Chapter Two

Supply, Demand & Investment Forecasts

2: Supply, Demand & Investment Forecasts

2.1 Introduction

This chapter contains Transco's supply, demand and investment forecasts, as well as information relating to system developments. The volume forecasts represent Transco's latest view and have been updated from the 1998 Base Plan Assumptions following consultation with the industry. A range of investment forecasts are presented which form part of Transco's 1998 Plan, these are based on the Base Plan Assumptions, which have also been used to underpin the calculation of the Long Run Marginal Costs and charges described in Chapter 3.

Appendix 5 describes Transco's supply and demand forecasts. However, forecasting is not an exact science and inevitably actual volumes will be different from those forecast today. Transco's forecasts assume continuing favourable prospects for gas as the preferred form of energy, both for end users and electricity generation. By the early years of the next century, Transco expect the share of primary energy consumption in the UK to be met by gas to be approximately 40%.

The forecast increase in future gas transportation volumes is heavily reliant on flows to the European Interconnector and upon the replacement of coal fired electricity generation by Combined Cycle Gas Turbine (CCGT) gas powered stations. The forecasts are thus very sensitive to any extension (of three years or more) of the current Review of Energy Sources for Power Generation (or power station moratorium).

2.2 Forecast Demand

Appendix 5 describes demand forecasts which have been updated from the 1998 Base Plan Assumptions, using the 1997 actual demands, load enquiries and feedback from the Base Plan consultation process. Both annual and peak day demands are discussed. Annual demand is the main driver of Transco's income, whereas peak day demand drives the system capacity required and is therefore one of the key drivers for Transco's capital expenditure. Annual demand forecasts are presented in two formats, firstly by LDZ and NTS load bands (for system design purposes) and secondly split into Business & Domestic and Large User (as set out in Transco's price control formula).

2.2.1 Demand Sensitivities

The demand forecasts are based on a wide range of factors including: historical trends, local intelligence, the nomination of major new supply points by shippers, general economic factors, comparative fuel prices, conservation and environmental measures, potential growth areas, Transco's connection policy and possible taxation effects. There is some uncertainty related to these factors which could lead to variation in the rate of demand growth. In particular, the following would lead to increased demand growth compared to the base case:

- additional Government support for CHP;
- further strengthening of the current gas price advantage over other fuels;
- the introduction of mains extension projects by PGTs;
- further fuel switching to gas;
- increased exports to Ireland, due to additional power generation in the North and accelerated depletion of the Kinsale Head gas field to the south of Ireland;
- less gas by-passing the NTS to the European Interconnector; and
- carbon based emissions trading.

Whereas the following would lead to lower demand growth:

- the Review of Energy Sources for Power Generation being extended for 3 or 5 years thereby affecting both CHP and CCGT growth (considered below);
- the gas price advantage being eroded;
- a substantial economic downturn including reduced housing completions;

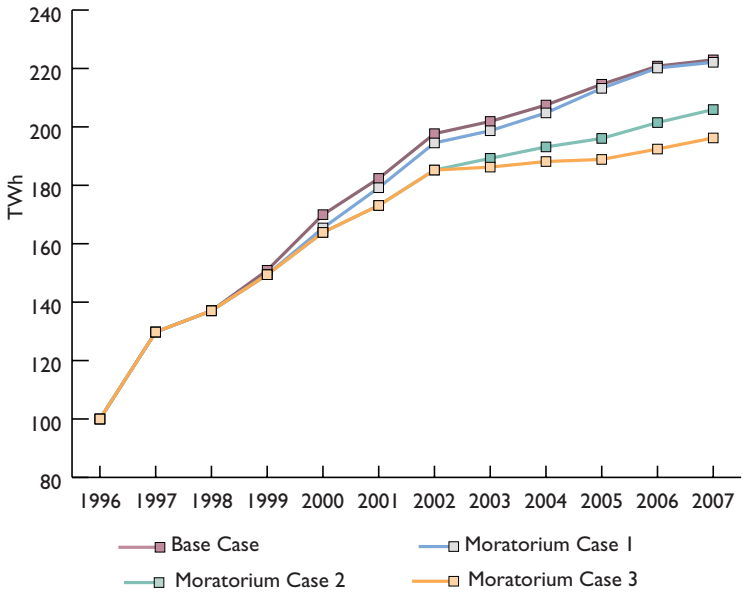
- reduced exports to Ireland, due either to an economic downturn, the discovery of additional indigenous gas reserves and / or reduced fuel switching;
- a continuation of the mild weather seen in 1997;
- an increase in the amount of gas by-passing the NTS to the European Interconnector; and
- some large loads located near terminals building their own pipelines and by-passing the NTS.

