CONCLUSIONS REPORT TO THE AUTHORITY

Modification Proposals to the Gas Transmission Transportation Charging Methodology

NTS GCM 01:

Alternative Methodologies for Determination of NTS Entry and Exit Capacity Prices

25th January 2007

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Executive Summary

This document sets out National Grid NTS's final proposals for modification of the Gas Transmission Transportation Charging Methodology (the "Charging Methodology") in respect of the setting of NTS Capacity Prices following the completion of a 28 day consultation on Consultation Paper NTS GCM 01. The final proposals within this document include changes to NTS Entry Capacity Baseline Reserve Prices and NTS Exit Capacity Prices[1], but do not cover NTS Entry Capacity Incremental Step Prices which will be considered as part of the annual review of the Incremental Entry Capacity Release (IECR) Methodology Statement.

Consultation Paper NTS GCM 01 sought views on a number of options for the NTS Capacity Price setting methodology. Two broad approaches were advocated;

1) continuation of the use of engineering based models (Transcost/Graphical Falcon) for determination of LRMCs for each entry-exit route combination with enhancements to the tariff determination process, thus continuing the inclusion of the effects of spare capacity and excluding the benefits of backhaul flows;

2) use of a Transportation model based on a single year supply/demand analysis excluding spare capacity and including the benefits of backhaul.

National Grid NTS noted in the consultation that the key differentiator between these two approaches was the treatment of spare capacity. The issue of whether it is appropriate to include spare capacity within the capacity charging methodology, and if so, how, is extremely challenging, when considering the balance between the charging methodology objectives in respect of cost reflectivity, promoting competition and avoiding undue discrimination, while ensuring efficient and economic operation of the NTS.

The approach which gained majority support and is selected as the final proposal for consideration by the Authority is the implementation of the Transportation model (option 2). In particular there was significant support for exclusion of spare capacity within the Transportation model on the basis that this would result in more stable charges by removing transient network effects and avoid cross subsides where possible. There was also significant support for option 2b (i.e. NTS SO Baseline Entry Capacity levels being used to determine NTS Entry Capacity Baseline Reserve Prices) on the basis that this would result in more stable charges and avoid cross subsides where possible.

In summary, National Grid NTS considers that implementation of option 2b would better achieve the relevant methodology objectives (under National Grid NTS's GT Licence obligation Standard Special Conditions A5) when compared with the other options included as part of the consultation as explained below: -

- "Reflect the costs incurred by the licensee in its transportation business"
    - allows capacity prices to be updated and set on a dynamic basis reflective of changes in the gas transmission system and supply/demand forecasts;
    - allows use of a single year analysis thereby providing improved temporal signals regarding when it is most efficient and economic to connect to and use the transmission system and avoids price distortions potentially created by inaccurate long term forecasts;

[1] Separate papers have been published discussing the potential amendments to the Charging Methodology to support the implementation of the enduring offtake arrangements in respect of the use of NTS Exit Capacity from 1 October 2010 (see papers NTS GCD 01, 02 and 03).

- allows true long run marginal cost estimates to be calculated, taking into account avoided costs resulting from backhaul flows, which are representative of the costs incurred in providing capacity;
- removes annual caps on exit capacity price movements;
- removes potential distortions in the current tariff model caused by the point in the process at which negative prices are removed; and
- maintains cost reflective locational differentials between exit points and between entry points by adjusting prices additively, as opposed to scaling, to recover allowed TO revenue.

- "Reserve prices are calculated at a level that promotes efficiency, avoids undue preference in the supply of transportation services and promotes competition between gas shippers and between gas suppliers."
  - avoids undue preference through the avoidance of cross subsidies by the calculation of LRMCs that reflect the cost incurred in making capacity available.
- "Facilitate effective competition between gas shippers and between gas suppliers."
  - avoids the repeatability issues of engineering based models (e.g. Transcost), and therefore improves price predictability;
  - simpler and easier to use and more transparent than engineering based models, allowing entry and exit capacity prices to be determined by a single model in a simple spreadsheet format. This therefore allows Users to replicate the charge setting process and undertake scenario analysis to inform User choice about where and when it would be most efficient and economic to connect to and use the transmission system.

