December 1999

Monitoring Transco's Capital Expenditure

A Report and Consultation Document

Contents

Note on references to Ofgem, Ofgas and OFFER

On 16 June 1999, the former regulatory offices, Ofgas and OFFER, were renamed the Office of Gas and Electricity Markets (Ofgem). References in this text to documents and events before this date use the name of the original regulatory office.

Executive Summary

BG Transco plc's gas transportation business (Transco) is subject to an RPI-X price control. The level of this price control is based on a number of financial projections, including projections of Transco's capital expenditure requirements. At the time of the last price-control review, Ofgas and Transco experienced difficulties when analysing both historical and projected levels of capital expenditure, and it was agreed that capital expenditure should be monitored during the current price-control period.

This document serves two purposes:

- it reports on progress in developing a framework for capital expenditure monitoring, including Transco's reports on its 1997 and 1998 expenditures; and
- it invites views on Transco's report and Ofgem's approach to capital expenditure monitoring.

Capital expenditure monitoring serves a number of purposes (which are discussed in Chapter 2). In particular, capital expenditure monitoring will improve the process of setting the next price control and provide transparency for customers who ultimately fund Transco's capital expenditure. Capital expenditure monitoring is intended to allow Ofgem to identify whether Transco has spent more or less on capital expenditure than was expected when the price control was set and the reasons for any such variance. This will serve two purposes. Firstly, it will help Ofgem to assess the efficient levels of capital expenditure required during the next price-control period. Secondly, where underspends are not due to efficiency gains, Ofgem intends to take account of any undue financial gains Transco has received from these underspends by appropriate reductions in the next transportation price control. In Chapter 3, this document sets out a framework for analysing variances in Transco's capital expenditure.

Transco's price control is designed to incentivise Transco to improve its efficiency by seeking out cost-saving opportunities. This incentive is created by allowing Transco to keep the benefits of any cost savings it achieves during the current price-control period. However, Ofgem needs to ensure that cost savings are not achieved by sacrificing the quality of service delivered to customers. It is also important to ensure that Transco is not given perverse incentives – it should not be encouraged to trade-off long-run efficiency for short-term cost savings.

The current price control was set by Ofgas using financial projections made by the Monopolies and Mergers Commission (the MMC) in 1997. Where Transco's capital expenditure is lower than the MMC's projections, capital expenditure monitoring should help Ofgem to determine whether this variation is due to efficiency gains by Transco or a failure to deliver the expected levels of service to its customers.

It is important to recognise that capital expenditure is not an end in itself. It is designed to help achieve certain outputs, by improving the quantity and quality of services provided to customers. The framework for analysing capital expenditure variances presented in Chapter 3 therefore starts by identifying the outputs that capital expenditure is designed to achieve and the drivers that translate these outputs into physical workloads and levels of expenditure. The framework can be developed to identify the extent to which any underspend is due to efficiency gains by Transco or failure by Transco to deliver expected outputs.

Transco's reports on its 1997 and 1998 capital expenditure analyse the variance between actual expenditure in each year and the MMC's projections of capital expenditure over the period of the price control. Chapter 4 sets out Transco and Ofgem's interpretation of the MMC's projections.

Transco's variance analyses for 1997 and 1998 are reproduced in Appendices 5 and 6 of this document, and summarised in Chapter 5. In 1997, Transco reported an underspend of £195m (23%) against the MMC projections. In 1998, Transco reported an underspend of £163m (19%) against the MMC projections. Capital expenditure monitoring has not yet provided Ofgem with sufficient information to judge the extent to which these underspends are attributable to efficiency savings.

Although progress has been made on developing a framework for capital expenditure monitoring, Transco's report does not yet fully meet Ofgem's aims for capital expenditure monitoring. In particular, Ofgem's view is that more work is needed to agree appropriate definitions of outputs. Ofgem also intends to investigate further the reasons for Transco's underspend, and will obtain an independent audit of Transco's data.

1 Introduction

Purpose of this Document

1.1 This document has two purposes.

- it reports on progress in developing a framework for capital expenditure monitoring, including Transco's report on its 1997 and 1998 expenditures; and

- it invites views on Transco's report and Ofgem's approach to capital expenditure monitoring.

1.2 Capital expenditure is expenditure on new assets used to provide gas transportation services. In contrast, operating expenditure is expenditure required to provide transportation services that does not lead to the creation of new assets (for example, the cost of maintaining rather than replacing an asset). In practice, the distinction between operating and capital expenditure can become blurred. In particular, Transco may have scope to substitute between them. For example, rather than replacing a pipe, more frequent maintenance could be performed on it. In addition, capital expenditure should in principle include not only the price of the new asset but also any labour or other costs involved in installing that new asset. For both these reasons it is important to understand the relationship between capital expenditure and operating expenditure.

1.3 This document discusses capital expenditure during the current price-control period. Ofgem will consider whether this capital expenditure has been economic and efficient as part of its next periodic review of Transco's price control. Ofgem will also publish a document that considers the issues surrounding long-term investment by Transco. This will address questions relating to capital expenditure over the longer run and whether there are adequate signals and incentives on Transco to encourage it to invest to the correct level and in the correct place over the longer run.

Background

The Gas Act 1986

1.4 The Gas Act 1986 (as amended by the Gas Act 1995) (the "Gas Act") provides for the regulation of the onshore gas regime and for the separate licensing of gas transportation, gas shipping and gas supply.

1.5 The general duties of the Director General of Gas Supply (the 'Director') are set out in sections 4 and 4A of the Act. The Director must exercise his functions in a manner he considers is best calculated to secure that all reasonable demands for gas are met, that licence holders are able to finance their activities, and that there is effective competition in the shipping and supply of gas.

1.6 Subject to these primary duties, the Director also has a duty to exercise his functions in the manner he considers is best calculated to protect the interests of consumers, to promote efficient use of gas by licensees and to secure effective competition in the carrying on of activities that are ancillary to shipping and supply. In doing so, he has to take into account the effect on the environment of activities connected with the conveyance of gas through pipes. In addition, he has certain duties related to safety.

History of Transco's Price Control and Capital Expenditure Monitoring

1.7 Transco's charges for gas transportation are regulated by an *RPI-X* price control, which caps Transco's average revenue. As well as regulating price levels, the price control is also intended to provide incentives on Transco to improve its efficiency. Transco can increase its profits, while keeping its charges within the levels dictated by the price control, if it reduces its costs by operating more efficiently. This provides an incentive on Transco to improve its efficiency, although Ofgem must ensure that cost savings are not made by reducing the quality of services delivered to customers (shippers and end users).

1.8 The price control is reviewed periodically, most recently during 1995 to 1997. This review led to the current price control which is intended to apply from 1

April 1997 to 31 March 2002. The current price control was set by forecasting Transco's future funding requirements in three areas:

(i) operating expenditure;
(ii) return of capital (depreciation); and
(iii) return on capital.

Areas (ii) and (iii) are influenced by Transco's capital expenditure requirements. Forecasts of capital expenditure are therefore an important factor in setting the level of Transco's price control.

1.9 Before the price control can be modified, Ofgem and Transco must agree on the proposed modification. If agreement cannot be reached, the existing price control can be referred to the Competition Commission, formerly the Monopolies and Mergers Commission (MMC). The Commission must then investigate the price control and decide whether it operates against the public interest.

1.10 As part of the last review of the transportation price control, Ofgas published final proposals for a new price control in August 1996[1]. Within this document, Ofgas proposed that it would, in future, monitor capital expenditure annually against forecast. However, British Gas plc (BG Transco plc's predecessor) did not accept Ofgas's proposals for the new price control. As a result, on 14 October 1996, the Director General of Gas Supply (DGGS) referred the price control existing at that time to the MMC. The MMC reported its conclusions in May 1997.[2]

1.11 The MMC concluded that continuing the then existing price control would have operated against the public interest. It recommended that new price controls for transportation and storage be introduced. The MMC's recommendations were based on a number of factors, including its forecasts of Transco's capital expenditure requirements. It identified a number of changes in Transco's business environment that could be expected to lead to changes in capital

[1] *1997 Price Control Review British Gas Transportation and Storage – The Director General's final proposals*, Ofgas (August 1996)
[2] *BG plc: A report under the Gas Act 1986 on the restriction of prices for gas transportation and storage services*, HMSO (1997)

expenditure levels compared to those projected by Ofgas and Transco. Some of these changes were more explicitly quantified than others.

1.12 While the MMC did not formally recommend undertaking annual capital expenditure monitoring, its report indicated that capital expenditure monitoring could have a positive impact. Moreover, it had recommended capital expenditure monitoring in its report on Scottish Hydro.[3]

1.13 Following the MMC's recommendations, Ofgas published a consultation document[4] to invite views from interested parties on Ofgas's resulting proposals and suggested licence modifications. Within this document, it was confirmed that Transco and Ofgas had reached an agreement on a way forward for capital expenditure monitoring. In February 1998 Ofgas published its document setting out the final agreed features of the price controls to operate on Transco's gas transportation and storage services between April 1997 and March 2002[5]. Ofgas set the new price control using the MMC's forecasts of Transco's future cash flows. Ofgas noted that during the course of the price-control review, Ofgas and Transco agreed that a framework should be established to monitor Transco's actual capital expenditures against those forecast, and to identify the reasons for any differences between the two.

1.14 Subsequently, in March 1998, the Government produced a Green Paper on the regulation of utilities[6]. An effective capital expenditure monitoring arrangement for monopoly regulation was one of the features recommended by the government. This was supported by all of the utility regulators, including Ofgas.

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[3] *Scottish Hydro-Electric plc: A report on a reference under section 12 of the Electricity Act 1989,* HMSO (1995).
[4] *BG Transportation & Storage The Director General's Price Control Proposals April 1997- March 2002 A Consultation Document*, Ofgas (July 1997)
[5] *BG Transportation & Storage: The Director General's Price Control Proposals April 1997 – March 2002. Licence Modifications,* Ofgas (February 1998).
[6] *Modernising the Framework for Utility Regulation: A Fair Deal for Customers,* DTI (1998)

1.15 In December 1999, Ofgem published its final price-control proposals for the electricity distribution businesses[7]. Ofgem recognised that RPI-X, as a basis for regulating monopoly businesses, had been successful in incentivising companies to reduce costs and improve the quality of supply. Nevertheless, there was still scope for improvement in how it was applied. In particular, Ofgem stated its intention to carry out an ongoing programme of work which would consider, amongst other things, the introduction of additional mechanisms to regulate quality of supply. An important part of this work will be defining the outputs of the distribution businesses and the balance of incentives in relation to cost reduction and the quality of supply.

Structure of the Document and Consultation

1.16 The structure of this document is as follows: Chapter 2 below considers the purposes of capital expenditure monitoring; Chapter 3 provides an overview of the key features of a capital expenditure monitoring framework; Chapter 4 interprets Transco's 1997 Investment Plan in the light of the MMC's capital expenditure projections; Chapter 5 summarises Transco's 1997 and 1998 variance analyses; and Chapter 6 summarises the principal issues raised by this document.

1.17 If you wish to express views on the content of this document, it would be helpful to receive responses by 7 February 2000. Replies should be addressed to:

Mr Justin Coombs
Director of Price Controls
Office of Gas and Electricity Markets
Stockley House
130 Wilton Road
London SW1V 1LQ

1.18 It is open to respondents to mark all or part of their responses as confidential. However, we would prefer that, as far as possible, responses were provided in a

[7] *Review of Public Electricity Suppliers 1998 to 2000: Distribution Price Control Review Final Proposals,* Ofgem (December 1999)

form that can be placed in the Ofgem library. If respondents do submit a confidential response, please could they supply an additional non-confidential summary. If you would like to discuss this document Rachel Gutman on 0171 932 1689 will be pleased to help.

2 The Purposes of Capital Expenditure Monitoring

2.1 This chapter describes the reasons for monitoring capital expenditure. Firstly, it identifies three principal reasons for capital expenditure monitoring, and some recent issues which have highlighted the importance of monitoring capital expenditure. It then describes the documents Transco has produced to develop a capital expenditure monitoring framework.

Reasons for Capital Expenditure Monitoring

2.2 There are three principal reasons for monitoring Transco's capital expenditure.

(i) An objective record of expenditure incurred

2.3 Capital expenditure monitoring should provide an objective record of the levels of capital expenditure Transco has incurred during the period of the current price control. This should avoid some of the problems incurred during the last price-control review when Ofgas found it difficult to obtain the necessary information from Transco.

2.4 This objective record should inform projections of future levels of capital expenditure and provide information which can be used to roll forward Transco's regulatory value.

(ii) An assessment of the reasons for any variation from the MMC's projections

2.5 Capital expenditure monitoring should also provide Ofgem with a clearer understanding of why particular levels of expenditure have been incurred and the reasons for any variation from the MMC's projections. This information has two uses:

- it should help Ofgem to define efficient levels of capital expenditure and assess Transco's capital expenditure requirements during the period of the next price control; and

- if Transco has spent less on capital expenditure than the MMC projected Transco's allowed revenues may have been higher than necessary during the current price-control period and some adjustment to future revenues to take account of this may be appropriate.

2.6 Chapter 3 below sets out a framework for analysing variations from the MMC's projections.

(iii) Transparency

2.7 By making the results of capital expenditure monitoring public, Ofgem hopes to provide Transco's customers with information on the capital expenditure which they ultimately fund and the reasons for any variations from the projections used to set the current price control.

Specific Issues that have illustrated the Importance of Capital Expenditure Monitoring

2.8 Two current issues have further illustrated the importance of capital expenditure monitoring. The first is the need for Transco to invest in the national transmission system (NTS) to meet changing patterns of demand and supply. There have been concerns from customers about the existing incentives on Transco to invest in new capacity in a timely manner. These concerns are exacerbated by the changing patterns of gas supply in Great Britain and the increase in demand for entry capacity in the north of the country, notably at St Fergus. The aim of the capital expenditure monitoring process is to help Ofgem identify whether Transco has failed to provide outputs to customers, and if so, whether this was the result of a capital expenditure underspend.

2.9 A second factor is that Ofgem and Transco are currently in the process of unbundling the transportation, metering and meter-reading components of Transco's price control. This partly involves identifying the assets and capital expenditures required now and in the future for each of the business units. Capital expenditure monitoring will help inform this process.

Progress to Date

2.10 Ofgem and Transco have been working to develop a capital expenditure monitoring framework that delivers a set of agreed aims and features. A full description of these were set out in Appendix 5 of Ofgas's July 1997 document[8]. That appendix is re-produced as Appendix 1 to this document.

2.11 Transco has also produced several documents outlining its capital investment. Some of these are included or summarised in appendices to this document:

- "The MMC outcome and a reconciliation to Transco's investment plans" (summarised in Appendix 3);
- "Definitions of Investment Drivers and Outputs" a paper defining the outputs and drivers Transco uses for capital expenditure monitoring (Appendix 4);
- "Capital Investment Monitoring: 1997 Variance Analysis". This sets out actual levels of capital expenditure for different asset categories, and identifies variances between actual capital expenditure in 1997 and the MMC's projections. It also sets out Transco's view of the reasons for these variances (Appendix 5);
- "Capital Investment Monitoring: 1998 Variance Analysis". This sets out actual levels of capital expenditure for different asset categories, and identifies variances between actual capital expenditure in 1998 and the MMC's projections. It also sets out Transco's view of the reasons for these variances (Appendix 6).

2.12 In addition, in accordance with Condition 12 of Transco's Public Gas Transporter Licence, Transco is required to publish annually a ten-year forecast of transportation system usage and likely developments to the system. The "Ten-Year Statement" for 1999, which was recently published on Transco's web site, explains Transco's volume forecasts, systems reinforcement projects, investment plans and pricing methodology.

[8] *BG Transportation and Storage: The Director General's Price Control Proposals, April 1997 – March 2002, A Consultation Document,* Ofgas (July 1997)

2.13 Annual monitoring of Transco's capital expenditure has not previously been carried out by Ofgem. Significant work has been required to ensure that the data produced is accurate and useful - this work is ongoing, particularly in the area of output definitions. Consequently, Ofgem is only now in a position to publish Transco's reports for 1997 and 1998. However, Ofgem expects that now that a basic framework for monitoring capital expenditure has been developed, annual reports should be publicly available shortly after the end of each year. In order for there to be confidence in these documents, Ofgem considers that they should in future be independently audited.

3 Key Features of a Capital Expenditure Monitoring Framework

3.1 The data reported in chapter 5 below shows that Transco's capital expenditure in 1997 and 1998 was significantly lower than levels projected by the MMC. This chapter describes how Ofgem expects to analyse such variations from the MMC's projections. This chapter explains the importance of linking capital expenditure monitoring to the level of service provided to Transco's customers; how Ofgem intends to treat capital expenditure variances when setting future price controls; and the workings of a capital expenditure monitoring framework developed by Ofgem and its consultants.

Capital Expenditure and Output Measures

3.2 Ofgem believes that for capital expenditure monitoring to be most useful, information on capital expenditure needs to be considered alongside information on the quality and quantity of services Transco supplies to its customers.

3.3 Capital expenditure is not an end in itself. Transco undertakes capital expenditure in order to maintain or improve the service provided to customers, or to allow it to provide the same service at lower cost. All capital expenditure should ultimately be aimed at enhancing the way Transco provides services to customers. For any particular capital expenditure project it should be possible to define an impact on Transco's "output", in terms of the quality or quantity of services delivered to its customers, arising from that project.

3.4 However, in practice it can be difficult to measure these outputs, particularly when they involve improvements in the quality of services provided. Consequently, a set of proxies for measuring outputs are often required. These proxies must reflect both the quantity and quality of output over time. They must also be measurable, and they must be comprehensive enough not to mislead judgements based on them.

3.5 It is useful to start by considering the "standards of service" which Transco aims, or is required, to meet. For example, a standard of service might define a level of

accuracy which meters supplied by Transco should deliver. An output measure can then be defined as a measure of performance in meeting a defined standard of service to customers. In the example above the output measure would be the number, or proportion, of meters that meet this service standard.

3.6 Examples of output proxy measures might include:

- Transco's performance in meeting peak-day levels of demand; and
- the number of supply points to which gas is transported.

3.7 In principle, these proxies should measure the service Transco delivers, rather than its inputs: the resources it uses to deliver these services. For example, the quantity of pipeline Transco builds is an input that Transco uses to deliver services to its customers, not a measure of its output. Output measures need to measure the quantity or quality of services that Transco delivers to customers. However, sometimes using inputs as a proxy for outputs is the only available measure. For example, Transco may be incurring capital expenditure during the current price-control period which, due to the lead times involved in major investment projects, are not expected to impact on Transco's outputs until the next price-control period. In this case, it is important to bear the nature of such proxies in mind when then considering performance.

3.8 Once standards of service and output measures have been defined it is necessary to agree the output level that is expected to be achieved in a given price-control period. For any price-control period, there should be a given level of expected outputs against which Transco's performance can be judged.

3.9 Given that Transco's capital expenditure in both 1997 and 1998 was below levels projected by the MMC, the next section discusses how any capital expenditure *underspend* during the current price-control period will be treated when setting future price controls. Ofgem would expect to treat an overspend in a symmetrical manner.

The Treatment of Capital Expenditure Underspends in Future Price Controls

3.10 As explained in paragraph 2.5 above, an important objective of capital expenditure monitoring is to allow an assessment of any differences between planned and actual expenditures. Firstly, this will help Ofgem to assess the efficient levels of capital expenditure required during the next price-control period. Secondly, if actual expenditure is less than the MMC expected, Ofgem may wish to take this into account at the next price-control review. How this is done will depend principally on Transco's performance in delivering the outputs described above.

3.11 If Transco spends less on capital expenditure than the MMC predicted, this may automatically impact on the next price control. At the last price-control review, Ofgas updated Transco's regulatory value based on the actual levels of capital expenditure incurred, rather than the levels previously projected. If Transco underspends against the MMC's projections in the current period, assuming the same approach is used, Transco's regulatory asset value at the end of the current price-control period may well be lower than previously predicted. This should lower the levels of projected depreciation and return on capital used to set the next price control.

3.12 However, during the *current* price-control period, Transco seems likely to receive revenues based on projected levels of capital expenditure which it will not, in practice, incur. This may provide an undue financial benefit to shareholders, depending on the reasons for the underspend.

3.13 There are two principal explanations for a capital expenditure underspend relative to the MMC projections:

(i) Transco may have delivered the expected outputs on which the MMC projections were based, but done so more efficiently than anticipated in the MMC projections. Where these unanticipated efficiency gains provide a financial benefit to Transco during the current price-control

period, this benefit should be retained by Transco as an incentive to continue to seek such efficiency savings; or

(ii) Transco may have failed to deliver the outputs on which the MMC projections were based because it has failed to carry out the necessary work. In this situation Transco will have received revenues from customers in order to finance service improvements which have not been delivered. In this situation it would be appropriate to consider making an adjustment in Transco's revenues under the next price control to take account of any benefit Transco has received from such a capital expenditure underspend.

3.14 In summary, if Transco has delivered expected levels of outputs, any underspend should normally be treated by Ofgem as an unanticipated efficiency gain. However, if Transco has both underspent on capital expenditure and failed to deliver the required outputs, Ofgem intends to take account of this underspend and make appropriate adjustments to allowed revenues under the next price control.

3.15 In order to adopt this approach, Ofgem will need to work with Transco to define more clearly the outputs underlying the MMC's projections of capital expenditure. In particular the links between output and capital expenditure will need to be defined.

Developing a Capital Expenditure Monitoring Framework

3.16 Ofgem's consultants and advisors have developed a framework that could be used to monitor capital expenditure. This framework is described in this section and the section that follows.

3.17 The first issue is to translate improvements in outputs into specific capital expenditure. If suitable output measures have been identified, we can then describe how a specified "workload" will be required to achieve a particular level of output. This physical workload can be defined as the assets created to meet a

defined increase in output or to maintain output levels. The relationship between the output level and the workload can be defined as the investment driver:

Equation (i):

Workload (W) = function of Output (Q)

$$W = D(Q)$$

where the function D(.) is the investment driver
(this will not necessarily be a linear relationship)

3.18 The investment driver is the primary reason for the investment to maintain or improve a standard of service; for example the demand from new customers for meters. Investment drivers can be divided into two categories: those associated with *maintaining the existing level of output*, and those associated with *enhancing the level* of output.

3.19 The next step is to measure the total input costs (for example, the material and labour costs) of each unit of workload. Having calculated the cost of undertaking one unit of workload, this "unit cost" can simply be multiplied by the workload to give the total investment, or capital expenditure, requirement (although this might not be a linear relationship where economies of scale exist). This is the total cost of undertaking the workload.

Equation (ii):

Capital Expenditure = Workload (W) x Unit cost (C)

3.20 The following example illustrates this approach in the case of meter installation.

Output (Q)

3.21 A possible example of an output proxy might be the number of domestic customers provided with gas meters of a certain accuracy. For example, hypothetically, the MMC might have expected that 10,000 new domestic supply points would require meters in a particular period, and that output would have to

rise accordingly.

Investment Drivers (D)

3.22 In this case the investment driver associated with the projected increase in output would be the requirement to install accurate meters at 10,000 new supply points. (There might also be an additional investment driver associated with the need to maintain the existing level of output which would require Transco to replace or repair a proportion of the stock of existing meters.)

Workload (W)

3.23 The Transco workload would then be the number of meters it needed to install for new consumers.

$$W = D(Q)$$
$$= 10{,}000 \text{ new meter installations}$$

Unit cost (C)

3.24 Again hypothetically, the unit cost might be £40 per meter installed, including both materials and associated labour costs.

Capital expenditure

3.25 Capital expenditure would then be the total expenditure necessary to install the 10,000 meters at £40 per meter:

$$= W \times C$$
$$= 10{,}000 \times £40$$
$$= £400{,}000$$

3.26 In this example the output (providing domestic supply points with accurate meters) translates into a capital expenditure requirement of £400,000. In this simple example the output was measured by the quantity of supply points provided with meters. However, ideally the "quality" of service (e.g. the accuracy of the meters) should also be considered.

Analysing Variations from the MMC's Projections

3.27 The next issue is how to assess whether an underspend on capital expenditure relative to the MMC's projections is due to an unanticipated efficiency gain or a failure to deliver required outputs. Ofgem's consultants WS Atkins have been working with Ofgem and Transco to develop a capital expenditure monitoring framework that will identify the reasons for any differences between planned and actual investment for each asset category. Their work focused on the following broad reasons for any variance between planned and actual spend:

(a) **changes in workloads required**, due to either
- changes in outputs; or
- changes in investment drivers;

(b) **changes in the timing of the workload**, due to either
- "slippage"; or
- "re-scheduling"; or

(c) **changes in unit costs**, due to either;
- factors within Transco's control; or
- factors outside Transco's control.

3.28 This framework provides a starting point for assessing whether or not Transco's underspend or overspend is due to unanticipated efficiency gains or a failure to deliver outputs. This is developed further below – assuming a capital expenditure underspend.

(a) **Changes in workloads.**

As shown in equation (i) above, the level of workload is determined by the required level of output and the investment driver which translates this output into a workload. Changes in workload can therefore be divided into those leading to lower output levels or those brought about by changes in investment drivers. The second of these reasons, where Transco has achieved the same output with a lower workload, would be an efficiency gain by Transco. The first, a failure to deliver planned outputs, would not.

(b) **Changes in the timing of workloads**.

These may result from the "re-scheduling" of workload, where forecast output is still achieved on time but project timings are altered in order to minimise the costs of delivering the planned output. Alternatively, it may result from "slippage", where expected outputs have not been achieved on time. The first reason would indicate an efficiency gain, because required outputs have been delivered on time with lower levels of capital expenditure. The second reason would not represent an efficiency gain, and Ofgem would need to ensure that future price controls did not include additional allowances for work which has already been funded through the current price control.

(c) **Changes in unit costs**

As shown in equation (ii) above, the level of capital expenditure is a function of both the workload and a unit cost. If the cost of each unit of workload falls, Transco will be able to deliver the output with a lower level of capital expenditure. A reduction in the unit costs may imply an unanticipated efficiency saving by Transco. As explained in chapter 2, capital expenditure monitoring should allow Ofgem to understand the reasons for variations in expenditure in order to inform assessments of future efficient levels. For this purpose, it may be useful to distinguish between different reasons for cost savings. For example, it may be useful to distinguish between a cost reduction resulting from a change In Transco's purchasing methods and a cost reduction due to factors beyond Transco's influence (eg a change in exchange rates, or a fall in world commodity prices).

3.29 As was explained in paragraph 2.5 above, assessing the reasons for any underspend relative to the MMC's projections serves two purposes.

- When Ofgem is assessing whether Transco has received any undue financial benefit from such underspends, the key issue will be whether Transco has delivered expected outputs. However, difficulties may arise adopting this approach if the outputs on which the MMC projections are based cannot be identified and agreed between Ofgem and Transco.

- When Ofgem is determining future levels of efficient capital expenditure, it will be necessary to consider a number of other factors, including the underlying reasons for any changes in input costs.

3.30 **Ofgem welcomes views on the framework for capital expenditure monitoring outlined in this Chapter.**

4 Transco's Investment Plan and the MMC's Capital Expenditure Projections

4.1 Capital expenditure monitoring requires an initial set of capital expenditure forecasts against which actual capital expenditure can be measured. These forecasts must sum to the yearly totals for capital expenditure used to set the 1997-2002 transportation price control, which Ofgas set using the MMC's projections. These totals were the result of the MMC's judgement of the investments Transco would need to make for different types of asset over the life of the price-control period.

The MMC's Capital Expenditure Projections

4.2 The MMC came to its view on Transco's capital expenditure requirements, after considering Transco's "1997 Investment Plan" (which set out Transco's expectations for the years 1997 to 2002) and the views of its consultants on any likely efficiencies or industry circumstances that Transco had not taken into account. Transco's *calendar-year* breakdown of expected investments in its 1997 Investment Plan can be summarised as follows:

Table 4.1 – Summary of Transco's 1997 Investment Plan

£m (1996 prices)	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*Total (6 years)*
NTS	144	200	133	120	150	146	894
RTS	57	45	35	34	31	31	234
Distribution	109	108	105	102	98	95	617
Meters	226	253	243	237	206	153	1318
Support services	125	76	46	59	69	57	429
Total: Capital Mains & Services	661	682	562	552	554	481	3492
Mains & Services Replacement	266	296	306	316	319	312	1815
Total Investment	927	978	868	868	873	793	5307

4.3 The investment totals in terms of *formula years*[9] are:

Table 4.2 – Transco's 1997 Investment Plan totals by formula year

£m (1996 prices)	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*Total (5 years)*
1997 Investment Plan	940	951	867	868	853	4,479

4.4 The MMC described a series of changes that it had made to Transco's forecasts in order to arrive at its totals for Transco's capital expenditure. Some of the changes were explicitly quantified, whereas other changes were more qualitatively described.

4.5 The MMC quantified its view on capital expenditure in its May 1997 report as follows:

- reducing capital expenditure on mains replacement by £150 million (paragraph 2.149);
- allowing only half the proposed expenditure on "black-square" meters (paragraph 2.151);
- disallowing all expenditure on reverification of meters (paragraph 2.151);
- reducing the expenditure on electronic-token meters (ETMs) by £100 million (paragraph 2.153);
- proposing a gross capital spend for the five year period of *almost* £4.1 billion (paragraph 2.157); and
- setting out in Table 9.8 the capital expenditure for each formula year 1997/98 through to 2001/02 which together totalled £4,054 million.

4.6 The MMC also made three unquantified comments on capital expenditure savings:

- *"we believe there is only limited scope for cost reduction in Transco's figure* [relating to information systems]" (paragraph 2.154);

[9] A Formula year runs from 1st April to 31st March of the following year.

- *"we also consider that there is some, limited scope to reduce or defer expenditure on compressors"* (paragraph 2.155); and
- *"finally, as many BG forecasts of unit investment costs and productivity trends are broadly similar to WS Atkins' projections, we see only modest scope for further adjustment to BG's unit cost forecasts and we have assumed some limited economies from more efficient use of the existing system, slightly faster technological progress and improvements in procurement"* (paragraph 2.156).

4.7 The adjustments can be generally classified as reductions in workloads, deferment of workloads or achievement of agreed outputs at lower unit cost, as per the broad categorisation of reasons for changes in capital expenditure described in chapter 3. The adjustments resulted in the following investment totals, by formula year:

Table 4.3 – Formula year investment totals allowed by MMC

£m (1996 prices)	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*Total (5 years)*
MMC Allowed investments	890	861	760	764	779	4054

4.8 Ofgem and Transco have recently agreed a revised Investment Plan for Transco that reconciles with the MMC investment forecasts and takes account of the detailed comments made by the MMC.

Transco's Reconciliation of its Investment Plan to the MMC's Comments

4.9 Transco has produced a paper which outlines how it has reconciled the figures allowed by the MMC to its investment plans. A summary of some of the more important aspects of this paper is produced in Appendix 3. Transco has produced the following reconciliation:

Table 4.4 – Transco's reconciliation of its Investment Plan to the MMC's comments and forecasts by calendar year

£m (1996 prices)	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*Total (6 years)*
NTS	142	196	117	106	159	157	877
RTS	57	45	35	34	30	30	231
Distribution	108	106	104	101	97	94	609
Meters	220	210	189	177	153	130	1080
Support services	122	75	45	58	68	56	421
Total: Capital Mains & Services	649	631	489	475	508	466	3219
Mains & Services Replacement	240	263	272	280	283	277	1615
Total Investment	889	894	762	755	791	743	4834

4.10 In *formula years* the totals are:

Table 4.5 – Transco's post-reconciliation totals in formula years

£m (1996 prices)	*1997/98*	*1998/99*	*1999/00*	*2000/01*	*2001/02*	*Total (5 years)*
Transco's post-reconciliation totals	890	861	760	764	779	4054
MMC Allowed Investments	890	861	760	764	779	4054

4.11 For comparison with actual expenditure, the yearly planned figures also have to be adjusted for replacement contributions. These represent the amounts of money paid by consumers themselves towards replacement of a piece of capital. Table 4.6 summarises this adjustment to the planned figures.

4.12 The planned figures used in Transco's variance reports are the totals from Table 4.6 but adjusted for inflation and for the divestment of storage (see Appendix 4).

Table 4.6 – Transco's post reconciliation totals adjusted for replacement contributions - financial years

£m (1996 prices)	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*Total (6 years)*
Total: Capital Mains & Services	649	631	489	475	508	466	3219
Mains & Services Replacement	240	263	272	280	283	277	1615
Total Investment	889	894	762	755	791	743	4834
Less Replacement Contributions	-41	-44	-34	-33	-32	-32	-216
Net Investment	*848*	*850*	*728*	*722*	*759*	*711*	*4618*

5 Transco's 1997 and 1998 Variance Analyses

5.1 This chapter summarises Transco's variance analyses of its 1997 and 1998 capital expenditure (Transco's reports are reproduced in full as Appendices 5 and 6). The first two sections of this chapter summarise Transco's analyses of 1997 and 1998 expenditure. The third section provides Ofgem's views on the effectiveness of Transco's analysis in fulfilling the agreed aims of capital expenditure monitoring as set out in Appendix 5 of Ofgem's July 1997 price control consultation document.