At the time of going to press, the Government had not finalised its policy arising from the consultation document "Review of Energy Sources for Power Generation" issued on June 25th. The Government's initial conclusions are that new and pending applications for gas fired power generation projects under Section 36 of the Electricity Act 1989 and Section 14(1) and 14(2) of the Energy Act 1976, would be "inconsistent with the Government's energy policy concerns relating to diversity and security of supply". The government has also concluded that a number of changes are required to the electricity regime to promote competition and efficiency. A modified policy for giving consent to the construction of new power stations will therefore apply "while market reforms are being addressed" with each station considered on its merits. Such a policy introduces further uncertainty to Transco's demand forecasts, consequently the base case forecasts assume that the "modified consents policy" only lasts for one year. Under these circumstances it is expected to have little effect. The base case includes twelve new CCGT power stations (of which 9 have Section 36 approval) which are expected to be commissioned by 2002.

Given the uncertainties introduced by this policy, Transco has analysed the possible effects on throughput of the new consents policy being extended for one, three or five years. Where proposed gas fired power station projects have been delayed, it is assumed that they are replaced by coal plant to maintain a plant margin of approximately 20%. For all three cases, it is assumed that CHP plants generating up to 100 MW are unaffected.

Figure 2.2.1 shows the impact of the three cases on Transco's forecasts of power station load fed from the NTS. Case 1, a one year extension, shows an initial reduction before returning to the Base Case levels towards the end of the forecast period. Case 2, a three year extension, shows initial growth associated with new stations already under construction or with Section 36 approval; there is then a brief period of more limited growth before new stations come on stream from 2003 onwards. Case 3, a five year extension, again shows initial growth associated with new stations already under construction, or with Section 36 approval, followed by a period of more limited growth until new stations come on stream two years after the moratorium is lifted.

Figure 2.2.1 Effect Of Uncertainty Arising From Review Of Energy Sources For Power Generation



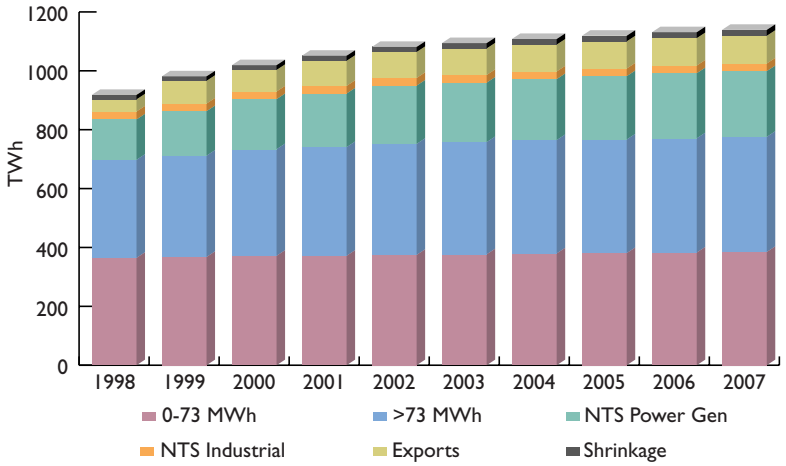
2.2.2 Base Case Annual and Peak Demands

Although the uncertainties described above lead to a range of forecasts, a single line is presented below for clarity. The demand forecasts have been updated from the 1998 Base Plan Assumptions following consultation with the industry.

Key demand side issues include:

- Overall Business & Domestic demand is forecast to grow by 56 TWh in the next 5 years, reflecting the current strong competitive position of gas in relation to other fuels and the change from a deep to a shallow connection policy for LDZ loads (a shallow policy implies that new loads will no longer be charged for reinforcement, subject to an economic test).
- Twelve new CCGT power stations (of which 9 have Section 36 approval) are expected to be commissioned by 2002.
- Exports to both Northern and Southern Ireland are expected to grow significantly over the forecast period as industrial and power station loads switch to gas and Ireland's indigenous supply from the Kinsale Head gas field depletes
- The European Interconnector is due to start operating in October 1998, growing to a level of 132 TWh per annum by 2001. However, 50% of this gas is expected to by-pass Transco's system from October 1999, growing to 70% once gas from the SEAL Pipeline is landed in October 2000.

Figure 2.2.2a Annual Demand (TWh)



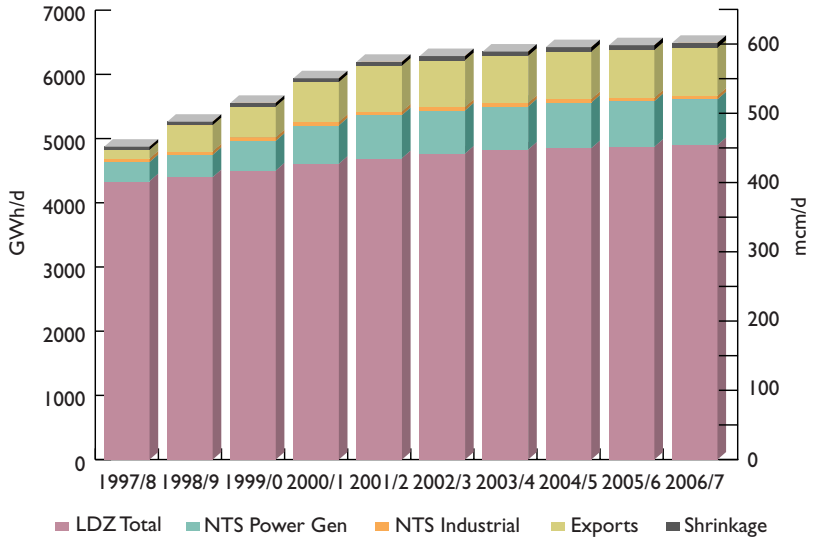
Note:

- The annual demand forecasts are based on average weather conditions over the last ten years (mild weather correction). This represents a 2% reduction in annual demand from 65 year seasonal normal weather conditions, more details about the mild weather correction are given in Appendix 5.
- The >73 MWh band includes both firm and interruptible loads and LDZ Large Users.
- NTS Power Generation includes all stations connected to the NTS, but excludes consumption by stations via their own dedicated pipelines and those embedded within Transco's LDZs.

Annual demand is expected to grow by 29% over the next ten years (from 1997 to 2007). The majority of this growth is attributable to the European Interconnector, exports to Ireland and the additional gas fired power stations expected to be commissioned over the period.

The peak demand forecast reflects the changes in annual demand and thus shows an increase compared to the 1998 Base Plan figures. Peak demand is forecast to increase by 1620 GWh/d over the next nine years (from 1997/8 to 2006/7).

Figure 2.2.2b Peak Demand (GWh per day)



Peak demand growth is higher than the growth in annual system throughput because the European Interconnector by-pass reduces annual but not peak demand and because an allowance has been made for interruptible consumers switching to firm. However, this is offset by the increase in system load factor brought about by the relatively flat load profiles of the new power stations.

2.3 Forecast Supply

Appendix 5 also describes supply sensitivities that match the central demand forecast. The supply forecasts have been revised from those published in the 1998 Base Plan Assumptions taking into account feedback from shippers and producers. Key supply side issues include:

- The actual maximum deliveries to St. Fergus during the winter of 1997/8 were lower than forecast in the 1998 Base Plan Assumptions; the forecasts presented here have been revised to reflect this.
- The actual timing and amount of new supplies to St. Fergus, including new Norwegian imports and supplies through the Miller pipeline. Two cases are presented here, one of which allows for a gradual build up of new supplies, while the second assumes that the new supplies will all be delivered at the same time. Both cases assume that the new St. Fergus supplies will be delivered from 2001/2.
- The development of new storage facilities. There are at least four proposed new onshore facilities. However, due to uncertainties about most of these, only one has been included in the latest supply forecasts. This is Hatfield Moor which is being developed by Scottish Power and which is expected to be operational from 1999.
- Any change to the demand forecasts for the European Interconnector. These may have a major effect on the sourcing of gas for the UK.
- At Barrow there is an increase throughout the ten year period reflecting the levels of gas actually supplied in 1997.

