

Transco



**Transportation
Ten Year
Statement
2002**



Disclaimer

This Statement is produced for the purpose of and in accordance with Transco's obligations in Standard Condition 25 of its Gas Transporters' Licence and Section O 4.1 of its Network Code in reliance on information supplied pursuant to Section O of its Network Code. Section O 1.3 of its Network Code applies to any estimate, forecast or other information contained in this Statement.

Transco's Ten Year Statement is not intended to have any legal force or to imply any legal obligations as regards capacity planning, future investment and the resulting capacity.

Foreword

The 2002 edition of the Transco Ten Year Statement is the first to be published by National Grid Transco and the seventh produced in accordance with Condition 25 of Transco's Gas Transporter Licence. This requires that the Ten Year Statement, published annually, shall provide a ten-year forecast of transportation system usage and likely system developments that can be used by companies, who are contemplating connecting to the Transco system or entering into transport arrangements, to identify and evaluate opportunities.

The Statement explains our volume forecasts, system reinforcement projects and investment plans. It has been published at the end of the 2002 planning process and follows on from the publication of Transco's "Transporting Britain's Energy – Development of Investment Scenarios" document in July 2002. The Statement forms the basis of our industry wide consultation process, Transporting Britain's Energy, due to restart in the new year, and is the first element of Transco's 2003 planning process.

Layout

The Statement contains essential information on actual volumes, the process for planning the development of the system, including supply and demand forecasts, system reinforcement projects and associated investment. The main body of the document provides an overview of the key issues, with all the detail contained in the appendices.

I hope you find the 2002 Ten Year Statement both interesting and informative. We always welcome a response from readers, which is why we have attached a feedback form.

I look forward to receiving your views on the Statement, including suggestions as to how it might be further improved.



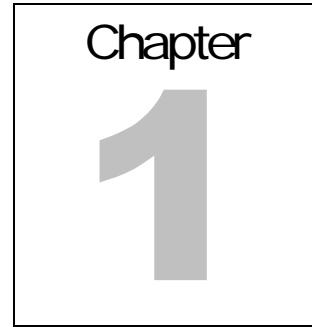
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Executive Summary

The purpose of this document is to set out Transco's assessment of the future demand and supply position for natural gas in Great Britain, and the consequences for investment in Transco's gas transmission network.

Context

Transco has developed the forecasts of supply and demand presented in this year's Ten Year Statement using data received during the course of its Transporting Britain's Energy (TBE) consultation process, supplemented by some commercially available information. This is consistent with the approach that Transco has taken in previous years. It had been hoped that the first long term entry capacity auctions would have been held in time to provide additional evidence of capacity requirements. At the time of writing, however, the first such auctions are planned for January 2003, with the second long term auctions expected in August 2003. Transco will take account of information received in the course of these auctions as part of the 2003 planning cycle.

Transco's new price control, effective from April 2002, has provided incentives both to respond to the signals it receives from the market by making long-term capacity rights available, and to drive investment decisions associated with the provision of these long-term capacity rights. In undertaking the long term planning process, however, Transco's key focus remains the fulfilment of its licence obligation to develop the system in order to provide capacity for 1 in 20 peak day conditions.

Demand & Supply Outlook

Transco's demand forecasts indicate a 16% increase in annual gas demand by 2011/12, with peak demand growing by 20% over the same timeframe. The bulk of this increase is expected in the middle part of the period. Growth in the early years is likely to be depressed as a result of a slow-down in the gas-fired power generation and manufacturing sectors, and reduced exports to Ireland and Europe. It should be noted that a significant level of uncertainty surrounds these projections, which results from a number of factors including economic conditions, price trends and Government policy.

To meet future levels of demand, new sources of supply will be required. These may be new UKCS developments, pipeline imports, or imported LNG. However, the exact sources and their National Transmission System (NTS) entry points remain uncertain. The UKCS itself is a mature gas province and although new discoveries are likely, their size and scale are forecast to decline. Depending on the extent of this decline, Great Britain's import dependency is forecast to be at least 45% by 2011/12.

This supply/demand picture suggests the potential for a peak supply deficit in 2005/6 unless certain key upstream infrastructure is delivered (most notably Interconnector compression facilities at Zeebrugge). Even under average winter conditions, without this new upstream infrastructure interruptible consumers could face very long periods of shipper-initiated interruption.

NTS Investment Implications

This year, rather than having a central case, Transco has used two scenarios to assess the range of impacts on the NTS of potential new supplies. These scenarios diverge from 2006/7 onwards. The two scenarios are based around delivery of all new imports to either St Fergus or Bacton. They provide Transco with an outer envelope for investment planning purposes, and allow other scenarios to be considered as required. Depending on the supply scenario, Transco's network analysis indicates that NTS investment in the order of £1.06bn-£1.55bn will be required over the life of the long-term plan.

In addition to the uncertainty regarding the location of new supplies, physically undertaking investment on the NTS is becoming increasingly challenging as a result of changes to environmental legislation and mounting pressure from landowners for increased compensation payments. With the UK's growing dependence on imports and the progressive tightening of supply, the planning of the transmission infrastructure is moving into an inherently more uncertain era in which lead times are likely to become a more critical factor.

Next Steps

The production of this Ten Year Statement is the final milestone in the 2002 planning cycle. However, consistent with the approach adopted in previous years, Transco proposes to use the forecasts contained in this Ten Year Statement as the starting point for next year's consultation. In addition, targeted questionnaires will be circulated to a range of industry players requesting supply and demand forecast data shortly after publication of this document.

Document Scope

2.1 Overview of “Transporting Britain’s Energy” Process

The production of the Ten Year Statement is essentially the conclusion to the planning process for the current planning cycle. As in previous years there are areas of remaining uncertainty, which Transco will address through the impending Transporting Britain’s Energy (TBE) consultation that will initiate the start of the planning process for 2003. Transco proposes to use the forecasts contained in this 2002 Ten Year Statement as the starting point for this consultation. Shortly after the publication of this document, questionnaires will be circulated to a range of industry players (producers, shippers, storage operators, terminal operators, transporters and consumers) requesting supply and demand forecast data and comments on Transco’s underlying assumptions.

The proposed programme for this year’s plan is as follows:

- Publish 2002 Ten Year Statement – December 2002
- Circulate 2003 questionnaires – December 2002
- Receive responses to questionnaires – February 2003
- Hold consultation meetings – February 2003
- Provide feedback on responses received, including commentary on the January 2003 Long Term System Entry Capacity (LTSEC) auction conclusions, via the Internet – ongoing from early March 2003
- Produce outline investment proposals and publish industry consultation on investment options – June 2003
- Publish 2003 Ten Year Statement (including an assessment of the August 2003 LTSEC auctions) – December 2003

2.2 Structure of Document

The Statement has been structured so that the main body of the document, chapters 3 to 6, set out the key drivers and uncertainties affecting demand, supply and the provision of capacity on Transco's system. Chapters 3 and 4, respectively, provide an overview of Transco's latest demand and supply forecasts, highlighting the expected growth in the import dependency of the UK. Chapter 5 outlines Transco's plans for investment in the National Transmission System (NTS) under the two supply scenarios discussed in Chapter 4. Currently approved NTS projects and those under consideration for construction are also presented here. Chapter 6 presents the Local Transmission System (LTS) approved projects along with the total market connection forecasts for the next 5 years.

The Appendices provide details of the methodologies used to produce the demand and supply forecasts, the latest demand and supply scenarios themselves, actual gas flow data, system maps, connection specifications and GT Licence amendments. In particular, given the significance of the new Long Term System Entry Capacity auctions (planned for introduction in January 2003), a detailed description of the way in which they will operate is provided in appendix 6. The final sections of the document contain a glossary, conversion matrix and feedback form.



Demand

3.1 Overview

This chapter explains the main drivers behind the growth in the demand for gas over the last twenty five years before examining the key drivers that underpin Transco's latest demand forecasts. An overview of these forecasts is provided in section 3.3, together with an explanation of the main uncertainties surrounding them, with the forecasts being presented in greater detail in Appendix 2.

The last ten years have seen dramatic growth in the demand for gas within the UK with growth rates reaching those not seen since the introduction of natural gas in the late 1960s. The main drivers behind this growth have been falling gas prices, brought about by a supply surplus and increased gas on gas competition, and the development of gas fired power generation. However, growth rates into the future are unlikely to continue at this level as markets near saturation and gas prices increase due to greater linkage to European prices and a projected supply shortfall. This view is supported by recent evidence, which shows that increases in industrial gas prices during 2001 have reduced gas demand within the traditional industrial markets, particularly the interruptible sector.

3.2 Recent Energy Trends

This section endeavours to put into historical context the position of gas within the energy market and to identify the main market drivers supporting recent growth in gas demand.

3.2.1 Energy's Position in the Economy

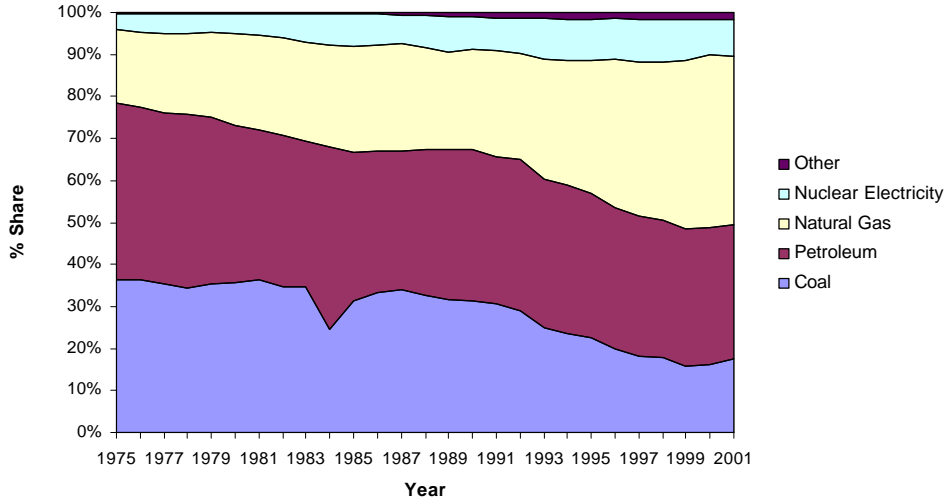
The energy industry currently accounts for only 3½% of GDP compared to around twice that amount ten years ago. This fall in percentage share is attributed to greater productivity, the decline in manufacturing and more efficient use of fuel.

3.2.2 Energy Market

Total primary energy consumption in the UK has remained fairly static over the past twenty five years, growing at a rate of ½% per annum. As Figure 3.2A illustrates, the most significant change during this period has been one of fuel substitution and sectoral change. The gas share of UK primary energy consumption (before conversion

and distribution losses) has increased significantly from 17% in 1975 to around 40% at present. If transportation related usage is excluded from primary energy consumption, the gas share becomes 52%.

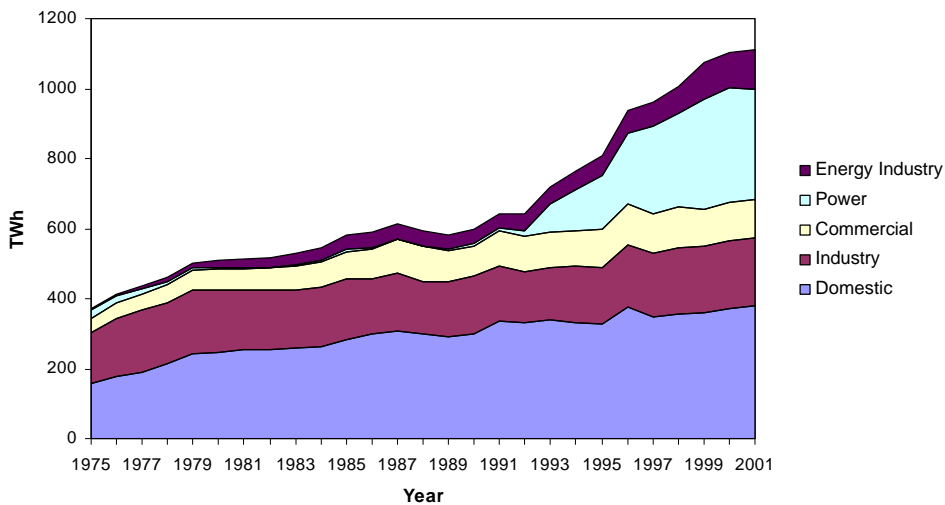
FIGURE 3.2A – Inland Consumption of Primary Fuels
 Source – DTI, Digest of UK Energy Statistics (DUKES) 2002



3.2.3 Historical Gas Demand Growth

To obtain a better understanding of why the gas share of the energy market has risen so dramatically in recent years, it is important to consider the development of a number of different market sectors. Figure 3.2B illustrates how each of the main market sectors has developed over the last 25 years. The spike seen in 1996 was due to cold weather that increased demand for space heating load predominately in the domestic sector.

FIGURE 3.2B – Gas Consumption by Sector
 Source – DTI, Digest of UK Energy Statistics (DUKES) 2002



Individual sectors are discussed in greater detail in the following sections.

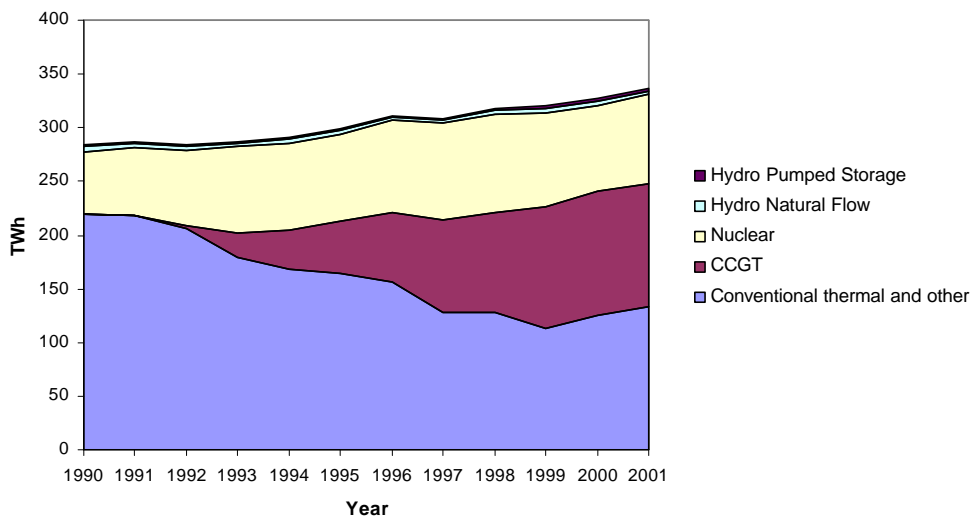
3.2.3.1 Power Generation

The highest growth rates can be found in the relatively new market of power generation, where the number of large power stations connected to Transco's NTS has grown from 1 in 1991 to 32 in 2001. This has resulted in the gas share of generation growing to 37%. However, this share is 2 percentage points lower than in 2000 reflecting lower consumption through higher gas prices, cheap imported coal and greater availability of nuclear plants. Consequently, coal's share increased to 34% from 31% in 2000 with nuclear increasing slightly to 22%. Figure 3.2C illustrates the generation mix of power stations operated by major electricity producers in the UK.

In addition to the growth in larger scale power generation, i.e. Combined Cycle Gas Turbine (CCGT) stations, there has been strong growth in the smaller scale embedded generation and Combined Heat & Power (CHP). However, the level of electricity generated and exported from these smaller generators fell by 20% during 2001.

FIGURE 3.2C – Electricity Generated by Major Power Producers in the UK

Source – DTI, Digest of UK Energy Statistics (DUKES) 2002

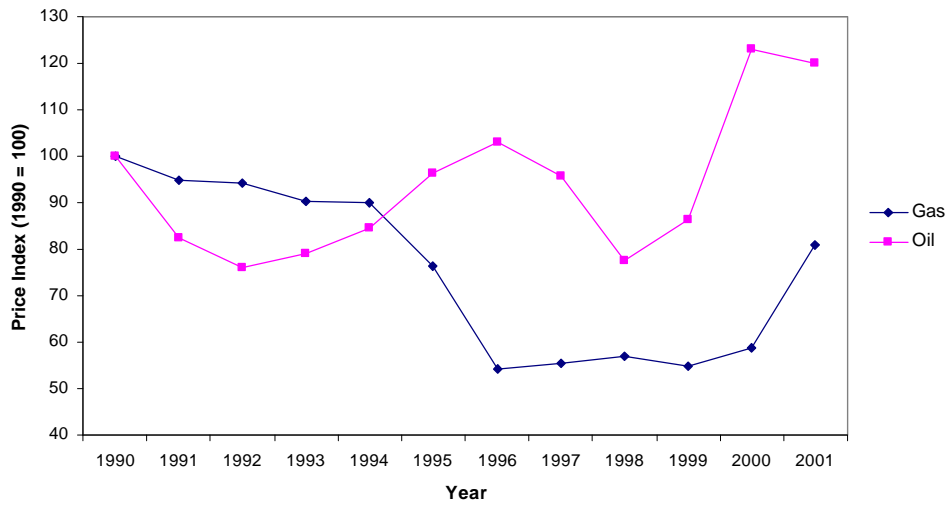


3.2.3.2 Industrial and Commercial

Historically, growth in the industrial and commercial sectors has been driven by the economic climate and fuel substitution brought about by the competitive position of gas in relation to other fuels, most notably oil. The level of fuel substitution was influenced by various environmental initiatives. For instance, in the chemical industry, high sulphur content Heavy Fuel Oil (HFO) was in many cases replaced by gas. Coupled with this, demand was further enhanced through the implementation of various development schemes that sought to encourage new industry and investment into economically deprived areas.

Figure 3.2D provides a comparison of how the price of gas to industrial consumers over the last ten years has changed in relationship to changes in the price of oil.

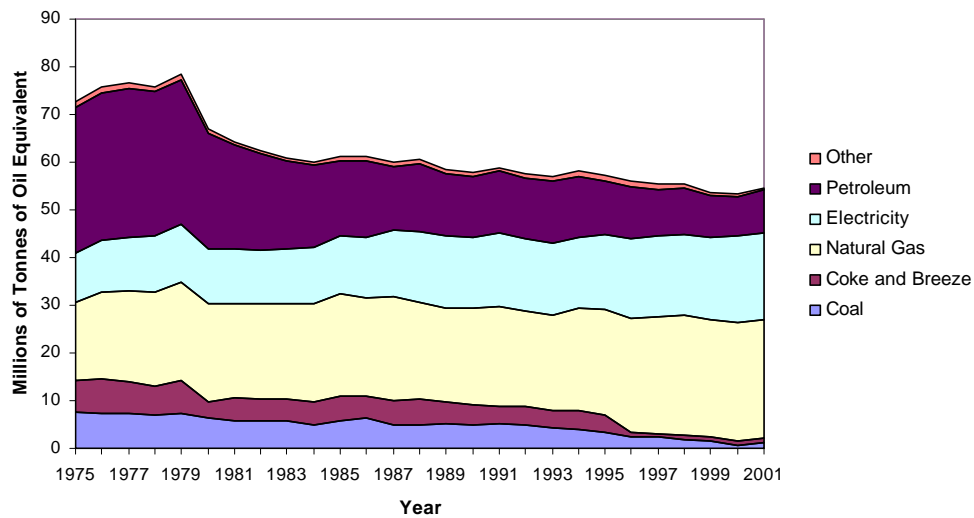
FIGURE 3.2D - Industrial Price Indices
 Source - DTI, Digest of UK Energy Statistics (DUKES) 2002



During the mid to late 1990s, a favourable economic climate and highly competitive gas prices, brought about by fierce gas on gas competition and rising oil prices, supported strong growth in the industrial and commercial sectors. In 2001, however, gas prices rose by as much as 37% in the industrial sector as a result, in part, of the indexation to UK spot prices (which have in turn been influenced by European gas prices). This gas price increase resulted in a reduction in gas demand to the industrial sector during 2001.

Figure 3.2E illustrates, by fuel type, industrial energy consumption over the last thirty years which highlights the growing share of gas in the energy market for the reasons mentioned above.

FIGURE 3.2E - Industrial & Commercial Energy Consumption
 Source - DTI, Digest of UK Energy Statistics (DUKES) 2002



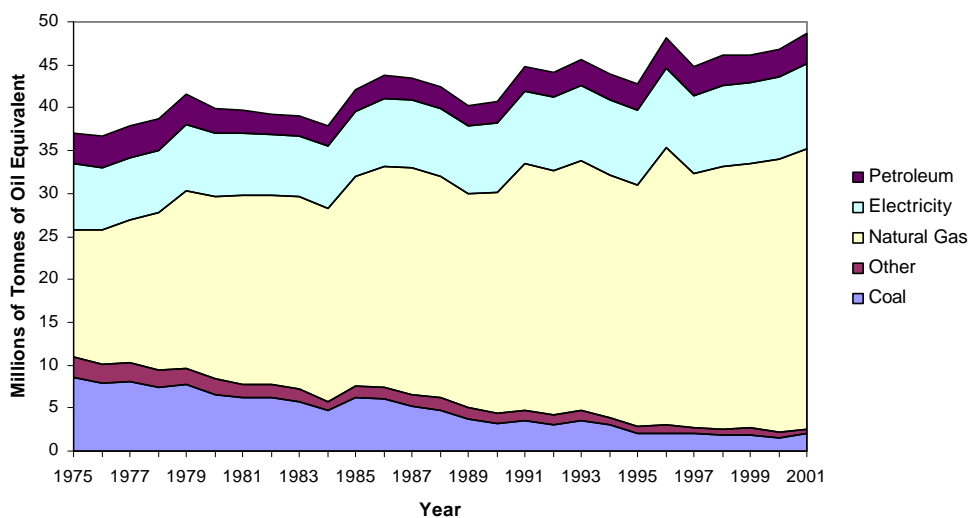


3.2.3.3 Domestic

The underlying growth rate of gas consumption in this sector has fallen to around 2 percentage points in recent years as a result of the near saturation of the domestic energy market. Over 85% of all homes in the UK are centrally heated and gas-fired installations account for more than 75% of these systems (having risen from a share of only 45% in 1975).

Figure 3.2F illustrates the development of domestic energy consumption and fuel mix over the last 25 years.

FIGURE 3.2F – Domestic Energy Consumption
Source – DTI, Digest of UK Energy Statistics (DUKES) 2002



3.2.3.4 Exports

The consumption data presented in Figures 3.2B, 3.2E and 3.2F excludes gas that has passed through Transco’s network prior to being exported to Ireland or mainland Europe. Exports to Ireland commenced in 1995 and to Continental Europe in 1998. Both markets have grown rapidly and together accounted for a demand of 146 TWh in 2001, 13% of total throughput.

