May 1999

TRANSCO PRICING DISCUSSION PAPER PD4

Capacity/Commodity Split

Summary

Transco's LDZ transportation charges are split 50/50 between capacity and commodity. NTS transportation charges are split 65/35. Prior to considering any further changes to the balance of LDZ or NTS transportation charges Transco wish to invite further discussion regarding allocation of costs to capacity and commodity categories. In particular Transco are concerned to resolve the issue of allocating mark up costs when considering marginal cost analysis. The required mark up for LDZ transportation charges is 62% of total costs. The conclusion of this discussion could have significant impacts upon various consumer groups depending upon the outcome.

Introduction

Transco operate within the constraints of BG plc's Public Gas Transporter licence. The licence requires Transco to aim for a cost reflective charging structure. Cost reflective charges not only fulfil a key licence requirement, but are desirable to help the company become more efficient in its operations. Such efficiency is helped if the correct economic signals regarding the location of its costs can be reflected in Transco's charging structure.

Capacity and Commodity charges are set by Transco to reflect the relative economics of building and operating new peak day and new annual capacity respectively. Thus increasing demand on the coldest winter days will be reflected in changes to capacity costs. New costs associated with increases in annual throughput without any implied peak capacity requirement will be reflected through the commodity charge.

The analysis is conducted in two stages, firstly average costs and return on assets are allocated to the major asset categories. Next the average costs are projected onto the expected investment plan for a given increment of growth. Taken together the two stages provide a forward looking view of ongoing and expected investment costs. It is the results of the latter stage which Transco favour for determining the appropriate capacity/commodity split.

The analysis of LDZ costs for this paper has been conducted in a manner consistent with that applied in previous years to NTS Capacity/Commodity analysis. The results of previous years (1997 and 1998) NTS. Capacity/Commodity analysis are presented for indicative purposes, where appropriate.

Average Cost Analysis

This analysis is based upon the reported 1998 ABC costs for LDZ activities. Approximately 380 activity categories are considered in this analysis. Transco district engineering expertise has been called upon to help identify those activities that will increase if peak day throughput increases and those activity costs that increase if annual throughput increases. Activities that are not believed to be driven by increases in either peak day or annual throughput are categorised as indirect costs. Examples of indirect costs are vehicles, communications or HQ related activities.

Return on Assets is based upon the 1998 regulatory asset value (RAV) and is calculated at 7% rate of return. The regulatory asset value for LTS and Distribution pipeline systems is £1.25bn and £5.48bn respectively.

Total average costs associated with gas transportation on a national basis for the LDZ as a whole and those portions associated with LTS and distribution systems is as follows.

Results of Average Cost analysis

	Total	LTS	Distribution
LDZ Capacity	76.3%	71.3%	78%
LDZ Commodity	0.4%	1.7%	0%
LDZ Indirect	23.4%	27%	22%

The only average costs that have been appended to the commodity category are costs for odourising gas at offtakes that form the NTS/LDZ interface. Odourisation represents 1.7% of LTS costs but is a smaller proportion when total LDZ costs are considered. This is a new LDZ activity that had formerly been carried out at entry points to the NTS pipelines.

All other costs that could be attributed to one of the major categories were found to be capacity related. One contributory factor is that maintenance tends to be conducted on a periodic rather than a throughput related basis. This implies that the only factor that will drive up maintenance costs is the quantity of plant required rather than the quantity of gas transported through the pipeline. Depreciation, return on assets and rates are also included in the capacity category. Rates are based on total asset value, increased periodically in line with changes to the quantity of above seven bar pipeline. Changes to the calculation of rateable value are under consideration by the Government. For the purposes of this analysis it has been assumed that it will continue to be a length related cost. All the above costs are driven by the quantity of assets employed. Under Transco's shallow reinforcement policy, new plant will only be constructed to support new firm loads, which in turn drives an increase in peak day demand. Increased annual throughput associated with new firm loads should be adequately supported by the quantity of plant put in place to support the peak day. The logic of load factors determines that demand on all other days will be lower than peak day demand. The only exception to this may be on days of high forecast errors, which in turn are factored into the planning process. Interruptibles are expected to be supplied using capacity released by high load factor customers at off peak periods. They are, therefore, not directly supported by new pipeline projects.

A high level of indirect costs, 23% of total average costs, and return on assets is apparent. Depreciation and rates may initially be thought to fall into the indirect or fixed cost category. However the extended time periods necessary to consider changes in demand levels determines that a short run period in terms of LDZ costs is measured in years rather than months or weeks. Over a number of years depreciation and rates may be expected to vary as capacity is increased to match new demand requirements.

Average costs analysis of NTS activities has been conducted on the same basis, and presented in consultation papers in 1997 and 1998. The results, provided below, indicate that a high proportion of average costs can be associated directly to capacity or commodity. The higher proportion of commodity costs, when compared with LDZ. analysis, is due largely to operation and maintenance of base load compression which is required to drive gas through the NTS pipeline system.

NTS Average Cost analysis

	1997	1998
NTS Capacity	82%	76%
NTS Commodity	6%	7%
Indirect	12%	17%

Marginal Costs

Marginal costs may be defined as the cost of delivering one more unit of peak or annual capacity. This type of cost analysis is Transco's favoured means of determining the appropriate capacity/commodity split. Marginal costs can be thought of as a vehicle for

estimating forward looking costs. The basis for calculating the marginal costs in this paper is to determine the average incremental cost associated with a change in demand. The marginal cost is then approximated by dividing the average incremental costs by the increment of demand. The product is a cost per unit of demand for capacity and commodity. For the purposes of determining the appropriate capacity commodity split, a key factor is understanding the implications of projecting the costs onto total LDZ demand.

Calculation of average incremental costs is facilitated by initially sorting average total costs into appropriate categories. Having wherever possible identified the major driver for changing each activity cost (capacity or commodity) a more accurate indicator of the magnitude of changes to costs is identified. Most costs have a demonstrable link to the quantity of the asset in service, for example, pipeline survey costs are a function of the pipeline length. Increasing the pipeline length may be expected to drive up the cost of pipeline surveys. Most other costs associated with pipelines also have a relationship to the quantity of pipeline employed. In a similar manner costs associated with the operation and maintenance of above ground installations (AGI's) may be expected to be a function of the number of installations in operation. Other cost categories employed in the analysis include new project related, maintenance of cast iron pipelines and depreciation including rates.

The average incremental cost is calculated for a change in demand. In this analysis demand is presumed to increase by 10% on a national basis. Such an increase in demand is consistent with the five year projection of demand growth identified in the 1998 Ten Year Statement. A five year view of demand changes also complies with Transco's investment planning projections. A suite of capacity expansion projects can therefore be identified to meet the 10% growth in demand. The investment plan provides information regarding increased pipeline length and quantity of AGI's associated with the incremental growth in demand. This information is the basis for determining the appropriate changes to return on assets, depreciation and rates, length, number and new project related costs. Incremental growth in costs for maintenance of cast iron related systems is set at zero. It is not likely that new cast iron pipelines will be built in the future, the advantages of steel and Polyethylene (PE) pipelines being significant. The new materials are less prone to faults and hence the maintenance costs are expected to remain low. Similarly the incremental costs for gas storage holders are set at zero. It is anticipated that in future any new LDZ storage requirement will be met by pipeline diurnal storage.

On commodity related costs it is anticipated that odourisation costs may increase at the same rate as demand. The marginal costs for a unit of peak and annual LDZ growth are:

Results of Marginal Cost analysis for LDZ

Category	LDZ. Cost
Marginal Capacity Cost	11.01 p/pk kWh
Marginal Commodity Cost	0.0007 p/kWh

Marginal costs are unaffected by indirect costs and therefore marginal costs can only be capacity or commodity driven. When the marginal costs are applied to 100% of LDZ demand the projected income can be measured against the total LDZ cost. In this analysis the total LDZ cost, including return on assets, is £1,477,544. The table below summarises the result.

