

**Arthur D Little**

**Competition in the  
UK gas market:  
current and future  
situation**

Updated Report

Report to  
BBL Company

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## 1. Introduction

BBL Company, a general partnership between Netherlands-based subsidiaries of NV Nederlandse Gasunie, E.on Ruhrgas AG and Fluxys, is planning to build a new pipeline linking the Dutch and British gas pipeline networks, to be operational in Q4 2006. The project is known as the Balgzand-Bacton Line (BBL).

During 2003, submissions were made to the regulatory authorities in the Netherlands (the Ministry of Economic Affairs, EZ) and the UK (Ofgem) describing the project and seeking clearance to proceed with the project without being subject to the Second Gas Directive. Arthur D Little Ltd was asked to write a report on the likely effects on competition in the UK gas market both with and without the BBL project being built. This report was annexed to the request by the project developers to Ofgem for a letter of comfort regarding a future possible derogation.

Both EZ (in the Netherlands) and Ofgem (in the UK) have acknowledged the potential benefits of the BBL and have indicated that when they have jurisdiction they will be minded to grant derogation from the Second Gas Directive. The European Commission has also given its views on the BBL project. In view of the formal exemption application, BBL Company wishes to commission a further report on competition in the UK gas market, and its possible future evolution, to take into account new information available since Arthur D Little's September 2003 report.

The BBL would further interconnect gas supply sources and gas markets in North West Europe. There are growing possibilities to move gas produced in Norway, the UK and the Netherlands to markets in the UK, Ireland, and Continental Europe via offshore links between the UK and Norwegian pipeline systems, the Interconnector (which has reverse flow capability) and, in future, the BBL. A connection between the UK and the Netherlands will allow additional trading of gas to take place, both by physical flows from the Netherlands to the UK but also in the reverse direction, by swapping – or commercial reverse flow. And a later stage, if appropriate, physical reverse flow capability could be created. It is therefore appropriate to place the BBL in a European context, not just in a UK context.

This report updates Arthur D Little's previous analysis of the UK gas market, taking into account the current status of several major new infrastructure projects, as well as the BBL, and other factors, including:

- The Isle of Grain LNG terminal, capacity of which has been awarded to BP and Sonatrach on a 50/50 basis
- The Dragon LNG terminal in Wales (owned by Petroplus, Petronas and BG)

- The Ormen Lange gas pipeline from Norway
- ExxonMobil's proposed LNG terminal at Milford Haven
- The expansion of reverse flow in the Interconnector
- Updated figures on UKCS production by company
- The latest gas demand projections published by Transco
- Changes in downstream market shares, as published by Ofgem in April 2004, in their publication "Review of Domestic Competition"

In addition to updating the quantitative aspects of the 2003 report, Arthur D Little has been requested to provide a qualitative description of competition in the UK gas market, focussing on the downstream sector, and to assess the contribution which the BBL project can play in enhancing the security of gas supply not only in the UK but also in the Netherlands.

## 2. Summary and Conclusions

We have assessed the degree of market concentration in the upstream and downstream sectors of the UK gas market, and the degree of competitive intensity, using a combination of quantitative indicators such as the Herfindahl-Hirschmann Index, and some qualitative analysis. All of our analysis has been done on the basis of annual volumes, not capacity, though clearly the BBL provides both volume and capacity.

We conclude that the upstream sector exhibits low levels of market concentration currently, and that on reasonable assumptions about future imports, the situation is not expected to change adversely over the rest of the decade. To the contrary, we expect that market concentration will diminish, especially if the BBL is built.

In the downstream sector, we have looked separately at three market sectors: gas sold to power generators, to industrial and commercial customers and to residential customers. Just as in our 2003 report, we conclude that there is a relatively low level of market concentration in gas sold to power generators. In the industrial and commercial sector, market concentration appears to have risen since last year, with one or two companies having substantially increased their market share in the recent contracting round by aggressive marketing. The higher concentration does not appear to work against the interests of consumers and there is a high degree of competitive intensity in the I&C sector. In the residential gas market, British Gas continues to hold a dominant market position but does not appear to be using this to engage in predatory pricing (to keep competitors out), nor is it earning excess profits. British Gas's margins in energy supply were only 2.6% last year, and it lost a further 220,000 customers in the first quarter of 2004, since increasing its prices in January 2004.

It can be reasonably assumed that British Gas will continue to lose market share, but at rates lower than the recent rate. By 2010 it may hold only 49% of the residential gas supply market. And this sector is changing from a gas supply market to an energy supply market, on which basis British Gas's current market share is much lower anyway – at around 44% as opposed to 61% in the gas supply business.

We have analysed the “headroom” for new entrants and conclude that British Gas is not using its position in the market to make it unattractive for competitors to participate in this business.

Accordingly, we believe there is an acceptable level of competitive intensity in the UK gas market, and we believe that the BBL is likely to enhance the level of competition, by creating additional capacity. It will also add to security of energy supply, by creating

access to additional gas reserves both in the Netherlands and further east. The enhancement to energy supply security applies both to UK and to Dutch consumers.

In terms of its effect on the UK gas market, in our opinion the BBL will not increase the level of market concentration in any segment of the market, upstream or downstream. At worst, it has no effect on concentration, and at best, by creating additional capacity which can be used in future in ways which may not be foreseeable today, it can create additional competition. It will make a substantial contribution to increased security of gas supply for UK consumers. And it can offer enhanced competition of security of supply for Dutch consumers via the facilitation of swaps.



### 3. Competition in the UK upstream sector

#### 3.1 Quantitative analysis

As in our 2003 report, we have calculated the Herfindahl-Hirschmann Index (HHI) for the upstream supply of gas to the UK market, based on the market share of each producer. The source of the data is the well-known Wood Mackenzie database, and we have calculated the HHI for 2004, 2008 and 2010. We have made assumptions regarding the timing and degree of utilisation of new import infrastructure.

The HHI is a measure of the degree of concentration in an industry sector. It is calculated by summing the squares of the market share of each participant in the sector. In a strict monopoly, in which one firm has 100% market share, the HHI would be 10,000. In a market of five participants, each with a 20% market share, the HHI would be equal to 2000, being the sum of 400 for each of five players.