3.3 Demand Forecasts - Energy Prices, Drivers and Market Uncertainties

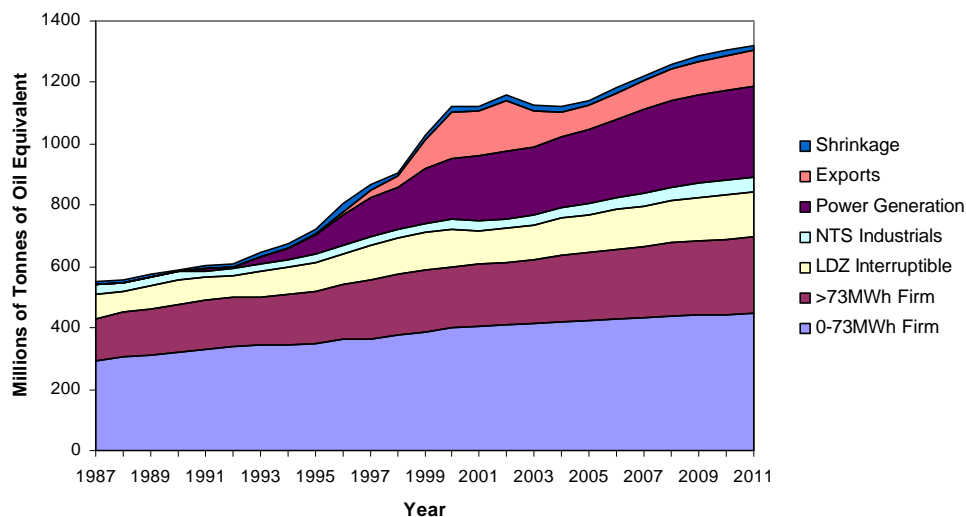
Transco’s demand forecasts are based upon an extensive range of planning assumptions derived from Transco’s own market observation and data collected from its consultation process, Transporting Britain’s Energy. The consultation involves a cross-section of market participants, including consumers and consumer groups, and provides Transco with important feedback on the impact of market developments, such as the Climate Change Levy, and data relating to the consumption of new and existing loads. The management of requests for new connections to Transco’s system provides another important source of data.

This section provides an outline of the latest gas demand forecasts and key underlying assumptions. As in previous years, there remains significant uncertainty around the main drivers of demand growth and the impact that such drivers will have upon the development of the UK energy industry. However, for ease of clarity, only one planning case has been presented for demand.

Figure 3.3A illustrates both historical consumption and the latest forecast of demand on Transco’s system. With respect to this data, it should be noted that:

- Annual demands are corrected to a 35-year weather trend condition.
- Exports include interconnector flows to Ireland and Continental Europe.
- NTS Power Generation includes all large-scale gas-fired plants connected to the NTS, but excludes the consumption of stations embedded within Transco’s networks and those supplied by third party pipelines.

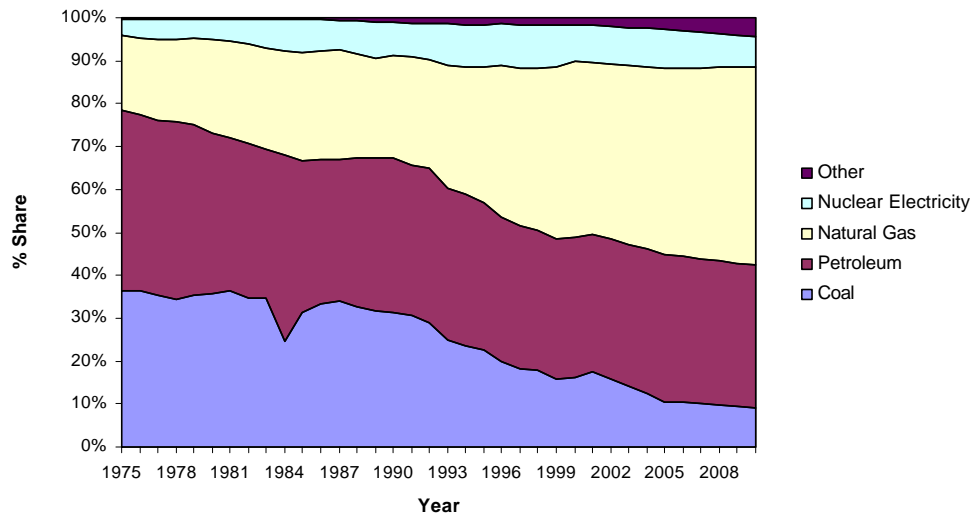
FIGURE 3.3A – Historical and Forecast Annual Throughput



Appendix A2.1 provides a more detailed breakdown of the latest annual and peak day demand forecasts. The forecasts indicate a 16% increase in annual gas demand by 2011/12, with peak day demand growing by 20% over the same timeframe. The higher growth in peak demand is attributable to new firm loads such as CCGTs. It should be noted that a significant level of uncertainty surrounds these projections, which results from a number of factors including economic conditions, price trends and Government policy.

In Figure 3.3B, Transco’s forecasts have been used as the basis of a projection of UK consumption of primary fuels. Over the course of the forecast, the gas share of consumption increases from 40% to 46%. This increase is largely at the expense of coal and ensues from the assumed closure of a significant volume of coal-fired power generation capacity.

FIGURE 3.3B – Projected Inland Consumption of Primary Fuels



3.3.1 Energy Prices

The following points summarise the assumptions that Transco has made in relation to key price-related influences on gas demand.

- Beach gas prices are expected to rise in real terms over the forecast period, leading to a partial erosion of the competitive advantage of gas over other fuels, particularly in the early years. This movement in price will be as a result of the increasingly tight supply position and rising oil prices.
- Prompt gas prices continue to be governed by prices at the beach although, due to the tightening supply situation, increased volatility may be expected around periods of high demand.
- The oil price remains fairly static in the early years of the forecast before rising slowly in the mid to long-term. Over the period, the forecast assumes that oil, in real terms, remains around the mid point of OPEC's current preferred band of between \$22 and \$28/barrel. The price of oil-derived products, such as fuel oil, remains closely indexed to the price of crude.
- Wholesale electricity prices will be subject to a degree of upward movement over the forecasts period from the levels experienced during the summer of 2002 of around £16/MWh. The economics of new CCGT developments do not look favourable until wholesale prices rise to a level of around £24/MWh in 2005/6.
- Coal prices experience very little change and in real terms are subject to some reduction over the forecast period.

The price of gas, and its relationship with the price of competing fuel sources, has a fundamental impact on demand. The tightening supply situation and the linkage that

exists with continental gas markets has had a significant impact on British gas prices with trading across the European Interconnector introducing an oil price influence to the market. Given the impending potential supply deficit, the development of new supplies, in terms of both source and method of delivery, is perhaps the most notable gas price uncertainty at a time when the price of oil is subject to upward pressure resulting from the escalation of tensions in the Middle East.

Other significant price-related uncertainties relate to the wholesale electricity price and energy taxation, such as the Climate Change Levy (CCL) with its associated exemptions and climate change agreements.

3.3.2 Market Drivers

In relation to the demands placed upon Transco's distribution networks, the main assumptions underpinning the latest projections of volume can be outlined as follows:

- Economic growth rates average around 2.6% per annum over the period with the rate of inflation remaining steady.
- Despite the weakening of its competitive position, no significant fuel switching (away from gas) occurs.
- The Climate Change Levy has some impact on demand growth in non-domestic markets with efficiency gains leading to a small (around 3%) reduction in sector demand by 2010.
- The combined influence of weaker wholesale electricity prices, increased fuel costs and the operation of current trading arrangements, result in the slippage of many Combined Heat and Power (CHP) and small-scale embedded generation developments. The 2002 forecast assumes that installed CHP capacity will reach about 7.5GWe by 2010. Although well below the Government's target, this projection is in line with last year's forecast. Gas-fired installations are expected to account for a large majority of new-build, accounting for approximately 80% of the total market by the end of the decade.
- Socio-demographic changes influence growth in the new housing market causing the number of property completions to increase slowly over the forecast period, from 163,000 in 2001 to 181,000 in 2010. Across the domestic sector, average consumption remains stable with improvements in insulation and appliance efficiency offset by an increased comfort factor.

CHP has the potential to be one of the most significant drivers of demand growth on local systems. In the case of "good-quality" CHP installations, where input fuel is exempt from the CCL, there is a quantifiable incentive for new developments, although its effectiveness will depend upon a number of factors including the perceived risk of market participation. A further incentive will be introduced if the Government is able to implement its proposed exemption (of CCL) of all electricity output from quality approved sites. Relative fuel and power price movements have had an adverse effect on the economics of many potential projects and would-be

developers will require significant incentives (in addition to those already available) if the Government's 10GWe capacity target is to be achieved by 2010.

New markets, such as domestic CHP (DCHP), could lead to an upturn in CHP capacity growth and improve household energy efficiency. The adoption of such technology may not lead to a significant change in domestic gas demand, although demand profiles may change. Equally DCHP appliances would have to be installed in very significant quantities in order to have a material impact on the load placed upon large-scale generating plants and local power networks.

Recent experiences have highlighted how sensitive industrial gas-demand can be to periods of recession, emphasising the potential impact that any prolonged variation away from assumed economic growth rates will have on future demand. The degree to which demand within each LDZ would be influenced by such a change is largely dependent on the concentration and make up of local industry.

In addition to satisfying the requirements of the distribution networks, the National Transmission System (NTS) supplies gas to consumers in three broad categories:

- Power Generation (including large-scale CHP developments).
- Industrial Consumers.
- Exports.

3.3.2.1 Power Generation (NTS)

As previously noted, present wholesale electricity prices are too low to support the cost of new-build CCGT plants and are expected to remain so for some time. The current forecast assumes that the development of most new plants will be subject to slippage until the wholesale price recovers to approximately £24/MWh. The current view of wholesale prices suggests that this level will not be reached until 2005/6. A limited number of loads with strong site-specific drivers are expected to progress in the interim period.

In the longer term, power generation demand will be supported by tighter environmental legislation, impacting upon conventional coal-fired plants, and the closure of all nuclear Magnox stations by 2010.

Over the forecast period, the amount of electricity generated by gas-fired stations is projected to increase from 40% to 51% of total power output.

The economics of gas-fired power generation, and those associated with CHP installations, are sensitive to price movements in both gas and electricity markets. Going forward, the power generation sector may also be influenced by the development of energy (electricity and gas) trading and transmission arrangements. The generation fuel-mix will also shape future gas demand; the fate of nuclear generation, with the planned closure of Magnox facilities together with other recent events in the sector, and the progression of renewable energy projects are key factors in this respect.

The price motivated mothballing of generation capacity and changes of plant ownership could lead to lasting changes in the make-up of the generation base.

3.3.2.2 Industrial Consumers (NTS)

The NTS industrial demand consists of feedstock, process and smaller-scale CHP loads. As already mentioned, there has been a downturn in output from existing CHP loads which together with a perceived market risk for new CHP loads has resulted in demand growth slipping further within the forecasts.

Changes in the underlying structure and organisation of certain industries have given rise to some significant variations in this sector. For instance a rationalisation of a single site led to the loss of some 6TWh of demand in 2001.

The impact and extent of environmental taxation and legislation, such as the Large Combustion Plant Directive (applicable to combustion plants with a thermal output of greater than 50 MW), lends further uncertainty to any demand forecasts.

