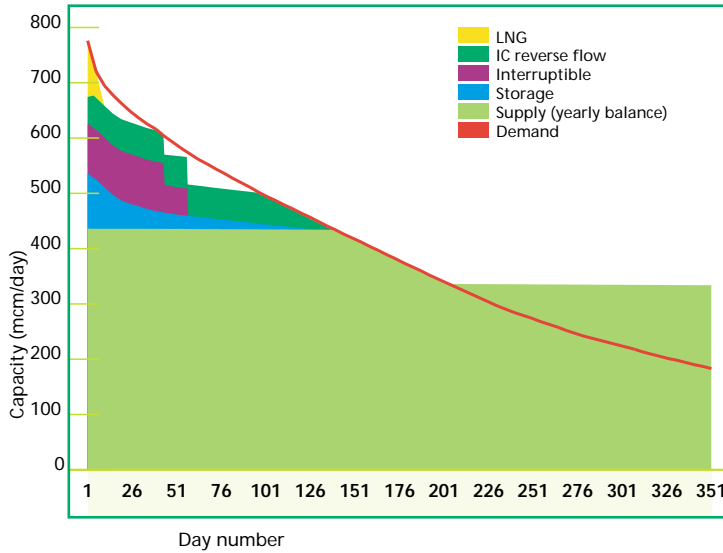
Capacity analyses

The GTS perception of the UK balance through the year has been built up from a combination of analyses, all of them considering situations over several years.

1-in-20 peak day analysis

If the UK is only able to call on existing and planned storage capacity, LNG supplies and customer interruptions, an analysis for a 1-in-20 winter peak day shows a deficit as from 2005. Now the Interconnector can also be used in high volume reverse flows, under the assumption that additional gas is available at Zeebrugge, then the shortfall in peak day gas demand does not begin until after 2007.

Load Duration curve Severe winter 2006



Supply and demand over the year

Since part of the storage capacity has only a peak-shaving function, in winter periods the UK could be faced with shortages and interruptions of considerable duration. These conclusions are based on matching supply and demand over a year.

The graph shows supply and demand for a severe winter (1 in 50) in 2006 and the various available ways of bridging the gap, like storage and interruptible demand. The white area below the red line shows the shortfall in gas. Even after all the available measures presently announced there still is a gap of around 100 days, representing a volume of about 300 million m³. Although there may be no shortfall on the peak day, in later years the shortfall will grow, reaching 8000 million m³ in a severe winter by 2010.

These shortfalls in gas supply over the year can be translated into the number of Interconnectors/BBL pipelines necessary to make good additional missing capacity. Depending on the year and the various options available, like interruptible demand and the availability of gas for reverse flow, between 1 and 5 additional pipelines could be necessary just for capacity balancing purposes.

Conclusions

The analyses show significant shortages in the UK for both volume and capacity. As always, the magnitude of the shortages depends on many factors, but regardless of the chosen methodology and assumptions, the results given here and shown by studies from various independent sources all forecast more or less similar shortages. Clearly, there is a strong business case for the BBL, given the potential of the continental market upstream of the Balgzand entry point to provide the necessary resources to help meet these future shortages.



Technical information

About the project

The BBL is currently planned as a gas pipeline system between the UK and the Netherlands. The physical gas flow is from the Netherlands to the UK.

The system will consist of the following elements:

- 1 Compression facilities in Noord-Holland
- 2 An onshore pipeline section to a designated pipeline landfall location near Julianadorp
- 3 A shore crossing/landfall from behind the dunes to a location just off the coast, preferably constructed using the horizontal directional drilling method
- 4 An offshore pipeline crossing the North Sea from the Netherlands to the UK
- 5 A pipeline section crossing the beach at Bacton
- 6 An onshore pipeline section to the existing gas terminal
- 7 Receiving facilities at the terminal.

Compression facilities

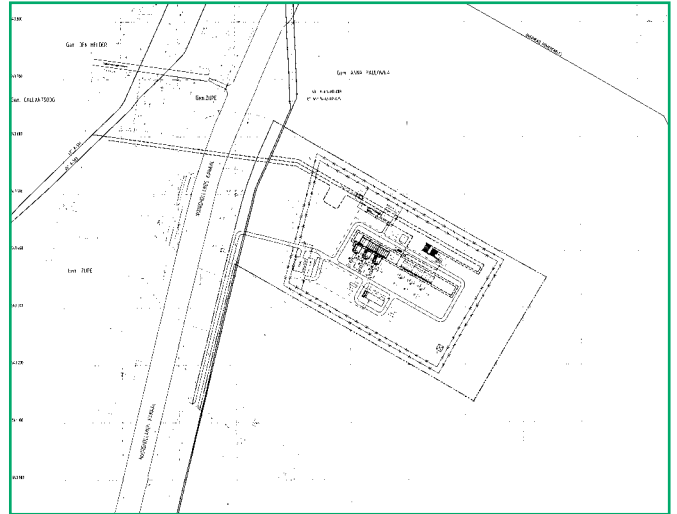
Noord-Holland

The compressor station in the Anna Paulowna polder, next to the Noord-Hollands Canal will be the inlet point for the new transportation system. The compression facilities and pipeline diameter will depend on the contracted capacity.

Dutch onshore pipe section



Location compressor station



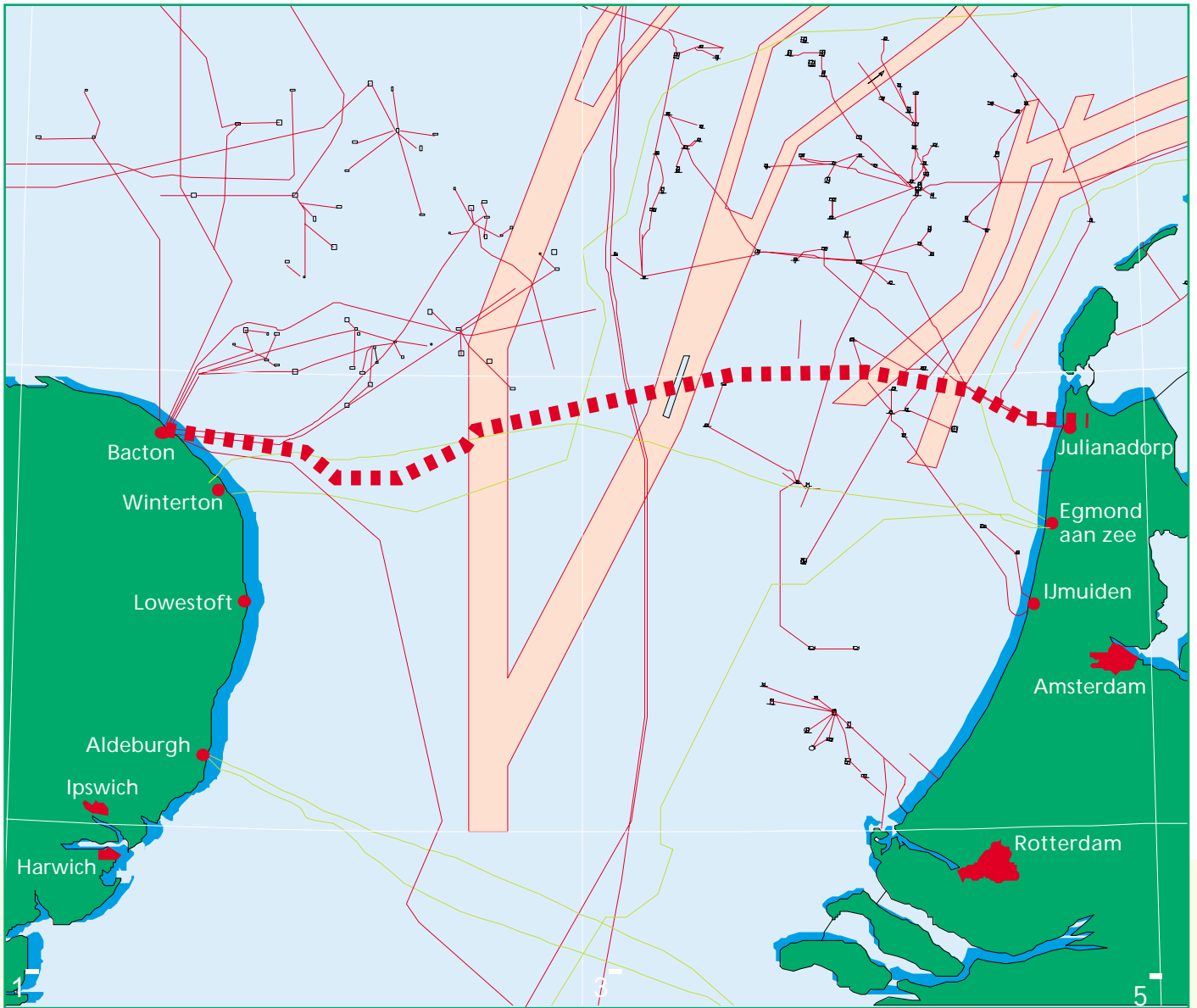
Pipeline system

Design and engineering

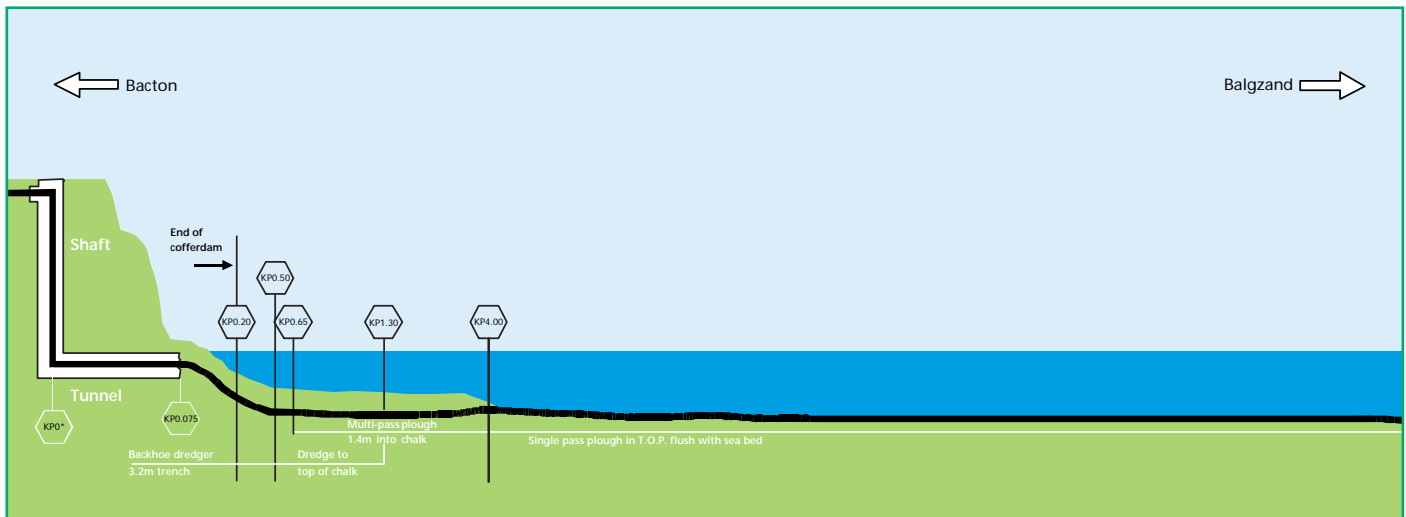
The pipeline system is subject to design codes and standards required by Rijkswaterstaat in the Dutch Sector and the Department of Trade and Industry (DTI) and the Health and Safety Executive (HSE) in the UK. Therefore, an important aspect during the project development will be the interface between the representative authorities in the Netherlands and the UK.

Consultations are going on with Dutch authorities to get the required permits for the pipeline and the compressor station. A specific report will be made in which the effects of the project on the environment are carefully considered.

The proposed pipeline system has a total length of approximately 235 km. The 4 km long onshore pipe section runs from the compressor station at the Noord-Hollands Canal to the designated pipeline landfall location crossing the dunes close to the village of Julianadorp. After crossing the dunes, the offshore pipeline route follows the existing pipeline corridor off the Dutch coast for some kilometres before heading towards Bacton. The total length of the offshore section will be approximately 230 km. Along the offshore route, the pipeline will cross five existing pipelines and nine telecommunication cables. At Bacton, the pipeline will be routed to an existing gas terminal. The onshore length will be approximately 1 km.



Pipeline system route

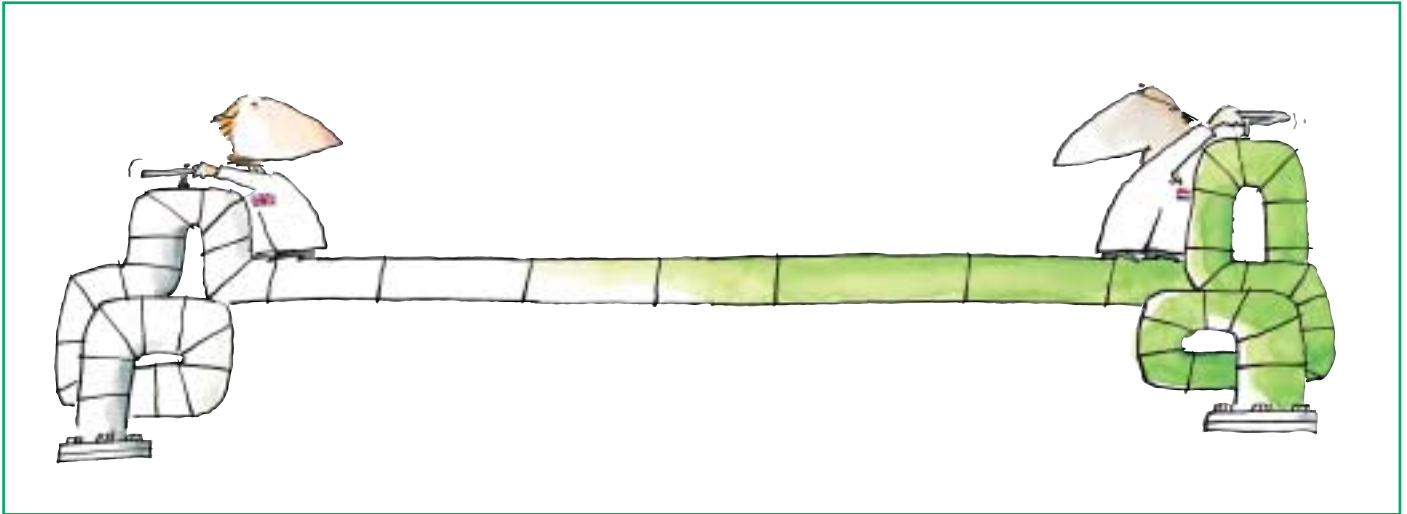


Pipeline system

Construction

The pipeline system will be constructed using proven and reliable construction techniques. To minimise the environmental impact, the Dutch dune crossing will preferably be constructed using the Horizontal Directional Drilling (HDD) method. At the UK side, the Bacton landfall involves a tunnelled shore crossing with a vertical shaft bringing the pipeline close to the onshore gas plant.