The classic use of the HHI is in public policy reviews of mergers and acquisitions. The US Department of Justice, and associated regulatory bodies such as the Federal Trade Commission, the Federal Communications Commissions and the Federal Energy Regulatory Commission use the HHI to assess market concentration before and after an "event" (usually a merger between two firms, but in the case we are considering, with and without the BBL). Where the HHI post-event is below 1000, the event is regarded as having no adverse competitive effect regardless of the change in HHI. Where the post-event HHI is in the range 1000 to 1800 and the increase is more than 100, this potentially raises significant competitive concerns. If the post-event HHI exceeds 1800 and the increase exceeds 50 then it is presumed that the event creates or enhances market power.

We have used Transco's latest Ten Year Statement forecast of UK gas demand, and Wood Mackenzie's field-by-field gas production forecasts, together with a scenario of future infrastructure development and flows of gas through new infrastructure. At present, on an annual basis, there is a surplus of UKCS gas availability compared with UK demand and this allows exports to take place. But declining UKCS production will make the UK a net importer. The UK already imports significant quantities of gas through pipelines from Norway and via the Interconnector, which has reverse flow capabilities and usually flows in "reverse flow" mode for several weeks in the winter. Depending on the scale and timing of new gas import infrastructure, the Interconnector may use its reverse flow mode for greater periods of time in future than it has in the past.

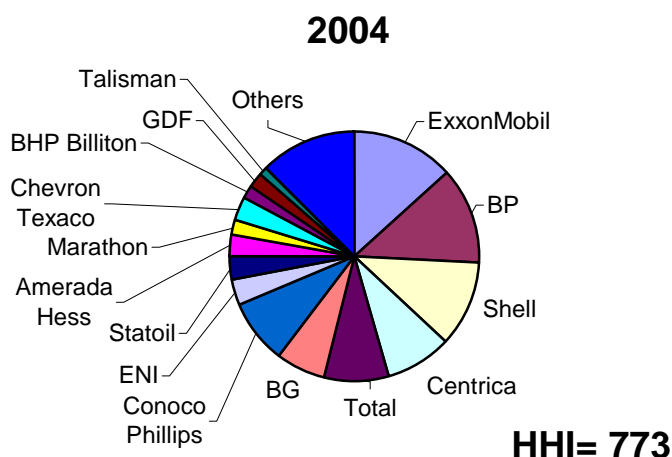
Given the large amount of new infrastructure which is being planned, our analysis suggests strongly that there is likely to be some unused capacity in several pipes or LNG terminals, especially in the summer. In winter, they are likely to be utilized close to full capacity, but in the summer utilisation levels will drop, especially in the LNG terminals, as LNG can go to other markets if these offer higher value to the LNG supplier – for example, the US gas market.

Our supply scenario is based on the development of the Ormen Lange pipeline (Langeled) from Norway (Q4 2006), the BBL pipeline from the Netherlands (Q4 2006), expansion (in two phases) of reverse flow capacity in the Interconnector ( Q4 2005 and Q4 2006), the Isle of Grain LNG terminal (Q4 2005) and one other LNG terminal (Q4 2006) prior to 2010 (which could be the expansion of the Isle of Grain, or one of the two proposed LNG terminals in Wales). We have not looked beyond 2010.

As regards utilization, we have assumed that new pipelines operate at an approximate 75-80% utilization level, and LNG terminals at 35-60% utilization (increasing over time). The Interconnector acts as the “balancing” infrastructure to ensure an overall equilibrium between demand and supply.

On the basis of these assumptions, and attributing ownership of the gas to the equity in the pipe (unless we have specific data today which enables us to make a more accurate assessment of ownership of the gas, as we can for the BBL volumes), we calculate an HHI of 773. This is indicative of a sector in which there is no market concentration.

**Figure 1: Market Share of Upstream Sector in 2004**



Source: Wood Mackenzie and Arthur D. Little Analysis. The equivalent calculation in our 2003 report gave an HHI of 944 for 2003. Part of the reason for the difference is that in 2003 we attributed the sale of gas by Gasunie Trade & Supply to Centrica to the private shareholders of Gasunie Trade & Supply (Shell and ExxonMobil) on a 50/50 basis, as it seemed possible that the structure of Gasunie might change in the short term. This now looks unlikely in the short term and so for this 2004 report we attribute the gas to Gasunie T&S.

We do not think this conclusion would change if we adopted a different, but equally plausible scenario of infrastructure development and utilisation. The fact is that ownership of capacity and gas will be quite highly fragmented, as is UKCS production, and therefore the HHI is likely to remain below the level at which regulatory attention might be drawn.

The table below shows the 2004 data, and forecasts for 2008 and 2010. The forecasts indicate that the HHI is expected to remain well below 1000, and is expected to decline as UK production is replaced by imports from a variety of sources.

**Table 1: Market Share of Upstream Sector in 2004, 2008 and 2010 (with BBL)**

Producers	2004	2008	2010
ExxonMobil	13.2%	10.3%	12.8%
BP	12.7%	14.0%	11.5%
Shell	10.9%	10.1%	7.7%
Centrica (British Gas)	8.8%	4.4%	4.0%
Total	8.4%	8.3%	7.5%
BG	6.3%	3.3%	4.4%
ConocoPhillips	8.5%	7.3%	5.6%
ENI	3.3%	2.5%	2.1%
Statoil	3.2%	6.6%	6.6%
Amerada Hess	2.6%	3.2%	1.3%
Marathon	2.0%	1.2%	1.0%
ChevronTexaco	3.0%	2.9%	2.4%
BHP Billiton	1.8%	1.1%	0.7%
GDF	1.9%	1.5%	3.3%
Talisman	1.0%	0.6%	0.4%
Gasunie Trade & Supply	0.0%	6.0%	6.1%
Others	12.6%	16.8%	22.6%
<b>HHI</b>	<b>773</b>	<b>685</b>	<b>626</b>

Source: Wood Mackenzie and Arthur D. Little Analysis. Here we have assumed a BBL capacity of 15bcm (Groningen quality) and that capacity utilisation of BBL pipeline does not exceed 75% on an annual basis. Our other assumptions include exports to Republic of Ireland and Northern Ireland, and other imports through Vesterled, Langed, LNG at the Isle of Grain and Milford Haven, with the Interconnector balancing the supply/demand gap.