3.3.2.3 Exports

The export market is made up of the demands of the Irish and European Interconnectors. The Irish market is driven by factors not dissimilar to those affecting Transco's distribution networks, whilst the European Interconnector load is largely dependent on daily price differentials between the UK and Europe.

It is expected that the flow of gas to Continental Europe will remain seasonal, with the UK becoming a net importer by 2005. For the purposes of this forecast, no by-pass of the NTS by SEAL (Shearwater Elgin Area Line) gas is assumed at Bacton.

Demand for gas in Ireland is expected to grow strongly over the forecast period, increasing the market's import requirement, although the development of the Corrib field will tend to reduce the demand placed upon Transco's system in the mid-term. A significant proportion of growth is attributed to new gas-fired power generation capacity and expanding industrial markets. The forecast assumes no significant indigenous supply developments after Corrib.

As Irish demand upon Transco's system is so heavily influenced by the development of gas-fired power generation capacity, any factors influencing existing demands in the generating sector or the scale and timing of new developments will impinge on the accuracy of the forecast. The performance of Ireland's economy, impressive in recent years, and the degree to which it will be dampened by the global slowdown is a further uncertainty.



3.4 Impact of Global Warming

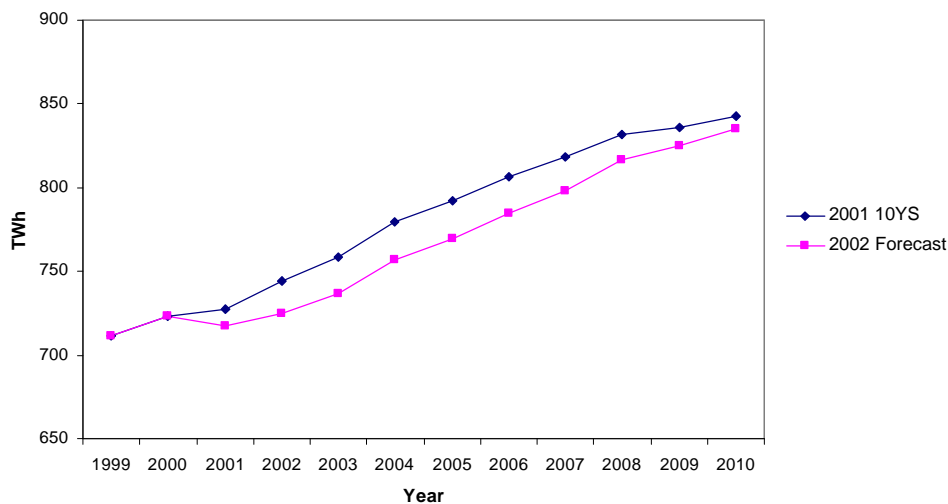
In 2000, Transco commissioned an independent study to investigate the impact of “global warming” on long term average weather conditions. The subsequent report concluded that there is evidence to support a potential reduction in LDZ demand, based on a long term average, of up to 5.6%. However, the overall recommendation was for an adjustment of 3.5% based on the trend over the last 35 years and, consequently, this 3.5% correction is incorporated within the LDZ annual demand forecasts shown in Appendix 2. The rate of warming implied by this trend is consistent with that reported by climate change experts.

With regard to peak demand conditions, independent experts have in the past been unable to conclude to what extent extremes of weather will be affected by “global warming”. Consequently, Transco considers it prudent to make no adjustment to its 1 in 20 peak day demand forecast at this stage. This approach is supported by the fact that the coldest day over the last 73 years occurred only 15 years ago.

3.5 Forecast Comparison

This section compares the demand forecasts detailed in Appendix 2 with those published in the 2001 Ten Year Statements. Figure 3.5A shows that forecast growth rates over the forecast period, for LDZ markets, are comparable to those predicted in last year’s forecast, however, initially there is a degree of slippage due to the downturn in demand caused by higher gas prices particularly in the industrial sector, recession in manufacturing and the reduced incentives for power generation.

FIGURE 3.5A – Comparison of LDZ Total Demand Forecasts



NOTE: 2001 10YS & 2002 10YS relate to the forecasts published in the 2001 & 2002 Ten Year Statements respectively. All demand data is shown assuming a weather condition based on the last 35 years.

Whilst Figure 3.5A illustrates the relative positions of total LDZ demand, to understand the likely impact on capacity requirements interruptible demand needs to be excluded. Figure 3.5B compares annual firm demand and shows that, in comparison to the 2001 forecast, the latest forecast is marginally lower in the first few years before falling in line by 2007/8. Hence, by the end of the forecast period, the level of LDZ capacity planned will be similar to last year's plan.

FIGURE 3.5B – Comparison of LDZ Firm Demand Forecasts

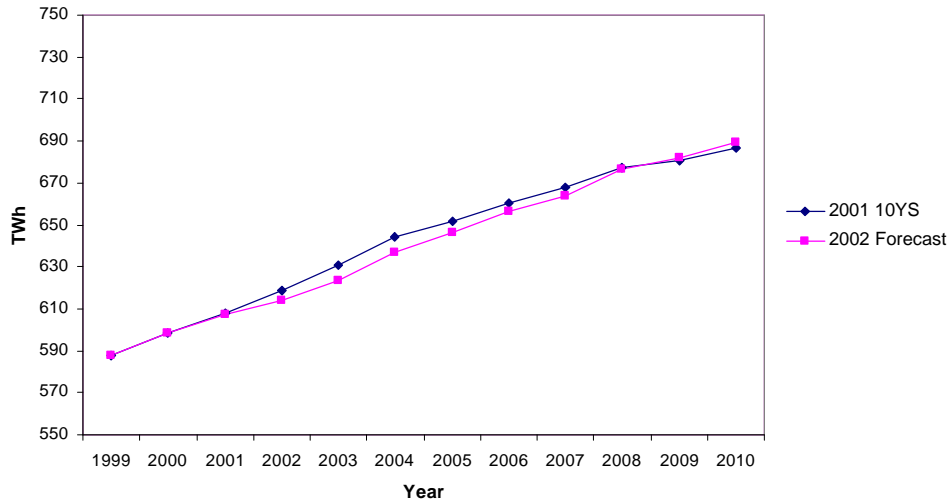
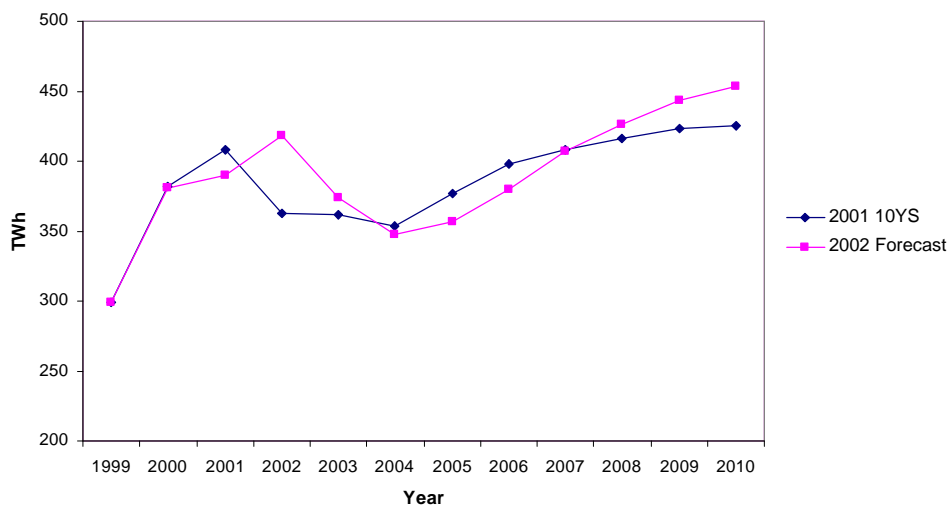


Figure 3.5C compares the forecasts of flows to NTS supplied loads. The projected initial reduction in demand is because of lower European exports due to the price differential between the UK and Europe during the summer and the greater need for imports as the UKCS depletes. Differences in the demand profiles between the two statements reflect changes in the assumptions surrounding the timing of production from the Corrib field and the by-passing of Transco's system at Bacton.

FIGURE 3.5C – Comparison of NTS Demand Forecasts



Supply

4.1 Overview

Transco's supply forecasts continue to be built from information received through a combination of its Transporting Britain's Energy (TBE) consultation process and commercial sources. It is anticipated that long-term entry capacity auctions will provide an additional source of information; the first of these is due to take place in January 2003. The main purpose of Transco's forecasts is to derive supply/demand scenarios that can be used to identify and assess potential NTS investments. For this reason, Transco may include some supply sources within its forecasts, even though it is far from certain that these sources will materialise. Transco's forecasts should therefore not be interpreted as a central view, but, rather, a prudent basis for investment scenario planning. Ultimately, investments will only be made where there is genuine evidence that they are required. This will be determined through a combination of long-term auction signals and consultation with industry stakeholders.

Transco's supply forecasts are built up through a combination of the following:

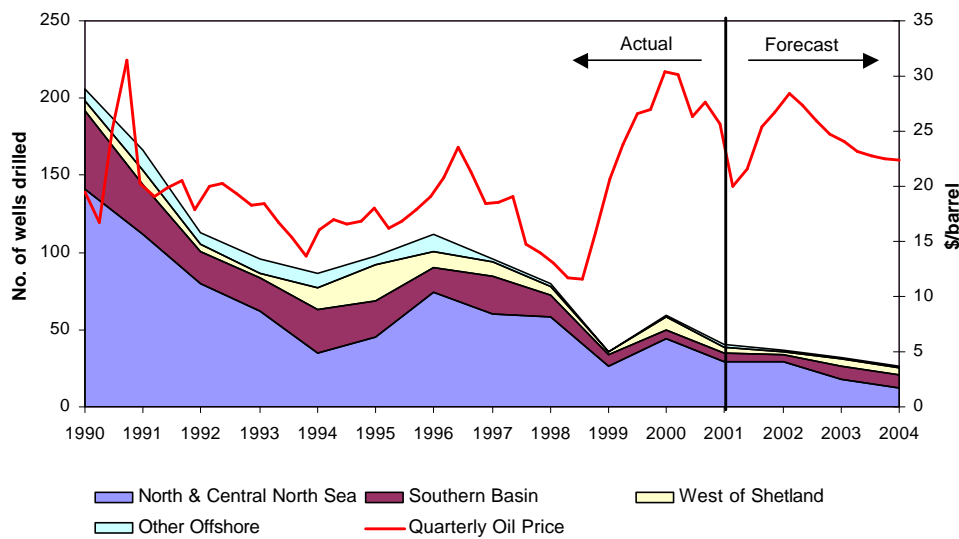
- Expected UKCS supplies from fields presently in production, under development or appraisal.
- Imports through existing links (from Norway through Vesterled, and from continental Europe through the Interconnector).
- An assumed upside in UKCS developments.
- New imports, to the extent required to meet any remaining deficit.

This chapter covers the potential make-up of future supplies to the UK, looking at the rate of decline of the UK Continental Shelf, the need for further imports and where these imports may come from. Particular reference is made to the potential for imports from Norway and of LNG. Supply scenarios are described, which have been developed by Transco in order to facilitate the production of investment cases. Appendix 2 presents the supply forecasts in detail, while Appendix 3 presents actual supply information from the 2001/2 gas supply year.