The actual pipelaying will commence with the pipe laybarge anchoring offshore Bacton for the pipe to be pulled ashore into a cofferdam. A tie-in between the Bacton landfall section and the offshore section will be made on the beach. After the pipe pull, the barge will start laying the pipe from Bacton to the Callantsoog tie-in point, where the offshore section will be connected to the Dutch landfall section.



Regulatory aspects and commercial structure

GTS will develop and operate the BBL pipeline in compliance with all applicable laws and regulations. The BBL is expected to commence operations in 2006. To this end, GTS is already discussing the planning and regulatory processes with the relevant authorities. A treaty or an Inter-Governmental Agreement between the UK and Dutch Governments will be concluded before the start of operations in 2006. This agreement will set out how the governments will work together on certain matters regarding the BBL pipeline. This will include health, safety, environmental matters and tax aspects.

Access

The access regime is characterised by the current 'open season' for capacity rights in the BBL project. Any shipper wishing to contract capacity in the BBL project is invited to express interest during this open season. The terms and conditions, as well as an indication of the applicable tariffs, are published on page 16 in this brochure.

Capacity Management

Owners of capacity rights will be allowed to trade their capacity rights freely. Full assignment of capacity rights will be subject to approval by the BBL. A use-it-or-lose-it system for actually unused capacity will be developed. The allocation of this unused capacity will be on a regulated basis.

Ownership

The BBL will most probably be built and owned by a new company. The BBL project is an initiative of GTS, which will establish and hold an equity stake in the BBL company. Currently GTS is considering the participation of other shareholders in the BBL. The project does not, however, depend on the participation of other pipeline companies. Ownership is in any case expected to be in the hands of independent pipeline companies. Shareholders will in principle not own capacity rights. Capacity rights will be agreed in separate contracts.

Operation

GTS will be responsible for the operation and maintenance of the BBL on behalf of the BBL owner (or owners).



Transmission services

The aim of this 'open season' is to market long-term firm transmission capacity. The present open season will also be used to elicit shippers' wishes with regard to services, terms and conditions. The final terms and conditions for the BBL will be the result of negotiations during the open season.

Transmission capacity from any entry point of the GTS-transmission system to the entry point of the BBL can be part of the negotiations.

Firm transmission capacity

Shippers will be able to contract firm transmission capacity on the BBL for the term of the agreement. The capacity to be built will depend on the commitments received from shippers during this open season and the subsequent negotiations. In principle the design will not exceed the contracted capacity. Physical gas flow will only be available from the Netherlands to the UK.



Transmission capacity trading

Shippers will be able to trade all or part of their firm transmission capacity with third parties for specified periods of time. There are two ways of doing this:

1 Subletting of transmission capacity

Existing shippers will be free to sublet all or part of their transmission capacity to a third party for a period of time. The terms and conditions on which this takes place will be up to the shipper and the sublessee. The shipper will remain responsible for all obligations vis-à-vis the BBL.

2 Assignment of transmission capacity

Existing shippers will also have the right to assign all or part of their capacity to a third party. The assignee in that case takes over all the rights and obligations of the existing shipper for the term of the agreement. The assignee needs to satisfy the conditions laid down by the BBL. For example, the assignee will have to satisfy certain financial criteria showing that he can meet its obligations under the transmission contract.

Quality and pressure

The BBL will transport dry gas. Gas quality specifications will conform to those required by Transco (NTS specifications) for entry to the UK market. Because GTS will control the gas quality (since the BBL entry point will be an exit point on the GTS-transmission system) it is possible that gas entering at the entry points of the GTS-transmission system will have a different quality. However, the quality of this entry gas has to comply with the specifications stipulated in the relevant Transmission Service Agreement (TSA) and shippers will have to contract the necessary quality conversion services from GTS.

GTS will negotiate a NEA (Network Entry Agreement) with Transco laying down the final specifications.



Balancing

The balancing of the BBL will be on an hour-by-hour energy basis. For balancing, the 'in = out' rule applies. An operational margin will apply for balancing. Other balancing and tolerance services could also be considered, depending on shippers' interest.

Nomination and allocation

Nomination

Each shipper will be required to make hourly nominations at the entry point for the following gas day.

Allocation

Because the volume of gas that actually flows each hour may not always exactly equal the nominations for that hour, the allocation process will retroactively determine how much gas each shipper is credited with. The allocation process will be executed at the entry and the exit points, based on the nominations in place.





Indicative terms and conditions

Indicative tariffs

The tariff for the BBL pipeline will depend on the size and the capacity of the pipeline. We cannot therefore give any guaranteed transmission tariff at this stage. However, for the smallest-capacity pipeline, the estimated charge will be € 65/m³(35.17)/hour/year based on a 15-year contract. This fee includes the fuel costs for the pipeline. Economies of scale imply that the tariff could be reduced if more long-term transmission capacity is contracted. Shippers will be responsible for securing any necessary transmission capacity in the adjacent pipeline systems themselves.

BBL entry point

The entry point of the BBL will be an exit point in the GTS-transmission system. Terms and conditions as published in the relevant GTS Transmission Service Agreement will be applicable for this exit point.

BBL exit point

The exit point of the BBL will be connected to the National Transmission System (NTS) of Transco in the UK. If necessary, the shipper will be responsible for securing NTS entry capacity.

Contract period

During the open season there will be a minimum term of 10 years and a maximum term of 20 years for the transmission contract.

Creditworthiness

Shippers wishing to subscribe for transmission capacity will have to demonstrate sufficient financial strength to meet their obligations vis-à-vis the BBL owner. Potential shippers will therefore be required to provide relevant information to the BBL, who may also require guarantees from the shippers' ultimate parent company or other guarantees such as a bankers guarantee.

Applicable law

The transmission contract will be governed by Dutch Law.



Timetable

17 March 2003 BBL information document sent out to shippers and interested parties.

16 May 2003 Close of open season: shippers can submit a non-binding capacity nomination to Gastransport Services at any time up to this date.

March - 1 September 2003 Negotiation of transmission agreement with potential shippers.

September 2003 Signing of transmission contract; decision on total pipeline capacity.

General remark

On the basis of meetings with relevant national and European legislative and regulatory authorities, GTS has come to the conclusion that the final regulatory and legislative position of the BBL pipeline is not yet entirely clear. This is due to the fact that the second Gas Directive (amending Directive 98/30EC) has not yet been adopted and subsequently implemented in national law. This will influence the final investment decision.



If you want to become a shipper

GTS expects to start the construction of the BBL in 2004. The decision on building the pipeline and its final capacity will be taken before the fourth quarter of 2003. The transmission contracts accordingly have to be signed before the end of September.

The capacity to be installed will be based on the contracts with shippers and on an estimate of future needs.

If you are interested in contracting transmission capacity, you can fill in the form at our website:

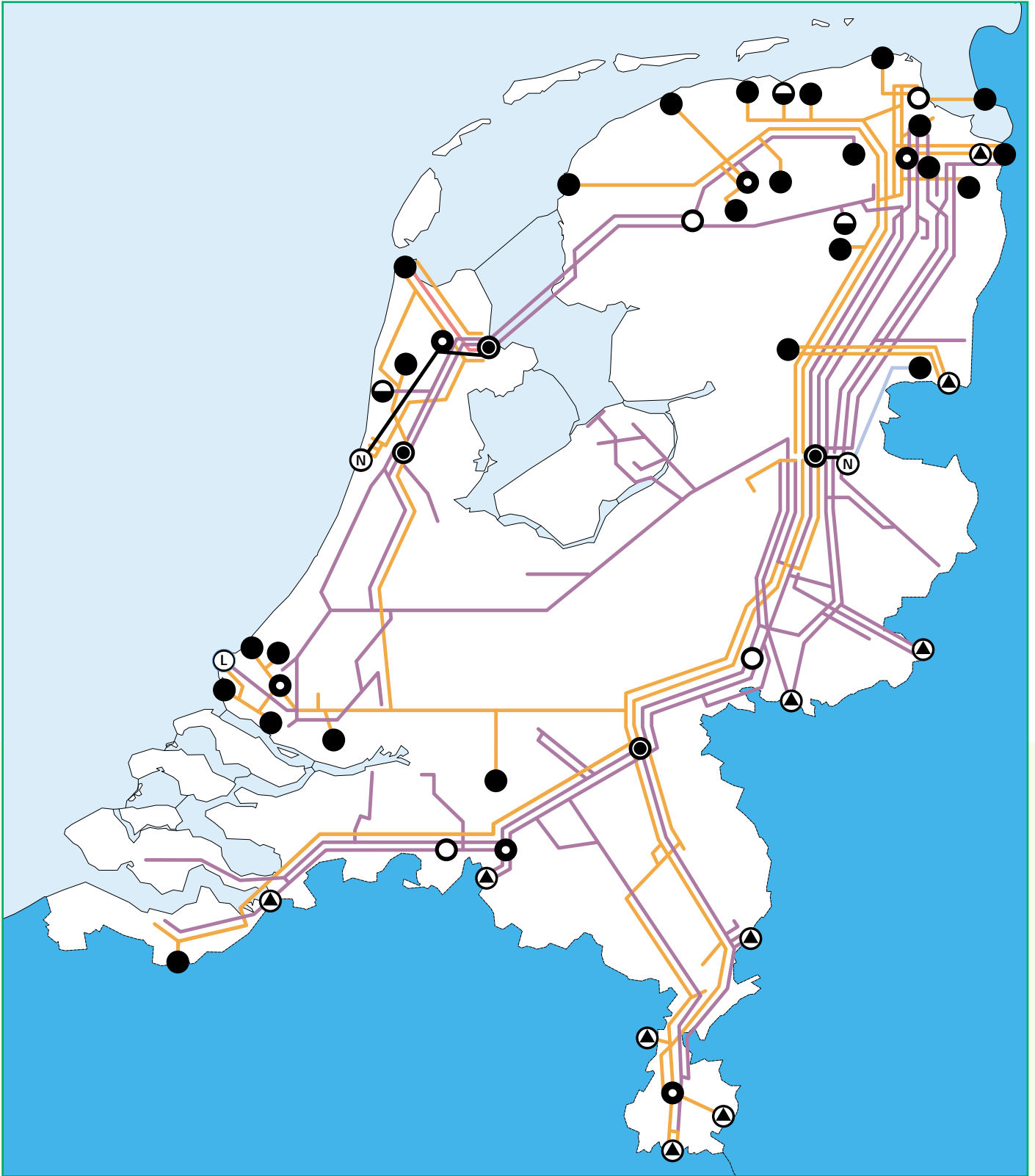
www.bbl.gastransportservices.nl

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Map of Dutch transportation grid

- pipelines – Groningen gas
- pipelines – high-calorific gas
- pipelines – low-calorific gas
- pipelines – desulphurized gas
- pipelines – nitrogen
- feeder station(s)
- ⊙ compressor and blending station
- compressor station
- ◌ blending station
- ◌ underground gas storage
- ◌ export station
- ◌ LNG facility
- ◌ nitrogen plant

Colophon

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ANNEX 2.

Abstract from the N.V. Nederlandse Gasunie firewalls handbook

Reason	<p>The Gas Act stipulates that Gasunie must not use commercially sensitive information (CSI) obtained in the course of negotiations relating to transport contracts or from the actual provision of transport services when buying or selling gas. To comply with the provisions of the Gas Act, it has been decided to establish two separate operating organisations: Gasunie Trade & Supply and Gastransport Services. These two organisations occupy separate buildings. For the time being, however, the gas transport organisation will be providing support services to the trading organisation. For that reason, firewalls comprising a system of measures aimed at preventing abuse of CSI and conflict of interests within Gasunie (as buyer and seller of gas and gas transport organisation combined) continue to be necessary.</p>
Purpose	<p>This manual describes the organisation of the firewall system within Gasunie and the measures that have been put in place in this context. The various agreements reached serve as reference framework for both Gasunie Trade & Supply and Gastransport Services. The manual also forms a reference framework for both internal and external audits.</p>
Organisation	<p>The manual has been organised on the lines of the Gasunie standards for quality systems. This involves different levels of description, forming separate sections in the manual:</p> <p><u>Policy</u>: The fundamentals, the objectives and the organisation of the firewall model.</p> <p><u>Control</u>: The function and duties of the compliance officer. Description of the process leading to CSI and an analysis of the places in the organisation where CSI is found. Also includes a risk analysis in relation to the firewalls.</p> <p><u>Management</u>: This section contains a number of general procedures relating to the firewall system.</p>
Management	<p>The Firewall Manual is managed on behalf of the compliance officer, J. Grooten (FA), by W.H.T.T. Zwart (FF-B). It is the manager's duty to ensure that amendments to the manual are duly processed and new versions are issued. Questions, comments and suggestions should be addressed to the manager. Owner of the manual is the Chief Executive Officer. Amendments to the manual will be agreed with the CEO periodically.</p>
Distribution	<p>The manual will be distributed electronically via the DIS system. There will also be restricted issue of the manual as a hardcopy document.</p>

1. Background

Gasunie has always been a gas trading and transport company, with buying, carrying and selling natural gas as its primary activities, both in the Netherlands and beyond. Corporate policy focuses on the continuity of the company as a prominent European supplier of natural gas. The company is careful to ensure that its activities comply with the relevant statutory and other rules and regulations. The Gas Act, implementing a European Directive, came into operation on 10 August 2000. The purpose of this document is to describe the implications for Gasunie of one of the Act's provisions.

The Gas Act has significant implications for Gasunie. Summarising, Section 10, subsection 3, Section 11, subsection 2, Section 14, subsection 3 and Sections 37 and 38 of the Gas Act mean the following for the structure and activities of Gasunie:

- Gasunie is under obligation to negotiate the provision of gas transport and necessarily related services with any party requesting such services.
- The conditions on which this gas transport and the necessarily related services are provided must be reasonable, transparent and non-discriminatory.
- In its gas purchasing or sales activities, Gasunie is prohibited from making improper use of commercially sensitive information (CSI) obtained in the course of negotiations regarding gas transport or in the course of actual transport operations.
- Gasunie does not have to be split into legally independent network operator and trading companies.

The Gas Act does not contain any unequivocal directives concerning the organisational measures to be implemented by Gasunie in order to comply with the Act. Initially, Gasunie satisfied the provisions of the Gas Act whilst continuing to operate as an integrated business. It was, however, subsequently decided to set up a separate operating organisation for gas trading (Gasunie Trade & Supply) and another for the transport operations (Gastransport Services), with support services provisionally being shared by the two companies. These two operating organisations occupy separate buildings. The shared support services necessitate the establishment of a compliance structure or the necessary changes to existing structures in order to segregate the production processes, i.e. erect the necessary firewalls. The aim is that even Gasunie outsiders should perceive that the information relating to shippers concerning transport contracts is not available to Gasunie Trade & Supply. This is why the concept of commercially sensitive information has been introduced.

2. Definition of commercially sensitive information

Commercially sensitive information (CSI) means information about customers/ accounts (shippers) obtained from market players by Gastransport Services. CSI therefore includes:

- a. shippers' capacity planning and capacity reporting details;
- b. shippers' capacity projections;

- c. any report containing details of shippers;
- d. shippers' contract details (including details of potential shippers' contracts):
 - names;
 - Applications for the transport of third-party gas plus related services;
 - contracted hourly capacities;
 - contracted prices/tariffs;
 - contract documentation and individual contract clauses;
 - correspondence, e-mails, internal customer memorandums, etc. kept on file;
- e. billing information (metering data):
 - metered/allocated hourly capacities (in MJ/h);
 - prices/tariffs charged;
 - invoice details
 - customer account details and payment performance information;
- f. applications for the construction of gas pipelines serving third parties.

N.B. The following elements *do not* constitute CSI:

- aggregated data (provided it is anonymous);
- standard contracts (format only).

3. Purpose of the firewalls

The purpose of the firewalls is to ensure that commercially sensitive information is only able to find its way to the appropriate destination and also remains there. This concerns information provided by market players whether orally or in writing (electronic or hardcopy). The aim of the firewalls is therefore to restrict access to information. The access restrictions can take the following forms:

Type	Application
Code of conduct/ communication	Conduct of staff. Ensuring adequate information and proper appreciation.
Organisation/ procedures	Working procedures and guidelines to be followed by staff, e.g. concerning the distribution of documents.
Logical access	Restricting/controlling access to systems and data with respect to those systems which are shared by Gasunie Trade & Supply and Gastransport Services and protecting CSI that is included in the systems.
Physical security	Wherever there is a need for a physical bar preventing unauthorised access.

In general, organisational segregation is necessary wherever people take decisions or influence decision-making; where people are merely performing administrative tasks, a code of conduct is

sufficient. Gasunie has deliberately opted to implement robust measures that are clearly visible. The relocation of Gasunie's trading activities to separate premises along with the other measures that have been put in place affords significant protection for information relating to other shippers.

4. Basic firewall model concept

The decision to share support services for the time being obliges Gasunie to introduce an internal system of measures in order to ensure compliance with the requirements of the Gas Act relating to CSI.

There shall be no abuse of commercially sensitive information:

- obtained through negotiations concerning transport on behalf of third parties;
- obtained through the actual provision of transport services.

The key feature of the model is the creation of a separate organisation for the gas trading activities (Gasunie Trade & Supply) and the location of this organisation in premises away from Gastransport Services. This essentially makes Gasunie Trade & Supply a shipper like any other as regards the use of commercially sensitive information.

Gastransport Services will in future be providing transport services for Gasunie gas and for third-party gas, together with the related services. Within Gastransport Services, it is the commercial business unit S that is responsible for arranging these services.

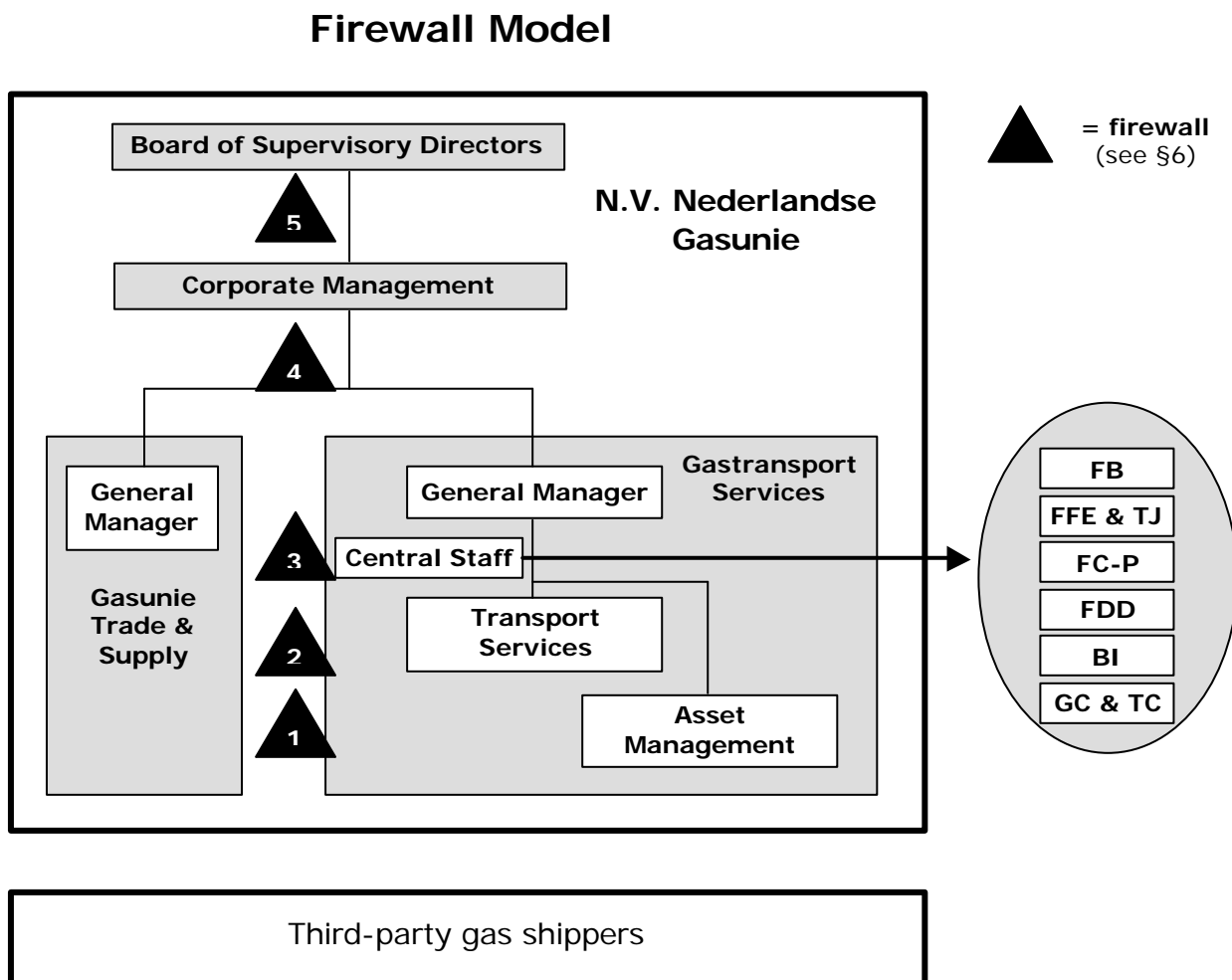
The processes involved in supplying the services provided by Gasunie Trade & Supply and unit S of Gastransport Services share an interface with the Asset Management part of the organisation, which is not only responsible for the actual gas transport activities but also for allocating transport capacity on a non-discriminatory basis.

On some sections of the network, transport capacity is in short supply. Allocation of this capacity must be performed objectively. It is for this reason that the transport protocol was established. This protocol refers to the procedure to be followed by Asset Management vis-à-vis individual shippers (including Gasunie Trade & Supply) for allocating transport capacity. Under the provisions of the Gas Act, third-party access to the network must be offered on terms and conditions that are non-discriminatory. There are two parts to the procedure: an exploratory stage and an actual service stage. The procedure in both stages is much the same, except that, during the exploratory stage, it concerns intended actual volumes under terms and conditions that still have to be agreed whereas, in the actual service stage, it concerns agreed terms and conditions under which the agreed transport will be possible. In the first stage, the crucial thing is to reach agreement on the terms and conditions. In both stages, it is a sine qua non that the required transport capacity is available.

Allocating transport capacity is therefore bound by the rules of the protocol. Gastransport Services has opted to grant transport capacity to shippers with whom agreement has been reached on the terms and conditions under which transport services will be provided on a first-come first-served basis. In this connection, it is important to bear in mind that the first stage of the transport protocol, i.e. establishing whether the proposed gas transport is practicable and, if so, on what terms and conditions, can be skipped for those shippers who are familiar with the terms and conditions and have accepted them. The available transport capacity for a number of important entry and exit points is published on the Internet.

The basic management and accountability mechanisms for the units concerned remain unchanged. They are not affected in any way by the implementation of the Gas Act. The management control model that has developed over the years continues to apply for these units just as it always has. Gasunie Trade & Supply's primary task consists in buying and selling gas in accordance with approved policies. Asset Management has the job of ensuring the reliable availability of the pipeline system at the lowest possible cost and is held accountable accordingly. Unit S is expected to process applications from shippers (exclusively concerning transport capacity and related services) and then, assuming that the application can be honoured in the estimation of Asset Management, appropriately preparing and signing the associated contract. Unit S is therefore accountable for respecting the firewalls (confidentiality), adhering strictly to the transport protocol, applying the transport terms and conditions consistently (non-discrimination) and ensuring the quality of the contracting process and the contract implementation and follow-up.

5. Conceptual representation of the firewall model



Notes to the chart:

The operating organisations Gasunie Trade & Supply and Gastransport Services

Gasunie Trade & Supply and the Transport Services unit are two separate operating organisations within the corporate entity of N.V. Nederlandse Gasunie. The respective responsibilities of the separate organisations are as follows:

- Gasunie Trade & Supply, referred to below simply as Trade, is responsible for buying/selling Gasunie gas (commodity) and, acting as intermediary, arranging for the transport of this gas and for related services provided by the Transport Services unit, abbreviated to S, which also sells transport capacity for third-party gas plus related services.
- The actual gas transport takes place via the gas transmission system, which is owned and operated by Asset Management.
- For the time being, the central staff departments FB, FC-P, FDD and BI also provide support services to Trade.

In performing the various activities, CSI obtained by Gastransport Services must be concealed from Trade. Firewalls need to be erected at each of the above three levels, as symbolised by the black triangles. These firewalls are described in greater detail in Section 6.

Apart from the central staff departments shown in the chart, there are various other support departments for which it is not necessary to have firewalls, although they are important to the proper functioning and maintenance of the established firewalls. An example is Security, for preventing unauthorised access on certain doors. This is achieved through careful coordination between the departments BP and FDB.

Gasunie Corporate Management

The two operating organisations are each responsible for preparing their own policy. After approval of the proposed policy by Gasunie Corporate Management (made up of H, HF, HB, G and T), the two organisations then independently implement the policy. Gasunie Corporate Management does not normally consider any commercially sensitive information. On occasions when such information does have to be considered, however, the necessary firewall is erected by strict segregation of the meeting and the minutes of the proceedings.

Board of Supervisory Directors

Mandatory approval procedures and reporting could result in CSI obtained by Gastransport Services becoming known to Trade. Various procedural rules are in place to prevent this and agreements have also been reached with the individual members of the Board.

On the basis of the underlying concept described above and the definition of CSI, an inventory of areas of existing and potential risk has been prepared. Areas of risk refers to those points in the organisation where CSI is collected by virtue of the function. At each of these points, safeguards have to be put in place to make it impossible (within the bounds of reasonableness) for abuse of such information to occur.

The above concept and its underlying principles have been implemented and anchored within the Gasunie organisation. This has been achieved through the implementation of the Firewall Model. The associated measures represent a highly coordinated system involving both interdependent and compensatory links.

The firewalls serve as a guarantee that CSI relating to third-party gas shippers will not be available to Trade. Conversely, commercial information relating to Trade – as distinct from technical information – possessed by Gastransport Services support units has to be prevented from coming into the possession of unit S. This is achieved by adhering to the well-known principle of ‘need to know’ and generic measures covering classified information.

Important measures introduced by the Firewall Model (based on risk analysis)

7. Firewall model safeguards

The owner of the firewall model is the manager of unit H. Any changes to the model that are required will be submitted by line management to the unit H manager for approval. Subject to agreement between H and the Corporate Management Secretary, the latter duties may be delegated.

To provide the necessary safeguards, three measures have been put in place:

Maintaining the firewalls is a line management responsibility:

line management is responsible for complying with the adopted model. This should be interpreted in such a way that persons receiving or recording CSI as part of their jobs are responsible for ensuring that such information is properly protected. Apart from being alert to signs of the model having been breached or a risk of that happening, this means that various aspects of the model should be regularly discussed at meetings, both generally and on the basis of specific cases. Unit managers will be required to disclose all known infringements of the model in the existing Document of Representation, which will have a separate heading included for this purpose.

Subunit FF-B advisory function and appointment of compliance officer:

FF-B should be consulted with regard to the organisation of systems and the use of rights of access in connection with the application and control of the firewall model. A compliance officer has been appointed, whose job will be to ensure that the statutory requirements (Section 37 of the Gas Act) are adhered to. The compliance officer, the head of FA, will also be the point of contact for the industry regulators and will function as the contact for complaints, both internally and externally.

Regular firewall audits:

the operation of the firewalls will be audited on a regular basis. A weighting system will be developed for the purposes of evaluating the seriousness of comments resulting from internal audits.

Periodical evaluation of the model

The compliance officer will file annual reports to H, with input from FF-B and the Corporate Management Secretary responsible for implementation. After consideration by H, the report will be submitted for discussion by the audit committee.

Each year, the external auditors will include a separate section in their usual management letter, specifically devoted to the maintenance of the firewalls, commenting on failures in the system which they have identified or making recommendations for strengthening the model on the basis of the above information.

Chapter 2. section 1. Firewall compliance officer

A Gasunie firewall compliance officer has been appointed, with responsibility for ensuring that the provisions of Section 37 of the Gas Act are properly interpreted and implemented in the form of suitable measures. He is also responsible for ensuring that there are adequate checks on the proper operation of the measures in place, and reporting accordingly. The job of compliance officer is performed by J. Grooten, Head of Internal Audit (FA).

DUTIES

B. To provide internal information

- Informing the organisation by means of general publications via methaNet or in written communications to all staff or selected groups of staff concerning firewall procedures.
- Answering questions relating to firewalls from managers and staff.

B. To act as point of contact for outside parties, including regulators and auditors

- The compliance officer will be the first point of contact for outsiders seeking information about firewalls at Gasunie. External parties includes regulators such as the Netherlands Competition Authority (NMa), the Energy Industry Regulator (DTe) and external auditors (the latter whether they have been engaged by third parties or by Gasunie itself).

C. To receive and record complaints and reports of violations

- Taking note of comments or complaints from management, staff and outsiders concerning violations of the firewall procedures.
- Taking note of reported or observed violations of the Code of Conduct for staff.
- Maintaining a register of complaints and violations in a confidential, personal file.
- Taking note of remarks concerning firewalls in audit reports produced by FA, the Documents of Representation filed by unit managers, the findings of FF-B (Administrative Organisation Department) and the findings of the executive compliance officer in preparing firewall reports for H.

D. Firewall model management

- The firewall model will be described and outlined in the Firewall Manual under the compliance officer's supervision.
- Detailing of the model at departmental level will be performed in the various departmental manuals. The compliance officer will be responsible for ensuring that the measures to be taken and the measures already in place at departmental level are adequately described in the departmental manuals.
- Changes in legislation relating to firewalls will be monitored by the compliance officer, with interested parties being advised accordingly and changes to the model as a result of any new legislation being proposed.

Annexes to the draft application for an exemption

- Proposals for changes to firewall procedures submitted by officers other than the compliance officer himself should be put before H via the compliance officer and FF-B (i.e. after initialling by the compliance officer and FF-B and obtaining any comments they might have).

E. Reporting

- The compliance officer will report to H, at least once a year, immediately preceding the signing of the Document of Representation by H.
- The compliance officer will advise H on firewall matters ad hoc whenever the seriousness of a particular issue, in the compliance officer's estimation, warrants such action.

F. Deputising arrangements

- P.L. Kwast (FB) will deputise for the compliance officer as necessary.

ANNEX 3.