Figure 2.3a Maximum Beach Supplies, Low St Fergus Case (GWh per day)

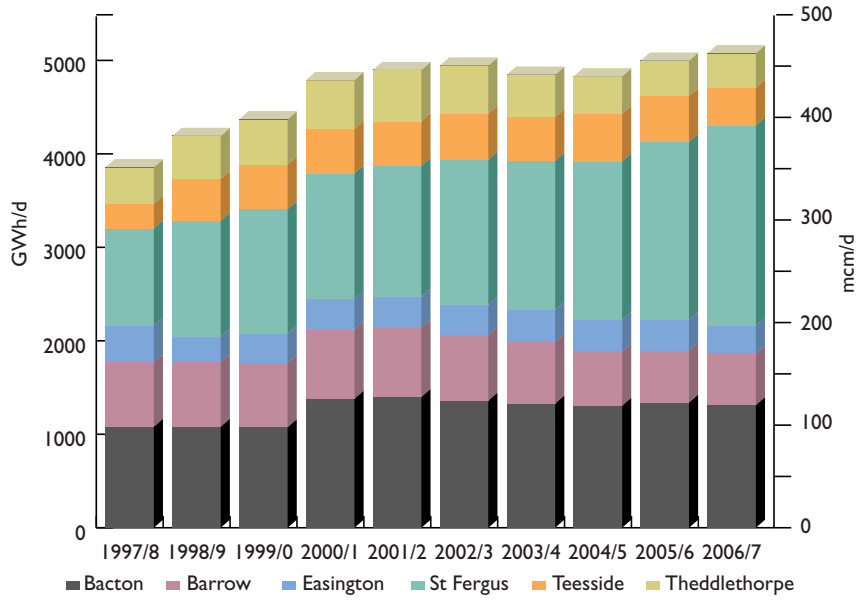
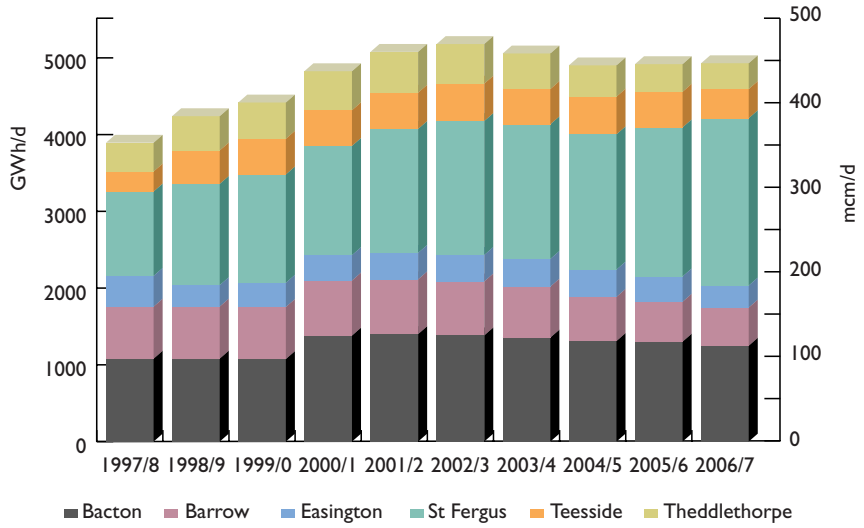


Figure 2.3b Maximum Beach Supplies, High St. Fergus Case (GWh per day)



The revised forecasts indicate a short term reduction in the availability of beach gas compared to the forecasts presented in the 1998 Base Plan Assumptions, particularly at Bacton and St. Fergus.

2.4 Supply/Demand Match

The peak supply/demand match is a major driver for Transco's investment. For NTS design purposes, Transco matches maximum beach supplies to peak day demand, with any shortfall made up through storage or demand management, with all interruptible loads assumed to be switched off.

Transco produces a supply / demand match purely for capacity planning purposes, it does not offer any guarantees that gas will be available and Transco has no obligations for security of supply.