The above analysis assumes that the BBL project comes online as planned. But we have also evaluated a scenario in which the BBL pipeline does not go ahead, and the volumes which are expected to be transported through the BBL are instead delivered via reverse flow in the Interconnector.

**Table 2: Market Share of Upstream Sector in 2004, 2008 and 2010 (without BBL)**

<b>Producers</b>	<b>2004</b>	<b>2008</b>	<b>2010</b>
ExxonMobil	13.2%	10.3%	13.0%
BP	12.7%	14.0%	12.7%
Shell	10.9%	10.1%	8.1%
Centrica (British Gas)	8.8%	4.4%	3.7%
Total	8.4%	8.3%	7.3%
BG	6.3%	3.3%	3.9%
ConocoPhillips	8.5%	7.3%	5.4%
ENI	3.3%	2.5%	2.0%
Statoil	3.2%	6.6%	7.9%
Amerada Hess	2.6%	3.2%	1.2%
Marathon	2.0%	1.2%	1.0%
ChevronTexaco	3.0%	2.9%	2.4%
BHP Billiton	1.8%	1.1%	0.7%
GDF	1.9%	1.5%	3.1%
Talisman	1.0%	0.6%	0.4%
Gasunie Trade & Supply	0.0%	6.0%	6.1%
Others	12.6%	16.8%	21.0%
<b>HHI</b>	<b>773</b>	<b>685</b>	<b>666</b>

Source: Wood Mackenzie and Arthur D. Little Analysis

In the absence of the BBL there would be no change to competitive intensity from 2004 to 2008, as there is sufficient spare capacity in the Interconnector to handle planned volumes expected to be delivered via the BBL. But there would be an increase in HHI by 2010 as a result of some of the BBL volumes displacing gas owned by other players delivered via the Interconnector, resulting in replacement gas being delivered through other pipelines or terminals, where gas ownership is expected to be less diverse. Thus there is a tendency for gas ownership to be slightly more concentrated without the BBL compared with the situation with the BBL, and consequently the HHI is slightly higher.

We have also evaluated a scenario in which the BBL is assumed not to be built, and the corresponding gas sales contracts which would use the BBL are not fulfilled. In this case, we assume that buyers would purchase gas from other producers and that it would flow to the UK through the new infrastructure which is being planned. This implies higher utilisation of Langede, the Interconnector (utilizing capacities owned by GDF,

Gazprom and Ruhrgas) and the LNG terminals. The results of this analysis are shown in Table 3 below. The higher HHI indicates that there is a greater degree of sector concentration than if the BBL were to go ahead.

**Table 3: Market Share of Upstream Sector in 2004, 2008 and 2010 (without BBL, and no “BBL contracts”)**

Producers	2004	2008	2010
ExxonMobil	13.2%	12.2%	14.8%
BP	12.7%	14.2%	11.7%
Shell	10.9%	10.4%	8.0%
Centrica (British Gas)	8.8%	4.4%	4.0%
Total	8.4%	8.3%	7.5%
BG	6.3%	3.3%	4.4%
ConocoPhillips	8.5%	7.3%	5.6%
ENI	3.3%	2.5%	2.1%
Statoil	3.2%	7.5%	7.5%
Amerada Hess	2.6%	3.2%	1.3%
Marathon	2.0%	1.2%	1.0%
ChevronTexaco	3.0%	2.9%	2.4%
BHP Billiton	1.8%	1.1%	0.7%
GDF	1.9%	3.3%	5.2%
Talisman	1.0%	0.6%	0.4%
Gasunie Trade & Supply	0.0%	0.0%	0.0%
Others	12.6%	17.7%	23.5%
<b>HHI</b>	<b>773</b>	<b>728</b>	<b>694</b>

Source: Wood Mackenzie and Arthur D. Little Analysis

In addition to the HHI, we have calculated the Concentration Ratio (CR) for the upstream sector. This is a slightly less sophisticated measure of concentration, and looks at the market share of the biggest firms in the sector: CR4 indicates the market share of the largest four firms. The table below shows the three cases we have evaluated, namely the CR4 based on the BBL coming online as planned; the CR4 assuming the BBL does not go ahead but that the gas sales contracts are delivered via other means; and finally the CR4 assuming that neither the BBL nor the “BBL gas sales contracts” proceed.

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**Table 4: Upstream Concentration Ratio: CR4**

<b>Concentration Ratio (CR4)</b>	<b>2004</b>	<b>2008</b>	<b>2010</b>
BBL proceeds	46	43	39
BBL does not proceed, but gas contracts fulfilled	46	43	42
BBL does not proceed, gas contracts not fulfilled	46	45	42

Source: Arthur D. Little Analysis

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The CR4 measure clearly indicates that the largest four firms account for less than half of UK gas supply, with a gradually-decreasing tendency. And the situation is not significantly different without the BBL, though the concentration ratios are slightly higher. The concentration ratios are not significantly different if the BBL is not built and the “BBL gas sales contracts” are not fulfilled.

### **3.2 Qualitative analysis**

While the HHI is one of quantitative measures which regulatory authorities evaluate when considering such issues as mergers and acquisitions, which may result in increases in concentration in an industry, market or market sector, it is not the only aspect which is looked into. A high degree of concentration does not necessarily work against the interests of consumers. This subject is discussed in more depth later in this report, and here we make a few observations about concentration, or the lack of it, in the upstream sector of the UK gas industry.

We believe that the upstream sector of the UK is highly competitive, as indicated by the relatively low HHI value. Empirical evidence suggests that there is easy entry and exit, as evidenced by the number of firms which have entered this sector in recent years by buying assets from larger companies such as BP and Shell, which have been rationalising their portfolios of gas reserves, and tending to exit from mature assets. These mature assets have been acquired by smaller firms which specialise in managing fields in their production decline phase so as to maximise their economics.

There is a well-developed wholesale market for gas, with sufficient price-reporting as to make the market relatively transparent. Accordingly, all participants understand the level of price in the wholesale market and are free to make their own decisions regarding sale and purchase of gas. From time to time Ofgem has investigated specific events in case these were indicative of malpractice by producers, but it has not found that there has been malpractice in the upstream sector. On one occasion (regarding trading at St Fergus at a time of Transco

capacity constraints), Ofgem found that some shippers may have engaged in practices which were questionable, but not producers.