National Grid NTS also included in Consultation Paper NTS GCM 01 proposed changes to the determination of NTS Entry Capacity Incremental Step Prices and the relocation of the methodology from the Incremental Entry Capacity Release (IECR) Methodology Statement to the Charging Methodology. Although broad support was received through User representations, on further consideration of the potential options for decoupling UCAs from the current entry user commitment model (as defined under the IECR), National Grid NTS does not propose changes at his time. National Grid NTS now considers that it would be more appropriate to consult on the new user commitment model and incremental step price determination together as these issues are fundamentally linked. National Grid NTS aims to undertake its annual review of the IECR shortly and will include proposals for the new user commitment model and incremental step price determination.

In addition, National Grid NTS now considers that these final proposals should be implemented from 1st October 2007, as opposed to 1st April 2007. This means that, in the event that these proposals are not vetoed by the Authority, the new entry capacity charging methodology would be used to set prices for use in the 2007 September Long Term Entry Capacity Auctions, and all other auctions thereafter. Similarly, the new exit capacity charging methodology would be applied to set charges for application from 1st October 2007.

[3] The Licence anuitisation factor is currently 0.10772 based on a rate of return of 6.25%.

1 Introduction

1.1 In January 2006 National Grid NTS instigated a review of the gas transmission transportation charging arrangements with the industry via the launch of the Gas Transmission Charging Methodology Forum (Gas TCMF).

1.2 One of the key areas of the review is the methodology by which entry and exit capacity prices are determined, and the information made available to the industry to understand and replicate the price setting process. At present the methodology for determining NTS Exit Capacity Charges and NTS Baseline Entry Capacity Reserve Prices is contained within the Gas Transmission Transportation Charging Methodology (the "Charging Methodology"). The methodology for determining NTS Incremental Entry Capacity price schedules is contained within the Incremental Entry Capacity Release (IECR) methodology statement.

1.3 The review of the capacity charging arrangements was instigated by Ofgem's open letter of 2 December 2005 which proposed that, as part of the TPCR, NTS Entry Capacity Baseline Reserve Prices are decoupled from Entry UCAs and set on a dynamic basis from 1 April 2007. Ofgem suggested that National Grid NTS therefore develop a charging model which is made available to the industry such that users can repeat the price setting process. Ofgem also stated that a single model for determination of all entry and exit capacity prices was desirable.

1.4 In conjunction with the industry through the Gas TCMF, National Grid NTS has developed a range of options for determination of Long Run Marginal Costs (LRMCs) for the purpose of determining NTS Capacity Prices. National Grid NTS has developed and run the various modelling options to allow comparison and better understanding of the models and have fully documented the process. A progress report (Gas TCMF PR01) on this work is available on the National Grid website at http://www.nationalgrid.com/uk/Gas/Charges/.

1.5 This work lead to National Grid NTS raising Pricing Consultation NTS GCM 01 on 2nd November 2006 with the consultation period ending on 30th November 2006. The consultation covered:

- The NTS Exit Capacity Charging Methodology applicable from 1 April 2007 to 30 September 2010;
- The NTS Entry Capacity Baseline Reserve Price and Incremental Step Price calculation methodology applicable to all capacity sold in auctions from 1 April 2007; and
- Inclusion of the methodology for determining Incremental Step Price schedules within the Charging Methodology.

1.6 This report covers the terms of the original proposals, the representations made by relevant parties and changes in the terms of the proposal made by National Grid NTS as a consequence of representations received.

2 Key Issues

2.1 The Gas TCMF discussions have identified a number of issues with the current arrangements that require consideration as part of any changes to the Charging Methodology. These are explained in the Progress Report PR 01, Chapter 3, and summarised below:

NTS Entry Capacity Reserve Prices

2.2 In December 2005, Ofgem issued an Open Letter on Charging requesting that National Grid NTS give consideration to decoupling the link between Licence defined revenue drivers (Unit Cost Allowances) and reserve prices set from entry capacity auctions from 1st April 2007.

2.3 Since Ofgem must give consideration to such factors as likely demand for the capacity at an entry point and the existing allowances for investment in the area around the entry point under the TO Price Control in deciding an appropriate UCA, the current UCAs used to set reserve prices are not necessarily a true indication of the relative locational capacity price a User should pay at the entry point.

2.4 Analysis undertaken by National Grid NTS shows that LRMCs have diverged significantly from UCAs due to changes in supply/demand forecasts and the network. This would indicate that UCAs have become less cost reflective over the course of the Price Control. This loss of cost reflectivity may mean that locational pricing signals are being distorted, and hence investment may not be triggered in an efficient way.