Abstract from the second Gas Directive (2003/55/EC)

CHAPTER VI

ORGANISATION OF ACCESS TO THE SYSTEM

Article 18

Third party access

1. Member States shall ensure the implementation of a system of third party access to the transmission and distribution system, and LNG facilities based on published tariffs, applicable to all eligible customers, including supply undertakings, and applied objectively and without discrimination between system users. Member States shall ensure that these tariffs, or the methodologies underlying their calculation shall be approved prior to their entry into force by a regulatory authority referred to in Article 25(1) and that these tariffs — and the methodologies, where only methodologies are approved — are published prior to their entry into force.
2. Transmission system operators shall, if necessary for the purpose of carrying out their functions including in relation to cross-border transmission, have access to the network of other transmission system operators.
3. The provisions of this Directive shall not prevent the conclusion of long-term contracts in so far as they comply with Community competition rules

Article 22

New infrastructure

1. Major new gas infrastructures, i.e. interconnectors between Member States, LNG and storage facilities, may, upon request, be exempted from the provisions of Articles 18, 19, 20, and 25(2), (3) and (4) under the following conditions:
 - a. the investment must enhance competition in gas supply and enhance security of supply;
 - b. the level of risk attached to the investment is such that the investment would not take place unless an exemption was granted;
 - c. the infrastructure must be owned by a natural or legal person which is separate at least in terms of its legal form from the system operators in whose systems that infrastructure will be built;
 - d. charges are levied on users of that infrastructure;
 - e. the exemption is not detrimental to competition or the effective functioning of the internal gas market, or the efficient functioning of the regulated system to which the infrastructure is connected.

2. Paragraph 1 shall apply also to significant increases of capacity in existing infrastructures and to modifications of such infrastructures which enable the development of new sources of gas supply.
3.
 - a. The regulatory authority referred to in Article 25 may, on a case by case basis, decide on the exemption referred to in paragraphs 1 and 2. However, Member States may provide that the regulatory authorities shall submit, for formal decision, to the relevant body in the Member State its opinion on the request for an exemption. This opinion shall be published together with the decision.
 - b.
 - i. The exemption may cover all or parts of, respectively, the new infrastructure, the existing infrastructure with significantly increased capacity or the modification of the existing infrastructure.
 - ii. In deciding to grant an exemption consideration shall be given, on a case by case basis, to the need to impose conditions regarding the duration of the exemption and non-discriminatory access to the interconnector.
 - iii. When deciding on the conditions in this subparagraph account shall, in particular, be taken of the duration of contracts, additional capacity to be built or the modification of existing capacity, the time horizon of the project and national circumstances.
 - c. When granting an exemption the relevant authority may decide upon the rules and mechanisms for management and allocation of capacity insofar as this does not prevent the implementation of long term contracts.
 - d. The exemption decision, including any conditions referred to in (b), shall be duly reasoned and published.
 - e. In the case of an interconnector any exemption decision shall be taken after consultation with the other Member States or regulatory authorities concerned.
4. The exemption decision shall be notified, without delay, by the competent authority to the Commission, together with all the relevant information with respect to the decision. This information may be submitted to the Commission in aggregate form, enabling the Commission to reach a well-founded decision. In particular, the information shall contain:
 - a. the detailed reasons on the basis of which the regulatory authority, or Member State, granted the exemption, including the financial information justifying the need for the exemption;
 - b. the analysis undertaken of the effect on competition and the effective functioning of the internal gas market resulting from the grant of the exemption;
 - c. the reasons for the time period and the share of the total capacity of the gas infrastructure in question for which the exemption is granted;
 - d. in case the exemption relates to an interconnector, the result of the consultation with the Member States concerned or regulatory authorities;

- e. the contribution of the infrastructure to the diversification of gas supply.

Within two months after receiving a notification, the Commission may request that the regulatory authority or the Member State concerned amend or withdraw the decision to grant an exemption. The two month period may be extended by one additional month where additional information is sought by the Commission.

If the regulatory authority or Member State concerned does not comply with the request within a period of four weeks, a final decision shall be taken in accordance with the procedure referred to in Article 30(2).

The Commission shall preserve the confidentiality of commercially sensitive information.

Article 25

Regulatory authorities

1. Member States shall designate one or more competent bodies with the function of regulatory authorities. These authorities shall be wholly independent of the interests of the gas industry. They shall, through the application of this Article, at least be responsible for ensuring non-discrimination, effective competition and the efficient functioning of the market, monitoring in particular:
 - a. the rules on the management and allocation of interconnection capacity, in conjunction with the regulatory authority or authorities of those Member States with which interconnection exists;
 - b. any mechanisms to deal with congested capacity within the national gas system;
 - c. the time taken by transmission and distribution system operators to make connections and repairs;
 - d. the publication of appropriate information by transmission and distribution system operators concerning interconnectors, grid usage and capacity allocation to interested parties, taking into account the need to treat non-aggregated information as commercially confidential;
 - e. the effective unbundling of accounts as referred to in Article 17, to ensure there are no cross subsidies between transmission, distribution, storage, LNG and supply activities;
 - f. the access conditions to storage, linepack and to other ancillary services as provided for in Article 19;
 - g. the extent to which transmission and distribution system operators fulfil their tasks in accordance with Articles 8 and 12;
 - h. the level of transparency and competition.

The authorities established pursuant to this Article shall publish an annual report on the outcome of their monitoring activities referred to in points (a) to (h).

2. The regulatory authorities shall be responsible for fixing or approving prior to their entry into force, at least the methodologies used to calculate or establish the terms and conditions for:
 - a. connection and access to national networks, including transmission and distribution tariffs. These tariffs, or methodologies, shall allow the necessary investments in the networks to be carried out in a manner allowing these investments to ensure the viability of the networks;
 - b. the provision of balancing services.
3. Notwithstanding paragraph 2, Member States may provide that the regulatory authorities shall submit, for formal decision, to the relevant body in the Member State the tariffs or at least the methodologies referred to in that paragraph as well as the modifications in paragraph 4. The relevant body shall, in such a case, have the power to either approve or reject a draft decision submitted by the regulatory authority. These tariffs or the methodologies or modifications thereto shall be published together with the decision on formal adoption. Any formal rejection of a draft decision shall also be published, including its justification.
4. Regulatory authorities shall have the authority to require transmission, LNG and distribution system operators, if necessary, to modify the terms and conditions, including tariffs and methodologies referred to in paragraphs 1, 2 and 3, to ensure that they are proportionate and applied in a non-discriminatory manner.
5. Any party having a complaint against a transmission, LNG or distribution system operator with respect to the issues mentioned in paragraphs 1, 2 and 4 and in Article 19 may refer the complaint to the regulatory authority which, acting as dispute settlement authority, shall issue a decision within two months after receipt of the complaint. This period may be extended by two months where additional information is sought by the regulatory authorities. This period may be extended with the agreement of the complainant. Such a decision shall have binding effect unless and until overruled on appeal.
6. Any party having a complaint against a transmission, LNG or distribution system operator with respect to the issues mentioned in paragraphs 1, 2 and 4 and in Article 19 may refer the complaint to the regulatory authority which, acting as dispute settlement authority, shall issue a decision within two months after receipt of the complaint. This period may be extended by two months where additional information is sought by the regulatory authorities. This period may be extended with the agreement of the complainant. Such a decision shall have binding effect unless and until overruled on appeal.
7. Member States shall take measures to ensure that regulatory authorities are able to carry out their duties referred to in paragraphs 1 to 5 in an efficient and expeditious manner.
8. Member States shall create appropriate and efficient mechanisms for regulation, control and transparency so as to avoid any abuse of a dominant position, in particular to the detriment of

consumers, and any predatory behaviour. These mechanisms shall take account of the provisions of the Treaty, and in particular Article 82 thereof.

9. Member States shall ensure that the appropriate measures are taken, including administrative action or criminal proceedings in conformity with their national law, against the natural or legal persons responsible where confidentiality rules imposed by this Directive have not been respected.
10. In the event of cross border disputes, the deciding regulatory authority shall be the regulatory authority which has jurisdiction in respect of the system operator, which refuses use of, or access to, the system.
11. Complaints referred to in paragraphs 5 and 6 shall be without prejudice to the exercise of rights of appeal under Community and national law.
12. National regulatory authorities shall contribute to the development of the internal market and of a level playing field by cooperating with each other and with the Commission in a transparent manner.

ANNEX 4.

Competition Study by ADL

Arthur D Little

**Competition in the
UK Gas Market:
Current and Future
Situation**

16 September 2003

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Table of Contents

Summary of Findings	1
Background	2
Objectives of the Study.....	3
The UK Gas Market	3
Competition in the UK Gas Market	4
Security of Supply.....	15
Conclusions	17
Appendix 1: Table of Calculations and Results for Current Upstream Market Share ..	18
Appendix 2: Table of Calculations and Results for Domestic Supply Market Share...	19
Appendix 3: Table of Calculations and Results for Industrial and Commercial Supply Market Share	20
Appendix 4: Table of Calculations and Results for Power Generators Supply Market Share.....	23
Appendix 5: Table of Calculations and Results for Total Downstream Supply Market Share.....	24
Appendix 6: Tables of Calculations and Results for Impact of the BBL on Competition in the Supply to the UK Market.....	25
Appendix 7: The Herfindahl-Hirschmann Index (HHI)	29

List of Tables

Table 1: Summary of Herfindahl-Hirschmann indices (HHI) calculated for the UK gas market in its current situation and forecast to include future developments	1
Table 2: Summary of expected other infrastructure projects	11
Table 3: Calculations and results for current upstream market share (2003).....	18
Table 4: Calculations and results for domestic supply market shares (2003)	19
Table 5: Calculations and results for industrial and commercial suppliers.....	20
Table 6: Table of calculations and results for gas power generation supply by capacity	23
Table 7: Table of calculations and results for gas power generation supply by market share.....	23
Table 8: Table of calculations and results for total downstream supply market share..	24
Table 9: Results for future market shares for the no BBL case.....	26
Table 10: Results for future market shares for the BBL maximum capacity 8 bcm case	27
Table 11: Results for future market shares for the BBL maximum capacity 17 bcm case	28

List of Figures

Figure 1: Tiers of the UK gas supply market	4
Figure 2: Market shares and Herfindahl-Hirschmann index for upstream gas market, 2003.....	5
Figure 3: Market shares (of customers) and Herfindahl index for UK domestic gas supply market, 2003	6
Figure 4: Market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market, 2003.....	8
Figure 5: Market shares and Herfindahl-Hirschmann index for gas supply to power generators market, 2003	9
Figure 6: Market shares and Herfindahl-Hirschmann index for gas supply to all downstream consumers combined, 2003	10
Figure 7: Market shares and Herfindahl-Hirschmann index for all three future cases, 2006.....	13
Figure 8: Market shares and Herfindahl-Hirschmann index for the no BBL and 8 bcm BBL cases, 2008	14
Figure 9: Market shares and Herfindahl-Hirschmann index for the 17 bcm capacity BBL case, 2008	15
Figure 10: 2003 market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market for firm gas contracts <25,000 therms	21
Figure 11: 2003 market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market for firm gas contracts >25,000 therms	22
Figure 12: 2003 market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market for interruptible gas contracts >200,000 therms.....	22

Summary of Findings

Having analysed the current and expected future competitive environment in the UK gas market, we conclude that there is strong competition at all tiers of the UK gas market, especially upstream, and that future competitive activity in the upstream supply segment will be sustained by, inter alia, the Balgzand to Bacton pipeline (BBL) project. This is demonstrated by the Herfindahl-Hirschmann Indices presented in Table 1, calculated for separate tiers of the market and forecast to include potential future developments.

Table 1: Summary of Herfindahl-Hirschmann indices (HHI) calculated for the UK gas market in its current situation and forecast to include future developments

Tier	Herfindahl-Hirschmann Index, by Year*						
	Current	1. No BBL		2. BBL capacity 8 bcm		3. BBL capacity 17 bcm	
		2006	2008	2006	2008	2006	2008
Upstream	944	900	993	900	993	900	927
Downstream:							
Total market [§]	1359	-	-	-	-	-	-
Power generation	1351	-	-	-	-	-	-
Industrial & commercial	1179	-	-	-	-	-	-
Domestic	4280 ⁺	-	-	-	-	-	-

Source: Arthur D. Little analysis. *In each case the figure shown is for the worst-case scenario. [§]HHI for the combined downstream segments, see section Downstream supply for details of calculation. ⁺Represents only the gas retail market, not the "dual fuel" approach to retail operations of the key market players. HHI for the supply businesses not calculated for 2006 and beyond, because BBL not expected to change these.

The Herfindahl-Hirschmann indices for 2003 indicate a highly competitive market in the upstream segment and in most segments of the downstream market.

Where necessary for our forecasts, assumptions regarding ownership of imported gas have been made on a "worst case" basis i.e. the assumption has a tendency to produce a higher Herfindahl-Hirschmann index than might actually be the case in reality.

By 2006, as UKCS production declines and is replaced with gas imports, our forecasts suggest the Herfindahl-Hirschmann Index will decrease, indicating that the upstream market will become less concentrated. By 2008, with a further decline in UKCS production and more imports, there will be an increase in the Herfindahl-Hirschmann Index, though it remains at levels indicative of a very competitive market.

The HHI for 2008 is the same regardless of whether or not the BBL is built with a capacity of 8 bcm per annum, because we assume that the Centrica import contract with Gasunie Trade & Supply would be delivered by another route if BBL is not built. But if the BBL is built with 17 bcm per annum of import capacity there could be a significant reduction in the HHI, to levels below the current level, indicating much lower concentration in the upstream sector.

We conclude that the BBL project would at worst make no difference to the competitive environment in the UK, and more likely would have a beneficial effect on competition. Our analysis suggests that competition will remain at levels which show no prima facie cause for concern over the potential emergence of a dominant market position. Ofgem have indicated in recent reports that competition is well established in all markets, and our analysis shows that the BBL will add to this.

In addition, the BBL adds diversity to transportation options to import gas to the UK, provides access to storage facilities on the Continent and therefore improves security of supply.

It is our firm belief, therefore, that the BBL pipeline will tend to increase competition in the long run and will enhance security of supply to the UK market.

Background

Gastransport Services has commissioned Arthur D. Little Ltd to conduct an independent study on the current and expected future levels of competition in the UK gas market. The purpose of this study is to indicate the potential effects of the proposed Balgzand to Bacton pipeline (BBL) project on these levels of competition. Gastransport Services is preparing an application to Ofgem for an exemption for the BBL from certain requirements of the EU Second Gas Directive on the basis of Article 22 of the EU Gas Directive.

Article 22 of the Gas Directive allows Member States to grant exemptions to certain new infrastructure projects under five conditions:

1. The investment must enhance competition in gas supply and enhance security of supply;
2. The level of risk attached to the pipeline is such that the investment would not take place unless an exemption is granted;
3. The infrastructure must be owned by a natural or legal person which is separate at least in terms of its legal form from the system operators in whose systems the infrastructure will be built;
4. Charges are levied on users of that infrastructure;
5. The exemption is not detrimental to the effective functioning of the internal gas market, or the efficient functioning of the regulated system to which the infrastructure is connected.

The DTI and Ofgem have published their “Initial Views” report, setting out the principles by which they anticipate approaching new gas infrastructure projects, in which they make it clear that great attention will be paid to the impact of a project on competition.