We note that Ofgem has wide powers to penalise the abuse of a dominant market position, or a breach of licence conditions, including (in certain cases) imposing fines of up to 10% of a firm's annual turnover. These powers are granted to Ofgem under several pieces of legislation, including the Gas Act 1986 and the Utilities Act 2000. Ofgem also has enforcement powers under the Competition Act 1998 and the Enterprise Act 2002 in respect of consumer protection. So it has many means of sanctioning anti-competitive behaviour if it finds that such behaviour has occurred.

In our judgement there is no reason to believe that there is a risk of abuse of a dominant market position in the upstream part of the UK gas industry, based on these figures.

## 4. Competition in the UK downstream sector

### 4.1 Quantitative analysis

We have looked at the same quantitative indicators of competitive intensity for the downstream sector as we have for the upstream sector. The downstream sector has several components:

- The market for gas sold to very large users such as power plants and very large industrial sites: the scale of these transactions makes them almost wholesale customers
- The market for gas sold to smaller industrial and commercial sector users
- The market for gas sold to residential users.

#### 4.1.1 Power plants

We do not have any new data since the 2003 report, except that there have been a few instances in which a power station has been acquired by a new owner. If we assume that the gas supply remains as arranged with the former owner, then there will have been little or no change in competitive intensity in this sector.

The results we reported in 2003 were of a current HHI of 1351, and a value of 1224 by 2008. We believe that these values remain valid indicators of competitive intensity in this sector of the gas supply market, and they suggest that there is no reason to be concerned over market power.

#### 4.1.2 Industrial and Commercial customers

As in 2003, we have used data published by John Hall Associates, a leading firm in the provision of data and advice in the area of energy procurement by large consumers. John Hall Associates (JHA) monitor the performance of each of the energy marketing companies in the periodic contracting rounds, and publish the market shares of the firms, split into three groups: below 25000 therms p.a. firm supply, above 25000 therms p.a. firm supply, and interruptible users.

Our findings in 2003 based on JHA data were very consistent with similar information published by Ofgem in its Review of Competition in the non-domestic gas and electricity supply sectors in July 2003. The size categories of customers were slightly different between the Ofgem data, which came from all suppliers, and the JHA data, which were based on a sample of customers. Ofgem used three categories: firm supply below 50,000 therms p.a., firm supply above 50,000 therms p.a., and interruptible



supply. JHA divided the two firm supply categories at 25,000 therms rather than 50,000 therms. The HHI results were as shown in Table 5 below:

**Table 5: HHI for Industrial and Commercial Customers as reported in 2003**

	Small firm	Large firm	Interruptible	Combined
OFGEM	2010	1413	1758	1266
ADL (JHA data)	2465	1319	1676	1179

We have again calculated the Herfindahl-Hirschmann index for each of the three customer groups and also for the overall supply of gas to industrial and commercial customers. The market shares and Herfindahl-Hirschmann index for individual groups and for the overall market (weighted by sector volume) are shown in Table 6.

**Table 6: Market Share of Suppliers to Industrial & Commercial customers, April 2004**

Suppliers	< 25K therms pa	> 25K therms pa	Inter-ruptible	Overall
Shell Gas Direct	37%	26%	4%	18%
Powergen <sup>1</sup>	43%	29%	32%	33%
Corona	5%	0%	0%	1%
Total	3%	20%	2%	10%
Centrica (British Gas)	0%	4%	0%	2%
GDF	0%	9%	33%	18%
Npower	0%	4%	0%	2%
SSE	9%	4%	0%	3%
BP	0%	0%	13%	5%
ENI	0%	0%	3%	1%
Scottish Power	0%	0%	3%	1%
Statoil	0%	0%	7%	3%
Others	3%	4%	2%	3%
<b>HHI</b>	<b>3346</b>	<b>2043</b>	<b>2436</b>	<b>1871</b>
<b>CR4</b>	<b>94</b>	<b>83</b>	<b>86</b>	<b>78</b>

Source: John Hall Associates

1. Powergen includes Ruhrgas, as both firms are owned by E.on. If we regarded them as separate companies (as reported by JHA) the HHIs would be 3346 (<25k th), 1638 (>25k th), 1968 (int.) and 1434 (overall)

The latest JHA data, from the April 2004 contracting round, indicates substantial changes in market shares compared with last year, which, coupled with some ownership changes in the sector (such as SSE acquiring Atlantic Gas & Power), together with our decision to add together the shares attributable to Powergen and Ruhrgas (both being wholly-owned by E.on), lead to significantly higher HHIs than we found a year ago. Broadly speaking, the HHIs are between 35% and 60% higher than they were a year ago, and are at levels which suggest a high degree of concentration. We understand that some suppliers have been very aggressive in bidding for new contracts and have achieved a large market share in this round.

We have obtained other information, from the Energy Information Centre, on market shares in the Industrial and Commercial sector, which shows a very different picture of market shares compared to John Hall Associates data. We understand that the EIC's data is drawn, among other sources, from their membership, which accounts for more than 20% of the UK's I&C gas and electricity consumption. The EIC data suggests less market concentration than the JHA data, as indicated by lower HHI values and lower concentration ratios.

**Table 7: I&C market shares by supplier according to Energy Information Centre, April 2004**

Suppliers	< 25K therms pa	> 25K therms pa	Inter- ruptible	Overall
Shell Gas Direct	14%	14%	9%	12%
Powergen	26%	20%	10%	17%
Total	13%	29%	23%	24%
Centrica (British Gas)	24%	14%	8%	13%
GDF	0%	5%	28%	6%
Npower	15%	7%	1%	6%
BP	1%	5%	8%	6%
ENI	2%	2%	2%	2%
Statoil	0%	1%	9%	4%
Others	3%	3%	1%	2%
<b>HHI</b>	1856	1746	1709	1470
<b>CR4</b>	79	77	70	68

Source: Energy Information Centre

Ofgem suggest, in their July 2003 report on non-domestic sector competition, that high levels of supplier concentration in this sector may not imply a low level of competitiveness. They look at the number of companies entering the sector, the spread of prices, and the amount of switching activity. The conclusion was that new suppliers continue to enter the sector, and that there is a high level of customer switching. For the

larger customers, Ofgem comments that buyer power is also a factor, and suggests that changes in market shares of suppliers may be a more relevant indication of competitiveness than the degree of supplier concentration. Table 8 compares the market shares within the I&C market for years 2003 and 2004, based on JHA data.