Transco's Variance Analysis for 1997

5.2 Transco's document "Capital Investment Monitoring 1997 Variance Analysis" is reproduced in full in Appendix 5 of this consultation document. In addition, Appendix 5 reproduces Transco's spreadsheets for the different asset categories that are the substance of its capital expenditure monitoring. The main results of Transco's analysis are summarised below.

5.3 Transco provide the following summary of investment and investment variance for 1997:

Table 5.1 – Summary of investment and investment variance for calendar year 1997

£m (1997 prices)	*MMC Outcome*	*1997 Actual*	*Variance*	*% Variance*
Gross Capital	644	502	-142	-22%
Net replacement	204	151	-54	-26%
Total investment	848	653	-195	-23%

5.4 The MMC outcome column represents the capital expenditure planned for 1997 following Transco's reconciliation of its original investment plan with the comments and forecasts of the MMC. These are the figures shown in tables 4.4 and 4.6 above adjusted for inflation and the divestment of storage.

5.5 These figures are broken down by asset category as follows:

Table 5.2 – Summary of investment and investment variance for 1997 broken down by asset category

£m (1997 prices)	*MMC Outcome*	*1997 Actual*	*Variance*	*% Variance*
NTS	147	115	-32	-22%
LTS	59	30	-29	-49%
Distribution: *- Mains* *- Services*	174 110	142 99	-32 -11	-18% -10%
Meters	227	160	-67	-30%
Other	132	107	-25	-19%
Total	848	653	-195	-23%

5.6 There is a significant underspend of £195m (23%) on capital against planned levels for 1997. Transco's view, expressed in its Investment Plan, is that the investment levels forecast were conservatively low. As shown in Appendix 5, Transco identify a number of reasons for this underspend in its Variance Analysis report.

5.7 Transco states that "serviceability" outputs have been achieved and "growth outputs" exceeded. They also suggest that outputs have been delivered at lower cost than forecast. Reasons for the underspend include: re-phasing of certain planned works; managed re-scheduling of growth-related pipeline projects; unit cost reductions as a result of the introduction of best practices; and workload changes resulting from the introduction of competition into the connections business. More details are available in Transco's report in Appendix 5.

5.8 Ofgem has not at this stage reached any conclusions on the reasons for the underspend given by Transco or the extent to which the reported underspend could be treated as efficiency savings.

Transco's Variance Analysis for 1998

5.9 Transco's document "Capital Investment Monitoring 1998 Variance Analysis" is reproduced in full in Appendix 6 of this consultation document. In addition, Appendix 6 reproduces Transco's spreadsheets for the different asset categories that are the substance of its capital expenditure monitoring. The main results of Transco's analysis are summarised below.

Table 5.3 – Summary of investment and investment variance for calendar year 1998

£m (1998 prices)	*MMC Outcome*	*1998 Actual*	*Variance*	*% Variance*
Gross Capital	648	553	-95	-15%
Net replacement	233	165	-68	-29%
Total investment	881	718	-163	-19%

5.10 The MMC outcome column represents the capital expenditure planned for 1998 following Transco's reconciliation of its original Investment Plan with the comments and forecasts of the MMC. As for 1997, these are the figures shown in tables 4.4 and 4.6 above, adjusted for inflation and the divestment of storage.

5.11 These figures are broken down by asset category as follows

Table 5.4 – Summary of investment and investment variance for 1998 broken down by asset category

£m (1998 prices)	*MMC Outcome*	*1998 Actual*	*Variance*	*% Variance*
NTS	209	206	-3	-2%
LTS	49	43	-6	-13%
Distribution:				
- Mains	198	149	-49	-25%
- Services	112	101	-11	-10%
Meters	224	133	-91	-41%
Other	89	86	-3	-3%
Total	881	718	-163	-19%

5.12 There is a significant underspend of £163m (19%) on capital against planned levels for 1998. As shown in Appendix 6, Transco identify a number of reasons for this underspend in its Variance Analysis report.

5.13 In Appendix 6, Transco suggest several reasons for the 19% underspend. They note that "servicability" outputs have been achieved and growth outputs exceeded. These outputs were delivered at "lower investment levels than forecast in the MMC report". Transco suggests that these lower costs were due to a number of factors: re-phasing of certain planned works; managed re-scheduling of growth-related pipeline projects; unit cost reductions as a result of the introduction of best practices; and workload changes (for instance through the introduction of competition in connections).

5.14 As with the 1997 underspend, Ofgem has not at this stage reached any conclusions on the reasons for the underspend given by Transco or the extent to which the reported underspend could be treated as efficiency savings.

Ofgem's Views on Transco's Variance Report

5.15 The agreed aims and features of capital expenditure monitoring were set out in Appendix 5 of Ofgas's July 1997 price control document, which is reproduced as Appendix 1 in this document. Specifically, ten separate aims were identified. In Appendix 2 we comment on how effectively Transco's capital expenditure monitoring has so far achieved each of the ten aims.

5.16 Significant progress has been made in monitoring Transco's capital expenditure but Transco's variance report does not currently meet all of Ofgem's aims for capital expenditure monitoring. In particular, Ofgem considers that more work is needed on output definitions. However, both Ofgem and its consultants are working with Transco to improve the quality of data provided by Transco and Ofgem expects that a framework which meets these aims can be established during the period before the next price-control review commences.

6 The Way Forward

Future Work on Capital Expenditure Monitoring

6.1 Ofgem recognises that Transco has made progress in monitoring its capital expenditure. However, Ofgem believes that further work is required to improve the quality of Transco's variance report. In particular the definitions of concepts such as outputs and drivers need more work. Ofgem will also need to investigate further the reasons for Transco's reported underspend, and intends to obtain an independent audit of Transco's data and data-collection methodology.

6.2 Ofgem expects that reports on Transco's capital expenditure each year should in future be available shortly after the end of each year.

6.3 Ofgem also intends to investigate Transco's operating expenditure. Only by considering operating expenditure and identifying any trade-off between capital expenditure and operating expenditure, will it be possible to fully evaluate the efficiency of Transco's investment. Ofgem expects that the experience gained from developing a capital expenditure monitoring framework will help the process of operating expenditure reporting.

6.4 Ofgem has not yet reached any conclusions on the reasons for Transco's apparent underspends in 1997 and 1998, or how these should be treated at the next price-control review. Before Ofgem can analyse these underspends, more work will be needed to define the output levels which the capital expenditures forecast by the MMC were expected to achieve. However, it is Ofgem's intention that where underspends are attributable to a failure by Transco to deliver expected levels of outputs, rather than to efficiency gains by Transco, allowed revenues under the next price control should be adjusted to take account of any undue financial benefit to Transco from such underspends.

Summary of the Issues for Consultation

6.5 Ofgem invites the views of respondents on the issues raised in this document. In particular, Ofgem welcomes the views of respondents on:

- Transco's variance report for 1997, and the reasons for Transco's apparent underspend;
- Transco's variance report for 1998, and the reasons for Transco's apparent underspend;
- the framework for capital expenditure monitoring outlined in chapter 3; and
- the outputs and drivers against which Transco's capital expenditure should be judged.

Appendix I: Objectives and Aims of Capital Expenditure Monitoring

(Appendix 5 from: *BG Transportation and Storage: The Director General's Price Control Proposals, April 1997 – March 2002*, Ofgas (July 1997))

The Present Position

At present there are no formal arrangements for monitoring Transco's capital expenditure. In our submission to the MMC, Ofgas identified four reasons for wishing to introduce formal capital expenditure monitoring:

- first, monitoring capital expenditure is a means to understand better the outputs that Transco could be providing as a transportation provider. Ideally, it would be outputs (in terms of performance measures) rather than inputs (in terms of millions of pounds, kilometres of pipe laid or other physical measures) that could guide a regulator as to whether a divergence from a forecast is due to reasons of efficiency. If a regulated company can achieve its performance standards while underspending its capital expenditure forecasts, this divergence could be attributed to reasons of efficiency;

- second, more formal capital expenditure monitoring would enable future price-control reviews to be carried out with less of the information problems that were present at the beginning of this price-control review. For example, much of the data that was requested by Ofgas on capital expenditure was not readily available. More regular monitoring would have addressed this issue and led to a lower burden in terms of information requests and management time on Transco;

- third, we wish to understand the interaction between capital expenditure and operating expenditure in more detail. Clearer monitoring of capital expenditure will enable this interaction to be understood more fully; and

- fourth, there is currently an incentive on Transco to overestimate its forecasts of capital expenditure. This can result in revenues being higher than is necessary.

The Way Forward

Transco and Ofgas have been considering the way in which monitoring of capital expenditure can be taken forward. In formulating a way forward, we wish to be able to meet the following objectives:

- to provide timely and appropriate information against which agreed outputs, cost drivers and capital expenditure efficiency may be measured and reviewed on an ongoing basis;

- to increase and develop knowledge of Transco's capital expenditure programme and the outputs it is designed to achieve, leading to better forecasts; and

- to avoid ad hoc information requests.

The following features of a capital expenditure monitoring programme will need to be developed:

1. clear definition of outputs;

2. identification of the drivers of investment and associated capital expenditure requirements;

3. a method for identifying efficiency gains as distinct from variances in capital expenditure arising from changes to the drivers of capital expenditure;

4. a measure of the impact of capital expenditure on operating costs;

5. an understanding of how capital expenditure may be affected by the unbundling of particular activities if and when such unbundling is appropriate;

6. the method whereby Transco's capital expenditure is linked to asset valuation;

7. high quality data in an agreed format compatible with both Ofgas's and Transco's existing or planned business systems;

8. an understanding of data collection methodology;

9. the basis for inclusion of a capital investment report in Transco's annual report and independently audited accounts; and

10. a link between Transco's capital expenditure requirements in the price-control period and Transco's longer term capital expenditure forecasts.

As a first step, Transco has agreed to the following actions:

- the break down of the MMC Investment Programme by process, identifying each major element of forecast capital expenditure for the period;

- the definition of the activities and outputs to be achieved for each major element of expenditure and the methods of measurement; and

- the capital expenditure reporting and monitoring requirements, and any additional capital requirement for independent audit.

Timetable

By the end of 1997, Transco and Ofgas anticipate being able to agree:

- a method for identification of efficiency gains beyond those in the re-based Investment Programme; and

- principles for taking account of these matters in future price-control reviews.

Appendix II: Progress Against the Ten Key Aims of Capital Expenditure Monitoring

The ten key aims of capital expenditure monitoring were set out in Appendix 5 of the Ofgas document, *BG Transportation and Storage: The Director General's Price Control Proposals, April 1997 – March 2002*, reproduced as Appendix 1 above. This Appendix sets out Ofgem's views on progress against these key aims.

Aim 1 – "clear definition of outputs"

For capital expenditure monitoring to function it is important that the outputs which capital expenditure is required to deliver are clearly identified. Outputs should be clearly described with a physical measure proposed and the intended result specified.

Transco's outputs do not fully meet these criteria. In particular, the outputs are not clearly measured. For instance, for NTS the serviceability output, "to ensure the reliable and safe operation of the NTS", lacks measurement. Furthermore, the definitions of outputs do not appear to accord with the stated outputs delivered. The output definitions should involve an identification of measurable terms, which should relate directly to the identification of the outputs actually delivered.

Aim 2 – "identification of the drivers of investment and associated capital expenditure requirements"

Ofgem does not believe that Transco's framework identifies investment drivers, and then capital expenditure requirements, in the way envisaged.

Investment drivers are the physical features of the system that lead to workloads and hence capital expenditure, and need to be identified according to this physical relationship. The broad investment driver categories of "serviceability", "growth" and "infrastructure" identified by Transco do not reflect this.

Aim 3 – "a method for identifying efficiency gains as distinct from variances in capital expenditure arising from changes to the drivers of capital expenditure"

Ofgem believes Transco's work on capital expenditure monitoring has been improving. However, Ofgem does not feel it is possible to establish the extent of efficiency savings from Transco's current data.

Whilst the broad categorisation of reasons for Transco's underspend is helpful, for instance in Table 1.4 of the 1997 Variance Analysis, the derivation of numbers is not sufficiently clear and convincing to have enough confidence in the amount of underspend attributed to each reason. Greater quantitative evidence is required as well as more detailed textual description of the detailed reasons for underspends within each of the categories.

Aim 4 – "a measure of the impact of capital expenditure on operating costs"

Currently, Transco does not identify substitution between capital expenditure and operating expenditure as a reason for underspends. Such substitution could arise, for example, if Transco works its existing system harder, for instance by increasing system pressures by running compressors at a higher level. Alternatively, efficiency gains may be possible if Transco is able to operate the system at greater intensity to achieve its outputs, without requiring significantly greater operating expenditure. Transco could explain where this occurs.

Aim 5 – "an understanding of how capital expenditure may be affected by the unbundling of particular activities if and when such unbundling is appropriate"

By separately identifying meters as an asset category, Transco's capital expenditure monitoring has recognised that unbundling is likely to occur. Indeed, it is important that meter unbundling and capital expenditure monitoring work closely together. In addition, Transco's connections business maybe unbundled from the transportation business in the future. In view of this, Ofgem would expect Transco to identify connections capital expenditure as a separate area of capital expenditure in future years.

Aim 6 – " Transco's capital expenditure is linked to asset valuation

Transco has not related the capital expenditure monitoring analysis to monitoring asset valuation levels over time. Ofgem believes this is an important part of capital expenditure monitoring. It is important that the size of the asset base can be monitored over time as it is this value that in turn partly determines the transportation charges Transco's customers pay. Monitoring of asset levels is also important for enabling greater understanding of Transco's capital expenditure requirements over time.

In future, Ofgem expects Transco to identify planned and actual capital expenditures for each category of asset lives for each of the asset types.

Aim 7 – "high quality data in an agreed format compatible with both Ofgem's and Transco's existing or planned business systems"

Ofgem intends to obtain an independent audit of Transco's data.

Aim 8 – "an understanding of data collection methodology"

Ofgem will expect Transco to produce a separate report on its data collection methodology. Ofgem considers that Transco's data collection methodology should be independently audited.

Aim 9 – "the basis for inclusion of a capital investment report in Transco's annual report and independently audited accounts"

Ofgem would like to see high-level summaries of Transco's variance reports, when suitably adjusted to meet Ofgem's requirements, included in BG Group plc's annual reports (or the accounts of any successor as Transco's ultimate holding company). Generally, it is sensible for all of Transco's financial reporting to be well integrated with

clear links established. This leads to greater clarity from a regulatory perspective and provides useful information to Transco's customers and shareholders.

Aim 10 – "a link between Transco's capital expenditure requirements in the price-control period and Transco's long-term capital expenditure forecasts"

Transco's capital expenditure monitoring work has not identified long-term capital expenditure requirements beyond the life of the current price control (after 2002). Ofgem believes it is important that Transco's current capital expenditures are placed in the context of long-term capital requirements, even though the planned capital expenditures used for the purposes of monitoring under- or over-spends only cover the current price-control period.

For instance, current replacement requirements can only be understood in the context of a long-term replacement programme. Although Transco's Ten-Year Statement mentions capital expenditure monitoring, Ofgem consider that in future there should be a link between actual expenditure listed in the Variance Reports and the long-term investment plans outlined in the Ten-Year Statement. In addition, re-scheduling reasons for underspend cannot be adequately justified unless a full description of long-term capital programmes is given, demonstrating why re-scheduling is a sensible long-term solution.

Appendix III: Summary of Transco's Reconciliation to the MMC Outcome

The MMC came to a view on Transco's capital expenditure requirements after considering Transco's "1997 Investment Plan" and the views of its consultants on any likely efficiencies or industry circumstances that Transco had not taken into account.

Since the MMC report was published, Ofgem and Transco have attempted to reconcile these MMC totals to Transco's investment plans. This has been achieved only recently for a high-level breakdown of Transco's investment expenditure. This high-level breakdown is summarised below in Table 1. These figures are in 1996 prices.

The net investment figure shows total investment less replacement contributions from customers.

To produce the total planned net investment figures in the variance reports, the net investment figures first need to be updated for inflation and then for the divestment of storage. Transco have used inflation figures of 3.1% for 1996-7 and 3.4% for 1997-8.

Therefore, using the net investment 1997 total, the adjustment for inflation would be £848 million*1.031=£874.28 million. To adjust for storage requires initially updating the storage figure for inflation: £25 million*1.031=£25.78 million. Lastly, to get the adjusted net investment required for 1997, the adjusted storage figure is deducted from the adjusted total net investment figure: £874.28 million - £25.78 million = £848.5 million.