The main focus of this study is related to conditions 1 and 5, this being impact of the BBL on competition in the UK.

Objectives of the Study

The overall objective of this study is to provide a clear description of current levels of competition in the UK gas market and to estimate the effect that the BBL project will have on such competition in the future. Furthermore, it is intended to consider the impact that the project may have on competition and security of gas supply within the UK and the EU.

The study will therefore include the following:

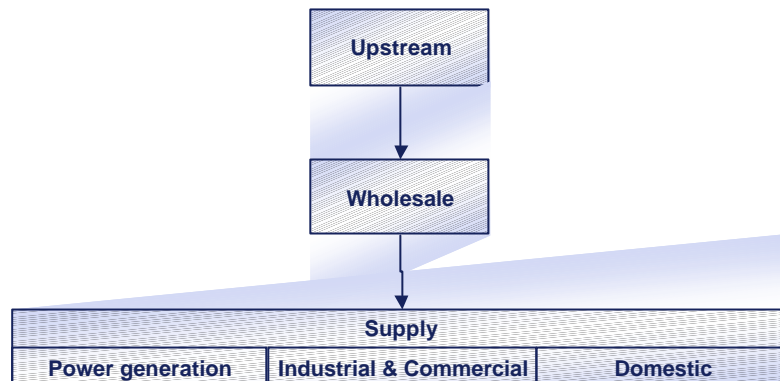
- A brief description of the UK gas market;
- A description of the current state of competition in the UK gas market;
- An assessment of the likely effect of the BBL on competition in the UK gas market;
- Estimation of the quantitative competition indicators suggested by Ofgem and the DTI¹;
- An analysis of the effects that the BBL would have on security of supply, with a particular focus on the UK.

The UK Gas Market

There are three main tiers to consider in the UK gas supply market, as shown in Figure 1.

¹ As described in Appendix 1 of “LNG facilities and interconnectors: EU legislation and regulatory regime - DTI/ Ofgem initial views” (June 2003)

Figure 1: Tiers of the UK gas supply market



Source: Arthur D. Little

As far as possible, given the constraints of the information which is publicly available, this study considers current competition in both the upstream and downstream (“supply”) segments of the gas supply chain. (Where no published data are available, we have relied on our own assessments based on our general experience in the UK gas sector.) As the immediate impact of the BBL project will be on the overall amount of gas entering the UK, the study focuses on the highest level of the market, namely the “beach supplies”, when considering the effect of the BBL on competition. We have assessed market concentration in the downstream market today, but have not sought to assess how this may change in future, because we do not expect that the BBL project, per se, will affect this.

We have not separately addressed the wholesale market segment for two main reasons. Firstly, there is not a single wholesale market, there are several elements to it: the “Over the Counter” market, the “On-the-day Commodity Market”, the futures market run by the IPE, and other forums in which gas is, or could be, traded. Secondly, we are unaware of any robust data describing the market shares of the various participants in the wholesale market, which covers not only physical transactions but also swaps, futures, options and other types of activity which are not necessarily physical in nature – such as transactions in which price risks are re-allocated between counterparties.

Competition in the UK Gas Market

Our assessment of current and expected future levels of competition within the UK gas market is supported by a quantitative analysis of market shares and a calculation of Herfindahl-Hirschmann indices for each level of the market.

The Herfindahl-Hirschmann Index (HHI) is a measure of competitiveness in a market and is calculated as the sum of the squares of the market shares of the participants in the market. A perfect monopoly has a Herfindahl-Hirschmann Index of 10,000 (or 100^2), a duopoly in which each player has 50% market share would have a Herfindahl-Hirschmann index of 5000, while a competitive market would normally be regarded as one in which the index is below 1800. (See Appendix 7 for further discussion of the HHI.)

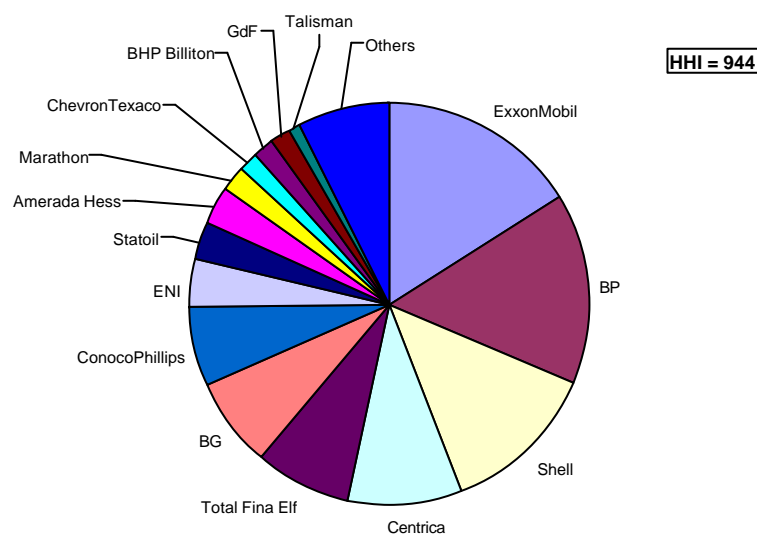
In this report, we have focussed on the Herfindahl-Hirschmann Index, which is one of the indicators of the degree of competitiveness looked at by Ofgem (and others). Although commonly used by regulatory and competition authorities, the HHI is not the only way of looking at competition. Barriers to entry are another consideration. For reasons set out in Appendix 7, we believe that the BBL project has a tendency to facilitate competition by reducing barriers to entry, as it will enable prospective shippers to benefit from economies of scale in gas transportation which they could not achieve by building an independent pipeline of their own.

Current State of Competition

Upstream Competition

Current levels of competition in the upstream gas market appear to be very strong. Using data from Wood Mackenzie and public information on contracted imports, market shares (see Figure 2) have been calculated for gas producers and beach suppliers based on their percentage stakes in supplies of gas coming into the UK, forecast for 2003. Appendix 1 contains a detailed table of the results from these calculations.

Figure 2: Market shares and Herfindahl-Hirschmann index for upstream gas market, 2003



Source: Arthur D. Little analysis using data from Wood Mackenzie

The six largest producers account for slightly over two-thirds of gas supplies, with the remaining third divided amongst a large number of smaller producers. These market share figures give a Herfindahl-Hirschmann index of 944, which is indicative of a very competitive market.

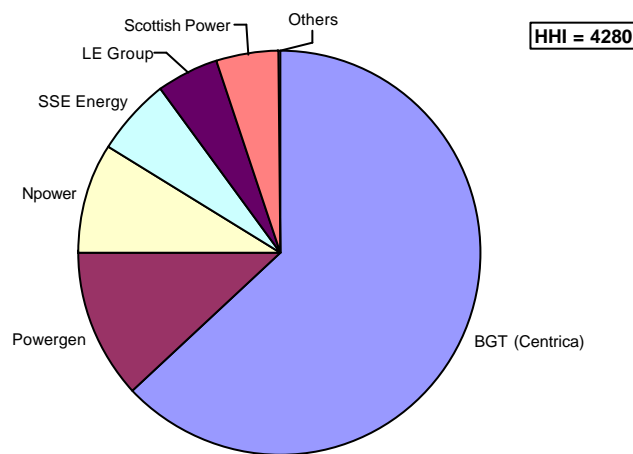
Downstream Supply

Competition has been considered in the downstream supply market for three different categories of customer: domestic; industrial and commercial; and power generators. In addition we have considered competition for the combined downstream supply market.

Domestic customers

Current data for the supply of gas to domestic consumers, taken from the recent Ofgem review of competition², reveals that Centrica still holds the largest market share at 63% of domestic gas customers, with five other players accounting for almost all the remainder (see Figure 3).

Figure 3: Market shares (of customers) and Herfindahl index for UK domestic gas supply market, 2003



Source: Arthur D. Little Analysis using data from Ofgem

The calculations for Figure 3 are summarised in Appendix 2.

² Ofgem report "Domestic gas and electricity supply competition – Recent developments" (June 2003)

The Herfindahl index calculated for domestic gas supply is 4280, which is much higher than one would expect for a competitive market, as a result of the significant market share held by Centrica. It should be recalled that the process of domestic energy market deregulation is still evolving – had this calculation been done in the mid-1990s then the HHI for the gas sector would have been 10000. Ofgem’s own calculations (in evidence to the Competition Commission) suggest that it fell from 5175 in September 2000 to 4280 by March 2003. Clearly these HHI levels are much higher than the level of 1800 which is often quoted as the upper limit of a competitive industry structure, though the figure is now much lower than it was previously, and can be expected to fall further.

Since deregulation of the domestic sector began in 1996, there has been a change to the basic business model of many of the companies which are active in this sector. Whereas traditionally British Gas (Centrica) sold only gas, and the Public Electricity Suppliers sold only electricity, they now sell both gas and electricity in a so-called “dual fuel” package, offering considerable savings to the customer. The Herfindahl-Hirschmann index calculated for the combined domestic gas and electricity sector is 2396, much lower than the 4280 for gas alone.

We note that Ofgem has recently published a report on competition in the domestic sector and has concluded that:

“competition for domestic customers is strong and benefiting vulnerable customers as well as those who are well-off”³.

So, despite the relatively high HHI in the domestic sector, it would appear that the current level of competition in the domestic sector is considered satisfactory at this stage in the process of deregulation, and is moving in the right direction.

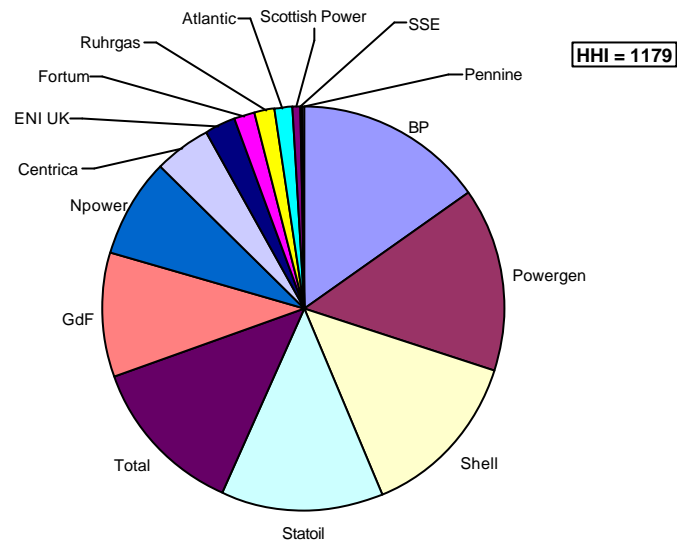
Industrial and commercial customers

Market shares for supplies to industrial and commercial customers have been taken from information provided by John Hall Associates⁴. The data are broken down into three categories: firm gas supply under 25,000 therms; firm gas supply over 25,000 therms; and interruptible contracts over 200,000 therms. Individual Herfindahl-Hirschmann indices have been calculated for each of these categories (see Appendix 3) and for the overall supply of gas for industrial and commercial purposes. The market shares and Herfindahl-Hirschmann index for the overall supply are shown in Figure 4.

³ Quote from Callum McCarthy, Chief Executive of Ofgem, taken from a press release, dated 16th June 2003, accompanying the Ofgem report “Domestic gas and electricity supply competition – Recent developments” (June 2003)

⁴ John Hall Associates’ Gas Price and Supply Report for April 2003

Figure 4: Market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market, 2003⁵



Source: Arthur D. Little Analysis using data from John Hall Associates

The data, used to calculate a Herfindahl-Hirschmann index of 1179, suggest that competition in the industrial and commercial supply market is vigorous, with a number of major players. For the individual sectors of the market, the Herfindahl-Hirschmann indices are as follows:

- Firm gas supply under 25,000 therms, HHI is 2465;
- Firm gas supply over 25,000 therms, HHI is 1391; and
- Interruptible contracts over 200,000 therms, HHI is 1676.

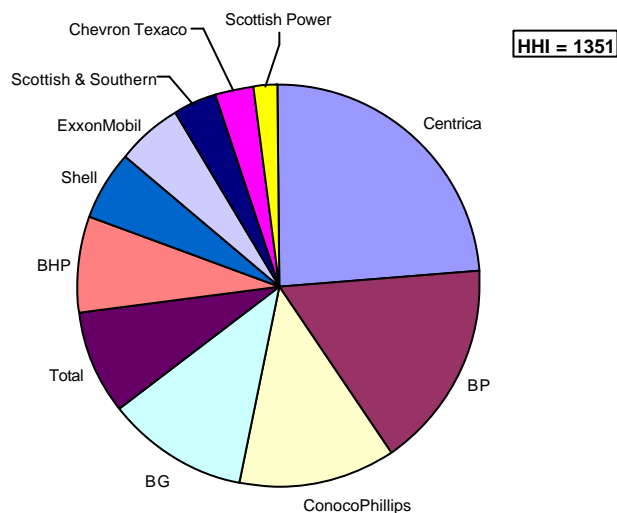
The highest of the indices, for the lower category of firm gas supply, is 2465, which is higher than what one might expect for a competitive market. This is a result of Powergen's relatively high market share amongst small customers, following its acquisition of TXU. Our calculations indicate that the market is generally competitive when broken down into its constituent parts.

⁵ Market shares as at April 2003, from John Hall Associates Gas Price and Supply Report (April 2003)

Power generation customers

In general, there is little publicly available information which provides details of the market for gas supply to power generators. We have therefore estimated market share in this sector based on our knowledge of the market. A current list of gas-fired power stations with capacity forecast to 2010 was taken as the basis for our analysis⁶. Where we were not sure of the identity of the gas supplier to a power station, we took the conservative assumption that the plant was supplied by the largest supplier, which would give an overestimate of the Herfindahl-Hirschmann index. In other words, we have made a “worst case” assumption. For further information on the calculations see Appendix 4. Figure 5 shows the resulting market shares calculated for gas supply to power generators.

Figure 5: Market shares and Herfindahl-Hirschmann index for gas supply to power generators market, 2003



Source: Arthur D. Little analysis based on our industry experience

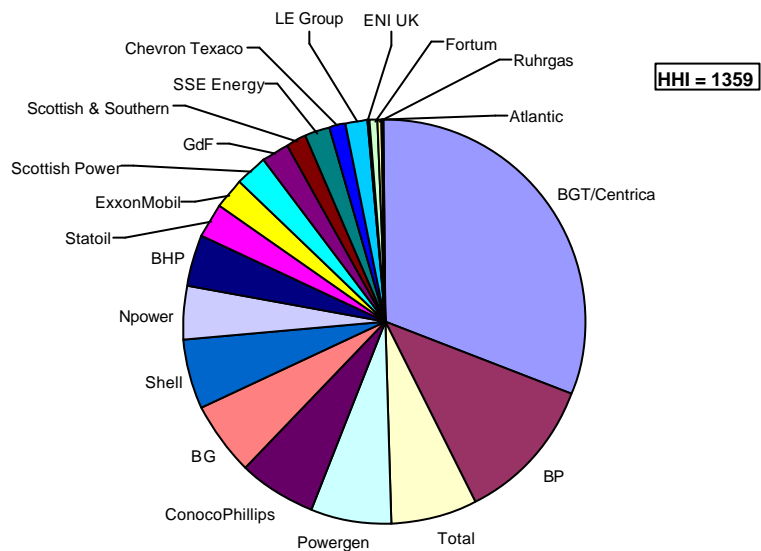
The Herfindahl-Hirschmann index calculated from our estimates is 1351, with Centrica holding the largest market share at 25%. This indicates that competition in this segment of the UK gas market is quite strong.

⁶ Source: National Grid Transco Seven Year Statement

Combined downstream supply market

In order to assess competition across the whole downstream supply market, we took market share data calculated for the three downstream sectors for 2003, as discussed above, and used data on consumption in each sector from 2002⁷ to estimate the total size of the market. For the purposes of the calculation we have assumed that the figures for consumption will be of a similar order across the sectors in 2003. Figure 6 shows the resulting market shares and Herfindahl-Hirschmann index. A detailed table of results is given in Appendix 5.

Figure 6: Market shares and Herfindahl-Hirschmann index for gas supply to all downstream consumers combined, 2003



Source: Arthur D. Little analysis using data from JHA, DUKES, National Grid Transco and Ofgem

It is clear from Figure 6 that, while Centrica hold a large downstream gas supply market share, there are a large number of companies participating in this tier of the supply chain and the Herfindahl-Hirschmann index of 1359 suggests that competition amongst these companies is strong.

Likely Impact of the BBL on Competition in Future

In order to develop a thorough analysis of long-term competition in the UK gas market, we have considered competition if the BBL is not built in addition to the impact of the BBL at two different capacities.

⁷ Data for consumption by sector taken from the Digest of United Kingdom Energy Statistics 2003

As the negotiations following the open season for capacity bookings for the BBL are still underway at the time of writing this report, our analysis of the effect of the project on competition is based on two possible alternatives for capacity, compared with the situation if the BBL is not built⁸. It is expected that the pipeline will be supplying gas to the UK by 2006, with an initial capacity of 8 bcm per annum. Depending on demand for capacity, this may then rise to 17 bcm per annum by 2008 and then remain constant. (These capacity figures are expressed in cubic metres at 35.17 MJ/m³, which we have adjusted by a factor of 0.89 for comparison with the typical calorific value of gas used in the UK.)

We expect that 8 bcm per annum (at 35.17 MJ/m³) of the BBL capacity, will be used to serve the Gasunie Trade & Supply gas sales contract to Centrica. By the time the gas deliveries commence, Gasunie Trade & Supply may not exist in its current form, and it is considered possible that ExxonMobil and Shell will be the counterparties of Centrica⁹. Accordingly, we have divided the volume of the contract with Centrica into two equal shares and attributed half the total volume to Shell and half to ExxonMobil.

We are aware of a number of other planned infrastructure projects. These are summarised in Table 2.

Table 2: Summary of expected other infrastructure projects

<i>Project</i>	<i>Expected Annual Throughput (bcm)</i>	<i>Forecast Start of Operation</i>
Isle of Grain LNG Terminal	~4	2005
Milford Haven LNG terminal (2 projects)	6 to 12 or more	2007
Expansion of the Interconnector reverse flow	8.5 in addition to current capacity	2006
	A further 8.5	2007/8
Ormen Lange to UK pipeline	~20	2007/8

In summary, it is possible that an additional 12.5 bcm per annum of capacity will be available to the UK market when the BBL comes online in 2006, with a further increase in capacity of 34.5 bcm in 2008. Gas flowing through these facilities effectively replaces declining UKCS production.

⁸ As suggested by Gastransport Services

⁹ Gasunie Trade & Supply currently has 4 shareholders. Negotiations as to its future structure are ongoing.

We are aware of three long-term gas import contracts which have so far been agreed. Statoil has agreed to supply 1.5 bcm per annum to BP, deliveries of which have already commenced and they also have a contract to supply 5 bcm per annum to Centrica, starting in 2005. In addition, Gasunie Trade & Supply have the contract with Centrica, referred to above.

Other potential import contracts are under negotiation. We are aware that ExxonMobil has signed a Letter of Intent with gas producers in Qatar to import up to 20 bcm per annum of LNG, of which perhaps half could be flowing by 2008. We also know that Ormen Lange producers are looking to sell up to 20 bcm to the UK in the same timeframe. This would presumably be split between the Ormen Lange partners, who are obliged to market their equity gas independently of one another, and these shares are:

- Norsk Hydro 18%;
- Shell 17.2%;
- BP 10.8%;
- Statoil 10.8%;
- ExxonMobil 7.2%;
- Petoro 36%.

Our approach has been to use forecasts of UK gas demand and contracted exports for 2006 and 2008 (published in the Ten Year Statement by NG Transco), and to subtract from these forecasts expected production from UKCS fields and the contracted imports mentioned above. To the extent that there is a deficit of supply to meet the expected demand for gas, we then assume that there will be additional gas imports (though there could be additional UKCS production from new fields). We assume that LNG and the Ormen Lange pipeline each provide half of any additional gas imports which are required. If the BBL project is not built then we assume that the volumes contracted to Centrica by Gasunie Trade & Supply will still be delivered, but via an alternative route, such as reverse-flow Interconnector capacity.

We then calculate the Herfindahl-Hirschmann index for 2006 and 2008 for several cases:

1. With no BBL
2. With BBL capacity of 8 bcm per annum, operational by 2006
3. With BBL capacity of 8 bcm per annum by 2006, rising to 17 bcm per annum by 2008

In case 3, with 17 bcm per annum capacity, we have assumed that 8 bcm serves the Gasunie Trade & Supply – Centrica contract, with the rest of the capacity split among the next largest players in the UK upstream market.

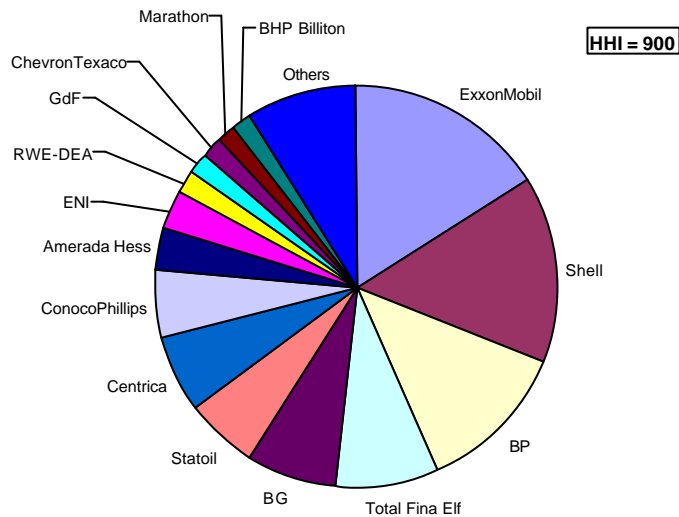
We can then compare the indices with and without the BBL:

Case (see above)	Herfindahl-Hirschmann Index	
	2006	2008
1	900	993
2	900	993
3	900	927

Further details of the calculations are presented in Appendix 6, with full results tables.

As we have assumed that, even in the no BBL case, 8 bcm per annum will be delivered to fulfil the Gasunie Trade & Supply contract with Centrica from 2006 on, the results for this year are the same for all three cases. The corresponding Herfindahl-Hirschmann index in each case is 900, indicating a very competitive market. Figure 7 shows the forecast market shares for 2006.

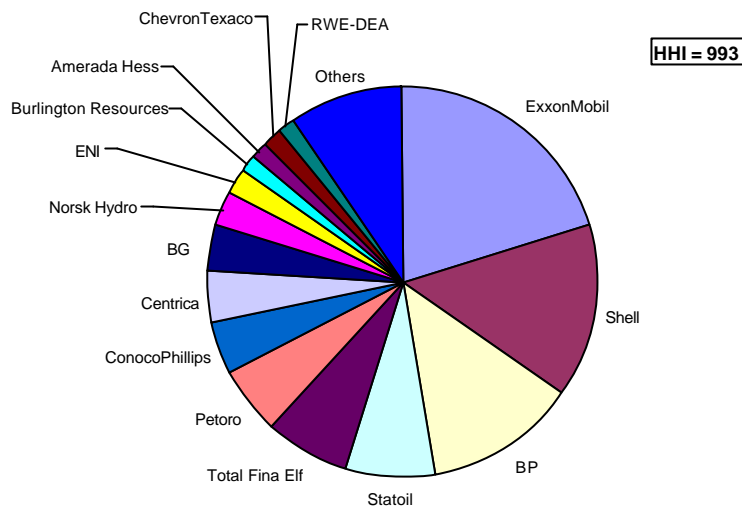
Figure 7: Market shares and Herfindahl-Hirschmann index for all three future cases, 2006



Source: Arthur D. Little analysis using data from Wood Mackenzie and publicly available information on contracts

In 2008, when we expect other infrastructure projects to have been completed and online, the predicted market shares and corresponding Herfindahl-Hirschmann indices differ depending on the assumed capacity of the BBL. The no BBL and 8 bcm per annum capacity BBL cases give the same result. The market shares for both cases are shown in Figure 8.

Figure 8: Market shares and Herfindahl-Hirschmann index for the no BBL and 8 bcm BBL cases, 2008

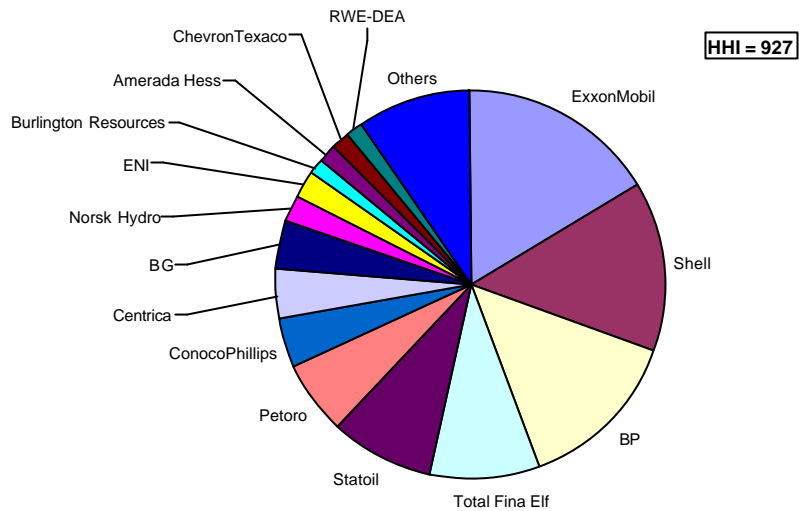


Source: Arthur D. Little analysis using data from Wood Mackenzie and publicly available information on contracts and projects

The Herfindahl-Hirschmann index is 993 for 2008 if we assume that there is no BBL or that the capacity of the BBL is 8 bcm per annum. This is higher than the value for 2006, shown above, and results from the inclusion of the expected LNG and Ormen Lange imports and the further decrease in gas supplies from UKCS producers.

If the capacity of the BBL is increased to 17 bcm per annum by 2008, the Herfindahl-Hirschmann index is lower than it would be with capacity of only 8 bcm per annum, at 927. Not only does this show that the upstream market is likely to be highly competitive in 2008, but it also shows that the BBL will have a beneficial impact on competition amongst upstream suppliers. See Figure 9 for a breakdown of market shares.

Figure 9: Market shares and Herfindahl-Hirschmann index for the 17 bcm capacity BBL case, 2008



Source: Arthur D. Little analysis using data from Wood Mackenzie and publicly available information on contracts and projects

On the basis of these results, our conclusion is that the UK upstream gas supply market will remain very competitive following the addition of the BBL and other proposed infrastructure. On “worst case” assumptions the BBL has no effect on concentration, and with realistic assumptions the effect of the BBL will be to increase competition beyond the levels which would be experienced were the BBL not built.

Security of Supply

Forecast Situation

As discussed above, forecasts for UK demand for gas over the next decade predict a shortfall between what is required and what can be supplied from the UKCS. It is anticipated that demand will exceed available supply in 2005, which poses a considerable challenge to security of supply in the UK gas market.

Recent problems in the electricity sector, in particular, have made customers very aware of the importance of secure supplies of energy, and there are many calls for additional investment to be made so as to guarantee future energy supply reliability. For example, in September 2002 (well before recent supply problems) the Energy Intensive Users Group said, in response to the DTI’s consultative process on Energy Policy:

"We support the case for continuing investment in energy transportation systems to enhance security of supply. Alleviating network constraints increases flexibility to deal with changing sources of supply and facilitates competition between producers and generators. This is a particular concern in light of the increasing dependence on gas..."

www.eiug.org.uk, press release dated 13.09.02

The EIUG goes on specifically to indicate their support for investments in new gas infrastructure.

Expected Impact of BBL

The BBL will provide an alternative route for gas supply in to the UK, allowing UKCS production to be supplemented by gas from Russia and other potential sources. Together with the expansion of the Interconnector reverse flow capacity and the proposed new LNG terminals, the BBL will certainly have a positive impact on security of supply to the UK. Up to now, the UK gas market has to a large extent only been able to call upon imported gas from Norwegian gas fields. However, the BBL will enable UK consumers to draw upon a diverse range of gas reserves which are connected to the Continental European gas network.

The BBL will also provide access to gas storage facilities in the Netherlands and beyond, allowing UK consumers to benefit from the seasonal and strategic storage opportunities which these can provide, to supplement those available at the UK's own facilities.

Furthermore, by providing an additional link with the continent, the BBL could enhance security of supply to Europe, and the Netherlands in particular. If reverse flow capacity were built in at a future date, there would be potential for the BBL to supplement the European market with gas from the UKCS or the Ormen Lange field in Norway, as well as the LNG supplies which will be landed in the UK.

Regardless of reverse flow capacity to flow gas from the UK to the Netherlands, the BBL would facilitate arbitrage between the two markets, as has already happened on the Interconnector.

Conclusions

In conclusion, it is clear that the UK gas market is currently highly competitive, particularly upstream. We do not expect the BBL to have a detrimental effect on the current status. Indeed, we expect that the BBL and other infrastructure projects will at worst make no difference to competition in the UK, and more likely will enhance competition in the long run by providing routes for supplies to enter the UK from alternative sources. Furthermore, the BBL will add to security of supply both in the UK and in the Netherlands.