4.2 UKCS Supplies

The UK supply/demand position continues to be dominated by the forecast decline in gas production from the UKCS and the resultant growing dependence on imports. The decline of the UKCS is expected despite sustained high prices for oil, and to a lesser extent gas, over the last two years. The DTI's 2002 statistics for actual exploration and appraisal (E&A) wells drilled and intentions to drill continues to show a downward trend as shown in Figure 4.2A. Whilst the drilling of E&A wells does not reflect production in the year drilled, they are indicative of the potential of the UKCS to sustain production in the longer term.

FIGURE 4.2A – UKCS Exploration and Appraisal Drilling Activity
Source – DTI and IPE

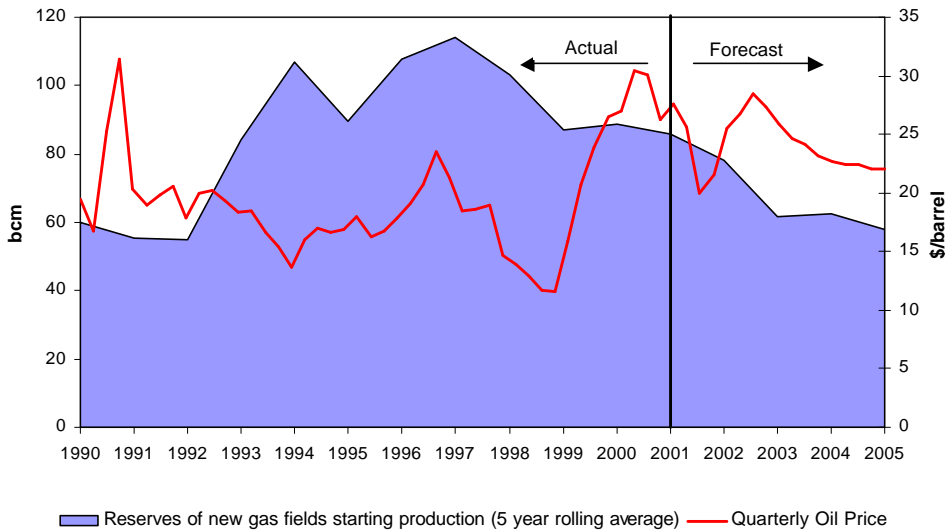


The DTI also reports that production investment (i.e. other than on E&A) through to 2005 could remain close to existing levels. Hence whilst a longer-term production decline from the UKCS appears inevitable, proposed developments are still scheduled to start production through to 2005. Figure 4.2B shows the total aggregated reserves brought on stream since 1990. For the UK to remain self-sufficient in gas over a sustained period of time, the aggregated reserves of fields coming on stream each year would have to match the annual level of demand. Any shortfall would ultimately need to be met by imports. With annual demands now greater than 100 bcm/annum, Figure 4.2B shows that since 1998 new UKCS developments have been insufficient to match longer-term demand.

Transco has extrapolated the recent trend of UKCS developments in order to estimate future levels of UKCS production, over and above those presently in production, development and appraisal phases. This so-called 'UKCS upside' is shown in Transco's annual supply forecast in Section 4.3. Given the evidence of UKCS erosion implicit in Figure 4.2A, Transco's UKCS upside assumption is perhaps a somewhat bullish view, however it is well within the range of other reported analyses. (For

network analysis purposes, the location of the UK upside supplies is assumed to be consistent with the landing points of the fields upon which the trend analysis is based).

FIGURE 4.2B – UKCS Development Trends
 Source - Deloitte & Touche (Petroview), IPE & Transco Forecast



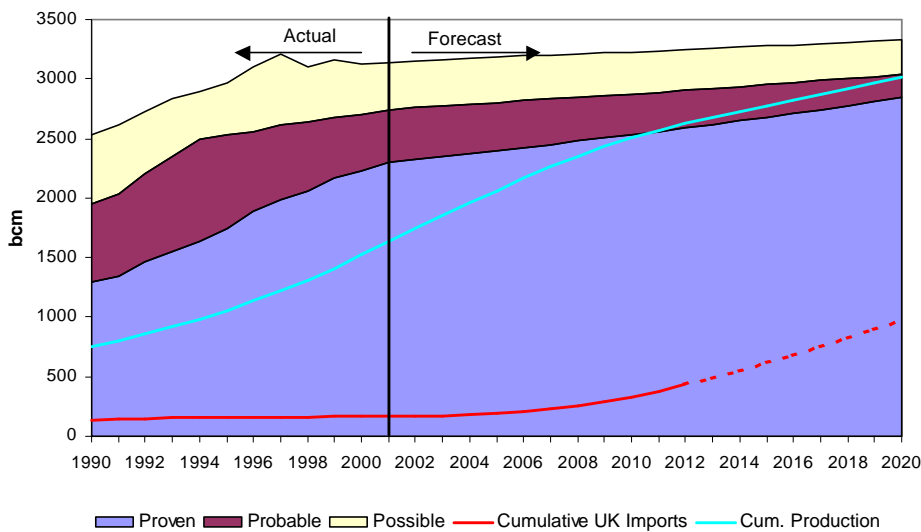
In their 2001 annual statistics, the DTI continues to report UKCS gas reserves in terms of expectation of being available for future sale. Whilst proven reserves (which include cumulative production) have increased again by 65 bcm from those reported in 2000, probable and possible reserves have again both declined by 50 bcm, resulting in a net increase of just 15 bcm compared to annual production of 107 bcm. The resultant levelling off of total reserves since 1996 (shown in Fig 4.2C) highlights the maturity of the UKCS and the possible effects of reduced E&A activity.

Transco has developed a longer-term UKCS supply forecasting capability to assess projections of reserves and future UKCS production. Fig 4.2C shows reported DTI reserves since 1990 and a Transco scenario based on a mid case increase in reserve projections. The analysis suggests, that by 2020, 92% of UKCS reserves could have been produced.



FIGURE 4.2C – UKCS Production Scenario

Source - DTI, NPD (Norwegian Petroleum Directorate), ENI & Transco Forecast



4.3 Imported Supplies

Notwithstanding known UKCS developments and the potential capability of existing importation routes (from the Norwegian offshore gas infrastructure through Vesterled and from continental Europe through an enhanced Interconnector), the UK has a need for further imports to meet forecast demand. The key issue here is one of access to plentiful supplies of gas that exist around the world, rather than a shortage of gas per se. This depends upon the timely construction of upstream / continental infrastructure and the completion of associated commercial arrangements.

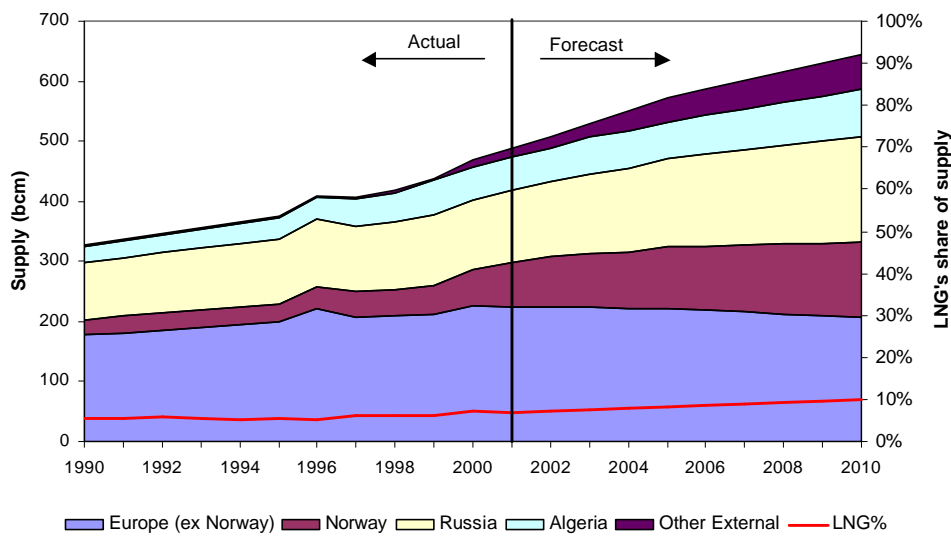
The landfall of new imports is far from certain. Possible importation routes include new interconnectors with the continent, further connections with the Norwegian offshore gas infrastructure (through new or existing pipelines), and LNG imports. In total, Transco forecasts that imported gas will be required to meet one third of all supplies by 2010 and approximately 45% by 2011/12. This forecast is arguably optimistic (i.e. the import dependency may well be higher) but is comfortably within the range of cases recently presented by other analysts.

4.3.1 Continental Supplies

With the exception of Norwegian supplies, there is a general decline in European gas production from indigenous sources. This trend is shown in Figure 4.3A, which indicates that Europe will become increasingly reliant on imported gas from three key sources; Russia, Norway and North Africa. In addition to pipeline gas, LNG from North Africa and other sources (most notably the Atlantic Basin and the Middle East) will increasingly meet European import needs.



FIGURE 4.3A – European Supply Trends
 Source - Global Insight Company, ENI, Energy Markets



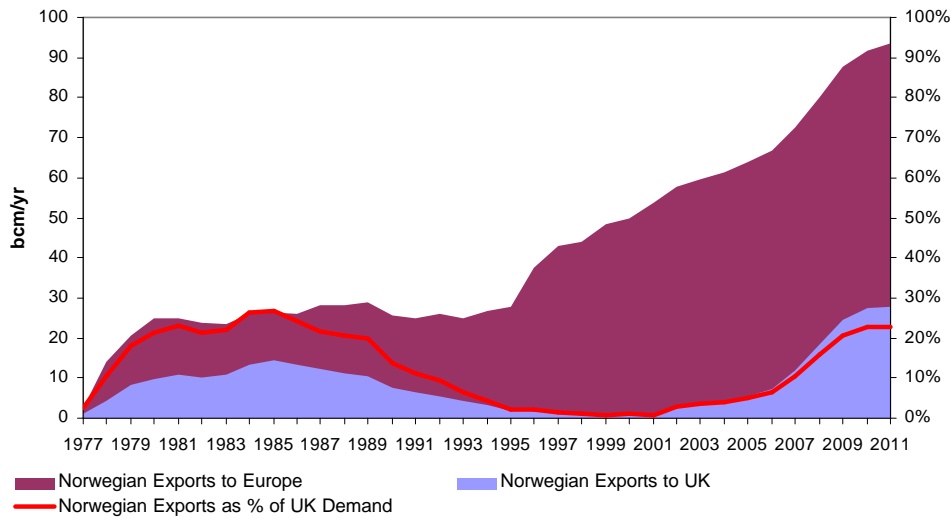
4.3.2 New Norwegian Supplies

During the 1980s Norwegian imports through Frigg to St Fergus accounted for over 25% of UK gas demand, however since then (until recently) they have declined. The UK currently imports approximately 3% of its gas from Norway through the Vesterled link to Frigg. With the UK's forecast increased import dependency, Norway is expected to play a major part in meeting UK gas demand.

The undeveloped Norwegian Ormen Lange Field has reported proven reserves of 400 bcm and is expected to commence production in 2007, with expected annual volumes in the range 15-25 bcm/yr. The UK is expected to attract a large share of the exports from Ormen Lange, however the route(s) to the UK market are yet to be decided.

Figure 4.3B shows actual Norwegian exports to the UK and the continent since 1977. The figure also shows projections of how this might change over the next 10 years based on an assumed development profile for Ormen Lange and meeting the Norwegian government's reported target of 95 bcm exports by 2015.

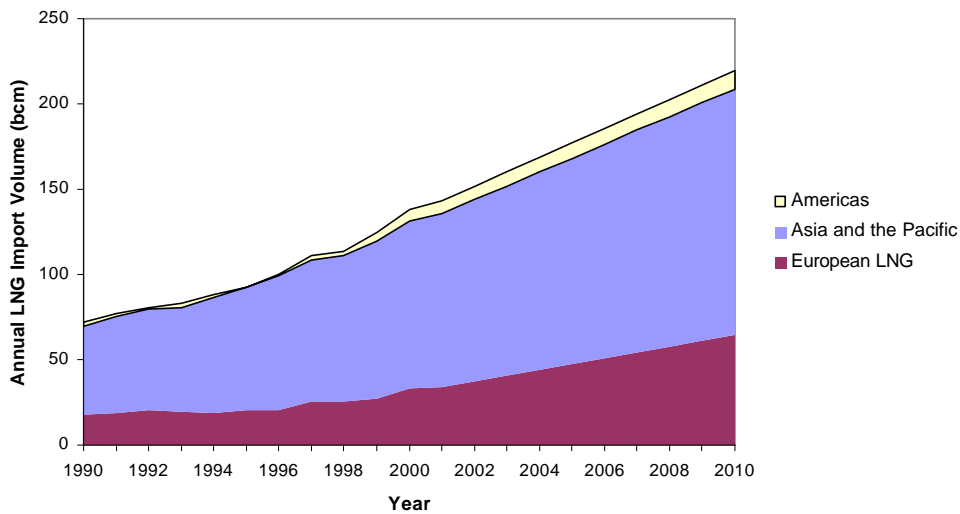
FIGURE 4.3B – Norwegian Production and exports to the UK
 Source - NPD, Norwegian Government, Transco Forecast



4.3.3 LNG Imports

Figure 4.3C shows the growth in world LNG trade between 1990 and 2000 and projected growth based on historic trends. During this period world gas demand has increased by 2% per year, however LNG trade has outperformed this with annual growth at approximately 7%, largely through increased imports to Asia and Europe. Whilst the UK does not currently have any importation facilities for LNG, there are proposals for developments at both Milford Haven in South Wales and at the Isle of Grain in Kent. These could play an important strategic role in securing future supplies of gas to the UK.

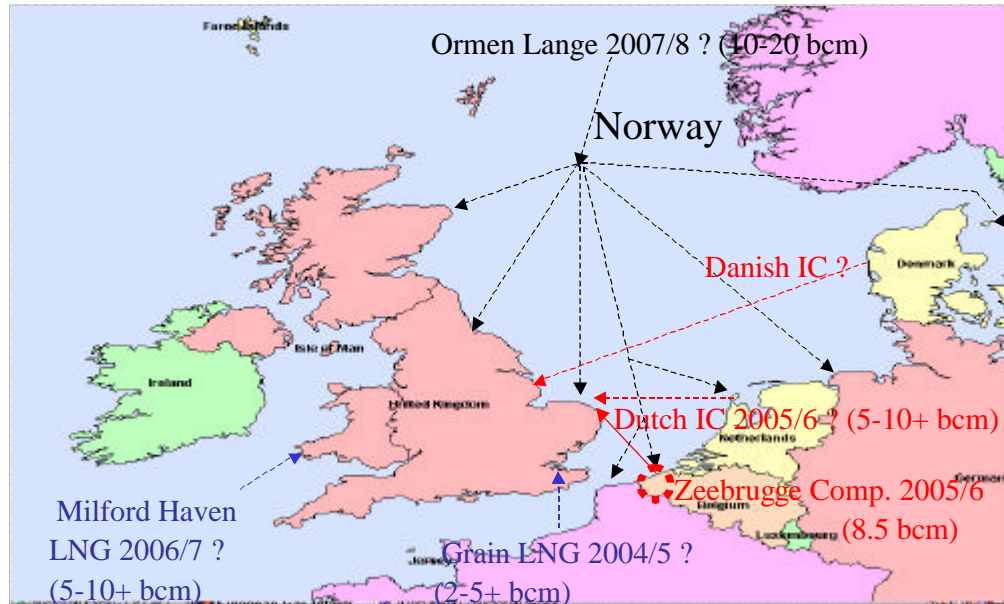
FIGURE 4.3C – World LNG Trade
 Source - ENI, Energy Markets



4.3.4 Import Projects

A number of parties are presently developing potential projects to import gas into the UK. These are detailed below in Fig 4.3D.

FIGURE 4.3D – Import Options



The reported import projects vary in relation to status, location, likely ‘first-gas’ dates and gas volumes, leading to a considerable level of uncertainty in the geographic profile of future UK gas supplies. Figure 4.3E highlights these uncertainties by way of low, mid and high cases of project go-ahead against import volumes required, which in turn are dependent on any UKCS upside. The high case includes most of the reported potential import projects; including Interconnector compression at Zeebrugge, a new continental Interconnector, two new links from Norway including Ormen Lange, and the reported LNG projects. The mid case takes a more pragmatic view than the high case regarding timescales and competing projects, including only one new link from Norway and reduced LNG imports. The low case is comparable with the mid case but includes a further reduction in import volumes and further slippage of project timescales.

FIGURE 4.3E – Import Projects Projections

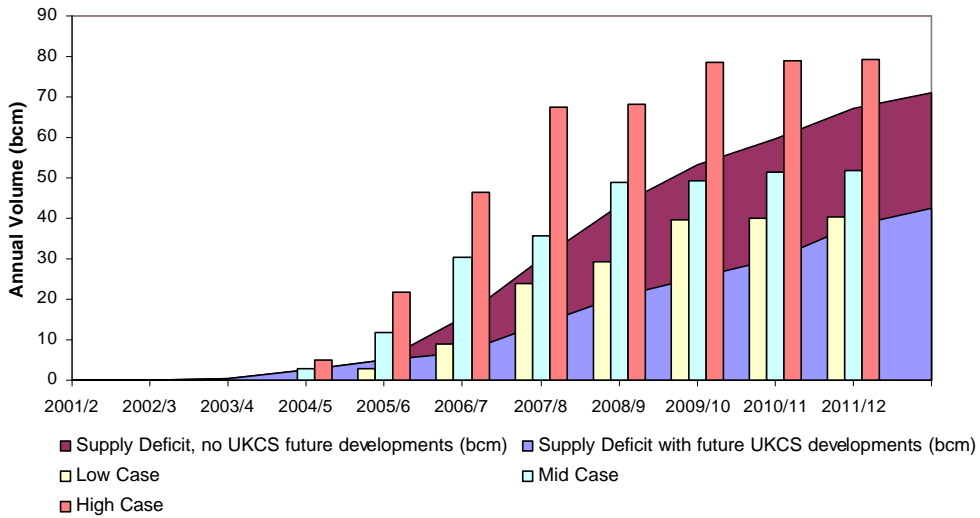
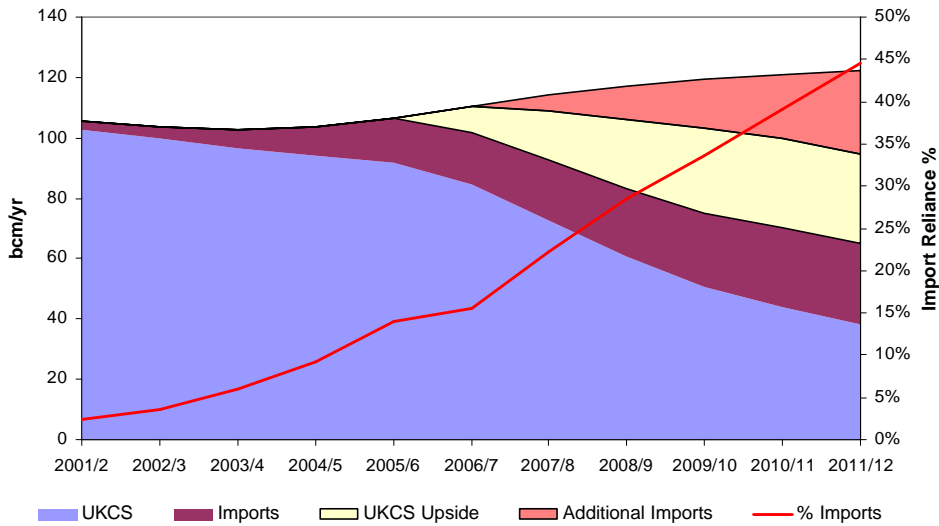


Figure 4.3E shows that the supply deficit up to 2011/12 could be met by a combination of UKCS upside (as presented in Figure 4.2B) and Transco’s low case of new imports. However in the event of there being no UKCS future developments, even the mid case for new imports will fail to meet the deficit after 2008/9.

Figure 4.3F shows how the supply / demand match is achieved with inclusion of a UKCS upside and the level of additional imports required to meet demand.

FIGURE 4.3F – Annual Supply Forecast





4.4 Supply Scenarios

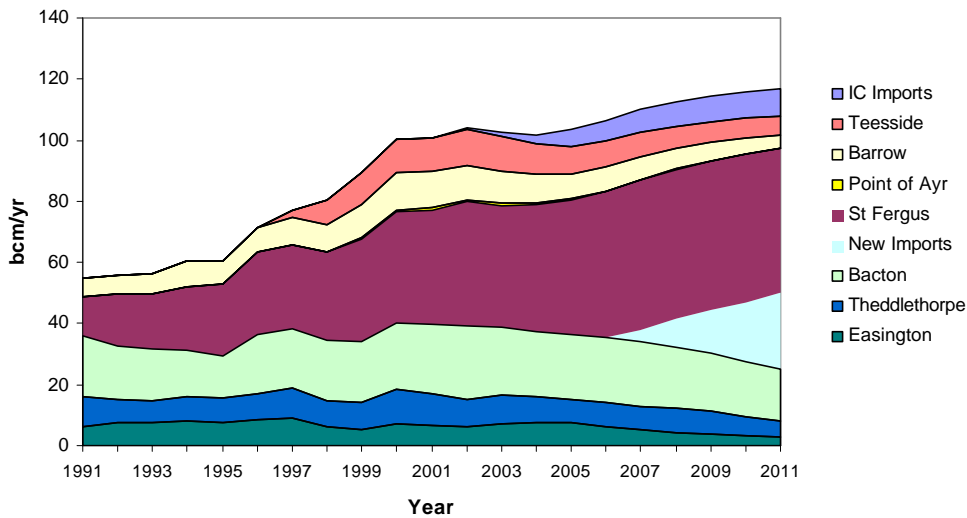
In order to manage the uncertainty associated with the future locational profile of gas supplies, in particular new imports, Transco has developed alternative supply scenarios against which potential investment requirements have been identified.

To encompass the range of investments that Transco may have to make, two principal supply scenarios have been considered; a high investment Northern case with all new imports to St Fergus; and a lower investment Southern case with all new imports to Bacton. These two scenarios do not diverge until 2007/8.

This approach of flexing the assumed location of new imports enables further scenarios to be considered if required. For example, a Western case based on LNG imports into Milford Haven can be considered through substitution of the new imports from either St Fergus or Bacton.

Figure 4.4A shows actual annual terminal supplies since 1991 and forecast supplies through to 2011. The new imports are shown wedged between St Fergus and Bacton to highlight the respective Northern and Southern investment scenarios or alternatively the potential imports at either new or existing terminals. Further details of the supply forecasts for both scenarios for annual and peak conditions are shown in Appendix 2.

FIGURE 4.4A – Terminal Supplies for Northern and Southern Cases



4.5 Security of Supply Implications

The primary driver of infrastructure investment is the peak rather than the annual position. Forecast peak demand is met by a combination of beach supplies, interconnector imports, storage withdrawal and interruption. As in Transco's supply



forecasts in 2000 and 2001, beach levels are predicted to remain at around the 400 mcm/d level at best, while peak demands are forecast to continue to grow.

Transco's forecasts show that 2005/6 is the first year in which peak demand can only be met (other than by demand management) by additional peak supply imports. These peak supplies are most likely to be provided by the installation of compression facilities for the continental Interconnector and proposed new storage projects.

Figure 4.5A shows the winter supply position in the form of a load duration curve assuming full supply availability for 2005/6. The areas of storage on the chart represent the peak deliverability and space available. The area depicting Interconnector imports assumes the installation of compression to provide a supply rate in line with that recently announced. Beach supplies include future development projects that have been granted governmental approval and appraisal projects that have yet to given developmental approval. No allowance for operational incidents, such as supply losses, is shown for any of the supplies.

FIGURE 4.5A – 2005/6 Winter, Full Supply Availability

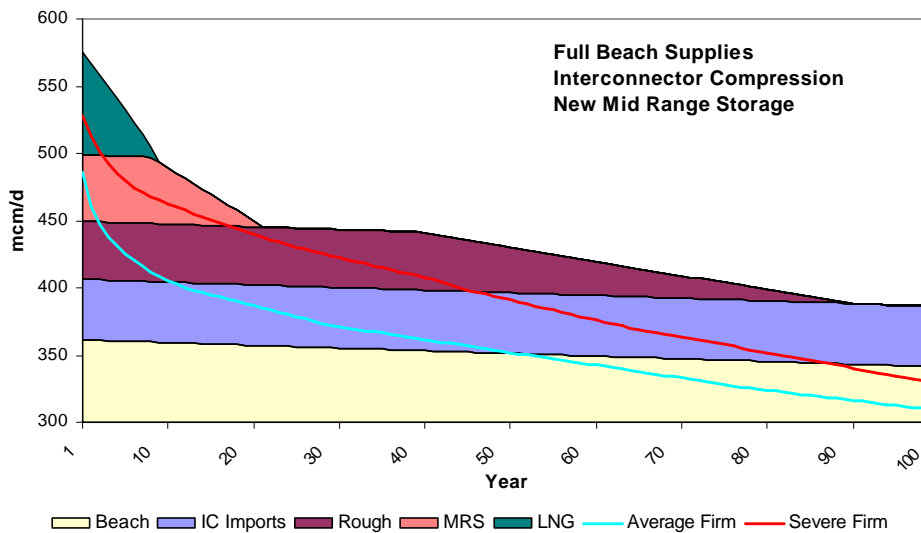
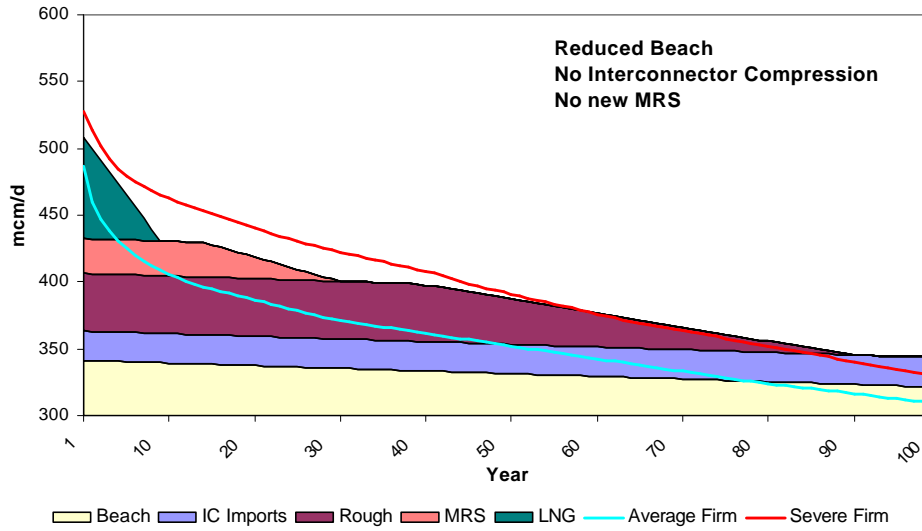




Figure 4.5B shows that without installation of compression at Zeebrugge, and with a slightly lower level of beach supplies and no new storage, there will be insufficient supplies available to meet severe firm demand. The reduced level of beach supplies reflects uncertainty over new fields and/or allowance for some loss of supply.

FIGURE 4.5B – 2005/6 Winter, Reduced Supply Availability



NTS Capacity Provision and Investment

5.1 Introduction

The new NTS price control and associated Network Code developments have changed the way that NTS capacity will be sold into the future. In summary, the main impacts of these changes are:

- To provide shippers with the opportunity to secure long term rights to NTS entry capacity through an auction process.
- To allow Transco to respond to signals received via auctions and its established consultation process in making long term capacity rights available.
- To place incentives on Transco in order to drive investment decisions associated with the provision of long term capacity rights.

Details of the new commercial incentive regime are presented in Appendix 6.

At the time of writing, the first long term auctions are yet to be held (planned for January 2003). The 2002 investment planning process has therefore been similar to those conducted in previous years. One notable difference is that this year Transco has not run a central case, preferring instead to analyse two supply scenarios. From these scenarios, an 'envelope' of plausible investment requirements has been developed.

This chapter presents the currently approved NTS projects, those that are presently under consideration for construction in 2004, and aggregate investment scenarios consistent with the supply scenarios detailed in chapter 4. Detailed maps describing the current NTS and LTS transmission systems and approved future investments are presented in Appendix 4.

5.2 Recent Developments

In addition to the uncertainty regarding the location of new supplies, physically undertaking investment on the NTS is becoming increasingly challenging as a result of changes to environmental legislation and mounting pressure within the land owning community for increased compensation payments. This latter factor presents the largest risk to timely delivery of future NTS investments and is reflected in the number of Compulsory Purchase Order proceedings (CPOs) that Transco has had to initiate in the last two construction seasons. In response to these pressures, Transco is continuing to develop its contractual strategy and risk management procedures and is actively developing the application of new technologies to minimise the intrusion of our assets upon the natural environment.

5.3 Investment Plans and Scenarios

5.3.1 Investment Planning Process

The suite of projects proposed within the 2001 Ten Year Statement have been exhaustively reappraised to ensure that investments are made in the most efficient manner possible to meet the overlapping drivers of growth, replacement, summer flexibility and environmental efficiency. Two effects are worth noting in particular. First, the proposal to provide full summer flexibility for entry capacity at the Bacton terminal (the ability to maintain peak entry flows at summer demand levels) has been modified to reflect the ongoing use of the European Interconnector in summer months. Second, the softer growth forecasts in this year's plan has resulted in certain projects appearing later in the plan than previously envisaged. These points explain the lower projected spend on summer flexibility investment in the present price control period compared with that highlighted in the 2001 Ten Year Statement (see Figure 5.3A).

As Chapter 4 explained, Transco has considered two main development scenarios for the NTS, a Northern and a Southern case. Further analysis is planned in relation to a Western case, to examine the impact of potential LNG imports at Milford Haven in West Wales. The Northern and Southern cases do not diverge until 2007/8 and, therefore, the projects identified in the early years of the plan are the same under each scenario.

5.3.2 Investment Approved/Under Consideration for 2004

Details of the major new project expenditure required in the construction horizon to meet changing supply and demand patterns and demand growth are given below:

5.3.3 Projects Approved for Construction (Approval January 2002)

Project	Build	Scope	Cost
Aberdeen to Wooler pipeline uprating	2003	230km, 80 to 85 bar _g	£9m
Bathgate Compressor Station, new units	2003	45 MW	£53m
Longtown to Lupton pipeline uprating	2004	207km, 70 to 85 bar _g	£6m
Bacton to Kings Lynn pipeline	2003	65km x 1200mm	£64m
Wisbech to Huntingdon pipeline uprating	2005	67km, 75 to 85 bar _g	£11m
Chalgrove to East Ilsley pipeline	2003	25km x 900mm	£18m

All the projects listed above were approved for completion by October 2003, based on the output from the 2001 supply and demand forecasts. However, the new forecasts produced in May 2002 demonstrated some localised slippage in both supplies and demands. Some of these projects have, therefore, subsequently been rephased, as indicated by the date indicated in the 'Build' column.

5.3.4 Projects under consideration for 2004

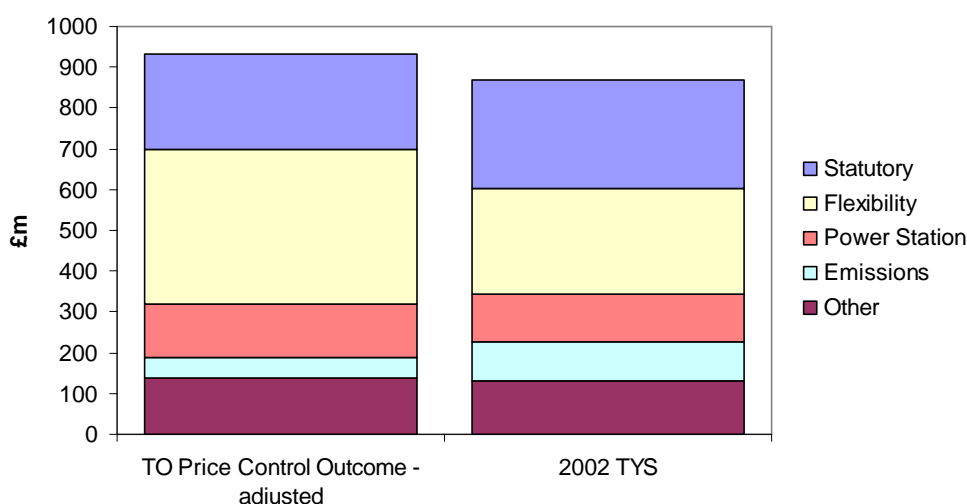
Project	Build	Scope	Cost
Aberdeen to Lochside pipeline	2004	50km x 1200mm	£50m
Wooler to Bishop Auckland uprating	2004	145km, 75 to 85 bar _g	£8m

The projects listed in this section are set out in section 5.4 with their locations highlighted on the map of the NTS (Figure 5.4A).

5.3.5 Investment in Present Price Control Period

Figure 5.3A indicates the expected level of total investment in the present price control period (2002-2007) under the NTS Transmission Owner (TO) price control, split by the investment category for indicative purposes. In practice, many of the planned investments will meet more than one driver to a greater or lesser extent.

FIGURE 5.3A – Forecast Spend by Investment Category 2002/3 to 2006/7 Inclusive (2002 Real Prices)



NOTE: 'Power Station' investment was partially excluded from the NTS TO Price Control (being enabled by the new SO incentive mechanisms). The TO Price Control outcome has been adjusted to include power station investment for ease of comparison.

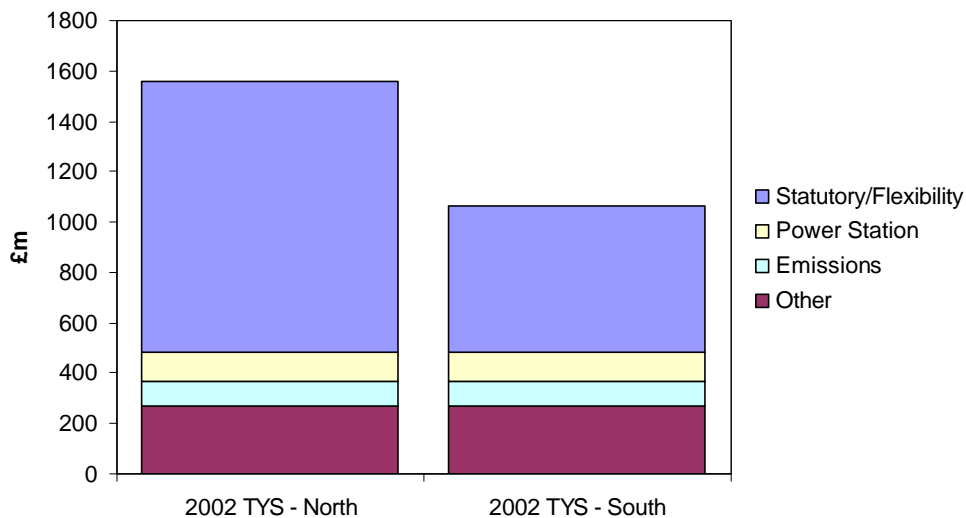
In the above Figure, ‘Statutory’ relates to growth investment consistent with the obligations placed on Transco under its Gas Transporter’s licence to meet 1 in 20 peak day criteria. ‘Power Station’ investment accounts for the large one-off connections to the NTS. ‘Other’ investment includes asset enhancement and the replacement of assets that have reached the end of their economic life.

5.3.6 Analysis of Investment Scenarios

The difference between the Northern and Southern cases is the assumed location of new gas imports from 2007/8 onwards. Under the Northern case, this gas is assumed to enter the NTS at St Fergus, whereas under the Southern case the assumed entry location is Bacton. Since St Fergus is further from the main centres of gas demand, more network reinforcement would be required under the Northern case. This is illustrated in Figure 5.3B, which shows the expected levels of investment in the NTS under these two cases. Again, for indicative purposes, these investment levels are split between the main investment driver categories with the ‘Statutory’ and ‘Flexibility’ categories combined in this case.

To put Transco’s investment scenarios in the context of major upstream projects, the investment required to develop the Norwegian Ormen Lange field is forecast to be in the range £3bn to £5bn, and it is expected that the proposed Gazprom pipeline from Siberia to Western Europe would cost around £3.7bn.

FIGURE 5.3B – Forecast Spend by Investment Category 2002/3 to 20011/12 Inclusive (2002 Real Prices)



5.3.7 Network Resilience

Within the recent document “Transporting Britain’s Energy 2002 – Development of Investment Scenarios”, published in July 2002, Transco included an assessment of the NTS projects required to provide greater network resilience in the event of supply-side failures. The cost of these investments was estimated to be around £0.2bn. This resilience expenditure is excluded from the investment figures shown in Figures 5.3A and 5.3B. In general, however, Transco has received positive feedback on the possibility of such investment. Transco therefore intends to develop its analysis of the

options in this area, and expects to publish further details in the course of the 2003 Transporting Britain's Energy consultation process.

5.4 NTS Project List & Map

NTS Projects Completed in 2002

- A. Willington to Steppingley (21 km x 900mm)
- B. Cambridge to Matching Green (46 km x 1200mm)
- C. Kings Lynn compressor modifications

2003 Approved Projects

- D. Aberdeen to Wooler uprating (80 to 85 bar_g)
- E. Bathgate Compressor Station – new units
- F. Bacton to Kings Lynn pipeline (65km x 1200mm)
- G. Chalgrove to East Ilsley (25km x 900mm)

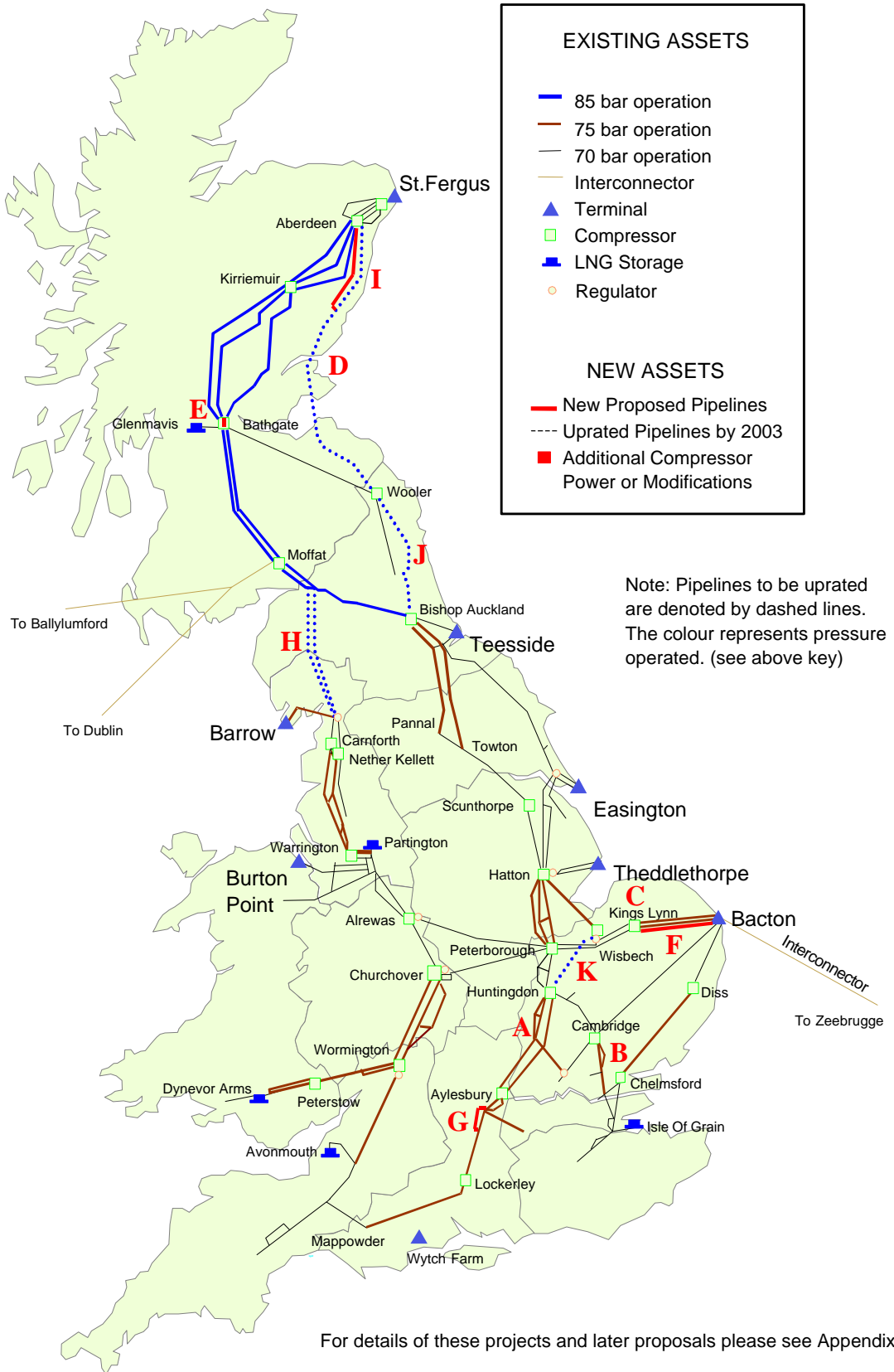
2004 Approved Projects/Projects Under Consideration

- H. Longtown to Lupton uprating (70 to 85 bar_g)
- I. Aberdeen to Lochside pipeline (50km x 1200mm)
- J. Wooler to Bishop Auckland uprating (75 to 85 bar_g)

2005 Approved Projects

- K. Wisbech to Huntingdon uprating (75 to 85 bar_g)

FIGURE 5.4A – NTS Projects Completed, Approved & Under Consideration



Investment in the LDZ Distribution Networks

6.1 Transportation System

During the past twelve months there have been a number of developments affecting how Transco is organised to operate and maintain the transportation system at the LDZ/Distribution Network level:

- Asset and Operations Management have been merged and now operate through eight regional Networks supported by national Network Services and Emergency Services.
- Fulcrum Connections operate as a separate subsidiary outside of the regulatory ringfence and provide gas connection services on behalf of Transco.
- A separate subsidiary, Transco Metering Services, provides metering and meter reading services to Transco.

Transco continues to invest in the lower pressure tiers of its transportation network to meet customers' requirements for a safe and efficient network and their forecast growth for firm transportation services.

Significant investment is in the following areas:

6.2 LTS Development Plan

The Local Transmission System (LTS) is designed for transmission and storage on the basis of ensuring maintenance of the 1 in 20 peak day criterion. The system is developed, based on supply/demand forecasts, to ensure that this capability is maintained. LTS projects tend to be numerous and of lower value than NTS projects. The following major LTS pipeline projects (greater than £1 million) have been approved to date for 2002/03 and 2003/04.

6.2.1 2002/03 Approved Projects

Network	Project Name	Diameter (mm)	Total Project Workload (km)	Total Project Cost (£m)
Scotland	Onthank to Cross House	450	3	1
	Girvan Phase 1	250	7	2
North West	Samlesbury to Helmshore Reinforcement	1050	29	19
North of England	West Hull Reinforcement	1050	18	9
Wales & the West	Gilwern to Hafodyrynys	600	25	26

6.2.2 2003/04 Approved Projects

Network	Project Name	Diameter (mm)	Total project Workload (km)	Total Project Cost (£m)
North of England	Cowpen Bewley to Warden Law	300	30	10
	Darlington Reinforcement	300	4	2
Wales & the West	Overton to Chirk	150	9	2
	St Davids	150	10	3
West Midlands	Lower Quinton to Kings Coughton	1200	18	22

NOTE: Remaining projects are smaller and cost less than £1m.

Appendix 4 provides schematic diagrams of the LTS networks and is intended to give an indication of the extent of the networks within each LDZ. Networks operating below 7 bar are not shown.

6.3 Below 7 bar Distribution Network

The Transco below 7 bar network is constrained to operate between levels of pressure defined by statute, regulation and safe working practices.

Transco continues to develop its below 7 bar distribution network, investing in mains, services and associated plant and machinery to meet both the needs of providing capacity to customers wishing to connect to Transco's network and other Gas Transporters' requests for transportation services.

Transco's distribution networks are designed and reinforced to meet a peak six minute (pk6) demand level, which is the maximum demand level (averaged over a six minute period) that can be experienced in a network under cold winter conditions.

Transco will continue to invest in capital on reinforcement and new connections consistent with the growth in peak day demand forecast in this document.

The volume of connections for the total market is forecast to be as follows:



Figure: 6.3A Total Market Connections

Total Market	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Existing Housing	87,348	86,348	85,348	84,348	83,348	82,348
New Housing	156,099	157,480	158,891	160,075	160,285	160,093
I & C	12,500	12,500	12,500	12,500	12,500	12,500
Total	255,947	256,328	256,739	256,923	256,133	254,941

Transco also continues to invest in new and replacement meters and in the replacement of its transportation network assets, primarily for the renewal of mains and services within distribution systems. This includes expenditure for the delivery of the medium pressure ductile iron and the 30 year mains replacement programmes as agreed with the H&SE (Health & Safety Executive).