Table 1: Agreed MMC/Ofgem/Transco High Level Investment Plan

£m (1996 prices)	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*Total 6 years*
NTS Pipelines	74	94	79	54	101	109	512
NTS Plant & Machinery	69	102	38	52	57	47	365
TOTAL NTS	142	196	117	106	159	157	877
Of which Interconnector	29	96	65	52	45	22	309
RTS pipelines	21	20	9	14	11	9	83
Diurnal Storage	10	11	13	14	15	17	80
RTS Plant & Machinery	26	14	13	6	4	4	68
TOTAL RTS	57	45	35	34	30	30	231
Mains	39	38	37	37	36	34	220
Services	45	43	41	40	38	36	242
District Plant & Machinery	13	13	13	12	12	12	74
Land & Buildings	0	0	0	0	0	0	2
Tools and transport operations	11	12	12	12	12	12	71
TOTAL DISTRIBUTION	108	106	104	101	97	94	609
Meters	220	210	189	177	153	130	1080
TOTAL AREA/DISTRICT	527	557	445	418	440	411	2798
Storage Business Unit	25	24	2	1	1	1	53
Telecoms Business Unit	5	3	3	3	3	3	20
Information Services	54	20	19	24	19	23	159
Supplies & Transport	14	16	10	19	34	18	111
System Operations	17	6	11	11	11	11	65
Transportation Services	7	6	0	0	0	0	13
TOTAL CAPITAL	649	631	489	475	508	466	3219
Gross Replacement	240	263	272	280	283	277	1615
GROSS INVESTMENT	889	894	762	755	791	743	4834
Less Repl Contributions	-41	-44	-34	-33	-32	-32	-216
NET INVESTMENT	848	850	728	722	759	711	4618

Appendix IV: Definition of Investment Drivers & Outputs (written by Transco)

Introduction

Transco's 1997 Investment Plan was provided to the MMC as evidence to their inquiry. The plan was examined by the MMC and Ofgas's consultants, WS Atkins. In determining Transco's allowed revenues, the MMC applied reductions totalling £425m to Transco's proposed investment expenditure. In order to reflect the inherent uncertainty in investment forecasting, the MMC supported the development of a capital monitoring system with potential for capital correction at the next price-control review.

This paper sets out to define the drivers of investment for each system tier. It further states the anticipated workloads and costs of meeting these drivers, and the planned outputs.

All figures quoted are consistent with Transco's view of the MMC outcome, and all costs are in 1996 prices. The principle references for the figures within this document are the 1997 Base Plan Assumptions (for throughput forecasts) and the paper prepared for Ofgem entitled Transco's Capital Investment 1997 to 2002 - MMC Outcome.

This version of the paper is intended as a development draft for discussion.

National Transmission System (NTS)

Drivers

Transco has an obligation to expand the NTS pipeline network such that it has sufficient capacity to meet demand in a 1 in 20 peak day. This demand and corresponding supplies are forecast to grow as follows -

Demand

GWh/d	96/97	97/98	98/99	99/00	00/01	01/02
NTS 1 in 20 Peak Day Firm Demand	4,594	4,676	5,059	5,196	5,393	5,507

Note: Gas supply year runs from October to September

Supply

GWh/d	96/97	97/98	98/99	99/00	00/01	01/02
Bacton	1,002	952	1,020	1,072	1,167	1,247
Barrow	637	637	637	637	664	663
Easington	356	326	335	319	393	366
St Fergus	1,064	1,103	1,349	1,390	1,415	1,384
Teesside	12	287	446	504	530	526
Theddlethorpe	510	482	473	463	470	441
Onshore	5	4	3	2	1	1
Total Beach Supplies	3,586	3,791	4,263	4,387	4,640	4,628
Storage	1,008	885	796	809	753	880
Total Peak Supply	4,594	4,676	5,059	5,196	5,393	5,507

Note: Gas supply year runs from October to September

The figures above are drawn from the 1997 Base Plan Assumptions, and further details are available within that document.

Investment

£m	97	98	99	00	01	02
Pipelines	74	95	66	31	30	33
Plant & Machinery	69	98	36	37	20	10
Security of Supply	0	0	14	24	71	77
Maintenance	0	6	11	23	23	20

Outputs

- Transco provides capacity to deliver 1 in 20 peak day firm demand for total NTS.
- Capacity is provided to accept supplies from terminals and storage.
- Transco also invests in additional capacity to maintain and improve security of supply.

Local Transmission System (LTS)

Drivers Transco has an obligation to expand the LTS pipeline network such that it has sufficient capacity to meet demand in a 1 in 20 peak day. In total, LDZ demand is forecast to grow as follows -

GWh/d	96/97	97/98	98/99	99/00	00/01	01/02
Scotland	285	289	292	294	297	300
Northern	216	219	221	222	224	226
North West	532	539	546	550	555	560
North East	249	253	255	257	260	262
East Midlands	406	413	419	422	424	428
West Midlands	415	421	428	431	434	438
Wales North	44	45	45	45	46	46
Wales South	154	156	158	159	161	163
Eastern	343	348	353	357	360	363
North Thames	499	506	513	519	523	528
South East	469	476	481	486	491	495
Southern	335	341	345	348	351	354
South West	240	243	246	248	250	252
LDZ 1 in 20 Peak Day Firm Demand	4,187	4,249	4,302	4,338	4,376	4,415

Diurnal Storage Requirement	668	679	686	691	698	706

Note: Gas supply year runs from October to September

Investment

£m(1996 prices)	97	98	99	00	01	02
LDZ Demand Growth	44	32	21	19	15	13
Maintenance of System Capacity	2	1	2	0	0	0
Diurnal Storage Provision	10	11	12	13	15	17

Outputs

GWh/d	96/97	97/98	98/99	99/00	00/01	01/02
Total LDZ Peak Day Supply	4,187	4,249	4,302	4,338	4,376	4,415
Diurnal Storage Provision	668	679	686	691	698	706

Note: Gas supply year runs from October to September

Distribution

Drivers Transco has a legal obligation under it's PGT licence to respond to any request for a gas supply from consumers whose property is within 23m of a suitable existing gas main.

It will also supply connections to new housing sites and non domestic customers.

It is recognised that Transco will lose market share in connections as competition increases. However, for the purposes of consistency with the MMC Outcome, it has been assumed in the figures below that Transco retains a 100% market share.

000's	97	98	99	00	01	02
Demand for connections to New Housing	155	164	167	169	169	169
Demand for connections to Existing Housing	102	96	89	84	79	74
Demand for Non Domestic connections	16	16	16	16	16	16

Workload

	97	98	99	00	01	02
Total new mains (km)	1,756	1,809	1,822	1,832	1,827	1,823
Total new services (000's)	273	276	272	269	264	259

Investment

£m(1996 Prices)	97	98	99	00	01	02
Total new mains	38	38	37	36	35	34
Total new services	44	43	41	39	37	36

Outputs

000's	97	98	99	00	01	02
Number of connections to new domestic consumers	257	260	256	253	248	243
Number of connections to new non-domestic consumers	16	16	16	16	16	16

Meters

Drivers Transco has a licence obligation to provide meters and to maintain meter accuracy within stipulated tolerances. There are currently a number of meter replacement programmes which are ongoing, to replace meter populations which are known to have accuracy problems. New meters will also be fitted on occasion to properties where a meter has previously been removed and there remains an existing gas service. Transco has a further obligation to fit prepayment meter facilities, as requested by shippers/suppliers.

Workload

Volume (000's)	97	98	99	00	01	02
Black Spot Meters	500	500	500	500	500	467
Black Square meters	50	100	100	100	100	29
Non Domestic meter replacement	29	30	30	30	29	29
Other meter repl programmes	302	232	100	0	0	0
Escapes & Damage	206	209	214	214	219	219
Prepayment Meters	400	284	256	256	236	226
New Domestic Meters	334	338	333	329	322	316
New Non-Domestic Meters	16	16	16	16	16	16

Investment

£m(1996 prices)	97	98	99	00	01	02
Domestic Meter Replacement	78	95	81	70	69	59
Non Domestic Meter Repl.	14	14	14	14	13	13
Prepayment Meters	77	51	45	44	21	20
New Domestic Meters	36	35	34	33	31	30
New Non-Domestic Meters	14	14	14	13	13	13

Outputs

Volume (000's)	97	98	99	00	01	02
Black Spot meters awaiting programmed replacement at year end	2,467	1,967	1,467	967	467	0
Black Square meters awaiting programmed replacement at year end	908	808	708	608	508	479
Other existing replacement programmes. Meters awaiting programmed replacement at year end	332	100	0	0	0	0

- New meters are fitted as required by shippers/consumers
- Meters are replaced as necessary for Escape & Damage purposes
- Prepayment meters are provided as requested by shippers

Other Investment

Drivers Transco makes investments in the areas of IS, Telecommunications, and System Control for business sustaining purposes. Investment in dataloggers is required for daily meter reading purposes. Investment in vehicles is driven both by the size of Transco's direct labour workforce and the established working practices (e.g. single man working or team working).

Investment

£m	97	98	99	00	01	02
Meter Reading	7	6	0	0	0	0
Transport	14	16	10	19	34	18
IS	57	21	20	25	20	24
Telecommunications	5	3	3	3	3	3
System Control	17	6	11	11	11	11

Outputs These costs can largely be considered business sustaining and, as such, do not produce specific, easily measurable outputs in their own right. They instead support the other business activities in the achievement of their outputs and ongoing efficiency improvements.

The IS forecast is based on the delivery of systems to support Domestic Competition and will provide for age-based and technology driven replacement. The WAM system will provide integrated work and asset management systems for the business and a data warehousing facility is to be provided in order to provide flexibility in the analysis of operational data to inform managerial and strategic decision-making.

Transport investment is the capital element of maintaining the vehicle fleet which supports operational activities.

Mains & Services Replacement

The drivers and outputs for mains replacement will be discussed in detail in the Ofgas/HSE/Transco tripartite review of this policy.

Drivers Transco has a statutory requirement, as set out in the Health & Safety Commission document "Britain's Gas Supply - A Safety Framework" as follows -

"The new arrangements must be as safe as current arrangements and could, where possible, provide a basis for improving standards in line with the knowledge and technology of the day."

Workload The following workloads are Transco's view of the MMC outcome for mains & services replacement.

	97	98	99	00	01	02
Mains replacement (km)	1,947	2,157	2,355	2,488	2,539	2,613
Service replacement (000's)	286	298	316	325	333	341

Investment

£m(1996 Prices)	97	98	99	00	01	02
Net Replacement	200	224	242	250	254	248

Outputs

The outputs of the Mains and Services Replacement Investment Programme will be informed by the tripartite Ofgas/HSE/Transco discussions. Items which may require monitoring for this purpose are Gas in Buildings reports, mains removed from hazard and services replaced.

Appendix V: Transco's Capital Expenditure Monitoring: 1997 Variance Report (written by Transco)

Contents

FOREWORD

The purpose of this document is to provide a high-level summary of the major variances in Transco's 1997 Capital Investment when compared to that allowed by the MMC in calculating Transco's allowed revenues for the 1997 - 2002 price control period. The report does not seek to provide a rigorous identification of detailed workload or unit cost variances. It is intended that this detailed analysis will be provided in documentation to be developed in conjunction with Ofgas and their consultants.

CONVENTIONS WITHIN THIS DOCUMENT

The accounting convention used within Transco represents investment as gross capital and net replacement. Collectively these two elements are referred to as total investment. This convention is used throughout this document and all costs are shown at 1997 prices. Unit cost analysis of Replacement activities (Distribution Mains and Services) is on a gross basis to maintain consistency with MMC submissions.

Investment Driver Categorisation

Each category of investment is designated against one of three primary drivers - Serviceability; Growth and Infrastructure as shown below:

- Serviceability related capital expenditure is necessary to maintain delivery of Transco's current capabilities or required outputs or address changes to the operating requirements of those assets.
- Growth related capital expenditure is necessary to provide for new assets or increases in the required capabilities or outputs of Transco's existing assets.
- Infrastructure related capital expenditure provides and supports capabilities and a range of required outputs which are not easily mapped to serviceability or growth drivers.

Asset Type Categorisation

Investment is categorised against the asset types associated within the following categories which align broadly to asset life categorisations: National Transmission System (NTS); Local Transmission System (LTS); Distribution Mains; Distribution Services; Meters; Infrastructure.

1 EXECUTIVE SUMMARY

This report identifies and explains the progress made in 1997 towards delivery of the MMC agreed outputs for the formula period up to 2002. The report also identifies the main variances between investment allowed for by the MMC and Transco 1997 actual expenditure.

Serviceability outputs of safety and reliability have been achieved.

Growth outputs have been exceeded through increasing the capability of the pipeline system above MMC outcome levels.

These outputs have been delivered at lower cost than forecast in the MMC report. Reasons for this lower investment are numerous and complex and include:

- The re-phasing of certain planned works, affected by the uncertainty during 1997 arising from the MMC's inquiry, the outcome of which was not known until June 1997. Works particularly affected by this timing were distribution mains and services replacement and the meter replacement programmes;

- Managed re-scheduling of growth related pipeline projects, a benefit of improved planning and construction programmes which enable shorter project durations to deliver given outputs;

- Unit cost reductions as a result of the continuing introduction and implementation of best practices;

- Workload changes resulting from the introduction of competition into the connections business, changes in the road construction programme and consumer requirements; and

- Accounting treatment of overhead allocation.

1.1 Investment Summary

A high level investment summary is shown below:

Table 1.1

Investment Variance Analysis £m (1997 prices)	MMC Outcome	1997 Actual	Variance	% Variance
Gross capital	644	502	142	22%
Net replacement	204	151	54	26%
Total investment	848	653	195	23%

The high level summary breaks down into the driver categories as shown below:

Table 1.2

Investment £m (1997 prices)	MMC Outcome	1997 Actual	Variance	% Variance
Serviceability	292	216	76	26%
Growth	424	330	93	22%
Infrastructure	132	107	25	19%
Total	848	653	195	23%

The above data can be represented by asset type as follows:-

Table 1.3

Investment £m (1997 prices)	MMC Outcome	1997 Actual	Variance	% Variance
Serviceability				
NTS	-	-	-	-
LTS	-1	-1	0	50%
Distribution – Mains	134	99	36	27%
Distribution- Services	64	52	12	19%
Meters	95	66	29	31%
Total	292	216	76	26%
Growth				
NTS	147	115	32	22%
LTS	60	30	29	49%
Distribution – Mains	40	44	-4	-11%
Distribution – Services	46	47	-1	-3%
Meters	132	94	38	29%
Total	424	330	93	22%
Infrastructure	132	107	25	19%
TOTAL	848	653	195	23%

Alternatively, the high level summary can be broken down into asset types as shown below:-

Table 1.4

Investment £m (1997 prices)	MMC Outcome	1997 Actual	Variance	% Variance
NTS	147	115	32	22%
LTS	59	30	29	49%
Distribution - Mains	174	142	32	18%
- Services	110	99	11	10%
Meters	227	160	67	30%
Infrastructure	132	107	25	19%
Total	848	653	195	23%

The above tables show that total investment in 1997 differed from MMC Outcome by £195 million.

The following sections give analysis of the outputs achieved and the associated investment against these asset categories. Each section highlights achieved outputs and the 1997 variance.

The extent to which investment levels could vary over the remainder of the formula period is detailed in the "*Transportation Ten Year Statement 1998*". Within Appendix 7 of that document the maximum and "likely" ranges for Transco's investment up to 2002 are quantified and the significant issues and factors which underpin this uncertainty are described.

2 NATIONAL TRANSMISSION SYSTEM

2.1 Definition of Outputs

The outputs to be delivered in respect of National Transmission System (NTS) are:

- for Serviceability, to ensure the reliable and safe operation of the NTS;
- for Growth, to provide the capability to receive predetermined volumes of gas at terminals and have the capability to transmit the required 1 in 20 peak day volumes of gasto LDZ offtakes and other NTS connections in line with agreed plans.

2.2 Factors Affecting Required Output Levels

The desired outputs are revised annually as part of a process of Transco-led consultation with the broader industry to combine the views of producers, shippers, Government and major users. The outcome of this consultation is published annually within *"The Transportation 10 Year Statement"*.

Three basic factors drive NTS investment: forecast throughput; the geography of the demand; and the pattern of supply through the terminals. Where these factors differ from the assumptions in the original forecast, Transco undertakes analysis to determine whether this change in desired flow pattern can be delivered by the network. The resultant operating pattern may result in higher utilisation than was previously the case.

2.3 Outputs Delivered

Transco has responsibilities under its PGT Licence conditions to ensure the ongoing reliability and safety of its operations. These were met in 1997.