Appendix 1: Table of Calculations and Results for Current Upstream Market Share

Table 3: Calculations and results for current upstream market share (2003)

	UKCS sales (bcm)	Imports (bcm)	Market share (%)
ExxonMobil	18.03	0.00	15.98
BP	17.30	0.00	15.33
Shell	14.57	0.00	12.91
Centrica	10.17	0.00	9.01
Total Fina Elf	8.76	0.00	7.76
BG	8.16	0.00	7.23
ConocoPhillips	7.40	0.00	6.56
Amerada Hess	3.37	0.00	2.99
ENI	4.17	0.00	3.69
Marathon	2.13	0.00	1.88
BHP Billiton	1.81	0.00	1.60
ChevronTexaco	1.97	0.00	1.75
Talisman	1.21	0.00	1.07
Kerr-McGee	1.11	0.00	0.98
Tullow Oil	1.08	0.00	0.95
Burlington Resources	0.99	0.00	0.88
GdF	1.74	0.00	1.54
NOEX	0.39	0.00	0.35
PetroCanada	0.48	0.00	0.43
Consort Resources	0.67	0.00	0.59
Statoil	0.22	3.50	3.30
RG	0.26	0.00	0.23
Marubeni	0.17	0.00	0.15
Murphy Oil	0.21	0.00	0.19
OMV	0.27	0.00	0.24
Canadian Natural Resources	0.27	0.00	0.24
RWE-DEA	0.37	0.00	0.33
EDC	0.12	0.00	0.11
Oranje Nassau Energy	0.13	0.00	0.12
Premier Oil	0.16	0.00	0.14
First Oil	0.42	0.00	0.37
Dyas	0.11	0.00	0.10
EnCana Corp	0.08	0.00	0.07
Venture Production	0.35	0.00	0.31
Dana Petroleum	0.09	0.00	0.08
Intrepid Energy	0.07	0.00	0.06
Summit North Sea	0.04	0.00	0.03
Paladin	0.04	0.00	0.04
Hunt Oil	0.03	0.00	0.03
Bow Valley Energy	0.04	0.00	0.04
Cal Energy	0.03	0.00	0.03
Edison	0.03	0.00	0.02
NOEX	0.10	0.00	0.08
Agip	0.03	0.00	0.02
Svenska Petroleum	0.00	0.00	0.00
ROC	0.00	0.00	0.00
Cairn Energy	0.00	0.00	0.00
ATP	0.21	0.00	0.18
Iranian Oil	0.00	0.00	0.00
Norsk Hydro	0.00	0.00	0.00
Petoro	0.00	0.00	0.00
Total	109.34	3.50	100.00
HHI			943.91

Source: Arthur D. Little analysis using data from Wood Mackenzie and publicly available information on contracted imports

Appendix 2: Table of Calculations and Results for Domestic Supply Market Share

Table 4: Calculations and results for domestic supply market shares (2003)

Company	% Gas Market Share	Gas Market customers	% Electricity Market Share	Electricity Market customers	Combined Market	Combined Market Share (%)
Total*		20000000		26000000	46000000	
BGT (Centrica)	63	12600000	23	5980000	18580000	40
Powergen	12	2400000	22	5720000	8120000	18
Npower	9	1800000	16	4160000	5960000	13
SSE Energy	6	1200000	14	3640000	4840000	11
LE Group	5	1000000	15	3900000	4900000	11
Scottish Power	5	1000000	10	2600000	3600000	8
Others	0	0	0.0	0	0	0
HHI		4280		1790		2396

Source: Domestic gas suppliers and MPAS providers, from Ofgem "Domestic gas and electricity supply competition – Recent developments" (June 2003). *Ofgem estimate of total market size in number of customers.

Appendix 3: Table of Calculations and Results for Industrial and Commercial Supply Market Share

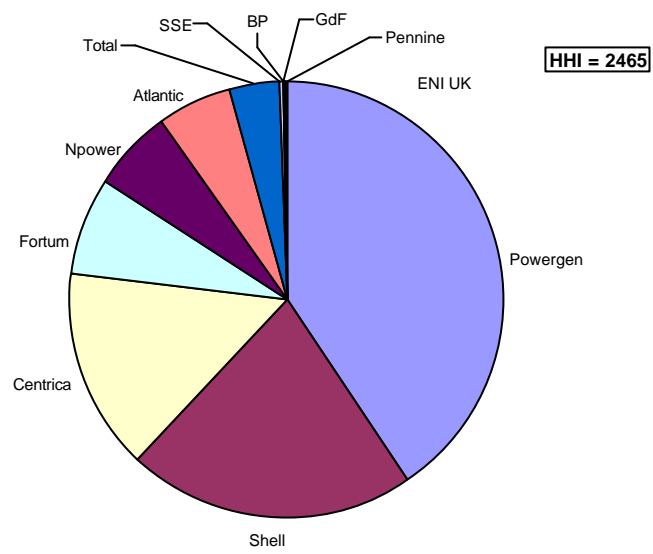
Table 5: Calculations and results for industrial and commercial suppliers

	Industrial/ Commercial Market Share			Total market
	<25,000 therms	>25,000 therms	Interruptible, >200,000 therms	
Total market (therms)	188,500,000	566,800,000	549,900,000	1,300,000,000
Market Share (%)	14.5	43.6	42.3	100
Company Market Shares (%)				
Powergen	40.64	18.50	1.77	14.71
Shell	21.40	13.13	11.20	13.57
Centrica	14.88	5.26	0.19	4.53
Fortum	7.13	1.54	0.00	1.70
Npower	6.24	5.84	10.91	8.07
Atlantic	5.64	1.24	0.25	1.47
Total	3.46	23.26	5.17	12.83
SSE	0.27	0.24	0.00	0.14
BP	0.14	9.33	26.72	15.39
GdF	0.11	9.19	14.07	9.97
Pennine	0.05	0.00	0.00	0.01
ENI UK	0.04	2.25	3.41	2.43
Statoil	0.00	9.64	21.58	13.33
Ruhrgas	0.00	0.53	3.25	1.61
Scottish Power	0.00	0.00	1.48	0.62
HHI	2464.65	1391.21	1676.42	1178.60

Source: John Hall Associates database

The results for the segments of the industrial and commercial supply market, as described above, are represented by the following figures.

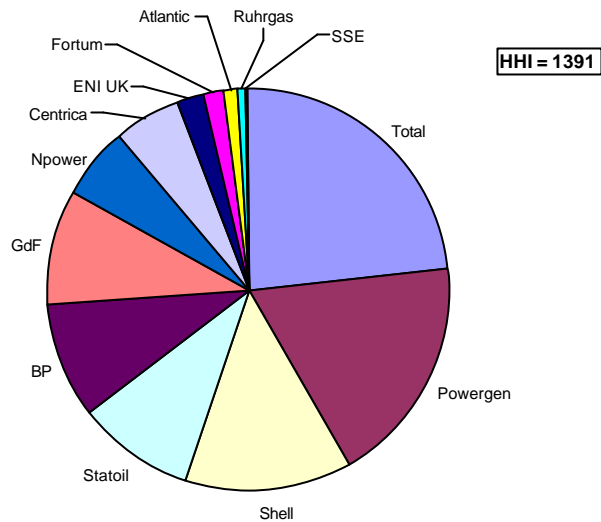
Figure 10: 2003¹⁰ market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market for firm gas contracts <25,000 therms



Source: Arthur D. Little analysis using JHA data

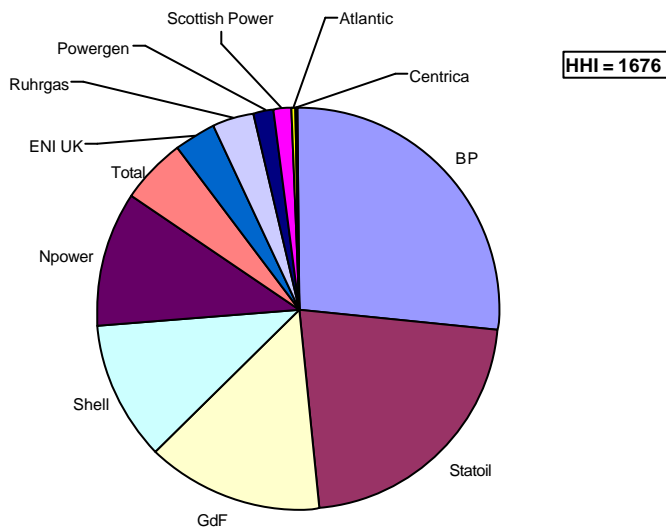
¹⁰ Market share as at April 2003, from John Hall Associates Gas Price and Supply Report (April 2003)

Figure 11: 2003¹¹ market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market for firm gas contracts >25,000 therms



Source: Arthur D. Little analysis using JHA data

Figure 12: 2003¹² market shares and Herfindahl-Hirschmann index for UK industrial and commercial gas supply market for interruptible gas contracts >200,000 therms



Source: Arthur D. Little analysis using JHA data

¹¹ Market share accurate for April 2003, from the John Hall Associates Gas Price and Supply Report (April 2003)

¹² Market share accurate for April 2003, from the John Hall Associates Gas Price and Supply Report (April 2003)

Appendix 4: Table of Calculations and Results for Power Generators Supply Market Share

Table 6: Table of calculations and results for gas power generation supply by capacity

	Capacity (MW)*		
	2003	2006	2008
BP	3527	3527	3527
Centrica	4307	4307	4307
BG	2445	2445	2445
BHP	1670	1670	1670
ExxonMobil	1121	1121	1121
Shell	1170	2073	2073
Total	1760	1760	1760
Chevron Texaco	685	685	685
ConocoPhillips	2645	2645	2645
Scottish & Southern	760	760	760
Scottish Power	400	400	400
Innogy	0	830	830
Total	20490	22223	22223
Miscellaneous:			
Damhead Creek [§]	805	805	805
Total	21295	23028	23028

Source: *Capacities based on National Grid Transco Seven Year Statement. ADL assessment of which producer supplies which plant is based on press releases on initial contracts and other data. [§]In order to produce a worst-case estimate of market share, it will be assumed that the largest player, Centrica, supply gas to Damhead Creek in the absence of contrary information.

Table 7: Table of calculations and results for gas power generation supply by market share

	Market Share (%)*		
	2003	2006	2008
Centrica	24.01	22.20	22.20
BP	16.56	15.32	15.32
ConocoPhillips	12.42	11.49	11.49
BG	11.48	10.62	10.62
Total	8.26	7.64	7.64
BHP	7.84	7.25	7.25
Shell	5.49	9.00	9.00
ExxonMobil	5.26	4.87	4.87
Scottish & Southern	3.57	3.30	3.30
Chevron Texaco	3.22	2.97	2.97
Scottish Power	1.88	1.74	1.74
Innogy	0.00	3.60	3.60
Total	100	100	100
HHI	1351	1224	1224

Source: *ADL estimates, assuming that gas is supplied pro-rata to plant capacity

Appendix 5: Table of Calculations and Results for Total Downstream Supply Market Share

Table 8: Table of calculations and results for total downstream supply market share

	Downstream supply segment			
	Domestic	Industrial & commercial	Power generators	Total
Total consumption (therms), 2002	12,800,000,000	9,483,054,380	22,940,214,242	45,223,268,622
Market share				
BGT/Centrica	63	4.53	24	30.96
BP	0	15.39	16.56	11.63
Total	0	12.83	8.26	6.88
Powergen	12	14.71	0	6.48
ConocoPhillips	0	0	12.42	6.30
BG	0	0	11.48	5.82
Shell	0	13.57	5.49	5.63
Npower	9	8.07	0	4.24
BHP	0	0	7.84	3.98
Statoil	0	13.33	0	2.80
ExxonMobil	0	0	5.26	2.67
Scottish Power	5	0.62	1.88	2.50
GdF	0	9.97	0	2.09
Scottish & Southern	0	0	3.57	1.81
SSE Energy	6	0.14	0	1.73
Chevron Texaco	0	0	3.22	1.63
LE Group	5	0	0	1.42
ENI UK	0	2.43	0	0.51
Fortum	0	1.7	0	0.36
Ruhrgas	0	1.61	0	0.34
Atlantic	0	1.47	0	0.31
Pennine	0	0.01	0	0.00
Innogy	0	0	0	0.00
Total	100	100	100	100
HHI	4280	1179	1351	1359

Source: Arthur D. Little analysis using data from JHA, DUKES, National Grid Transco and Ofgem

Appendix 6: Tables of Calculations and Results for Impact of the BBL on Competition in the Supply to the UK Market

These tables show details of the data and results for the calculation of the expected impact of the BBL on competition amongst gas producers. Data is shown for 2006 and 2008 and for the two potential capacities of the BBL (values for the BBL capacity are expressed such that $1\text{m}^3 = 35.17\text{MJ}$, the calculations have been adjusted to account for this). The assumptions are described in the *Likely Impact of the BBL on Competition in Future* section of this report.

Table 9: Results for future market shares for the no BBL case

Year	No BBL			
	Total Supply Capacity Share (%)			
Total amount (bcm) per annum	110.80	112.84	110.74	115.95
Market share:				
ExxonMobil	16.87	15.98	16.23	20.23
BP	16.63	15.33	12.37	12.45
Shell	13.31	12.91	14.84	14.57
Centrica	10.88	9.01	5.95	4.11
Total Fina Elf	9.13	7.76	8.35	7.20
BG	6.26	7.23	7.04	4.00
ConocoPhillips	5.11	6.56	5.72	4.31
ENI	3.52	3.69	2.99	2.10
Statoil	1.67	3.30	6.00	7.35
Amerada Hess	2.79	2.99	3.18	1.49
Marathon	1.99	1.88	1.50	1.16
ChevronTexaco	1.68	1.75	1.64	1.48
BHP Billiton	1.96	1.60	1.49	1.15
GdF	0.87	1.54	1.74	1.25
Talisman	1.12	1.07	0.86	0.65
Kerr-McGee	0.95	0.98	0.65	1.02
Tullow Oil	0.92	0.95	0.55	0.27
Burlington Resources	0.90	0.88	1.43	1.52
Consort Resources	0.34	0.59	0.91	0.58
PetroCanada	0.35	0.43	0.36	0.26
First Oil	0.10	0.37	0.17	0.05
NOEX	0.39	0.35	0.25	0.18
RWE-DEA	0.17	0.33	2.00	1.43
Venture Production	0.08	0.31	0.22	0.05
OMV	0.20	0.24	0.19	0.15
Canadian Natural Resources	0.19	0.24	0.14	0.05
RG	0.23	0.23	0.29	0.28
Murphy Oil	0.22	0.19	0.10	0.07
ATP	0.00	0.18	0.12	0.05
Marubeni	0.23	0.15	0.17	0.13
Premier Oil	0.12	0.14	0.10	0.07
Oranje Nassau Energy	0.15	0.12	0.09	0.10
EDC	0.16	0.11	0.05	0.03
Dvas	0.10	0.10	0.07	0.06
NOEX	0.01	0.08	0.10	0.11
Dana Petroleum	0.07	0.08	0.12	0.06
EnCana Corp	0.09	0.07	0.06	0.04
Intrepid Energy	0.06	0.06	0.10	0.07
Paladin	0.03	0.04	0.21	0.12
Bow Valley Energy	0.03	0.04	0.03	0.02
Summit North Sea	0.04	0.03	0.00	0.00
Cal Energy	0.03	0.03	0.01	0.01
Hunt Oil	0.03	0.03	0.01	0.01
Agip	0.01	0.02	0.15	0.19
Edison	0.02	0.02	0.02	0.01
Svenska Petroleum	0.00	0.00	0.00	0.00
ROC	0.00	0.00	0.01	0.00
Cairn Energy	0.00	0.00	0.00	0.04
Iranian Oil	0.00	0.00	1.40	1.16
Norsk Hydro	0.00	0.00	0.00	2.77
Petoro	0.00	0.00	0.00	5.53
Total	100.00	100.00	100.00	100.00
HHI	1044.25	943.91	900.18	993.03

Source: Arthur D. Little analysis

Table 10: Results for future market shares for the BBL maximum capacity 8 bcm case