Figure 2.4a Supplies to Match Peak Day Demand, Low St. Fergus Case (GWh per day)

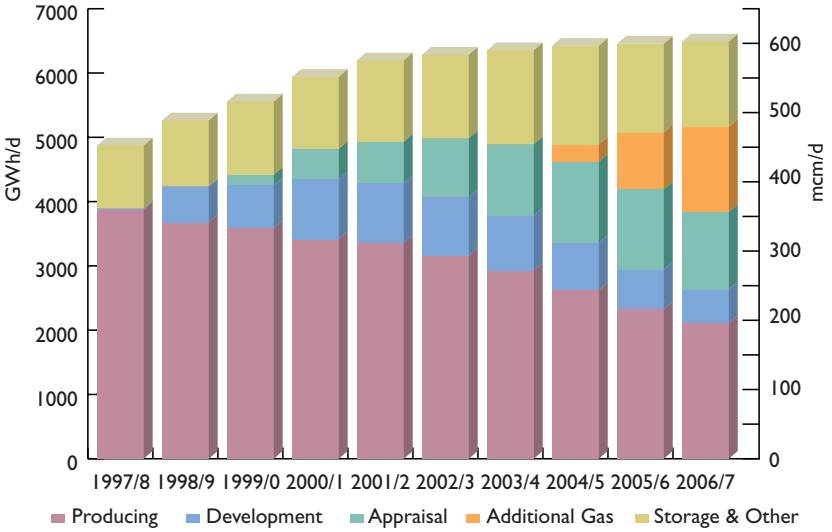
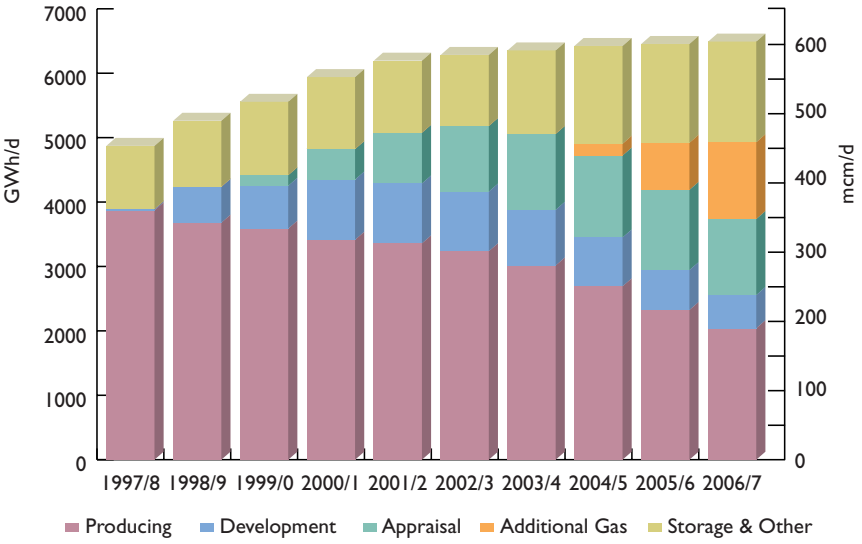


Figure 2.4b Supplies to Match Peak Day Demand, High St. Fergus Case (GWh per day)



2.5 System Reinforcement

Transco's Network Analysis team develops forecast flow patterns from the supply/demand match. To keep the planning scenarios up to date, the process is repeated each year in the light of new information and is updated following major developments. Further details of the modelling process are given in Appendix 7.

2.5.1 Capacity Planning

Transco models the daily dynamics of the National and Local Transmission Systems (NTS and LTS), using a network analysis tool called FALCON, in order to anticipate network capacity constraints and to design efficient reinforcements to ensure the appropriate level of system security is maintained within the network. Having identified potential constraints on the system, Transco analysts evaluate the options that are available to remove the constraint. They then optimise the system by selecting the most economic and efficient combination of alternatives.

The lower pressure tier (Distribution) system is designed to meet expected peak gas flows in any six minute period, assuming reasonable diversity of demand. Lower tier reinforcement planning is based on LDZ peak demand forecasts, adjusted to take account of the characteristics of specific Districts. The process is similar to the NTS and LTS, but at a lower pressure level. Reinforcement is usually carried out by installing a new main or by taking a new offtake point from a higher pressure tier.

2.5.2 Development Plans

The NTS development plan forms the basis of the Long Run Marginal Cost calculations and hence NTS prices, and represents the most likely scenario based on current information. However, it is heavily dependent on supply and demand forecasts and a number of external factors including the economy and Government and regulatory policy.