In the 1997/8 winter, the required 1 in 20 outputs were higher than forecast in the MMC Outcome and Transco would have been able to meet these, had 1 in 20 conditions prevailed, by changing the balance of flows within the network. The extent to which this may have been required is indicated in the table below:

Table 2.1

Peak Demand (GWh/d)	MMC Outcome 1997/8	Actual 1 in 20 Capability 1997/8	Change in Output for 1997/98
NTS 1 in 20 Peak Day Firm Demand	4,676	4,822	-146

The actual weather conditions experience during the 1997/98 winter were significantly warmer than average. The highest daily exit flow from the NTS was 4000GWh and it occurred on 16th December 1997. This was 86% of the MMC Outcome 1 in 20 peak and 83% of the actual 1 in 20 capability. Higher flows were experienced in winter 1995/96.

Annual throughput for the formula year 1997/98 was 613358 Gwh in the Business and Domestic sector. This was below the MMC Outcome by 3.4% reflecting the warmer than average weather conditions.

Annual throughput for Large Users was 209440 Gwh. which was 16.6% above the MMC Outcome reflecting the growing use of gas in the power generation market.

2.4 NTS Investment in 1997

The table below shows that NTS investment is driven by growth.

Table 2.2

NTS Investment (1997 Prices) £m	MMC Outcome	1997 Actual	Variance	% Variance
Serviceability - Replacement	-	-	-	-
Serviceability - Capital	-	-	-	-
Serviceability - TOTAL	-	-	-	-
Growth - Capital	147	115	32	22%
Total Investment	147	115	32	22%

2.5 Workload Description (NTS)

The workload in this category is typically high value projects involving the provision of additional pipeline and compressor capacity. Works are carried out by contractors, employed following competitive tendering.

2.6 Key Planning Assumptions and their effect on Variance (NTS)

The MMC Outcome spreadsheets detail the major projects that were forecast to incur expenditure during 1997. The duration of these projects is typically longer than one year, with the planned phasing of expenditure being linked to construction programme requirements.

2.7 Achievement of Workload (NTS)

All 3 major pipeline projects, Cowpen Bewley to Bishop Auckland (25km), Lutton to Huntingdon (19km) and Steppingley to Aylesbury (45km) required to be commissioned for winter 1997/98 were commissioned to plan.

The actual phasing of expenditure for projects due for completion later than 1997 has had a different profile from that assumed in the MMC Outcome. Changes in project management have enabled start dates, and therefore expenditure, to be deferred whilst maintaining the original commissioning date. This has had the impact of deferring expenditure of some £23m.

2.8 Project Specific Savings Achieved (NTS)

Specific savings on the 3 pipeline projects and on compressor projects amounted to £3m and £6m respectively. The pipeline savings were due to a combination of factors including more efficient material purchase (bulk purchase directly by Transco), more cost effective pipe transportation methods and identification of a lower cost route for a railway crossing. The compressor savings resulted from modifications to the design of ancillary features of the compressor station and the purchase of five compressor engines, under a single contract.

2.9 Summary of 1997 Investment Variance (NTS)

Table 2.3

Analysis of NTS Investment Variance (1997 prices)	£m
Pipeline expenditure re-phasing	21
Identified Pipeline Savings	3
Compressor expenditure re-phasing	2
Identified Compressor Savings	6
Total Variance	32

2.10 NTS investment related to specific requirements

It is not possible to map each NTS project to the delivery of transportation capacity for a single purpose. While a small number of projects are designed to meet specific demands at particular locations, most NTS projects are designed to optimise the provision of capacity in response to a number of drivers. The NTS planning process is described in more detail in the "*Transportation Ten Year Statement*".

Where major capacity expansion initiatives are planned, it is possible to identify projects for which these initiatives are a significant driver. The status of projects associated with two initiatives are described in sections *2.11* and *2.12* below.

2.11 NTS investment related to entry capacity at St.Fergus terminal.

The table below shows that investment associated with projects which were planned to enable increased entry capacity at St.Fergus was less than £1m close of the phasing in the MMC Outcome.

Table 2.5

Investment (1997 Prices) £m	MMC Outcome	1997 Actual	Variance
Major projects to provide St Fergus Entry Capacity	14	14	0

The 3 projects which make up the above expenditure relate to new compressors at Wooler, and 2 pipeline projects Wooler-Towtown and Aberdeen-Kerriemuir-Arbroath. Further work to complete this capacity expansion project was scheduled for completion in 1998.

2.12 NTS investment related to the European Interconnector

The table below shows that 1997 investment associated with making capacity available for the European Interconnector differed from the phasing in the MMC Outcome by £4m. This variance is an element within the rescheduling variance of the £23m detailed earlier.

Table 2.6

Investment (1997 Prices) £m	MMC Outcome	1997 Actual	Variance
Major projects associated with European Interconnector	30	26	4

There are nine planned projects which are summarised in the table above. Three of these relate to new compressors at Aberdeen, Towtown and Bishop Auckland. Actual expenditure on these compressors was ahead of the MMC Outcome by £4m. The remaining projects were related to pipelines and these were to support progressive build up of Interconnector flows from 1998 to the end of the formula period. Expenditure in 1997 was £8m behind the MMC Outcome phasing for these projects.

3 LOCAL TRANSMISSION SYSTEM

3.1 Definition of Outputs

The outputs to be delivered in respect of the Local Transmission System (LTS) are:-

- for Serviceability, to ensure the reliable and safe operation of the LTS
- for Growth, to transmit the required 1 in 20 peak day volumes of gas from NTS offtakes to the below 7 bar Distribution system within LDZs and to ensure the provision of adequate diurnal storage to cater for the variation in the rate of gas demand above the mean 24-hourly rate.

3.2 Factors Affecting Required Output Levels

The desired outputs are revised annually as part of a process of Transco-led consultation with the broader industry to combine the views of producers, shippers, Government and major users. The outcome of this consultation is published annually within *"The Transportation 10 Year Statement".*

Two basic factors drive LTS investment: forecast throughput and the geography of the demand. Where these factors differ from the assumptions in the original forecast, Transco undertakes analysis to determine whether this change in desired flow pattern can be delivered by the network. The resultant operating pattern may result in higher utilisation than was previously the case.

3.3 Outputs Delivered

The MMC Outcome includes provision for diverting pipelines, usually as a result of major road construction schemes. During 1997, Transco met these requirements in full.

In the 1997/8 winter, the required 1 in 20 outputs were higher than forecast in the MMC Outcome and Transco would have been able to meet these, had 1 in 20 conditions prevailed, by changing the balance of flows within the network. The extent to which this may have been required is indicated in the table below:

Table 3.1

Peak Demand (GWh/d)	**MMC Outcome 1997/8**	**Actual Capability 1997/8**	**Change in Output**
Total LDZ Peak	4,249	4,329	-80
Diurnal Storage Requirement	679	693	-14

The actual weather conditions experienced during the 1997/98 winter were significantly warmer than average. The highest daily exit flow in the LTS was 3450GWh and it occurred on 16th December 1997. This was 81% of the MMC

Outcome 1 in 20 peak and 80% of the actual 1 in 20 capability. Higher flows were experienced in winter 1995/96.

3.4 Investment in 1997

Table 3.2

LTS Investment (1997 Prices) £m	MMC Outcome	1997 Actual	Variance	% Variance
Serviceability - Replacement	-1	-0.5	-0.5	50%
Serviceability - Capital	-	-	-	-
Serviceability - TOTAL	-1	-0.5	-0.5	50%
Growth - Capital	59	30	28	48%
Total Investment	58	30	28	48%

3.5 Workload Description (LTS)

Serviceability driven workload involves the re-routing of existing pipelines in response to requests mainly from 3rd Parties (Local Authorities, Transport Authorities). Transco receives contributions (typically at a rate of 106%), for undertaking this work as dictated by relevant street works legislation. The workload in this category of activity tends to be non-routine and projects can vary greatly in scale and complexity.

Growth drives the need for additional pipeline capacity, associated pressure control equipment and additional diurnal storage capacity. The transmission capability requirements are outlined in *"The Transportation 10 Year Statement".*

3.6 Key Planning Assumptions and their effect on Variance (LTS)

The level of serviceability driven capital investment included in the MMC Outcome for LTS reflected the workload associated with recent quotations that had been issued for specific pipeline re-routing projects. Many of the road schemes identified through this process have subsequently been cancelled or postponed as a result of changes in the Government's road building programme.

The level of growth driven capital investment in the MMC Outcome was built up substantially from specific projects that were forecast for 1997. Updated information related to some of these projects indicates that £5m of proposed investment will no longer be required because customer requirements have changed.

Several other projects have been rescheduled, whilst maintaining their completion timescales. This has resulted in deferring capital expenditure levels in 1997 into future years. Rescheduled projects include the diurnal storage project at Peters Green (£10m) and several growth related projects totalling £10m, including Tea Green PRS, Bramford PRS and specific customer-related investment totalling £1m.

3.7 Achievement of Workload (LTS)

All projects enabling the provision ofplanned capacity levels were completed for winter 1997/98.

In addition, newly identified projects were undertaken including Stranraer PRS and several other projects totalling some £1m.

3.8 Project Specific Savings Achieved (LTS)

Specific project savings which total some £1m have been identified on 3 projects. The savings result from two initiatives led by Transco:

- modifying the externally produced design for a pressure reduction station (Dowlais/ Dyffryn); and
- reduced charges through improved contracts for a pipeline and filter/meter unit (Thornhill).

3.9 Summary of 1997 Investment Variance (LTS)

Table 3.3

Analysis of LTS Investment Variance (1997 prices)	**£m**
Re-scheduling of Growth Projects	10
Re-scheduling of Diurnal Storage Project	10
Projects Cancelled for Consumer reasons	7
Project Specific Savings Identified	1
Total Variance	28

4 DISTRIBUTION MAINS

4.1 Definition of Outputs

The outputs to be delivered in respect of the Distribution Mains system are:

- for Serviceability, to ensure the reliable and safe operation of the Mains system as set out in the Health & Safety Commission document "Britain's Gas Supply - A Safety Framework". This is enabled principally by the abandonment of cast iron mains at risk, in accordance with a replacement programme currently being reviewed jointly betweenTransco, Ofgas and the Health and Safety Executive.

- for Growth, to provide the capability for additional throughput in the below 7 bar pressure tiers of the pipe network within LDZs. This is enabled by the provision of new mains resulting from requests from shippers and developers for new supplies or additional throughput required to meet dynamic growth within the distribution system.

4.2 Factors Affecting Required Output Levels

The 1997 Plan was submitted during the MMC inquiry. Consistent with the submission to Ofgas earlier that year, Transco maintained its intention of increasing its statistical confidence level of not exceeding 3 cast iron mains related incidents per annum from its then current level of 42% to 95% over the 10 year period 1997 to 2006 - this was reflected in the 1997 planning assumption. Following discussions with Transco and Ofgas the MMC allowed an increase in investment approximately equivalent to a 60% confidence level subject to subsequent Tri-partite agreement. LDZs were targeted in 1997 to complete mains replacement work consistent with a 42% confidence level, and some re-phasing of the 60% confidence workload will take place in order for Transco to meet the implied output by 2002, subject to the 60% being endorsed by the Tri-partite group.

Growth outputs are driven by end user, developer and shipper requests which in turn are influenced by economic drivers including GDP, the buoyancy of the new housing market and the competitive position of gas relative to other fuels. The amount of total new mains forecast in the MMC outcome did not take account of the growth in competition from other PGTs in the new housing sector. It is estimated that 115 km of main has been laid by independent PGTs in 1997 (see section *4.6*). On the basis of this estimate, the total length of new main laid by all PGTs (including Transco) was 1857km. This exceeded the MMC forecast by 102km. Transco's reduced share in the market contributed to it laying 13km less new main than that included in the MMC outcome.

4.3 Outputs Delivered

During 1997, Transco exceeded the planned level of mains abandonment of 1947km by 10% and maintained the established safety level. No mains related incidents, associated with the mains replacement programme, were required to be reported to H&SE in 1997.

The capacity of the mains system was increased by Transco laying 1742 km of new main in response to consumer demands. Consumer requirement for new mains exceeded forecast, but the length of main laid by Transco was slightly less than forecast due to loss of market share to other PGTs.

4.4 Investment in 1997

Table 4.1

Distribution Mains Investment (1997 Prices) £m	MMC Outcome	1997 Actual	Variance	% Variance
Serviceability - Replacement	134	99	36	27%
Serviceability - Capital	-	-	-	-
Serviceability - TOTAL	134	99	36	27%
Growth - Capital	40	44	-4	-11%
Total Investment	174	142	32	18%

4.5 Workload Description (Distribution Mains)

Serviceability driven workload is primarily the replacement of mains to manage associated risk levels (Policy Replacement) and diversion of mains at the request of other authorities (Enforced Replacement).

Growth driven workload covers the provision of new mains to new housing, existing housing, non domestic customers, feeder mains and reinforcements to the below 7 bar network.

4.6 Key Planning Assumptions and their effect on Variance (Distribution Mains)

In the 1997 Investment Plan, the assumptions underlying the mains replacement modelling work were that:

- one metre of main to be abandoned would be replaced by one metre of main;

- a main to be abandoned would be replaced by a main of equivalent diameter;

- the ratio of mains < =180mm diameter to be replaced to those >180mm diameter was 3:1 i.e. a percentage split of 75:25 for below and above 180mm diameter mains.

For policy mains replaced in 1997, the continued development and implementation of best practices in planning and execution of works throughout the LDZs has contributed to the achievement of the following cost saving variances from the above assumptions:

- 7% less replacement main was required than the length to be abandoned

- approximately 20% of mains >180mm were replaced by mains < = 180mm

- 89% of replacement main laid was < = 180mm.

The combined effect of these 3 factors has been to reduce expenditure by £18m.

For Growth related workload, the MMC Outcome did not make an assumption as to the level of market share that would be lost as a result of independent PGT activity. Transco

has no detailed information regarding the length of new main laid by PGTs, but does have information that approximately fourteen thousand services were laid by other PGTs in 1997. Transco's own models assume that 8.23 metres of new housing main is laid per new housing service. Therefore the potential effect of independent PGT activity is a reduction of new mains to new housing workload by 115km (14000*8.23m). A gross value of £2m was assumed, based on some £14/metre, in the MMC Outcome for this workload.

4.7 Achievement of Serviceability Workload

The table below shows gross expenditure and unit costs. It differs from the serviceability expenditure in Table 4.1 as this was net of contributions for enforced diversions.

Table 4.2

Mains Replacement (Policy & Enforced)	MMC Outcome	1997 Actual	Variance	% Variance
Gross Expenditure (£m)	160	119	41	26%
Abandonment Workload (km)	1,947	2,150	-203	-10%
Replacement Workload (km.)	1,947	2,016	-69	-4%
Unit Cost (Gross £/m)	82	59	23	28%

The above table shows that whilst both output levels and associated workload targets were achieved for Total Mains Replacement, (Policy & Enforced), the overall unit cost was below the MMC outcome. It should be noted that much of this unit cost reduction was due to the change in workload mix for this particular year and is therefore unlikely to be sustainable over the formula period.

The overall length of policy replacement main laid was 7% above the planned MMC Outcome level. The length of main greater than 180mm in diameter laid was below plan by 220km whilst the length of main in the 180mm diameter or below category exceeded plan by 344km.

Enforced replacement expenditure was £5m below MMC Outcome level of £29m. This was largely offset by a reduction in contributions of £3m, resulting in net variance of £2m. The level of contributions, (typically 82%), is dictated by relevant legislation. In common with enforced pipeline diversions, the level of this activity is driven by external factors such as road improvement investment by the Highways Agency. Much of this work planned for 1997 has been cancelled or postponed.

4.8 Summary of Reasons for Distribution Mains (Serviceability) Variance

Table 4.3

Serviceability - Distribution Mains Investment Variance (1997 prices)	£m
Policy Mains Replacement < = 180mm	
Increased length laid 344km	-14
Reduction in planned unit cost of £6.4/metre	8
Policy Mains Replacement > 180mm	
Reduction in length laid 220km	32
Reduction of £38.8/metre in planned unit cost	8
Enforced Mains Replacement	5
Contributions Variance	-3
Total Variance	36

Unit cost reductions within the > 180mm and < =180mm pipe size bands are as a result of the use of discount rates within period contracts and reductions in reinstatement costs.

4.9 Achievement of Growth Workload (Distribution Mains)

The table below shows that growth related workload was close to MMC Outcome.