NTS Exit Capacity Charge Rebalancing

2.5 Rebalancing of exit capacity tariffs to reflect changes in supply/demand and network configuration has not been undertaken since 2001. This was due to the desire to delay rebalancing on the expectation that NTS exit reform would be implemented in 2002. Subsequent delays to reform have lead to a significant divergence in current tariffs and underlying LRMCs in certain locations.

Transparency and Repeatability

2.6 The application of Transcost and Graphical Falcon engineering models are manually intensive and sensitive to user settings (particularly compressor and regulator parameters) leading to stability and repeatability issues.

2.7 Such engineering models are not easy for a non-expert to use and understand, and hence do not allow users to easily undertake their own scenario analysis to inform the most efficient and economic location and timescales to connect to and use the transmission system.

Supply and Demand Forecast

2.8 The prices that result from the current methodology are extremely sensitive to the supply and demand forecasts chosen, particularly for the later years of the model, as the base networks in each year depends on the preceding year's base network.

2.9 The use of a ten year forecast combined with the difficulties in generating an accurate forecast may result in unstable prices. In addition, the use of a ten year forecast results in prices being set for long term entry capacity auctions that are effectively based on an assumed outcome of those auctions.

2.10 The averaging of the ten year forecast distorts locational price signals and destroys the temporal pricing signals for incremental capacity (e.g. an exit point locating close to a large new entry point *after* that entry point is commissioned generates more efficient investment signals and is less problematic from a security of supply perspective than if that exit point were to locate at the same site *before* the new entry point was flowing gas.)

2.11 All network analysis requires a balance between supply and demand and this is equally true of charging models. Under the prevailing Charging Methodology the Base Case supply data is adjusted to obtain a supply and demand match given the 1-in-20 demand level. This means that some Entry Points are not at their Base Case supply level within the charging model. This could be overcome by carrying out Entry Point specific analysis at Base Case levels for those Entry points that were not at their Base Case levels in the initial analysis and obtaining a supply and demand balance by supply substitution. This process could equally be carried out to adjust all Entry Points to the obligated Baseline level. For example, where a supply points was not at its Base Case level due to a supply surplus or where a supply point was not at its Baseline level, it could be adjusted to that level with the entry point furthest from the entry point in question being adjusted in the opposite direction. Such an approach would ensure that all prices would be generated at a relevant supply level on a consistent basis.

Tariff Model

2.12 The constraint of a minimum permitted charge of 0.0001p/kWh/day which removes negative costs at the optimisation procedure stage may create instability in the entry-exit split which could then lead to distortions to the cost reflectivity of the resulting prices.

2.13 The use of scaling to set Exit Capacity Charges that recover 50% of the allowed TO revenue may distort the locational differentials inherent in the LRMCs.

2.14 The year-on-year price capping rules, applied to NTS Exit Capacity charging, restrict price movements. This does not seem the optimal way to support the objective of cost reflectivity over the longer term, recognising that costs will change from year to year as the supply and demand scenario changes as new entry and exit connections are commissioned.

Single Model for NTS Capacity Charge Determination

2.15 Transcost was designed to model small increments in order to estimate LRMCs. Costs for providing increments above 12 mscmd, for incremental entry capacity price determination purposes, are therefore estimated using the Graphical Falcon network analysis modelling program.

2.16 If a single model is to be used to calculate all capacity prices then a single approach must be adopted. The requirement for Transcost/FALCON generated LRICs for incremental Entry Capacity price determination and Transcost generated LRMCs for exit pricing is the key obstacle to a single charging model.

2.17 As more fully explained in the Progress Report, this obstacle could be overcome by considering the LRMC at a revised supply/demand scenario where an entry point was adjusted to an incremental flow rather than using prevailing LRIC methodology. This would allow LRMC based pricing of Entry Capacity increments and would result in all capacity prices being calculated on the same basis and would therefore facilitate the use of a single charging model.

Treatment of Spare Capacity

2.18 One of the key questions discussed as part of the Gas TCMF is the treatment of spare capacity within the Transport model. Under the current arrangements, spare capacity is included within the Transport Model (currently Transcost), whereas under a Transportation Model, spare capacity is not directly included within the model.

2.19 The issue of whether it is appropriate, and if so, how, to include spare capacity within the capacity charging methodology is extremely challenging, ensuring that there is an appropriate balance between the charging methodology objectives in respect of cost reflectivity, promoting competition and avoiding undue discrimination, while ensuring efficient and economic operation of the NTS.

2.20 Above all, capacity charges should be set to provide forward looking Long Run Marginal Costs to provide stable and predictable locational signals to Users to inform their decisions over where and when to bring gas into, or offtake gas from, the NTS. The inclusion of spare capacity within the Transport Model may be seen to undermine these key objectives as inclusion of spare capacity is a transient feature of a network determined by the latest view of forecast supply/demand.

2.21 In contrast, it is important to ensure that the setting of capacity prices does not obviously discourage the use of any genuine spare capacity on the NTS, which could, in the extreme, lead to asset stranding. This issue is most apparent in relation to declining terminals for which actual NTS investment may have previously been undertaken (backed by Users meeting the relevant capacity release test), but then flows subsequently decline. While there is a benefit of signalling where spare capacity is available through capacity charges, this would only be the case if the level of spare capacity modelled is the level available taking into account all reasonable demand requirements i.e. is deemed to be sufficiently stable.

2.22 In addition, where capacity prices are set to not discourage use of genuine spare capacity, thereby resulting in the benefit of previous investments conferred on new Users of certain entry/exit points, then the cost of such investments are recovered from Users at other entry/exit points. Under the current arrangements, this would be through the application of the TO Commodity Charge. There would also be a difference between capacity costs incurred by existing Users that triggered the initial investments and such new Users for the same level of capacity utilisation. The extent of such cross-subsidy is a fundamental consideration in respect of the capacity charging methodology.

3 Terms of the Original Proposals

This section sets out the options that were consulted upon through NTS GCM 01 in respect of the most appropriate methodology for calculation of NTS Entry Capacity Prices from 1 April 2007 and NTS Exit Capacity Prices from 1 April to 30 September 2010.

Option 1 – Engineering Model Based Approach

NTS Exit Capacity Charging Methodology

Transport Model

It is proposed that the current methodology is continued i.e.

3.1 Long Run Marginal Costs (LRMCs) of each entry-exit route are determined using the Transcost Model, as described within the prevailing Charging Methodology.

3.2 For clarity and comparison with other options, this implies the determination of LRMCs for each entry-exit route based on a weighted average of 10 network analyses using the most recent forecast of supply and demand for the next 10 Gas Years.

However the following changes to the investment costs used within Transcost are proposed:

3.3 Investment costs would be calculated from the costs for all NTS investment work carried out over an 8 year period, including NTS investment work carried out during the previous 4 years in addition to the NTS investment planned for the next 4 years.

3.4 The project investment costs will then be adjusted by applying the Structural Steelwork Labour Costs price index to take into account the rates of change in the provision of network infrastructure, such as steel prices, construction costs and general inflation.

3.5 A more detailed description of this process is contained within Appendix A sections 5 to 12.

Tariff Model

The following changes to the current methodology statement are proposed in respect of the determination of NTS Exit Capacity Prices from the LRMCs for each entry-exit route calculated using the Transport Model:

3.6 *Project Management and Operating Costs / Calculation of Annuitised Costs* – The operating costs and the annuity discount factor[3] stated within the current Charging Methodology Statement are proposed to be parameterised and set by reference to the relevant values in National Grid NTS's GT Licence. These are used to convert the LRMC route costs into a LRMC route prices (in pence per peak day kilowatt-hour per day).

3.7 Calculation of NTS Capacity Charges

- LRMC route prices are proposed to be disaggregated into LRMC reflective Entry and Exit prices using Excel Solver such that in aggregate 50% of route costs are targeted at NTS Entry Points and 50% of route costs at NTS Exit Points (this constraint allows a unique solution to be found as opposed to applying the non-negativity constraint). This will be achieved by ensuring the

average positive values of the entry prices equals the average positive values of the exit prices. This step therefore results in "raw" NTS Entry and Exit Capacity Prices.

- These "raw" NTS Exit Capacity prices are then adjusted to ensure recovery of the relevant amount of allowed TO revenue from exit Users, as opposed to scaling under the current arrangements. it is proposed that this is achieved by adjusting additively the "raw" prices such that the resulting positive prices would recover the allowed revenue. This would preserve the locational differentials between the "raw" NTS Exit Capacity prices.
- Any negative prices are set to the minimum level of 0.0001 per kilowatt-hour per day as part of the adjustment process.

3.8 *Capacity Charge Re-balancing* - No year-on-year capping of prices would be undertaken.

NTS Entry Capacity Charging Methodology – