TRANSCO CONSULTATION PAPER PC 48

Methodology for determining floor prices for auctions of monthly entry capacity

Summary

During Industry discussions surrounding the Reform of Gas Trading Arrangements, the concept of using a price auction to allocate entry capacity has been discussed. This paper sets out a methodology for establishing floor prices for use in NTS entry capacity auctions. The present administered entry charges are based upon a long run marginal cost (LRMC) methodology. That methodology is an established means of identifying the costs of capacity expansion on the NTS, and is used in this paper as a basis for calculating floor prices.

Subject to implementation of Network Code Modification 0314 from 1 October 1999 a finite quantity of capacity, based upon Seasonal Normal Demand profiles will be offered at each auction location. The use of a profiled supply necessitates an adjustment to LRMC based charges if it is assumed that the starting point for calculating floor prices will be the same income profile as implied by the present peak day charge regime. A further adjustment is required to achieve a 50/50 split between entry and exit charges. No such limitation is used for LRMC based charges, but the methodology generally produces a split in the region of 50/50.

A discount is proposed for each auction location based upon an historic concentration ratio of the five largest holdings of entry capacity at each location. The concentration is taken as a proxy for the level of competitive forces at each location. This discounted price is the proposed floor price.

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Introduction

Proposals which are presently subject to consultation suggest auctions of entry capacity at the six major entry points, Bacton, Easington, Theddlethorpe, St Fergus, Teesside and Barrow. It is also proposed that Easington and Theddlethorpe be amalgamated into a single auction location known as Thread. The product for sale will be monthly tranches of entry capacity, which initially will be offered for a six month period from October 1999 through to March 2000. The quantity of capacity on offer will be limited to a level consistent with that associated with forecast Seasonal Normal Demand (SND). The SND supply profiles for each auction location have been presented for discussion by Transco in the paper "Methodology For Calculating Monthly System Entry Capacity Availability".

This Pricing consultation paper presents a methodology for determining floor prices in the capacity auctions. Floor prices are set with regard to a number of key features:

1. to ensure continuing collection of formula revenue
2. to limit potential inefficiency arising from market power
3. to limit potential inefficiency arising from bidder collusion

Collection of formula revenue

In general, setting floor prices at a level less than average cost implies a risk that the seller will not recover sufficient revenue to finance its operations. In Transco's case, the price control formula, rather than auction prices determines revenue. Setting floor prices that are based on the present entry charge levels is broadly consistent with achieving the rate of return allowed by the price control formula. By contrast, discounting floor prices could imply a potential reduction in the rate of return for entry capacity relative to other assets, which might be regarded as discriminatory.

If auctions clear at levels less than marginal cost, then there is a further concern that capacity expansion may prove harder to justify using conventional investment appraisal techniques. Any investment test in such an instance may need to take account of income generated elsewhere in the gas transportation chain, which could lead to inefficient investment. Floor prices linked to

marginal costs can help to reduce this concern.

Allied to the issue of revenue collection is one of predation. A common test for predation is to ascertain if a company's cost in any area is below its average variable cost (AVC). Such an outcome, if construed to be deliberately desired by the seller, may be viewed as a predatory pricing policy. It may become possible that a combination of low floor prices and limited competition at an entry point could create conditions where entry capacity will be gained at prices less than a level deemed appropriate by a predatory pricing test. The outcome could be that competition for the development of new pipelines, especially near entry points, is discouraged. This can be avoided by setting cost related floor prices.

Inefficiency arising from market power

Market power may be assumed to exist if action by one or more bidders, with no collusive agreement, is sufficient to move the market in a favourable direction for the bidder, possibly at the expense of other bidders or the seller. Such action by a bidder, may in some circumstances be considered to be an abuse of a dominant position, and therefore is prohibited under Chapter 2 of the Competition Act 1998. No auction design can remove market power. It can however, mitigate the abuse of market power. Floor prices are one aspect of auction design that can limit the extent to which market power can be abused. However, it is apparent from analysis of market concentration, discussed elsewhere in this paper, that four out of the six major beach entry points can be designated as highly concentrated markets, and hence market power is likely to exist. While Transco has no reason to believe such market power is likely to be abused, setting appropriate floor prices can help to limit the potential deleterious effects.

Inefficiency arising from bidder collusion

Chapter 1 of the Competition Act 1998 prohibits agreements between parties that may prevent, restrict or distort competition. Section 2 of the Act deals, amongst other things, with agreements that may directly fix purchase or selling prices. As with market power, no auction design can prevent bidder collusion. In circumstances where bidders do collude, then floor prices can provide a mechanism for limiting the extent to which prices can be driven down.

Measurement of market power

The Herfindahl-Hirschman index of market concentration at the major beach entry points is provided below. The index is calculated by summing the squares of the market shares of all firms in a market. In the table below, the index has been calculated on the basis of capacity bookings as at winter 1998/99. One may best understand the index by application of the United States of America's Justice Department designation that all readings above 1,800 reflect a highly concentrated market, and readings from 1,000 to 1,800 are moderately concentrated. The maximum reading is 10,000 for a market that contains only one participant. The index is normally used for scrutiny of mergers and acquisitions. In such instances the regulator is concerned with the degree of change in the index that is triggered by the merger of a number of businesses in a single market.

Table 1. Herfindahl-Hirschman index of market concentration

Entry Point	Index
Bacton	1,981
Easington	1,554
Theddlethorpe	2,550
St Fergus	2,115
Teesside	1,438
Barrow	10,000

The index for Thread (Easington and Theddlethorpe combined) is 2,015.

Based on the US Justice Department designation, the results suggest Teesside and Easington are moderately concentrated, and the other entry points are highly concentrated. The table confirms that Barrow is an entry point where no competition exists. In this case one may expect that an auction will clear at the floor price.

Transco has explored a methodology that uses the Herfindahl-Hirschman index and a measure of price elasticity to predict the propensity of prices to fall from an "efficient" clearing price under different degrees of competition. A measure of both the efficient clearing price and price elasticity would be required with this method. LRMC based charges could be used as a proxy for efficient clearing prices. Price elasticity at each entry point is, however more difficult and Transco has no estimate of this at present. Demand curve information generated through auctions may shed light on this area, possibly allowing the development of floor prices that reference Herfindahl-Hirschman indices in the future.

Concentration ratios' are another widely recognised measure of market concentration. The ratio is defined as the percentage of total industry capacity (or sales) made by the largest "n" firms. A common measure, used here, is to determine the degree of market concentration of the five largest businesses in a market, known as CR^5. Table 2 below highlights the CR^5 results on the same basis as the Herfindahl-Hirschman index.

Table 2. Concentration ratio of five largest shippers

Entry Point	CR^5
Bacton	73%
Easington	65%
Theddlethorpe	80%
St Fergus	69%
Teesside	76%

Barrow	100%

The CR5 for Thread is 65%.

Interaction of floor prices with LRMC based charges

In a market value based regime, as represented by an auction, it may be considered that a uniform floor price at each entry point is the most appropriate starting point. A uniform price may however require an increase in charges at southern-based entry locations when compared with the present administered entry charge regime. Reductions would be likely at more northerly entry points. A uniform price would consequently produce a redistribution from the present cost reflective structure.

In the gas year commencing 1 October 1999, NTS exit charges will continue to be based upon a long run marginal cost (LRMC) methodology. At present there is no predetermined split of income from entry and exit charges. The proposal for NTS administered capacity charges contained in the recent Transco discussion document PD6 implies that 52% of income will come from exit and 48% from entry capacity. Until the methodology for calculating charges at exit and smaller entry locations is changed, Transco believes it is appropriate that this methodology should establish the split of NTS capacity charge income between entry and exit.

It would seem reasonable to assume that in future exit capacity charges should be set to recover 50% of the target NTS capacity revenue identified in Transco's charging methodology

Migration to SND profile

In the present methodology, capacity rights are assumed to be available for each day of the year, such that when a peak day unit of capacity is sold, the purchaser retains that capacity for each day of a twelve month period. It is proposed that from 1 October 1999, purchasers of capacity will be able to purchase capacity for one month duration. Annual tranches of capacity will not be sold initially, though purchasers can assemble capacity holdings over any number of months on offer.

If the present administered charge regime remained, and the SND profile is adopted as a measure of chargeable capacity, a reduction in entry charge income would be experienced. This is a product of changing Transco's income volume calculation from peak day volume multiplied by 365 days (2000 TWh), to a volume based upon the SND profile (1062 TWh). The volumes used to calculate changes in the present administered charge methodology are no longer appropriate for the product expected to be on offer (the product being capacity based on a seasonal profile). Administered charges, if used to determine floor prices, can be adjusted to a level that would produce the same income as the present methodology. A comparison of income effects can then

be gained between the present and proposed methodologies.