8 bcm max BBL				
	Total Supply Capacity Share (%)			
Year	2002	2003	2006	2008
Total amount (bcm) per annum	110.80	112.84	110.74	115.95
Market share:				
ExxonMobil	16.87	15.98	16.23	20.23
BP	16.63	15.33	12.37	12.45
Shell	13.31	12.91	14.84	14.57
Centrica	10.88	9.01	5.95	4.11
Total Fina Elf	9.13	7.76	8.35	7.20
BG	6.26	7.23	7.04	4.00
ConocoPhillips	5.11	6.56	5.72	4.31
ENI	3.52	3.69	2.99	2.10
Statoil	1.67	3.30	6.00	7.35
Amerada Hess	2.79	2.99	3.18	1.49
Marathon	1.99	1.88	1.50	1.16
ChevronTexaco	1.68	1.75	1.64	1.48
BHP Billiton	1.96	1.60	1.49	1.15
GdF	0.87	1.54	1.74	1.25
Talisman	1.12	1.07	0.86	0.65
Kerr-McGee	0.95	0.98	0.65	1.02
Tullow Oil	0.92	0.95	0.55	0.27
Burlington Resources	0.90	0.88	1.43	1.52
Consort Resources	0.34	0.59	0.91	0.58
PetroCanada	0.35	0.43	0.36	0.26
First Oil	0.10	0.37	0.17	0.05
NOEX	0.39	0.35	0.25	0.18
RWE-DEA	0.17	0.33	2.00	1.43
Venture Production	0.08	0.31	0.22	0.05
OMV	0.20	0.24	0.19	0.15
Canadian Natural Resources	0.19	0.24	0.14	0.05
RG	0.23	0.23	0.29	0.28
Murphy Oil	0.22	0.19	0.10	0.07
ATP	0.00	0.18	0.12	0.05
Marubeni	0.23	0.15	0.17	0.13
Premier Oil	0.12	0.14	0.10	0.07
Oranje Nassau Energy	0.15	0.12	0.09	0.10
EDC	0.16	0.11	0.05	0.03
Dyas	0.10	0.10	0.07	0.06
NOEX	0.01	0.08	0.10	0.11
Dana Petroleum	0.07	0.08	0.12	0.06
EnCana Corp	0.09	0.07	0.06	0.04
Intrepid Energy	0.06	0.06	0.10	0.07
Paladin	0.03	0.04	0.21	0.12
Bow Valley Energy	0.03	0.04	0.03	0.02
Summit North Sea	0.04	0.03	0.00	0.00
Cal Energy	0.03	0.03	0.01	0.01
Hunt Oil	0.03	0.03	0.01	0.01
Agip	0.01	0.02	0.15	0.19
Edison	0.02	0.02	0.02	0.01
Svenska Petroleum	0.00	0.00	0.00	0.00
ROC	0.00	0.00	0.01	0.00
Cairn Energy	0.00	0.00	0.00	0.04
Iranian Oil	0.00	0.00	1.40	1.16
Norsk Hydro	0.00	0.00	0.00	2.77
Petoro	0.00	0.00	0.00	5.53
Total	100.00	100.00	100.00	100.00
HHI	1044.25	943.91	900.18	993.03

Source: Arthur D. Little analysis

Table 11: Results for future market shares for the BBL maximum capacity 17 bcm case

Year	17 bcm max BBL			
	Total Supply Capacity Share (%)			
Total amount (bcm) per year	110.80	112.84	110.74	115.95
Market share:				
ExxonMobil	16.87	15.98	16.23	16.49
Shell	13.31	12.91	14.84	13.97
BP	16.63	15.33	12.37	13.82
Total Fina Elf	9.13	7.76	8.35	8.94
BG	6.26	7.23	7.04	4.00
Statoil	1.67	3.30	6.00	8.72
Centrica	10.88	9.01	5.95	4.11
ConocoPhillips	5.11	6.56	5.72	4.31
Amerada Hess	2.79	2.99	3.18	1.49
ENI	3.52	3.69	2.99	2.10
RWE-DEA	0.17	0.33	2.00	1.43
GdF	0.87	1.54	1.74	1.25
ChevronTexaco	1.68	1.75	1.64	1.48
Marathon	1.99	1.88	1.50	1.16
BHP Billiton	1.96	1.60	1.49	1.15
Burlington Resources	0.90	0.88	1.43	1.52
Iranian Oil	0.00	0.00	1.40	1.16
Consort Resources	0.34	0.59	0.91	0.58
Talisman	1.12	1.07	0.86	0.65
Kerr-McGee	0.95	0.98	0.65	1.02
Tullow Oil	0.92	0.95	0.55	0.27
PetroCanada	0.35	0.43	0.36	0.26
RG	0.23	0.23	0.29	0.28
NOEX	0.39	0.35	0.25	0.18
Venture Production	0.08	0.31	0.22	0.05
Paladin	0.03	0.04	0.21	0.12
OMV	0.20	0.24	0.19	0.15
First Oil	0.10	0.37	0.17	0.05
Marubeni	0.23	0.15	0.17	0.13
Agip	0.01	0.02	0.15	0.19
Canadian Natural Resources	0.19	0.24	0.14	0.05
Dana Petroleum	0.07	0.08	0.12	0.06
ATP	0.00	0.18	0.12	0.05
Intrepid Energy	0.06	0.06	0.10	0.07
Murphy Oil	0.22	0.19	0.10	0.07
NOEX	0.01	0.08	0.10	0.11
Premier Oil	0.12	0.14	0.10	0.07
Oranje Nassau Energy	0.15	0.12	0.09	0.10
Dyas	0.10	0.10	0.07	0.06
EnCana Corp	0.09	0.07	0.06	0.04
EDC	0.16	0.11	0.05	0.03
Bow Valley Energy	0.03	0.04	0.03	0.02
Edison	0.02	0.02	0.02	0.01
Cal Energy	0.03	0.03	0.01	0.01
Hunt Oil	0.03	0.03	0.01	0.01
ROC	0.00	0.00	0.01	0.00
Summit North Sea	0.04	0.03	0.00	0.00
Svenska Petroleum	0.00	0.00	0.00	0.00
Cairn Energy	0.00	0.00	0.00	0.04
Norsk Hydro	0.00	0.00	0.00	2.14
Petoro	0.00	0.00	0.00	6.02
Total	100.00	100.00	100.00	100.00
HHI	1044.25	943.91	900.18	927.21

Source: Arthur D. Little analysis

Appendix 7: The Herfindahl-Hirschmann Index (HHI)

The HHI is a commonly used statistic, which is intended to indicate the level of competitive intensity in an industry. It is used by those who study industry concentration from a public policy point of view, such as regulators and academics. The Federal Trade Commission and other public bodies in the United States use the HHI quite extensively in consideration of merger activity between firms in the same industry. It is also used by the UK's Competition Commission in consideration of the level of competition in its various inquiries.

The EU website includes the following description of the HHI:

Specific measurement of market concentration, that is of the extent to which a small number of firms account for a large proportion of output. The HHI is used as one possible indicator of market power or competition among firms. It measures market concentration by adding the squares of the market shares of all firms in the industry. Where, for example, in a market five companies each have a market share of 20%, the HHI is $400 + 400 + 400 + 400 + 400 = 2000$. The higher the HHI for a specific market, the more output is concentrated within a small number of firms. In general terms, with an HHI below 1000 the market concentration can be characterised as low, between 1000 and 1800 as moderate and above 1800 as high.

A US description, in the context of the electricity sector but whose essence is widely quoted by Federal and State regulatory agencies:

Herfindahl-Hirschmann Index (HHI) -Widely used measure of market concentration which is calculated by summing the squares of the percentages of a market as represented by each competitor. For example, 5 equally sized generators each contributing 20% of a market would result in that market having an HHI of 2000 ($5 \times 20^2 = 2000$). Federal agencies handling anti-trust issues consider a market having an HHI of 1800 or more to be highly concentrated. While useful when examining competition among generators, it is of limited use when dealing with interacting components (such as generation and transmission) where even a low HHI would not necessarily reveal monopolistic capabilities.

But while the HHI is widely used, it is not an infallible guide to the level of competition in an industry, as the description above suggests. Among other considerations, barriers to entry will be influential in determining the level of competition. An industry might have few participants, and thus a high HHI. If profits in the industry are very low, then even if entry barriers are low no new entrants may wish to enter the market. But if entry barriers are high then this might give public policy makers cause for concern. The public policy-maker is of course interested to guard against the possible abuse of a dominant market position. It is not the dominant market position per se which is the problem. It is any anti-competitive behaviour which occurs as a result of this market position.

As an example of the concern which regulatory authorities have over entry barriers, here is an interesting comment from the US Federal Trade Commission in the context of the BP/Amoco merger:

The terminaling of gasoline and other light petroleum products in each terminaling market is either moderately concentrated or highly concentrated, and would become significantly more concentrated as a result of the merger. Premerger concentration in the terminaling markets, as measured by the Herfindahl-Hirschmann Index, ranges from more than 1,300 to more than 2,500, and as a result of the merger concentration would increase in each terminal market by more than 100 points to levels ranging from more than 1,500 to more than 3,600.

Entry into the terminaling of gasoline and other light petroleum products in each terminaling market is difficult and would not be timely, likely, or sufficient to prevent anticompetitive effects that may result from this merger.

An academic comment:

The Herfindahl-Hirschmann index squares the market shares of firms in the industry and adds up the total. But the number of firms in a market does not necessarily impart how low - or high - are barriers to entry. These are determined by the structure of the market, legal and bureaucratic hurdles, the existence, or lack thereof of functioning institutions, and by the possibility to turn an excess profit.

The index suffers from other shortcomings. Often the market is difficult to define. Mergers do not always drive prices higher. University of Chicago economists studying Industrial Organization - the branch of economics that deals with competition - have long advocated a shift of emphasis from market share to - usually temporary - market power. Influential antitrust thinkers, such as Robert Bork, recommended to revise the law to focus solely on consumer welfare.

The Benefits of Oligopolies by Sam Vaknin, Ph.D.

We note that generally speaking, gas transportation is characterised by high capital intensity and large-scale economies, which normally means there are high barriers to entry into a gas market for a prospective new supplier. This is why it is considered appropriate to conduct an “open season” for capacity bookings in new gas transportation infrastructure. An open season process offers all prospective gas market entrants the opportunity to benefit from the significant scale economies which are created by, in effect, joining together with others, and thus securing capacity more cheaply than any individual shipper could achieve by acting alone. And the existence of a secondary market in capacity, in which they can resell any capacity which was booked but is not currently being used, means the barriers to new entry into the gas market are substantially reduced.

Gastransport Services is conducting an “open season” for capacity in the BBL project, inviting potential shippers to declare their interest in booking capacity rights in the pipeline. Entry capacity to the Transco network in the UK is easily accessible via the auctions which are held regularly. And there is expected to be an active secondary market in capacity, just as there is in the Interconnector and at the beach terminals.

Accordingly, the BBL project facilitates the potential entry of new players into the UK gas market.

ANNEX 7.

Draft version of the Credit control protocol

Credit control protocol

INFORMATION

Customer will provide information about the group structure and the ultimate parent company. Customer will send the most recent audited annual accounts of the last three years (including balance sheets, profit and loss accounts, cash flow statements and notes to the accounts). If this information is not provided or is not available *Customer* will be classified in risk category high.

RISK CATEGORY

The creditworthiness of each *Customer* will be analysed. *Customers* will never be analysed on a stand-alone basis; links to parent companies or affiliates are important considerations.

CREDIT LIMITS

After classification in a risk category, the financial information provided by *Customer* is used to determine an appropriate credit limit.

Table 2: Credit limits per risk category

Risk category	Credit limit
Low	→ An appropriate credit limit will be applied. If the exposure exceeds the credit limit other securities might be required.
Medium	→ An appropriate credit limit will be applied. If the exposure exceeds the credit limit other securities might be required.
High	→ No credit limit. Adequate securities are required.

Every change in the Agreement can lead to a new credit analysis and can result in another risk category and/or other credit limit.

ANNEX 8

Bulletin board in the GTS system

Text taken from the GTS website:

The Bulletin Board is available for (potential) shippers to make known that they are searching other (potential) shippers to obtain transport under a shared contract (assignment) or to trade services (transport capacity and quality conversion). This Bulletin Board only serves the purpose of bringing (potential) shippers into contact with other (potential) shippers. It is not the intention of Gastransport Services to offer new services or products by means of this Bulletin Board.

Any consequences of collaboration between shippers or transfer of rights on services will be dealt with according to the contractual means available to Gastransport Services and the appropriate articles in the Transport Service Agreement (TSA) and the Transport protocol. In case (potential) shippers wish to make use of this Bulletin Board they can apply for a password and user ID. After obtaining the user ID and password you can enter the bulletin board.

Disclaimer

Gastransport Services can not be held responsible for any adverse consequences caused by incompleteness, incorrectness or delay of the information presented here nor in changes thereof or with regard to the handling of agreements, as a result of using this Bulletin Board, between shippers. On request Gastransport Services can perform a check, a paid service, to determine whether the traded services can be delivered by Gastransport Services and, if so, under what conditions.

ANNEX 9

Applications for shippers: On-line Transport Information Service (OTIS)

Text from GTS website: www.gastransport.nl

Two systems have become operational that can be used to gain insight into the hourly realisations of the gas quantities transported for you. These systems, NIMBUS-IM and DIALOG, are presented under the name On-line Transport Information Service (OTIS).

The NIMBUS-IM system can be used to examine on-line the energy and quality data allocated to you at entry and exit points of the Gastransport Services network contracted by you. This data can be requested with a maximum frequency of 1 time per 5 minutes. The information is based on the actual measurement data collected by us for this purpose on-line per telemetry. This takes place under the condition that this measurement data can be used on-line to make a reasonable estimate of the allocation. This last point means that when the allocations depend on measurements made by third parties, which are not available to us on-line, we cannot make an on-line estimate of the realisation. This situation occurs at Gas Receiving Stations where the gas is transferred by us to a Regional Network Manager and at supply stations. The data supplied by NIMBUS-IM is not fiscal.

The DIALOG system can be used in arrears to request information about the quantity of gas that has been transported for you over the entry and exit points where you are active. In the event that you are an exclusive shipper at a measurement point then you can request this data on the day following the day of the transport. This data is not fiscal. In the other cases, this data can be requested during the course of the month following the month in which the transport took place. This data, which DIALOG supplies then, is fiscal.

Although the data provided via OTIS has been collected with the greatest possible care, Gastransport Services cannot accept any liability for the possible inaccuracy of the data supplied. In this case, it must be remembered that there is a small chance that the data supplied is incorrect as a consequence of technical breakdowns.

For the time being, Gastransport Services will make available a beta version of NIMBUS-IM. The use of this version is free of charge. After this trial period, during which Gastransport Services and shippers can gain experience with NIMBUS-IM, a definitive version will be made available. From then onwards, a fee will be applied for the use of NIMBUS-IM. You will be informed about that in due time.

The use of the DIALOG system is free of charge.

The OTIS uses the Internet and is equipped with the latest safeguarding facilities to ensure that all shippers only have access to data about their own transport contracts. For this purpose, the shipper must possess personally-bound certificates to safeguard his access. A maximum number of 4 certificates will be issued to each shipper. The costs of a certificate amount to € 100 and are for the shipper's account.

Contractual matters regarding the use of OTIS are dealt with in a Letter Agreement to the Transmission Service Agreement 2002-1, signed by the shipper and Gastransport Services.

You will find more information on the On-line Information Service on this website under Contract documentation.