**Table 8: Market Share Comparison in I&C market for 2003 and 2004**

Suppliers	< 25K		> 25K		Interruptible		Overall	
	2003	2004	2003	2004	2003	2004	2003	2004
Shell Gas Direct	21%	37%	13%	26%	11%	4%	14%	18%
Powergen	41%	43%	19%	18%	2%	22%	15%	23%
Ruhrgas	0%	0%	1%	11%	3%	11%	2%	9%
Total	3%	3%	23%	20%	5%	2%	13%	10%
Centrica	15%	0%	5%	4%	0%	0%	5%	2%
GDF	0%	0%	9%	9%	14%	33%	10%	18%
Npower	6%	0%	6%	4%	11%	0%	8%	2%
SSE	0%	9%	0%	4%	0%	0%	0%	3%
BP	0%	0%	9%	0%	27%	13%	15%	5%
ENI UK	0%	0%	2%	0%	3%	3%	2%	1%
SP	0%	0%	0%	0%	1%	3%	1%	1%
Statoil	0%	0%	10%	0%	22%	7%	13%	3%
Others	13%	8%	3%	4%	0%	2%	3%	4%

Source: John Hall Associates

The above comparison does indeed suggest that some companies have gained substantial market share in the past year, at the expense of others whose market share has fallen, such as BP and Statoil.

As it appears that there have been significant changes in market share in the I&C sector, and some suppliers appear to have been very aggressive in the recent contracting round, we conclude that there is no reason to think that there is weak competition in the I&C sector, despite HHI values which are higher than is normally considered to be typical of a competitive sector.

#### **4.1.3 Residential sector**

In 1996, the residential sector had just one supplier, British Gas (which is the brand name of the company now called Centrica plc), and so the HHI was 10,000. Today, according to Ofgem, there are 9 active gas suppliers to this customer segment, and British Gas continues to lose market share. By December 2003, British Gas' share was down to 62%, and since then British Gas has increased its prices, causing a further 220,000 customers to switch to other suppliers (source: Centrica Annual Report 2003, published April 2004). This would bring its current market share down to 61%, and the annualised rate of loss of market share is 7%.

The major competitors to British Gas are the Public Electricity Suppliers: Powergen (including TXU), RWE Innogy (using the brand name npower), EDF Group (London

Electricity, Seaboard and SWEB), Scottish Power and Scottish & Southern Electricity (including Atlantic Gas and Power). Just as all these companies have moved into gas supply, so has British Gas moved into electricity supply. The so-called “dual fuel” supply package has become relatively common – Ofgem’s research indicates that 80% of switching customers have selected this option.

We believe that most of the customers who switch energy supply become dual fuel customers, in that they purchase both gas and electricity from the same supplier. This understanding is based on discussions with marketing companies and is backed up by evidence from Ofgem, which estimates that 80% of switchers take a dual fuel supply, based on survey data. Ofgem also indicates that there are around 21 million residential gas customers and that 47% of them have switched at least once. This suggests that there are as many as 10 million dual fuel customers.

If one accepts that the retail market is essentially a dual-fuel market, then British Gas’ market share is much lower than it would be if one looked only at gas customers. Gas and electricity are imperfect substitutes for each other (though traditionally there has been some heating use of electricity in the UK), but the retail companies tend to treat this sector as a combined gas and electricity sales opportunity because the marketing channels are the same, the billing systems are usually integrated and the CRM systems (call centres, etc) are the same.

Ofgem’s figures indicate that while British Gas has a 61% share of the “gas-only” segment, it has only 44% of the dual-fuel segment.

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**Table 9: Market Share of Suppliers to Residential Customers, December 2003**

<b>Suppliers</b>	<b>Gas</b>	<b>Dual Fuel</b>	<b>Elec.</b>	<b>Overall</b>
Centrica (British Gas)	61%	44%	24%	40%
Powergen	12%	18%	21%	17%
NPower	9%	13%	15%	13%
SSE	7%	10%	14%	11%
EDF	5%	8%	14%	10%
Scottish Power	6%	8%	11%	8%
Others	1%	0%	1%	1%
<b>HHI</b>	4057	2657	1756	2344
<b>CR4</b>	89	85	74	81

Source: Ofgem

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Taking gas-only customers, we can see that the HHI was 4057 at the end of 2003, compared with 4280 in 2002 as recorded in our 2003 report. In approximately a year the HHI has fallen by over 200 points. And the rate of loss of market share by British Gas has accelerated in 2004 as a result of gas price increases, as noted by Sir Roy Gardner, Chief Executive of Centrica, in comments made on 10 May 2004 on the occasion of Centrica's Annual General Meeting.

In the dual fuel segment of the market, the HHI is much lower, at 2657, and across the energy (gas and electricity) market as a whole the HHI is lower still, at 2344, because the electricity-only supply market shares are more uniform than those for gas (as a result of starting the process of retail competition with 12 incumbents in electricity but only one in gas).

We have made projections of British Gas's future market share, based on an assumption about the future rate of switching, and assuming that its competitors acquire BG's former customers pro-rata with their 2003 market shares.

British Gas lost nearly 700,000 residential customers in 2000, around 650,000 in 2001 and just over 600,000 in 2002. The rate of loss declined to only 250,000 in 2003, but has accelerated in the first quarter of 2004 following a tariff increase. In Q1 2004, they lost 220,000 customers. While we doubt that this rate of loss will be sustained, as its competitors have increased their tariffs, it seems likely that they may lose 500,000 customers this year.

For future years, if they lose customers at a rate which declines by 50,000 per year (in other words, 500,000 customers lost in 2004, 450,000 lost in 2005, etc), then by 2010 British Gas will have only 49% of the market, and the HHI will be 2920, as indicated in Table 10 below. This is clearly lower than it is today, and when one considers the dual fuel sector as well, suggests that concerns over market power and potential abuse of a dominant market position will be much reduced. This analysis is based on the gas-only segment of the residential market.

**Table 10: Projected Market Shares in Residential Gas Supply, 2004 to 2010 (Q4)**

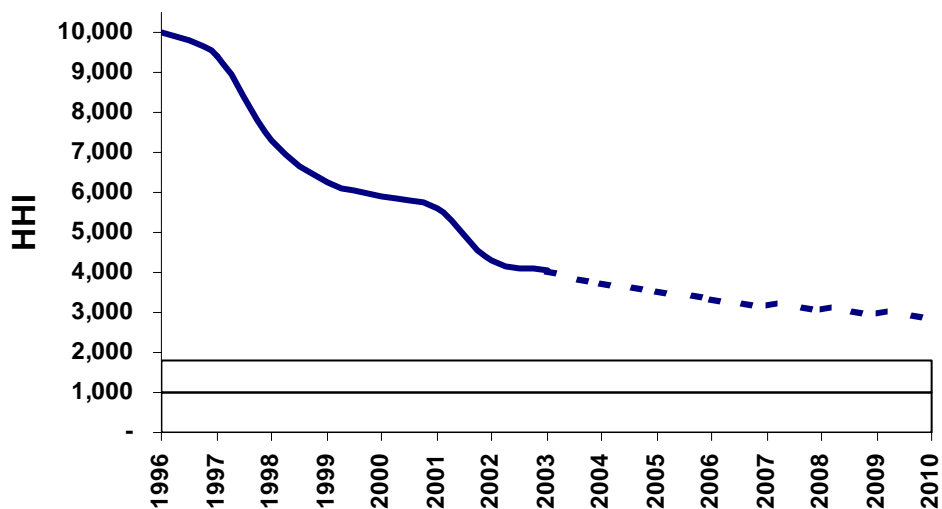
Suppliers	Gas						
	2004	2005	2006	2007	2008	2009	2010
Centrica (British Gas)	58%	56%	54%	52%	51%	50%	49%
Powergen	13%	13%	14%	14%	15%	15%	15%
NPower	9%	10%	10%	11%	11%	11%	12%
SSE	7%	8%	8%	8%	9%	9%	9%
EDF	5%	6%	6%	6%	6%	6%	6%
Scottish Power	6%	7%	7%	7%	7%	8%	8%
Others	1%	1%	1%	1%	1%	1%	1%
<b>HHI</b>	3734	3528	3353	3208	3089	2994	2920
<b>CR4</b>	87	87	86	86	85	85	85

Source: Ofgem and ADL Analysis

Figure 2 below shows the estimated HHI in the residential sector of the gas market since 1996, including a projection of its likely level (per Table 10 above) using the switching rate assumptions described above.

At the end of 1996, before the residential market was opened to competition, the HHI had a value of 10,000 because British Gas had a market share of 100%. Ofgem has made annual reports describing the progress of competition since then, and we have estimated the HHI on the basis of the figures quoted in Ofgem's reports. The historical data indicates that there is not a steady loss of market share by British Gas. Rather, there appear to be periodic accelerations and decelerations in the rate of switching. We attribute this phenomenon to the degree of marketing activity of the competitors, and the differential in prices between them. Thus there was a rapid move away from British Gas as the market began to be opened, with a deceleration in 1999/2000, followed by acceleration again in 2001 and deceleration in 2002/3. British Gas has announced that the rate of switching away from them has risen significantly in recent months following their price increase.

Figure 2: Historical and Future Estimates of HHI in Residential Gas Supply



Source: Ofgem and Arthur D Little Analysis

Figure 2 demonstrates that at current switching rates, the HHI could fall to around 2920 by the end of this decade. Of course, if there is an acceleration of switching rates this date would be brought forward.

If one were to consider the dual fuel market, as opposed to the gas supply-only market, then the concentration levels are already much lower (at 2657 today) and the threshold level of 1800 would be achieved much earlier.

We note that the share of British Gas in the I&C market is now at a relatively low level, and so to some extent this tends to offset their high share of the residential market, as their position across the whole of the downstream market (all sectors together) is diluted accordingly.

In any event, it is hard to argue that the BBL itself will increase the degree of market concentration in the downstream sector, particularly in the residential sector.

#### 4.2 Qualitative analysis

It is widely recognised that quantitative analysis of competitive intensity, resulting in metrics such as the Concentration Ratio and HHI, do not tell the full story of competitive intensity. They may give indications of the degree of concentration in an industry or market, but they do not offer any insight into whether one firm's dominance

of a market works against the interests of consumers. In other words, a high CR or HHI indicates that one or more firms have a dominant market position, but it does not mean that this is translated into abusive pricing behaviour. Nor does it necessarily mean a lack of competition – as is indicated by the significant changes in market share which can occur in the UK I&C gas market if one or two players decide to compete aggressively for market share, described above.

For this reasons, Anti-Trust regulators such as the US Department of Justice (and its agents such as the Federal Trade Commission, the Federal Communications Commission and the Federal Energy Regulatory Commission), the European Commission Directorate-General for Competition, the UK Competition Authority and others tend to look at a broader range of indicators of competition rather than focussing only on market shares, Concentration Ratios and HHIs.

Pricing behaviour is of particular interest. Can one player in the market act as a “price leader”, meaning that when it increases its prices all the other players follow? Or can it engage in “predatory pricing”, that is, setting prices so low that some firms exit the market? Are there significant barriers to entry? What is the effect of a small but significant non-transitory price increase by a player? This is the so-called “SSNIP” test. What is the degree of vertical integration in the industry and does this cause concern? They also pay attention to issues such as the geographical scope of a market, the availability of substitute products or services, control of infrastructure not easily duplicated, buying power, privileged access to financial resources, and economies of scale and scope.

The European Commission has set out explicit criteria in Annex II of the framework Directive governing electronic communications networks and services, for example. (2002/C 165/03):

*“two or more undertakings can be found to be in a joint dominant position within the meaning of Article 14 if [...] they operate in a market, the structure of which is considered to be conducive to coordinated effects. [...] this is likely to be the case where a market satisfies a number of appropriate characteristics, in particular in terms of market concentration, transparency and other characteristics, [including]:*

- *Market maturity*
- *Stagnant demand growth*
- *Low elasticity of demand*
- *Homogenous product*
- *Similar cost structures*
- *Similar market shares*
- *Lack of technical innovation*
- *Absence of excess capacity*



- *High barriers to entry*
- *Lack of countervailing buying power*
- *Lack of potential competition*
- *Formal or informal links between undertakings*
- *Retaliatory mechanisms*
- *Lack of scope for price competition”*

This list is not exhaustive, merely an indication of the type of factors DG COMP seeks to take into account when considering mergers and acquisitions, for example.