Table 4.4

Growth - Distribution Mains	MMC Outcome	1997 Actual	Variance	% Variance
Expenditure (£m)	40	44	-4	-11%
Workload (km.)	1,755	1,742	13	1%
Unit Cost (£/m)	23	25	-2	9%

4.10 Summary of Investment Variance (Distribution Mains)

Table 4.5

Analysis of Distribution Mains Investment Variance (1997 prices)	**£m**
Serviceability	18
Policy Mains Replacement – changes in lengths and diameter mix	16
- reductions in unit costs	2
Changes in Enforced Replacement (net of contributions)	2
Growth - main laid by independent PGTs	-6
- higher cost workload undertaken	-6
Total Variance	32

5 DISTRIBUTION SERVICES

5.1 Definition of Outputs

The key outputs to be delivered in respect of Distribution Services are:

- for Serviceability, to ensure the reliable and safe operation of Services. Service replacement policy is being considered as a part of the Tri-partite review.

- for Growth, to meet statutory requirements for connections within the Gas Supply Area and to respond to requests for non statutory connections subject to economicconsiderations.

5.2 Factors Affecting Required Output Levels

Service replacement is driven by three main factors:

- replacement of an adjacent main

- programmed replacement on the basis of previously identified deterioration

- individual service deterioration identified from public reported escapes

The level of new service requests is linked to the buoyancy of the housing market, GDP and the level of competition from other PGTs and of Self- Lay organisations.

Outputs Delivered

Some 262,000 services were replaced compared to the MMC Outcome forecast of 286,000. 72% of these were associated with replacement of the adjacent main and 20% as a result of individual service leakage. The main output from service replacement is reduction in risk associated with the high risk mains which can be abandoned once all services are fed from the newly re-laid mains.

254,000 new services were laid compared to the MMC Outcome of 273,000. As with new mains, there has been a loss of Transco's market share to other PGTs and self-lay organisations. The majority of the workload variance in new services is accounted for by the 14,000 new services laid by independent PGTs.

5.3 Investment in 1997

Table 5.1

Distribution Services Investment (1997 Prices) £m	MMC Outcome	1997 Actual	Variance	% Variance
Serviceability - Replacement	64	52	12	19%
Serviceability - Capital	-	-	-	-
Serviceability - TOTAL	64	52	12	19%
Growth – Capital	46	47	-1	-3%
Total Investment	110	99	11	10%

5.4 Workload Description (Distribution Services)

Serviceability workload is predominately associated with Service Replacement. Steel services are replaced and PE services transferred in the course of planned mains replacement. Bulk renewal of services is carried out where a high incidence of service leakage has become apparent in a particular locality. Unplanned service replacement will take place where replacement is the most cost-effective means of making safe a service found to be leaking following a public reported gas escape.

Growth driven workload includes the laying of new services to new housing, existing housing and non domestic premises.

5.5 Key Planning Assumptions and their effect on Variance (Distribution Services)

The mix of workload between service relay and service transfers was assumed to be 79%/21% in the MMC Outcome. The actual performance in 1997 was 63%/37%. Given that typical unit costs for these are £190 and £130 respectively, the effect of this is to reduce expenditure by £2m.

Competition from other PGTs has affected the volume of workload. Some 14,000 domestic services were laid by PGTs in 1997.

5.6 Achievement of Workload (Serviceability - Distribution Services)

Table 5.2

Serviceability- Distribution Services	MMC Outcome	1997 Actual	Variance
Expenditure (£m)	64	52	12
Services laid (000s)	286	262	24
Unit Costs (£)	224	199	25

Unit cost reductions for replacement services have been achieved through the more efficient use of period contracts which provide discounts when workload is pre-planned in bulk. Improved purchasing and supply agreements have reduced material costs. The greater use of best practices in no-dig techniques has had the dual benefit of reducing both labour and reinstatement costs.

5.7 Achievement of Workload (Growth - Distribution Services)

Table 5.3

Growth – Distribution Services	MMC Outcome	1997 Actual	Variance
Gross Expenditure (£m)	46	47	-1
Workload (services 000s)	273	254	19
Unit Cost	167	185	-18

14,000 of the 19,000 variance in new services laid is as a consequence of competition from independent PGTs.

5.8 Summary of Investment Variance (Distribution Services)

Table 5.4

Analysis of Distribution Services Investment Variance	£m
Serviceability - Lower Domestic Service Relay Workload	6
- Increase in proportion of service transfers	2
- Lower Non Domestic Service Relay Workload	2
- Unit cost reductions	2
Growth - Workload undertaken by independent PGTs	2
- Increase in high cost services to existing housing	-3
Total Variance	11

6 METERS

6.1 Definition of Outputs

The key outputs to be delivered in respect of Meters are:

- for Serviceability, to provide meters that operate within agreed levels of accuracy.

- for Growth, to meet Shipper and consumer requests for the provision of meters for new consumers and the provision of prepayment meters for Shippers.

6.2 Factors Affecting Required Output Levels

To ensure meters remain within acceptable accuracy levels, if specific meter types are identified as being likely to have accuracy levels which are unacceptable, programmes to replace such meters are agreed with Ofgas and other relevant legislative authorities.

Modifications to these agreed replacement programmes will occur as the results of further research into the achieved level of accuracy of individual meter types become established.

The number of new meters required will be influenced by the extent of competition by independent PGTs and other organisations together with the level of future economic growth.

The requirement for the installation of additional Electronic Token Meters (ETMs) is generated by Shippers' managing the level of debt of their consumers.

6.3 Outputs Delivered

The programme of replacement of Black Spot Meters was below MMC Outcome by 167,000. This deficit was equivalent to 4 months workload at the programmed level which was included in the MMC Outcome and was largely resultant from the uncertainty in the first half of 1997 whilst the MMC Outcome was awaited.

The replacement of the Black Square Meters has been deferred until later in the current formula period pending the results of research into meter accuracy levels. Ofgas will be informed of any changes in plans when the results of research are complete.

The number of ETMs installed exceeded the MMC Outcome level of 400,000 by 30,000.

The level of new meter installations required is driven by shippers requesting connections for new consumers. Demand for new meters was met, but at lower levels than forecast in the MMC Outcome.

Table 6.1

Meters Investment (1997 Prices) £m	MMC Outcome	1997 Actual	Variance	% Variance
Serviceability - Replacement	-	-	-	-
Serviceability - Capital	95	66	29	31%
Serviceability - TOTAL	95	66	29	31%
Growth - Capital	132	94	38	29%
Total Investment	227	160	67	30%

Table 6.2

Meters Installed during 1997 (000s)	MMC Outcome	Actual 1997	Variance	% Variance
Black Square Replacement Programme	50	0	50	100%
Black Spot Replacement Programme	500	333	167	33%
Other Replacement Programmes	331	325	6	2%
Prepayment Meters Installed	400	430	-30	-7%
New Meters Installed	350	314	36	10%
Gas escapes or damage	206	201	5	2%
Total	1,837	1,603	234	13%

The above table shows the level of meter installation activity undertaken in 1997 compared to MMC Outcome.

6.4 Workload Description

The Serviceability workload included in the MMC Outcome was for the programmed replacement of Black Spot Meters, Black Square Meters and Leather Diaphragm Meters, together with replacement of individual meters as a result of escapes and damage. Within the Growth workload are meters provided for new users of gas (both domestic and non domestic) and the installation of prepayment meters (usually Electronic Token Meters, (ETMs)).

6.5 Achievement of Workload

Progress towards the replacement of Black Spot Meters was slower than planned in 1997 due to:

- MMC outcome not known until June 1997;

- Domestic Competition priorities (system development and system lock out periods).

Some 333,000 Black Spot Meters were replaced in 1997. The 167,000 variance from the 500,000 target is being rephased over the remainder of the formula period.

The Black Square programme, which was forecast to replace 50,000 meters in 1997, was postponed pending the results of further sample testing.

6.6 Treatment of Overheads.

Following completion of the separation of British Gas's Transportation and Trading businesses in 1996, a review in 1997 using Transco specific Activity Based Costing data, indicated a reduction in overheads associated with capital meter work. The MMC Outcome included overheads equivalent to 100% of prime costs (direct labour plus materials), the rate inherited from the old Gas Business and used by British Gas Service to recharge Transco for meter work in the transitional year 1995. Following the review, the overall overhead uplift rate was reduced, but the basis of this application was improved so that overheads were applied to direct labour costs only, rather than total prime costs. The new overhead rate applied to direct labour costs was 104%. The effect of this review has been a reduction of £14 million in the overhead associated with meters for growth and £9 million for meters for serviceability.

6.7 ETM Assumptions

The "churn" of Electronic Token Meters (ETMs) can be caused either by replacement of an existing ETM to rectify a fault or by an ETM no longer being required at a property. When ETMs are removed for either reason, they are returned to the manufacturer's factory for refurbishment. Transco's approach to ETM refurbishment resulted in savings of £19m in 1997.

[Details omitted for reasons of commercial confidentiality].

The MMC Outcome assumed by Transco allows for 400,000 ETMs to be fitted in 1997. The actual number of ETMs fitted was 430,000. The planned cost of this increase in this workload was £5m. The cost of this additional workload was more than offset by workload reductions in new meter installation at a planned cost of £6m.

Table 6.3

Analysis of Meters Investment Variance (1997 prices)	£m
Black Square Workload under review	4
Reduced Workload in other Domestic Meter Replacement	13
Reductions in Unit Costs on Domestic Meter Replacement (excluding change in treatment of overheads)	1
Re-phasing of Non Domestic Meter Exchange	6
Lower new meter workload	6
Additional ETM workload	-5
Change in treatment of overheads	23
Additional ETM refurbishment	19
Total Variance	67

7 INFRASTRUCTURE INVESTMENT

7.1 Definition Of Outputs

The outputs which are delivered in respect of this category of investment are:

- for Serviceability, to ensure that support activities can continue to be undertaken by the provision of the necessary plant, equipment, vehicles and IT systems.

- for Growth, to provide the capability to meet increased gas transportation capability and the necessary functionality of operations in response to customer and regulatory requirements.

Because this category of expenditure results in the provision of support infrastructure the direct outputs are not easily mapped across the categories of Serviceability and Growth.

7.2 Factors Affecting Required Output Levels

The changes to functionality of operations are driven by the introduction of competition within gas supply, connections and other sectors of the business and by ongoing amendments to the Network Code. The need to meet the above requirements and to deliver progressive reductions in operational expenditure results in the modification or replacement of existing infrastructure.

7.3 Outputs Delivered

Phase 2 of Domestic Competition involved 1.6 million consumers and was implemented by March 1997.

Transco enabled the implementation of full competition in domestic gas supply by May1998.

1075 vehicles were replaced during 1997. (17% of the vehicle fleet as at December 1997.)

7.4 Investment in 1997

Table 7.1

Infrastructure Investment (1997 prices) £m	MMC Outcome	1997 Actual	Variance	% Variance
Information Systems	56	39	17	30%
Other Infrastructure	77	68	9	11%
Total	132	107	25	19%

7.5 Workload Description

The workload in this area covers the design, specification, procurement and installation of a range of infrastructure including:-

- information systems and hardware, vehicles, operational plant, gas control equipment, and communications equipment.

The table below indicates the main areas where variance occurred:-

Table 7.2

Infrastructure Investment (1997 prices) £m	MMC Outcome	1997 Actual	Variance	% Variance
Information Systems				
UK Link	29	26	3	10%
WAM	6	5	1	15%
E&MW	1	0	1	80%
I'X - Network Code	1	0	1	80%
Office & Support Systems	6	1	5	78%
IS Infrastructure	13	6	7	52%
Telecomms	5	1	4	81%
Transport	21	16	5	24%
District Plant & Machinery	14	23	-9	-67%
Tools & Transport Operations	12	15	-3	-29%
System Operations	18	7	10	58%
Other Infrastructure	8	6	2	25%
TOTAL	132	107	25	19%

It was necessary to advance some UK Link related expenditure into 1996 to ensure the timely implementation of Domestic Competition. The variance of £3m in 1997 was more than offset by the £8m which was advanced into 1996.

The detailed scope for the WAM project was subject to refinement during 1997 and rephasing into 1998 and 1999.

The improvements initially planned for Emergency and Meter Work system (E&MW) during 1997 have now been included in the revised scope for WAM.

Information Exchange (I'X) expenditure is linked directly to the level of requests from shippers to provide the necessary data transfer interfaces to enable agreed information

flows as outlined in the Network Code. Demand for this interface equipment in 1997 was lower than had been forecast.

Office and Support systems and infrastructure expenditure plans are linked to planning assumptions for organisational structures. Many of these structures were under review during 1997 resulting in deferral of planned support expenditure.

The Telecomms variance is partly accounted for by the deferral of certain projects including the Wales private mobile radio replacement project.

GLOSSARY

Bar

The unit of pressure that is approximately equal to atmospheric pressure (0.987 standard atmospheres). One millibar equals 0.001 bar.

Base Plan Assumptions (BPA)

A document produced by Transco on an annual basis that describes its supply and demand forecasts for the next ten years.

Compressor Station

An installation that uses gas or electrically powered jet engines to boost pressures in the pipeline system. Used to increase transmission capacity and move gas through the network.

Distribution System

A network of mains operating at three pressure tiers: intermediate (2-7 bar), medium (75mbar to 2 bar) and low (less than 75 mbar).

Diurnal Storage

Gas stored for the purpose of meeting variations in demand during the day. Gas can be stored in special installations (e.g. gasholders) or as linepack within the pipeline system.

Electronic Token Meter (ETM)

A prepayment meter which uses "smart card" technology to enable a gas supplier to recover gas charges and any outstanding debt as gas is consumed.

E&MW

An information system used to manage Emergency and Meter Work jobs.

Interconnector

A pipeline transporting gas to another country. The European interconnector can transport gas between Bacton in East Anglia and Zeebrugge in Belgium.

I'X - Network Code

An information system and associated infrastructure which enables the electronic exchange of information between Shippers and Transco in fulfilment of the Network Code.

Linepack

The volume of gas within the National or Local Transmission System at any time.

Local Distribution Zone (LDZ)

A geographic area supplied by one or more NTS offtakes. Consists of LTS and Distribution System pipelines.

Local Transmission System (LTS)

The pipeline system that takes gas from NTS offtakes and transports it to the Distribution system and direct to some large users.

National Transmission System (NTS)

High pressure system consisting of terminals, compressor stations and offtakes. Operates at pressures typically up to 75 bar. NTS pipelines transport gas from terminals to NTS offtakes.

Network Code

A document that defines the contractual relationship between Transco and its System Users.

Office of Gas Supply (Ofgas)

A Government agency responsible for regulating the onshore gas industry in Great Britain.

Peak Day Demand (1 in 20 Peak Demand)

The 1 in 20 peak day demand is the level of demand that, in a long series of winters, with connected load held at the levels appropriate to the winter in question, would be exceeded in one out of 20 winters, with each winter counted only once.

Public Gas Transporter (PGT)

A company licensed by Ofgas to transport gas to consumers. Transco is the largest PGT.

UK-Link

A suite of computer systems that supports Network Code operations. It includes AT-Link for energy balancing: Supply Point Administration: Invoicing and the Sites and Meters database.

WAM

The Work and Asset Management (WAM) programme will deliver a suite of computer systems in support of engineering activities which will replace systems which are known to be non -compliant with year 2000 and will include graphical geographic systems, quotations, emergency work issue, financial system interfaces and management information.

Appendix VI: Transco's Capital Expenditure Monitoring: 1998 Variance Report (written by Transco)

Contents

FOREWORD

The purpose of this document is to provide a high-level summary of the major variances in Transco's 1998 Capital Investment when compared to that allowed by the MMC in calculating Transco's allowed revenues for the 1997 - 2002 price control period. The report does not seek to provide a rigorous identification of detailed workload or unit cost variances.

CONVENTIONS WITHIN THIS DOCUMENT

The accounting convention used within Transco represents investment as either gross capital (in respect of enhancements) or net replacement (net of contributions). Collectively these two elements are referred to within this document as total investment.

All costs are shown at 1998 prices. Unit cost analysis of Replacement activities (Distribution Mains and Services) is on a gross basis to maintain consistency with MMC submissions. The MMC Outcome and its representation at 1998 prices is defined within the spreadsheets which accompany this report.

Investment Driver Categorisation

Each category of investment is designated against one of three primary drivers; Serviceability; Growth and Infrastructure as shown below:

- Serviceability related capital expenditure is necessary to maintain delivery of Transco's current capabilities or required outputs or address changes to the operating requirements of those assets.
- Growth related capital expenditure is necessary to provide for new assets or increases in the required capabilities or outputs of Transco's existing assets.
- Infrastructure related capital expenditure provides and supports capabilities and a range of required outputs which are not easily mapped to serviceability or growth drivers. It typically includes information and telecommunication systems, vehicles, and control equipment.

Asset Type Categorisation

Investment is categorised against the asset types associated within the following categories which align broadly to asset life categorisations: National Transmission System (NTS); Local Transmission System (LTS); Distribution; Mains; Distribution Services; Meters; Infrastructure

1 EXECUTIVE SUMMARY

This report identifies and explains the progress made in 1998 towards delivery of the MMC agreed outputs for the formula period up to 31st March 2002. The report also identifies the main variances between investment allowed for by the MMC and Transco's 1998 actual expenditure.