Marginal Costs applied to 100% of LDZ Demand

Category	Percentage of LDZ. total cost
LDZ Capacity	37.6%
LDZ Commodity	00.4%
Total	38.0%

An expectation of economies of scale and other efficiency gains implies that marginal costs will be less than average costs. It follows that average costs in the future may be expected to reduce as new demands are supplied through the LDZ pipeline system. In a monopoly industry it may be expected that such economies will always be available as demand increases. Average costs will continue to fall but marginal costs may always be lower. In such an environment application of charges equal to marginal cost only would result in an unsustainable financial deficit for LDZ operations. Indirect costs, or mark up, need to be allocated to the capacity and commodity charge so that total costs can be recovered and operations can continue in a sustainable manner.

The quantity of mark up that must be allocated to LDZ marginal costs in order to match total costs is 62% or £778,000,000. A wide range of outcomes are possible depending upon how the costs are allocated. At the extreme, mark up costs may be allocated entirely to capacity or commodity. Alternatively a proportionate allocation may be made of mark up costs to both categories. In previous analysis of NTS costs the indirect costs were sufficiently small for Transco to propose changing the balance of NTS capacity/commodity split without addressing the appropriate allocation of indirect costs. The table below summarises the results of past NTS marginal cost analysis.

Marginal Costs applied to 100% of NTS Demand

Category	Percentage of NTS total cost (1997)	Percentage of NTS total cost (1998)
NTS Capacity	93%	79%
NTS Commodity	6%	7%
Total	98%	86%

Allocation of all mark up costs to capacity will result in a charging structure that is composed of virtually 100% LDZ capacity charges and zero commodity charges (NTS charges would be 93% capacity and 7% commodity). This structure may be interpreted as suggesting minimal cost should be allocated to interruptible customers and it would be most beneficial to high load factor customers that have proportionately lower peak day requirements.

Alternatively if all mark up costs are allocated to commodity charges, then 63% of LDZ costs and 21% of NTS costs would be recovered by throughput related charges. Peak day capacity would also become cheaper, which suggests that the economic signal becomes one that emphasises a reduced premium for low load factor customers.

Mark up costs may be allocated between the capacity and commodity categories to reflect other economic factors that have not been recognised in this analysis. At present a 50/50 split may be viewed as reflective of BG plc's Public Gas Transporter Licence. The price control formula in the licence is based upon a 50/50 fixed/variable split in Transco's costs. It has been

argued by respondents to previous consultations regarding NTS charges that a capacity/commodity split that reflects the structure of BG plc's price control formula may help to avoid weather induced fluctuations in charges. Such instability is not desirable from a shipper or Transco perspective.

Conclusion

The LDZ capacity/commodity split at 50/50 reflects BG plc's price control formula and therefore may be expected to generate income in line with projections for LDZ income. This in turn may contribute to year on year stability of charges by reducing under or over recoveries that may otherwise need to be carried forward to the following year.

It is not clear that a 50/50 split is the correct economic signal when considering marginal costs. The uncertainty in this consideration is created by the high level of mark up that must be allocated to ensure that total costs can be recovered through LDZ transportation charges. At 62% major changes to the LDZ charges are possible depending upon how the mark up is recovered from the capacity and commodity charge. NTS cost allocation, at 65/35, has progressed further towards that implied by marginal costs analysis. However Transco's proposal to move to 75/25 from October 1998 was vetoed. Prior to consulting on further changes to the capacity and commodity split it is desirable to gain a measure of agreement on an appropriate methodology. It is upon the issue of allocation of mark up costs in particular that Transco would like to initiate further debate prior to considering changes to the LDZ. and NTS transportation charge capacity/commodity split.

Question for discussion

Transco would welcome respondent's views on:

The appropriate method of calculating marginal costs, including the allocation of mark up costs between the capacity and commodity categories.