Ofgem, in its April 2004 Review of Domestic Competition, refers to a number of criteria which it has considered in respect of the state of competition in the residential sector. These include the rate of switching and the number of customers which have switched since the market was opened, the level of prices, the market shares of the participants in the market, the “headroom” for new entrants and the number of new entrants.

There are academic critiques of the HHI and CR as indicators of market power, for example in the Centre on Regulation and Competition Working Paper 52 “Stochastic Market Structure: Concentration Measures and Motion Picture Antitrust” by Arthur de Vany and Cassey Lee Hong Kim:

*“The HHI has come under criticism. Schmalensee (1987) contends that the empirical link between concentration and collusion is weak. Furthermore, the HHI has not been proven to be superior to the CR4 in terms of predicting noncompetitive behaviour.”*

### **4.3 Other indicators of competitive intensity**

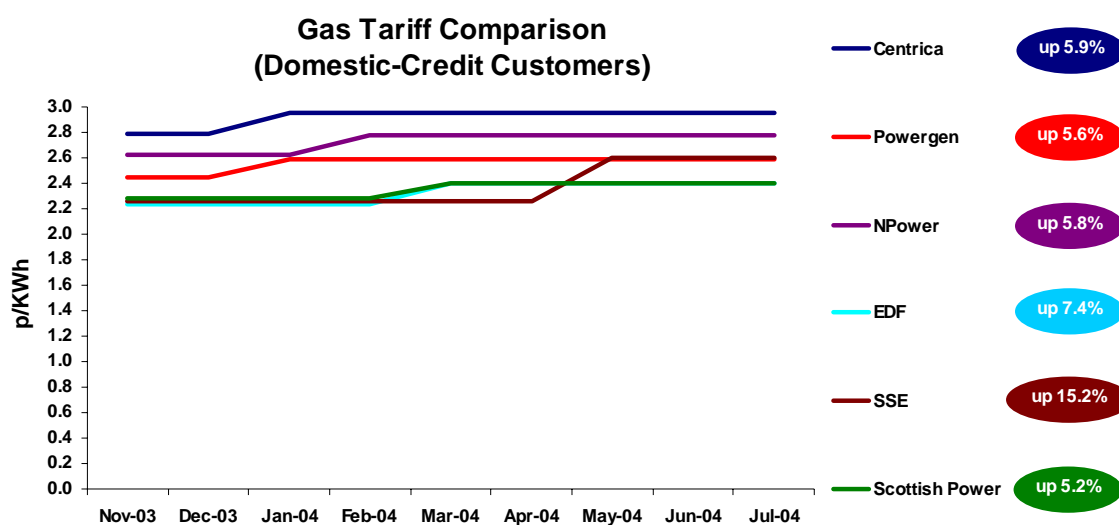
We have examined the current prices, and recent changes, in UK retail gas prices in order to establish whether or not British Gas could be accused of abusing a dominant market position in terms of setting retail prices.

Firstly, we note that the profitability of British Gas’s residential energy business (gas and electricity together) was approximately 2.6% in 2003, and has averaged just 2.4% between 2001 and 2003. This hardly suggests that British Gas is earning excess profits in the retail sector, nor that it is setting prices artificially low so as to discourage new entry.

Secondly, we have compared British Gas’s tariffs with those of other suppliers, as shown in Figure 3 below. This indicates that British Gas’s gas prices for residential customers are relatively high, but that their increase in tariffs is in line with those of the new entrants to the sector. All firms have seen the wholesale price of gas increase and

have adjusted their sales prices accordingly. Some firms delayed the increase by a few weeks, presumably to try to gain some additional customers (a tactic which appears to have been successful, from the point of view of attracting customers from British Gas), but have not absorbed the increase in wholesale prices within their profit margins, as these (like those of British Gas) are presumably too small to allow this possibility. One firm, Powergen, has announced a further increase (an average of 3.1%), to take effect from 6 September 2004.

**Figure 3: Comparison of Standard Gas Prices, by Competitor**



Source: Company Data, Press Releases, ukpower.co.uk and Arthur D Little Analysis

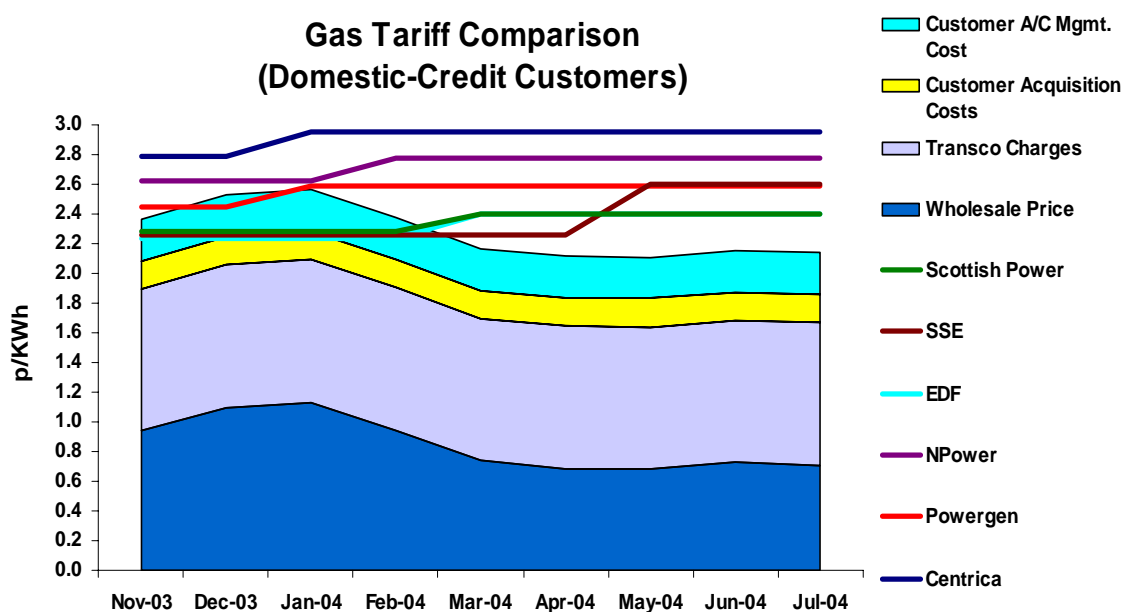
We have estimated whether or not there appears to be any “headroom” for new entrants in the residential sector, and conclude that recent price changes appear to have increased profit margins substantially, so that it ought to be attractive for new entry to occur, or at least, for competitors to British Gas to conduct further marketing activity to attract new customers.