Serviceability outputs of safety and reliability have been achieved.

Growth outputs have been exceeded through increasing the capability of the pipeline system above MMC outcome levels. Operational problems were experienced in the commissioning of some new plant which temporarily constrained the availability of new capacity through St Fergus.

These outputs have been delivered at lower investment levels than forecast in the MMC report.

There are many reasons for this lower cost including:

- The re-phasing of certain planned works, affected by the uncertainties during 1998. Works particularly affected by this were distribution mains and services replacement, which await the result of the HSE / Ofgem / Transco discussions, and the meter replacement programmes where further data validation and analysis will clarify the extent of the programme;

- Managed re-scheduling of growth related pipeline projects, a benefit of improved planning and construction programmes which enable shorter project durations to deliver given outputs;

- Unit cost reductions as a result of the continuing introduction and implementation of best practices;

- Workload changes resulting from the introduction of competition into the connections business, changes in the road construction programme and consumer requirements.

Investment levels in some asset categories are significantly below the MMC Outcome, notably those related to meters and mains replacement.

1.1 Investment Summary

A high level investment summary is shown below:

Table 1.1

Investment Variance Analysis £m (1998 prices)	MMC Outcome	1998 Actual	Variance	% Variance
Gross capital	648	553	95	15%
Net replacement	233	165	68	29%
Total investment	881	718	163	19%

The high level summary breaks down into the driver categories as shown below:

Table 1.2

Investment £m (1998 prices)	MMC Outcome	1998 Actual	Variance	% Variance
Serviceability	342	208	135	39%
Growth	450	424	26	6%
Infrastructure	89	86	3	3%
Total	881	718	163	19%

The above data can be represented by asset type as follows:-

Table 1.3

Investment £m (1998 prices)	MMC Outcome	1998 Actual	Variance	% Variance
Serviceability				
NTS	0	0	0	
LTS	2	0	2	100%
Distribution				
- Mains	158	109	49	31%
- Services	66	53	13	20%
Meters	117	46	71	61%
Total	342	208	135	39%
Growth				
NTS	209	206	3	2%
LTS	47	43	4	9%
Distribution				
- Mains	40	40	0	1%
- Services	46	48	-2	-5%
Meters	107	87	20	19%
Total	450	424	26	6%
Infrastructure	89	86	3	3%
Total	881	718	163	19%

Alternatively, the high level summary can be broken down into asset types as shown below:-

Table 1.4

Investment £m (1998 prices)	MMC Outcome	1998 Actual	Variance	% Variance
NTS	209	206	3	2%
LTS	49	43	6	13%
Distribution - Mains	198	149	49	25%
- Services	112	101	11	10%
Meters	224	133	91	41%
Infrastructure	89	86	3	3%
Total	881	718	163	19%

The following sections provide analysis of the outputs achieved and the associated investment against these asset categories. Each section highlights achieved outputs and the 1998 variance.

Section 8 summarises the outlook for investment in the remainder of the present formula period. The extent to which investment levels could vary over this period is detailed in the "*Transportation Ten Year Statement*" which is published annually by Transco. Within that document the "likely" ranges for Transco's investment are quantified and the significant issues and factors which underpin this view are described.

2 NATIONAL TRANSMISSION SYSTEM

2.1 Definition of Outputs

The outputs to be delivered in respect of National Transmission System (NTS) are:-

- for Serviceability, to ensure the reliable and safe operation of the NTS
- for Growth, to provide the capability to receive predetermined volumes of gas at terminals and have the capability to transmit the required 1 in 20 Peak Day volumes of gas to LDZ Offtakes and other NTS connections in line with agreed plans.

2.2 Factors Affecting Required Output Levels

The desired outputs are revised annually as part of a process of Transco-led consultation with the broader industry to combine the views of producers, shippers, Government and major users. The outcome of this consultation is published annually within *"The Transportation 10 Year Statement"*.

Three basic factors drive NTS investment; forecast throughput; the geography of the demand; and the pattern of supply through the terminals. Where these factors differ from the assumptions in the original forecast, Transco undertakes analysis to determine whether this change in desired flow pattern can be delivered by the network. The resultant operating pattern may result in higher (or lower) utilisation than was previously the case.

2.3 Outputs Delivered

Transco has responsibilities under its PGT Licence conditions to ensure the ongoing reliability and safety of its operations. These were met in 1998.

In 1998/9 winter, the required 1 in 20 outputs were higher than forecast in the MMC Outcome due to producers and shippers forecasting higher demand. Transco would have been able to meet these, had 1 in 20 conditions prevailed, by changing the balance of flows within the network. The extent to which this may have been required is indicated in the table below:

Table 2.1

Peak Demand (GWh/d)	MMC Outcome 1998/9	Actual 1 in 20 Capability 1998/9	Change in Output for 1998/99
NTS 1 in 20 Peak Day Firm Demand	5,059	5,244	185

The actual weather conditions experienced during the 1998/99 winter were significantly warmer than average for much of the period. Nonetheless the previous demand record was exceeded on three occasions with the highest daily exit flow from the NTS of 4375GWh occurring on 10th February 1999. This was 86% of the MMC Outcome 1 in 20 peak and 83% of the actual 1 in 20 capability.

Annual throughput for the formula year 1998/99 was higher than in 1997/98 reflecting the combined effects of growth and colder weather conditions.

2.4 NTS Investment in 1998

The table below shows that 1998's NTS investment is driven by growth, with no replacement investment being undertaken. Much of this growth is required to meet the additional demand requirements generated by the Interconnector from Bacton to Belgium.

Table 2.2

NTS Investment (1998 Prices) £m	MMC Outcome	1998 Actual	Variance	% Variance
Serviceability - Replacement	-	-	-	
Serviceability - Capital	-	-	-	
Serviceability - TOTAL	-	-	-	
Growth - Capital	209	206	3	2%
Total Investment	209	206	3	2%

2.5 Workload Description (NTS)

The workload in this category is typically high value projects involving the provision of additional pipeline and compressor capacity. Works are carried out by contractors, employed following competitive tendering.

2.6 Key Planning Assumptions and their effect on Variance (NTS)

The MMC Outcome spreadsheets detail the major projects that were forecast to incur expenditure during 1998. The duration of these projects is typically longer than one year, with the planned phasing of expenditure being linked to construction programme requirements.

2.7 Achievement of Workload (NTS)

The major new pipeline and pressure uprating projects detailed in the MMC Outcome which were required to be completed for winter 1998/99 were commissioned to plan. These included the new pipelines: Treales - Warrington (40km), Hatton - Silk Willoughby (35km) and Peterborough - Lutton (27 km).

Four major compressor projects were physically completed at Aberdeen, Wooler, Bishop Auckland and Carnforth. Operational problems at Aberdeen during late 1998 affected the availability of capacity from the new compressors at Wooler and Bishop Auckland.

The actual expenditure during 1998 was £3m below the MMC outcome of £209m.

2.8 Summary of 1998 Investment Variance (NTS)

Table 2.3

Analysis of NTS Investment Variance (1998 prices)	**£m**
Rescheduling of projects	3
Total Variance	3

3. LOCAL TRANSMISSION SYSTEM

3.1 Definition of Outputs

The outputs to be delivered in respect of the Local Transmission System (LTS) are:-

- for Serviceability, to ensure the reliable and safe operation of the LTS
- for Growth, to transmit the required 1 in 20 peak volumes of gas from NTS Offtakes to the below 7 bar Distribution system within LDZs and to ensure the provision of adequate diurnal storage to cater for the variation in the rate of gas demand above the mean 24-hourly rate.

3.2 Factors Affecting Required Output Levels

The desired outputs are revised annually as part of a process of Transco led consultation with the broader industry to combine the views of producers, shippers, Government and major users. The outcome of this consultation is published annually within *"The Transportation 10 Year Statement".*

Two basic factors drive LTS investment; forecast throughput and the geography of the demand. Where these factors differ from the assumptions in the original forecast, Transco undertakes analysis to determine whether this change in desired flow pattern can be delivered by the network. The resultant operating pattern may result in higher utilisation than was previously the case.

3.3 Outputs Delivered

The MMC Outcome includes provision for diverting pipelines, usually as a result of major road construction schemes. During 1998, Transco met these requirements in full.

In 1998/99 winter, the required 1 in 20 outputs were higher than forecast in the MMC Outcome and Transco would have been able to meet these, had 1 in 20 conditions prevailed, by changing the balance of flows within the network. The extent to which this may have been required is indicated in the table below:

Table 3.1

Peak Demand (GWh/d)	**MMC Outcome 1998/9**	**Actual Capability 1998/9**	**Change in Output**
Total LDZ Peak	4,302	4,319	17
Diurnal Storage Requirement	686	665	-21

The actual weather conditions experienced during the 1998/99 winter were significantly warmer than average. Nonetheless a record flow was achieved, breaking the previous record set in 1995/96. The highest daily exit flow in the LTS was 3607GWh and it

occurred on 9th February 1999. This was 84% of the MMC Outcome 1 in 20 peak and 83% of the actual 1 in 20 capability.

3.4 Investment in 1998

Table 3.2

LTS Investment (1998 Prices) £m	MMC Outcome	1998 Actual	Variance	% Variance
Serviceability - Replacement	2	0	2	100%
Serviceability - Capital	-	-	-	
Serviceability - TOTAL	2	-	2	100%
Growth - Capital	47	43	4	9%
Total Investment	49	43	6	13%

3.5 Workload Description (LTS)

Serviceability driven workload involves the re-routing of existing pipelines in response to requests mainly from 3rd Parties (Local Authorities, Transport Authorities). Transco receives contributions (typically at a rate of 106%), for undertaking this work as dictated by relevant street works legislation. The gross value of the work carried out in 1998 was £4m.

Growth drives the need for additional pipeline capacity, associated pressure control equipment and additional diurnal storage capacity. The transmission capability requirements are outlined in *"The Transportation 10 Year Statement".*

3.6 Key Planning Assumptions and their effect on Variance (LTS)

The level of serviceability driven capital investment included in the MMC Outcome for LTS reflected the workload associated with recent quotations that had been issued for specific pipeline re-routing projects. Many of the road schemes identified through this process have subsequently been cancelled or postponed as a result of changes in the Government's road building programme.

The level of growth driven capital investment in the MMC Outcome was built up substantially from specific projects that were forecast for 1998. Updated information related to some of these projects indicates that £4m of proposed investment will no longer be required because customer requirements have changed.

The completion of the Peters Green diurnal storage project in 1998 after deferral of £10m of expenditure previously planned for 1997 has served to reduce the variance overall LTS variance in 1998.

3.7 Achievement of Workload (LTS)

All projects enabling the provision of planned capacity levels were completed for winter 1998/99.

3.8 Summary of 1998 Investment Variance (LTS)

Table 3.3

Analysis of LTS Investment Variance (1998 prices)	£m
Rephasing of Peters Green Project from 1997	-10
Slippage	10
Serviceability - reduction in diversions	2
Projects cancelled for consumer reasons	4
Total Variance	6

4 DISTRIBUTION MAINS

4.1 Definition of Outputs

The outputs to be delivered in respect of the Distribution Mains system are:-

- for Serviceability, to ensure the reliable and safe operation of the Mains system as set out in the Health & Safety Commission document "Britain's Gas Supply - A Safety Framework". This is enabled principally by the abandonment of cast iron mains at risk, in accordance with a replacement programme currently being reviewed jointly between Transco, Ofgas and the Health and Safety Executive.

- for Growth, to provide the capability for additional throughput in the below 7 bar pressure tiers of the pipe network within LDZs. This is enabled by the provision of new mains resulting from requests from shippers and developers for new supplies or additional throughput required to meet dynamic growth within the distribution system to meet 1 in 20 peak requirements.

4.2 Factors Affecting Required Output Levels

The 1997 Plan was submitted during the MMC inquiry. Consistent with the submission to Ofgas earlier that year, Transco maintained its intention of increasing its statistical confidence level of not exceeding 3 cast iron mains related incidents per annum from its then current level of 42% to 95% over the 10 year period 1997 to 2006 - this was reflected in the 1997 planning assumption. Following discussions with Transco and Ofgas the MMC allowed an increase in investment approximately equivalent to a 60% confidence level subject to subsequent Tri-partite agreement. Because of the potential uncertainty regarding the final Tri-partite agreement LDZs were targeted in 1998 to complete mains replacement work consistent with a 42% confidence level.

Growth outputs are driven by end user, developer and shipper requests which in turn are influenced by economic drivers including GDP, the buoyancy of the new housing market and the competitive position of gas relative to other fuels. The amount of total new mains forecast in the MMC outcome did not take account of the growth in competition from other PGTs in the new housing sector. It is estimated that 329 km of main has been laid by independent PGTs in 1998 (See Section *4.6*). On the basis of this estimate, the total length of new main laid by all PGTs (including Transco) was 1775km. This was below the MMC forecast by 34km. Transco's reduced share in the market contributed to it laying 363km less new main than that included in the MMC outcome.

4.3 Outputs Delivered

During 1998, Transco replaced 1884km of main whilst abandoning 1990km. This abandonment level was 8% below the MMC Outcome and maintained the established safety level. Three mains related incidents were reported to the H&SE in 1998.

The capacity of the mains system was increased by Transco laying 1446 km of new main in response to consumer demands. Total consumer requirement for new mains were below MMC forecast with the length of main laid by Transco being further reduced due to loss of market share to other PGTs.

4.4 Investment in 1998

Table 4.1

Distribution Mains Investment (1998 Prices) £m	MMC Outcome	1998 Actual	Variance	% Variance
Serviceability - Replacement	158	109	49	31%
Serviceability - Capital	-	-		
Serviceability - TOTAL	158	109	49	31%
Growth - Capital	40	40	0	1%
Total Investment	198	149	49	25%

4.5 Workload Description (Distribution Mains)

Serviceability driven workload is primarily the replacement of mains to manage associated risk levels (Policy Replacement) and diversion of mains at the request of other authorities (Enforced Replacement).

Growth driven workload covers the provision of new mains to new housing, existing housing, non domestic customers, feeder mains and reinforcements to the below 7 bar network.

4.6 Key Planning Assumptions and their effect on Variance (Distribution Mains)

In the 1997 Investment Plan, the assumptions underlying the mains replacement modelling work were that:

- one metre of main to be abandoned would be replaced by one metre of main;

- a main to be abandoned would be replaced by a main of equivalent diameter;

- the ratio of mains < =180mm diameter to be replaced to those >180mm diameter was3:1 i.e. a percentage split of 75:25 for below and above 180mm diameter mains.

For policy mains replaced in 1998, the continued development and implementation of best practices in planning and execution of works throughout the LDZs has contributed to the achievement of the following cost saving variances from the above assumptions:

- 5% less replacement main was required than the length to be abandoned

- approximately 20% of mains >180mm were replaced by mains < = 180mm

- 87% of replacement main laid was < = 180mm.

The combined effect of these 3 factors has been to reduce expenditure by £40m.

For Growth related workload, the MMC Outcome did not make an assumption as to the level of market share that would be lost as a result of independent PGT activity. Transco has no detailed information regarding the length of new main laid by PGTs, but does have information that approximately forty thousand services were laid by other PGTs in 1998. Transco's own models assume that 8.23 metres of new housing main is laid per new housing service. Therefore the potential effect of independent PGT activity is a reduction of new mains to new housing workload by 329km (40000*8.23m). A gross value of £4m was assumed, based on some £13/metre, in the MMC Outcome for this workload.

4.7 Achievement of Serviceability Workload

The table below shows gross expenditure and unit costs. It differs from the serviceability expenditure in Table 4.1 as this was net of contributions for enforced diversions.

Table 4.2

Mains Replacement (Policy & Enforced)	MMC Outcome	1998 Actual	Variance	% Variance
Gross Expenditure (£m)	184	132	52	28%
Abandonment Workload (km)	2,157	1,990	167	8%
Replacement Workload (km.)	2,157	1,884	273	13%
Unit Cost (Gross £/m)	85	70	15	18%

It should be noted that the level of unit cost reduction versus the MMC Outcome has decreased from the 29% seen in 1997 to 18%. in 1998 due to changes in workload mix.

The overall length of policy replacement main laid was 13% below the planned MMC Outcome level. The length of main greater than 180mm in diameter laid was below plan by 276km whilst the length of main in the 180mm diameter or below category exceeded plan by 85km.

Enforced replacement expenditure was £5m below MMC Outcome level of £30m. This was offset by a reduction in contributions of £3m, resulting in net variance of £2m. The level of contributions, (typically 82%), is dictated by relevant legislation. In common with enforced pipeline diversions, the level of this activity is driven by external factors such as road improvement investment by the Highways Authorities. Much of this work planned for 1998 has been cancelled or postponed.

4.8 Achievement of Growth Workload (Distribution Mains)

The total growth related workload was close to MMC Outcome after PGT adjustments.

Table 4.3

Growth - Distribution Mains	MMC Outcome	1998 Actual	Variance	% Variance
Expenditure (£m)	40	40	0	1%
Workload (km.)	1,809	1,446	363	20%
Unit Cost (£/m)	22	28	-6	-24%

4.10 Summary of Investment Variance (Distribution Mains)

Table 4.4

Analysis of Distribution Mains Investment Variance (1998 prices)	£m
Policy Mains Replacement - changes in lengths and diameter mix	40
- reductions in unit costs	8
Changes in Enforced Replacement (net of contributions)	2
Growth - main laid by independent PGTs	4
- higher cost workload undertaken	-5
Total Variance	49

Unit cost reductions within the > 180mm and < = 180mm pipe size bands are as a result of the use of discount rates within period contracts and reductions in reinstatement costs.

5 DISTRIBUTION SERVICES

5.1 Definition of Outputs

The key outputs to be delivered in respect of Distribution Services are:-

- for Serviceability, to ensure the reliable and safe operation of Services.
- for Growth, to meet statutory requirements for connections within the Gas Supply Area and to respond to requests for non statutory connections subject to economic considerations.

5.2 Factors Affecting Required Output Levels

Service replacement is driven by three main factors:-

- replacement of an adjacent main
- programmed replacement on the basis of previously identified deterioration
- individual service deterioration identified from public reported escapes

The level of new service requests is linked to the buoyancy of the Housing Market, GDP and the level of competition from other PGTs and of Self- Lay organisations.

Outputs Delivered

Some 263,000 services were replaced compared to the MMC Outcome forecast of 298,000. These services are primarily replaced in association with abandonment of the adjacent high risk mains.

230,000 new services were laid compared to the MMC Outcome of 276,000. As with new mains, there has been a loss of Transco's market share to other PGTs and self-lay organisations. The majority of the workload variance in new services is accounted for by the 40,000 new services laid by independent PGTs.

5.3 Investment in 1998

Table 5.1

Distribution Services Investment (1998 Prices) £m	MMC Outcome	1998 Actual	Variance	% Variance
Serviceability - Replacement	66	53	13	20%
Serviceability - Capital	-	-	-	
Serviceability - TOTAL	66	53	13	20%
Growth - Capital	46	48	-2	-5%
Total Investment	112	101	11	10%

5.4 Workload Description (Distribution Services)

Serviceability workload is predominately associated with Service Replacement. Steel services are replaced and PE services transferred in the course of planned mains replacement. Bulk renewal of services is carried out where a high incidence of service leakage has become apparent in a particular locality. Unplanned service replacement will take place where replacement is the most cost-effective means of making safe a service found to be leaking following a public reported gas escape.

Growth driven workload includes the laying of new services to new housing, existing housing and non domestic premises.

5.5 Key Planning Assumptions and their effect on Variance (Distribution Services)

The mix of workload between service relay and service transfers was assumed to be 77:23 in the MMC Outcome. The actual performance in 1998 was 63:37. Given that typical unit costs for these are £190 and £100 respectively, the effect of this is to reduce expenditure by £3m.

Competition from other PGTs has affected the volume of workload. Some 40,000 domestic services were laid by PGTs in 1998.

5.6 Achievement of Workload (Serviceability - Distribution Services)

Table 5.2

Serviceability- Distribution Services	MMC Outcome	1998 Actual	Variance
Expenditure (£m)	66	53	13
Services laid (000s)	298	263	35
Unit Costs (£)	224	203	21

5.7 Achievement of Workload (Growth - Distribution Services)

Table 5.3

Growth - Distribution Services	MMC Outcome	1998 Actual	Variance
Gross Expenditure (£m)	46	48	-2
Workload (services 000s)	276	230	46
Unit Cost	166	209	-43

40,000 of the 46,000 variance in new services laid is as a consequence of competition from independent PGTs.

5.8 Summary of Investment Variance (Distribution Services)

Table 5.4

Analysis of Distribution Services Investment Variance	£m
Serviceability - Lower Domestic Service Relay Workload	8
- Increase in proportion of service transfers	3
- Lower Non Domestic Service Relay Workload	1
- Unit Cost Reductions on Service Transfers	3
Growth - Workload undertaken by independent PGTs	4
- Increase in high cost services to existing housing	-5
- Increase in high cost other services	-2
Total Variance	11

6 METERS

6.1 Definition of Outputs

The key outputs to be delivered in respect of Meters are:-

- for Serviceability, to provide meters that operate within agreed levels of accuracy.

- for Growth, to meet Shipper and consumer requests for the provision of meters for new consumers and the provision of prepayment meters for shippers.

6.2 Factors Affecting Required Output Levels

To ensure meters remain within acceptable accuracy levels, if specific meter types are identified as being likely to have accuracy levels which are unacceptable, programmes to replace such meters are agreed with Ofgem and other relevant legislative authorities.

Modifications to these agreed replacement programmes will occur as the results of further research into the achieved level of accuracy of individual meter types become established.

The number of new meters required will be influenced by the extent of competition by independent PGTs and other organisations together with the level of future economic growth.

The requirement for the installation of additional Electronic Token Meters (ETMs) is generated by Shippers' managing the level of debt of their consumers.

6.3 Outputs Delivered

The programme of replacement of Black Spot Meters was above MMC Outcome by 11,000 in 1998. This recovered some of the 167,000 shortfall in 1997 which resulted from uncertainty surrounding the potential MMC outcome.

The replacement of the Black Square Meters has been deferred until later in the current formula period pending the results of research into meter accuracy levels. Ofgem will be informed of any changes in plans when the results of research are complete.

The number of ETMs installed exceeded the MMC Outcome level of 284,000 by 114,000.

The level of new meter installations required is driven by shippers requesting connections for new consumers. Demand for new meters was met, but at lower levels than forecast in the MMC Outcome.

Table 6.1

Meters Investment (1998 Prices) £m	MMC Outcome	1998 Actual	Variance	% Variance
Serviceability – Replacement	-	-	-	
Serviceability – Capital	117	46	71	61%
Serviceability – TOTAL	117	46	71	61%
Growth – Capital	107	87	20	19%
Total Investment	224	133	91	41%

Table 6.2

Meters Installed during 1998 (000s)	MMC Outcome	Actual 1998	Variance	% Variance
New Domestic Installations	338	274	64	19%
New Non-Domestic Installations	16	8	8	48%
Prepayment Meters Installed	284	398	-114	-40%
Black Square Replacement Programme	100	-	100	100%
Black Spot Replacement Programme	500	511	-11	-2%
Other Domestic Policy Exchanges	232	43	189	81%
Other Domestic Replacement	209	201	8	4%
Non Domestic Exchange	30	4	26	85%
Total	1,709	1,440	269	16%

The above table shows the level of meter installation activity undertaken in 1998 compared to MMC Outcome.

6.4 Workload Description

The Serviceability workload included in the MMC Outcome was for the programmed replacement of Black Spot Meters, Black Square Meters, together with replacement of individual meters as a result of escapes and damage. Within the Growth workload are meters provided for new users of gas (both domestic and non-domestic) and the installation of prepayment meters (usually Electronic Token Meters, (ETMs)).

6.5 Achievement of Workload

Some 511,000 Black Spot Meters were replaced in 1998 against a target for the year of 500,000 .

The Black Square programme, which was forecast to replace 100,000 meters in 1998, was postponed pending the results of further sample testing. Latest information indicates that this programme will commence in 1999.

6.6 Treatment of Overheads.

Following completion of the separation of British Gas's Transportation and Trading businesses in 1996, a review in 1997, using Transco specific Activity Based Costing data, indicated a reduction in overheads associated with capital meter work. The MMC Outcome included overheads equivalent to 100% of prime costs (direct labour plus materials), the rate inherited from the old Gas Business and used by British Gas Service to recharge Transco for meter work in the transitional year 1995. Following the review, the overall overhead uplift rate was reduced, but the basis of application was improved so that overheads were applied to direct labour costs only, rather than total prime costs. The new overhead rate applied to direct labour costs was 104%. The effect of this review has been a reduction of £23m in the overhead associated with meters.

6.7 ETM Assumptions

The "churn" of Electronic Token Meters (ETMs) can be caused either by replacement of an existing ETM to rectify a fault or by an ETM no longer being required at a property. When ETMs are removed for either reason, they are returned to the manufacturer's factory for refurbishment.

Prior to 1996, the volume of ETMs sent for refurbishment as a result of these churn effects was below 10% of total ETM population. The increasing application by shippers of the ETM as a means of addressing consumers' debt problems has resulted not only in a significant increase in the ETM population but also in a greater volume of meters returned for refurbishment. Transco also began to improve its procedures for the control of meter movements in 1997. These changes account for the proportion of refurbished ETMs being fitted by Transco increasing from less than 10% in 1995 to approximately 32% in 1998. At this level, the reduced price paid for the supply of refurbished meters has a significant impact on the average price of ETMs acquired to meet shippers' and Transco's requirements. This reduction in average unit price accounts for £23m of the variance against the MMC forecast.

Table 6.3

Analysis of Meters Investment Variance (1998 prices)	£m
Black Square Workload under review	10
Reduced Workload in other Domestic Meter Replacement	17
Reductions in Unit Costs on Domestic Meters	10
Rephasing of Non Domestic Meter Exchange	14
Lower new meter workload	15
Additional ETM workload	-22
Change in treatment of overheads	23
Additional ETM refurbishment	23
Total Variance	91

7 INFRASTRUCTURE INVESTMENT

7.1 Definition of Outputs

The outputs which are delivered in respect of this category of investment are:-

- for Serviceability, to ensure that support activities can continue to be undertaken by the provision of the necessary plant, equipment, vehicles and IT systems

- for Growth, to provide the capability to meet increased gas transportation capability and the necessary functionality of operations in response to customer and regulatory requirements.

Because this category of expenditure results in the provision of support infrastructure the direct outputs are not easily mapped across the categories of Serviceability and Growth.

7.2 Factors affecting Required Output Levels

The changes to functionality of operations are driven by the introduction of competition within gas supply, connections and other sectors of the business and by ongoing amendments to the Network Code. The need to meet the above requirements and to deliver progressive reductions in operational expenditure results in the modification or replacement of existing infrastructure.

7.3 Outputs Delivered

Transco enabled the implementation of full competition in domestic gas supply by June 1998.

7.4 Investment in 1998

Table 7.1

Infrastructure Investment (1998 prices) £m	MMC Outcome	1998 Actual	Variance	% Variance
Information Systems	22	34	-13	-59%
Other Infrastructure	67	52	16	23%
Total	89	86	3	3%

7.5 Workload Description

The workload in this area covers the design, specification, procurement and installation of a range of infrastructure including:-

- information systems and hardware, vehicles, operational plant, gas control equipment, and communications equipment.

The table below indicates the main areas where variance occurred:-

Table 7.2

Infrastructure Investment (1998 prices) £m	MMC Outcome	1998 Actual	Variance	% Variance
Information Systems				
Other IS	22	22	0	-0%
NGD IS	-	13	-13	
Telecomms	3	4	-1	-29%
Transport	17	10	7	41%
District Plant & Machinery	14	14	0	-3%
Tools & Transport Operations	13	6	6	51%
Other Infrastructure	21	17	4	17%
TOTAL	89	86	3	3%

The timescale of the implementation of new office software (NGD - Next Generation Desktop) was compressed resulting in higher 1998 investment than included in the MMC Outcome. This was to benefit from improved systems efficiency and reduced downtime due to communications problems.

The phasing of Tools and Transport Operations expenditure in 1997 and 1998 virtually cancels the variances.

The Telecoms expenditure is above MMC Outcome because previously deferred projects were actioned in 1998, notably the replacement of a mobile radio system in Wales

8 INVESTMENT OUTLOOK FOR FORMULA PERIOD TO MARCH 2002

8.1 Formula period forecast

The investment variance against MMC Outcome during 1997 and 1998 has been £367m. This is 21% below the MMC Outcome. Transco's Central Case forecast for the formula period is for an overall variance of 15% as shown below:-

Table 8.1

Total Investment £m(1998 Prices)	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**Formula Years 97/8-01/2**
MMC Outcome	877	881	774	769	808	757	4,079
Actual / 1999 Plan	**673**	**718**	557	733	760	600	3,476
Variance	**204**	**163**	217	36	48	157	603
% Variance	**23%**	**19%**	28%	5%	6%	21%	15%

8.2 Improving forecasting

Since production of the forecasts which supported MMC submission several initiatives have been implemented to improve the accuracy of short and medium term investment forecasts.

The result of these initiatives has been to ensure that Transco has developed and implemented a much more robust Investment Planning and Review process which has supported the 1999 and subsequent forecasts. This process includes setting up Investment Planning Groups for each area of investment. These groups are made up of experts from within the business representing the appropriate process owners: Investment, Finance, Asset Management and Licence to Operate. These groups produce the initial investment plans which are then subject to formal review and challenge through a series of Investment Review Groups.

This process was partially implemented in time to support the preparation of the internal 1998 budget. The actual performance in 1998 was within 1% of the internal budget which was set through this process. Investment in the previous 4 years had averaged 23% below the annual budgets.

8.3 Uncertainties impacting on future investment levels

Several factors can have a significant impact on the forecasts shown above. These include:

- the requirements for entry capacity at St. Fergus and the regime for determining NTS related investment (RGTA).

- Mains Replacement to maintain agreed safety levels

- the levels of Black Spot and Black Square meter replacement

- the development of competition (connections)

The likely impact of these factors are monitored through the cycle of planning and review processes which now operate. The range of uncertainty in investment levels around the central case (in table 8.1) is potentially quite large. Current assessment of the likely range of investment during the formula period is that the variance from MMC Outcome will be a saving of between 6% and 23%.

GLOSSARY

Bar

The unit of pressure that is approximately equal to atmospheric pressure (0.987 standard atmospheres). One millibar equals 0.001 bar.

Base Plan Assumptions (BPA)

A document produced by Transco on an annual basis that describes its supply and demand forecasts for the next ten years.

Compressor Station

An installation that uses gas or electrically powered jet engines to boost pressures in the pipeline system. Used to increase transmission capacity and move gas through the network.

Distribution System

A network of mains operating at three pressure tiers: intermediate (2-7 bar), medium (75mbar to 2 bar) and low (less than 75 mbar).

Diurnal Storage

Gas stored for the purpose of meeting variations in demand during the day. Gas can be stored in special installations (e.g. gas holders) or as linepack within the pipeline system.

Electronic Token Meter (ETM)

A prepayment meter which uses "smart card" technology to enable a gas supplier to recover gas charges and any outstanding debt as gas is consumed.

E&MW

An information system used to manage Emergency and Meter Work jobs.

Interconnector

A pipeline transporting gas to another country. The European interconnector can transport gas between Bacton in East Anglia and Zeebrugge in Belgium.

Linepack

The volume of gas within the National or Local Transmission System at any time.

Local Distribution Zone (LDZ)

A geographic area supplied by one or more NTS offtakes. Consists of LTS and Distribution System pipelines.

Local Transmission System (LTS)

The pipeline system that takes gas from NTS offtakes and transports it to the Distribution system and direct to some large users.

National Transmission System (NTS)

High pressure system consisting of terminals, compressor stations and offtakes. Operates at pressures typically up to 75 bar. NTS pipelines transport gas from terminals to NTS offtakes.

Network Code

A document that defines the contractual relationship between Transco and its SystemUsers.

NGD

Next Generation Desktop.

Office of Gas Supply (Ofgas)

A Government agency responsible for regulating the onshore gas industry in Great Britain.

Peak Day Demand (1 in 20 Peak Demand)

The 1 in 20 peak day demand is the level of demand that, in a long series of winters, with connected load held at the levels appropriate to the winter in question, would be exceeded in one out of 20 winters, with each winter counted only once.

Public Gas Transporter (PGT)

A company licensed by Ofgas to transport gas to consumers. Transco is the largest PGT.

RGTA

Revised gas trading arrangements - a mechanism being developed for NTS pricing.

UK-Link

A suite of computer systems that supports Network Code operations. It includes AT-Link for energy balancing: Supply Point Administration: Invoicing and the Sites and Meters database.

WAM

The Work and Asset Management (WAM) programme will deliver a suite of computer systems in support of engineering activities which will replace systems which are known to be non -compliant with year 2000 and will include graphical geographic systems, quotations, emergency work issue, financial system interfaces and management information.