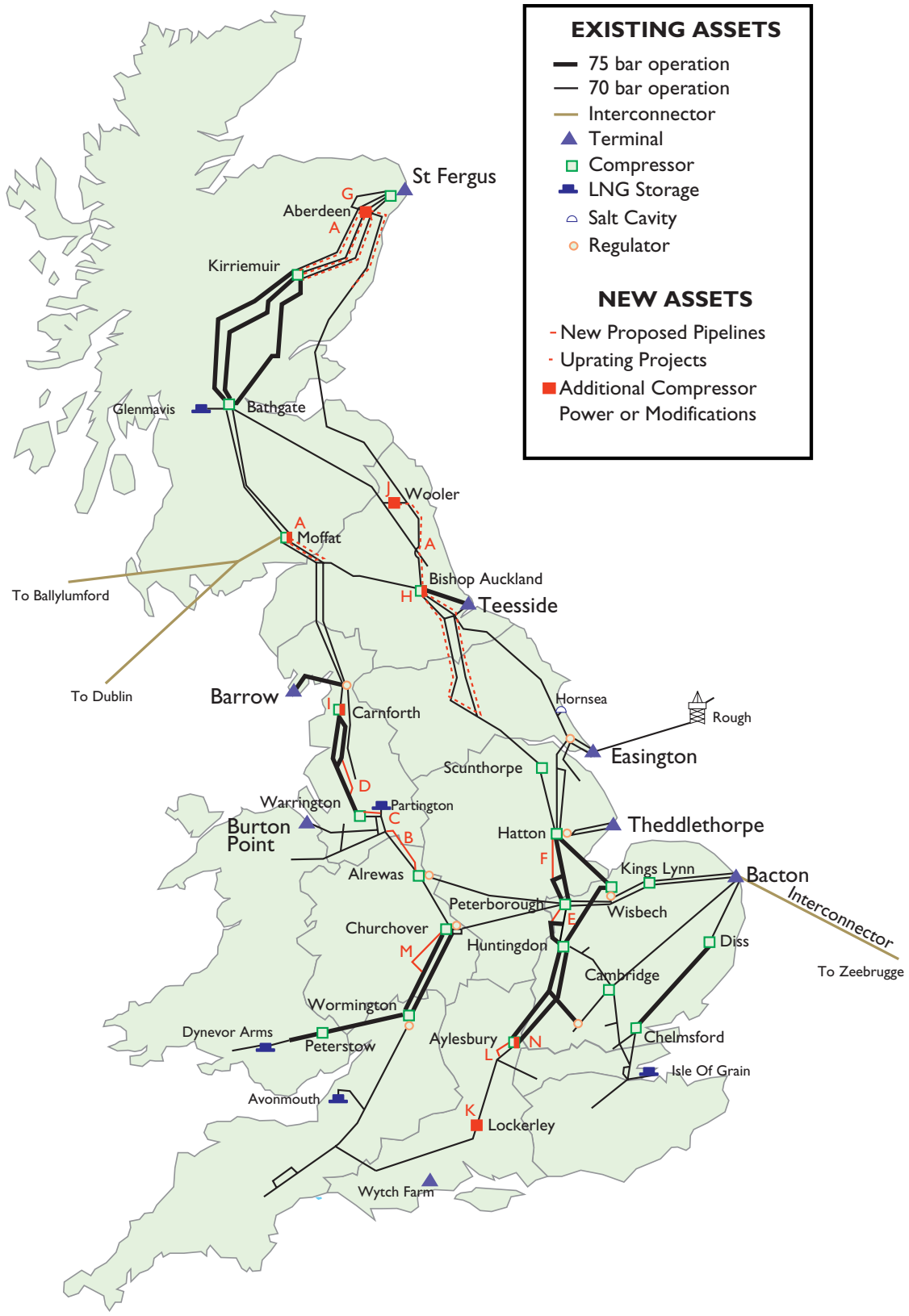
The following projects are necessary to meet short term forecast peak flows. They are currently under construction and are planned for completion by the end of 1998 or 1999.

Table 2.5.2 Committed Projects

1998 Projects:		
A	Uprating of pipelines in the North	
B	Audley to Alrewas	(67km x 1050mm)
C	Warrington to Warburton	(5.6km x 1050mm)
D	Treales to Burscough	(31km x 1050mm)
E	Peterborough to Lutton	(22km x 1050mm)
F	Hatton to Silk Willoughby	(38km x 1050mm)
G	Aberdeen Compressor	(2 x 28 MW)
H	Bishop Auckland Compressor	(2 x 28 MW)
I	Carnforth Compressor 3rd Unit	(1 x 28 MW)
J	Wooler Compressor	(2 x 28 MW)
1999 Projects:		
K	Lockerley Compressor	(2 x 8 MW)
L	Aylesbury to Chalgrove	(25km x 900mm)
M	Churchover to Newbold Pacey	(33km x 900mm)
N	Aylesbury Compressor upgrade to 40 MW	

The committed projects are shown on the following map. More detailed maps, one for each LDZ, are presented at the end of Appendix 7.

Figure 2.5.2 NTS Projects Scheduled for Completion by end of 1999



The LDZ plan, like the NTS development plan, is based on demand forecasts and modelling to identify projects necessary to supply 1 in 20 firm demand levels. However, unlike the NTS, LDZ projects tend to be numerous and of lower value (typically below £2 million). The major LDZ projects are described in Appendix 7.

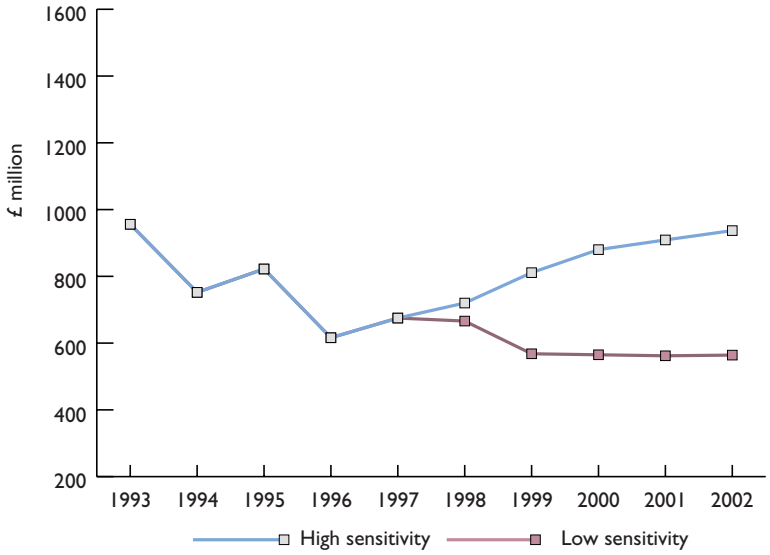
2.6 Investment Plan

This section outlines Transco's investment ranges for 1998 to 2003. The forecasts are created from NTS and LDZ reinforcement plans and other investment including distribution and meter work. A comprehensive review and challenge of the investment forecasts has been undertaken to ensure that the 1998 investment forecasts fully reflect the latest workload forecasts, costs and anticipated efficiencies. Further details are provided in Appendix 7.

The key investment drivers are the peak supply / demand match and the replacement policies for mains, services and meters.

Two investment ranges are presented, the first takes a view about the likelihood of various events which would impact capital expenditure while the second is a maximum range.

Figure 2.6a Investment Ranges Including Likelihood Factors 1998 to 2002 (£m at 1998 prices)



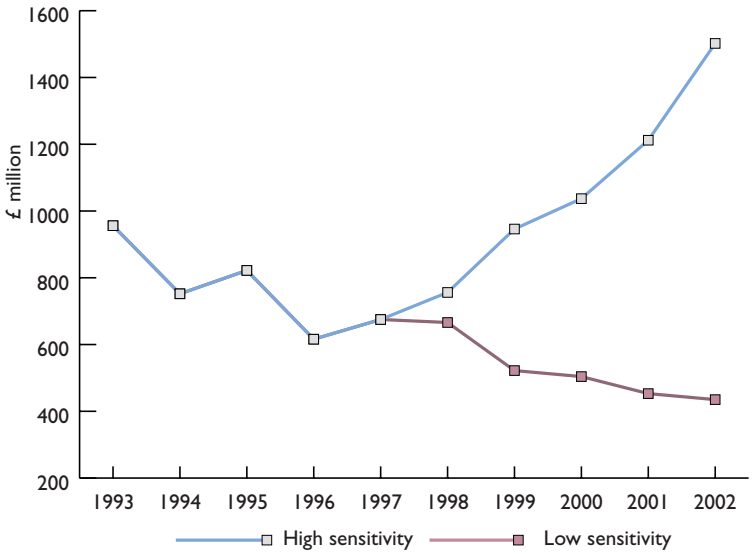
Several sensitivities are captured in the range of investment highlighted in Figure 2.6a. Sensitivities associated with Transco's investment forecasts are largely driven by external factors and include the impact of: the possible extension of the power station moratorium; new shallow connection policy; new gas developments at St. Fergus or Teesside, including additional Norwegian imports at St. Fergus; connections lost to competing PGTs; variation in levels of meter activity; and the tri-partite review (Transco, Ofgas and HSE) of future safety targets and replacement levels for Transco's distribution network. Transco uses a range of likelihood factors applied to possible events to reduce the range of investment. This recognises the fact that it is highly unlikely that all possible events will happen simultaneously. However there is a risk that any major event, such as significant expansion of St. Fergus, could require investment outside this range.

Significant items of expenditure within this plan include:

- NTS and LDZ reinforcement (£174 million invested in 1997);
- replacement of mains and services for safety reasons (£158 million invested in 1997); and
- replacement of meters plus the installation of additional electronic pre-payment meters (£153 million invested in 1997)

If all possible events are included at full cost, then the investment range resembles that shown in Figure 2.6b. There is minimal risk of Transco's investment being outside this range.

Figure 2.6b Extreme Investment Range 1998 to 2002 (£m at 1998 prices)



Transco continues to take a number of steps to improve the transparency of its investment process by involving Ofgas, its customers and other industry players. Some recent initiatives include:

- public consultations on revisions to Transco's connection policy;
- encouraging shippers to buy copies of the FALCON network analysis software to validate its pipeline investment decisions. Transco is also developing a less complex package, called Transcost, that will enable its customers to analyse NTS charges and key assumptions. It is hoped that Transcost will be available to shippers by late 1998; and
- continuing to work with shippers, producers and the DTI to improve the information received on gas supplies. Feedback on the 1998 Base Plan Assumptions, published in October 1997, has seen a continuation of the improving trend on supply information received, reflecting a higher degree of trust and confidence in the planning process.

2.6.1 Investment Efficiency

Preliminary steps have been taken to agree a capital monitoring process with Ofgas. Key aspects of the process will be to specify and agree with Ofgas the business outputs on which investment expenditure is incurred, key drivers of expenditure, and treatment of variations between actual and expected expenditure.

Techniques to minimise cost and maximise value are at the heart of Transco's investment procedures. These include:

- "risk sharing" procurement techniques to ensure lowest possible prices;
- use of sophisticated network analysis models;
- internal and external benchmarking and implementation of best practice procedures to improve performance and results; and
- Engineering for Value initiatives to seek out the best engineering options that increase investment value.

The plan incorporates challenging improvements in cost efficiency, averaging 2.5% per year. Transco has adopted best planning practices to formulate the planning philosophy used by all LDZs. These practices are underpinned by the Engineering for Value initiative that focuses operational staff on identifying radical alternative engineering solutions that will realise significant savings.

2.7 Summary

- There is uncertainty surrounding the future growth in UK demand for gas, particularly relating to the Interconnectors and power generation.
- The "baseline" case assumes that annual demand will grow by nearly 30% over the ten year period from 1997 to 2007.
- Forecasting is not an exact science and inevitably actual volumes will be different from those forecast today. The big issues affecting the supply/demand forecasts are the European Interconnector and how it will be sourced, the Review of Energy Sources for Power Generation and the impact of changes to Transco's connection policy.
- Transco plans to invest between £2.9 billion and £4.3 billion between 1998 and 2002. The eventual spend will be determined by the effect of sensitivities associated with: the possible extension of the Review of Energy Sources for Power Generation; the impact of the shallow connection policy; new gas developments from St. Fergus and Teesside; the levels of connections lost to new PGTs; the levels of meter activity; and the tri-partite review (by Transco, Ofgas and the HSE) of future safety targets and replacement levels on Transco's distribution network.