Taking monthly Bacton prices (Heren Index) as indicative of wholesale prices, together with typical transportation charges for a residential consumer, and indicative costs of £100 for customer acquisition, amortised over three years, and £50 p.a. for customer account management, we can calculate indicative costs for serving a residential customer. These values are indicative figures based on ADL’s experience in the market – we believe that marketing companies vary significantly from one to another in these costs, but that our figures are “in the ballpark” of typical retailer experience. Figure 4 shows the sum of each of these cost elements (wholesale prices, Transco charges and

overheads) compared with the current prices charged by the main suppliers. The difference between the sum of the costs and the price indicates the profit margin.

This analysis suggests that several firms were achieving negative margins during the recent winter, but the transition from winter wholesale prices to Spring wholesale prices, together with increases in consumer prices, have restored positive profit margins. It suggests that there is sufficient “headroom” to attract new entrants and to maintain the interest of the current players in expanding their customer bases.

Figure 4: Headroom



Source: Company Data, Press Releases, ukpower.co.uk and Arthur D Little Analysis

We note that currently, UK wholesale gas prices are relatively high compared with previous years. While this might, in the short term, deter potential new entrants from seeking to establish themselves in the gas marketing business (unless they are also producers of gas) because they may feel that they cannot procure gas supplies cost-effectively, these high prices will tend to “choke-off” some gas demand growth, and should bring forth additional supplies.

An example of “choking-off” demand would include power generators reducing their use of gas and increasing their use of coal for producing electricity (though had not happened up to February 2004, according to data published by the DTI, perhaps because nuclear output is lower for technical reasons, and coal is less competitive than in the past due to high prices and emissions issues).

The effect of high prices on the supply side will also take some time to work through the system, but it is clear that there are many new projects being considered which will add to the availability of gas for UK consumers, of which BBL is one.

The combined effect of lower demand and higher supply can be expected to lead to a greater degree of competition in the market than would otherwise be the case. And the greater the amount of capacity that is built, the higher the prospect of competition. Spare capacity is always more likely to create a competitive environment than a situation of tight infrastructure availability.

This will be discussed further in the next section.

## 5. Security of Supply and other considerations

### 5.1 Security of supply for the UK

Security of supply has been a concern in recent years in energy markets in Europe and the United States in particular, following the well-publicised energy market problems in California in 2000/1, and electricity blackouts in 2003 in the UK, Scandinavia and Italy.

The UK's Department of Trade and Industry and Ofgem are sufficiently concerned about security of energy supply that they have established a Joint Energy Security of Supply forum, which meets twice a year and reports on security of supply in the UK.

The greater the diversity of energy supply options, the greater is the security of supply. The greater the redundancy in delivery routes, the greater the security of supply. The BBL therefore offers a considerable increase in security of gas supply for the UK market by providing an extra delivery route. If one assumes that in the absence of the BBL, the gas sales contracts which the BBL is intended to serve would be fulfilled by other delivery routes, then the BBL itself does not add to the reserve base which UK customers can draw upon. But if these contracts include Conditions Precedent which cause them to collapse if the BBL is not built, then the BBL has a double benefit in security of supply terms: a greater gas reserve base to draw upon and greater redundancy in delivery routes.

We can quantify the route diversity aspect by looking at entry capacity with and without the BBL (and other new infrastructure developments):

**Table 11: Proposed New Entry Capacity**

<b>Proposed New Infrastructure Projects (2010)</b>	<b>Entry Capacity</b>		<b>%</b>
Langeled	21	bcm	30%
Interconnector (incremental)	16	bcm	23%
BBL	12.5	bcm	18%
Isle of Grain LNG	4.4	bcm	6%
South Hook LNG	10.5	bcm	15%
Dragon LNG	6	bcm	8%

Source: Arthur D Little Analysis

This indicates that major import routes and LNG terminals will account for around 70 bcm pa of delivery capacity by 2010, on current construction plans, representing around

70% of forecast UK gas demand. The BBL, with a capacity of 15 bcm (at 35.17MJ/m<sup>3</sup>), represents around 12.5 bcm pa of delivery capacity when expressed in terms of UK-specification gas, or 18% of import capacity in 2010. If the BBL does not go ahead, the margin of surplus capacity would obviously fall.

In analysing UK gas imports we have assumed that:

- Langede enters the UK at Easington
- BBL and Interconnector enter the UK at Bacton
- LNG enters the UK in Wales or at the Isle of Grain

Each of the new import infrastructure projects plays a role in broadening and diversifying the resource base available to UK gas consumers. Security of supply is enhanced by each of the projects. A direct connection with the Netherlands, with its large indigenous gas reserves, is perhaps the most robust contributor to supply security – making it possible for the UK to access low technical cost, low reservoir risk, short haul gas reserves with a direct delivery route into the UK. If (or when) the Baltic gas pipeline is built, which would bring Russian gas to North Germany and the Netherlands, then the BBL will provide an obvious route for very substantial additional reserves of Russian gas to be accessed by UK customers.

## **5.2 Security of supply for the Netherlands**

The BBL also plays a role in contributing to security of supply for the Netherlands. Just as the BBL makes a direct connection to Dutch reserves possible for UK consumers, because the BBL offers commercial reverse flow capability it will offer a similar enhancement to security of supply for Dutch consumers. In effect, the BBL offers them the opportunity to access the UKCS reserves base, as well as offering an indirect route for Norwegian gas to be delivered (via swaps) to the Netherlands. Thus security of supply will be improved for the Dutch market.

Accordingly, we believe that the BBL has the potential to increase the level of competition in both the UK and the Netherlands because it adds to capacity, and if there is spare capacity the chance of it being used by new suppliers always exists, thus adding to competition in both markets.