It is possible to achieve this by various means. Charges at each entry point can be scaled individually to ensure that each entry point is assumed to recover the income suggested under the present methodology. In practice this requires larger scaling factors for those entry points that have a more variable seasonal profile. Similarly entry points that have a flatter seasonal profile will require a smaller adjustment to correct the charge level for a given income. Such an adjustment might be construed as a methodology that favours flat over variable profile entry points.

Alternatively all entry points can be scaled by a common factor to achieve the adjustment to administered entry charges. This methodology makes no judgement of varying supply profiles between entry points. However, using this method, total expected income at Barrow (the most concentrated terminal) would be less than had previously been anticipated. Such an outcome may be viewed as a windfall at that location given the probability that the capacity auction will clear at the floor price.

The “Barrow-effect” could be mitigated by ensuring that the floor price at Barrow is set at a level that will maintain a level of income consistent with the present methodology. All other entry points could then be subject to a common scaling factor. Transco believes this approach has attractions, views would be particularly welcome on whether it could be regarded as unduly discriminatory.

Proposed Method

1. Calculation of NTS long run marginal costs will continue in accordance with the present methodology.

2. The resulting NTS capacity charges will be adjusted such that expected revenue at those prices would be divided equally between entry and exit. Charges at all entry locations that may be subject to an auction of capacity will be scaled equally in order to form the basis for reserve prices.

3. Terminals with a Herfindahl-Hirschman index more than 8,000 shall be an exception from the uniform scaling requirement. The basis of the floor price shall be calculated to produce the same income when subject to a profiled supply as had been expected when the administered charge had been subject to a constant supply (peak) rate.

4. The adjusted floor prices determined above shall be multiplied by a concentration ratio, the result of which are the floor prices. The concentration ratio is assumed to provide a measure of the competitive forces at each auction location. The greater the competitive forces the greater the discount from the adjusted entry charge. Concentration ratios' shall be calculated by expressing as a percentage the share of capacity booking held at each location by the five largest holders of capacity (CR^5) at that location.

Conclusion

A methodology for setting floor prices has been set out in this consultation paper. The methodology allows the greatest deviation from administered charges at locations where competitive forces are most apparent.

Experience of auctions and analysis of the results should enable further development of floor prices in future. However, prior to commencement of auctions, no such history exists to draw upon when determining the auction format and suitable floor prices.

QUESTIONS for CONSULTATION

Transco propose to adopt a methodology for calculating initial floor prices in the monthly entry capacity auctions. That proposed methodology is based upon LRMC informed charges and a discount factor. The discount factor shall be determined by a concentration ratio measurement at each auction location.

Transco would welcome respondents views on the following:

Should Transco adopt the methodology described for determining floor prices in monthly capacity auction?

Is it reasonable to set floor charges at Barrow at a level consistent with income gained from the present administered charges?

Appendix 1

Present Entry Regime **Methodology excluding Thread**

Adjusted Entry Charge

Methodology including Thread

Adjusted Entry Charge **Reserve Price**

Reserve Price

Entry location	Entry Charge	Peak Flow (GWh)	Income (£m)
Bacton	0.00007	1,101	2.8
Easington	0.00230	345	6.4
Theddlethorpe	0.00120	483	2.1
St Fergus	0.02170	1,412	111.8
Teesside	0.00500	487	8.9
Barrow	0.00450	703	11.6
			143.6

Entry location	Entry Charge p/kWh	Annual Profile (TWh)	Income (£m)
Bacton	0.0010	225	2.2
Thread	0.0025	200	4.9
St Fergus	0.0313	400	125.1
Teesside	0.0072	129	9.3
Barrow	0.0115	108	12.4
			154

Entry location	Entry Charge p/kWh	CR[5]	Income (£m)
Bacton	0.0007	73%	1.7
Thread	0.0016	65%	3.2
St Fergus	0.0216	69%	86.3
Teesside	0.0055	76%	7.1
Barrow	0.0115	100%	12.4
			111

Entry location	Entry Charge p/kWh	Annual Profile (TWh)	Income (£m)
Bacton	0.0010	225	2.3
Easington	0.0033	93	3.0
Theddlethorpe	0.0017	107	1.9
St Fergus	0.0313	400	125.1
Teesside	0.0072	129	9.3
Barrow	0.0115	108	12.4
			154

Entry location	Entry Charge p/kWh	CR[5]	Income (£m)
Bacton	0.0007	73%	1.7
Easington	0.0022	65%	2.0
Theddlethorpe	0.0014	80%	1.5
St Fergus	0.0216	69%	86.3
Teesside	0.0055	76%	7.1
Barrow	0.0115	100%	12.4
			111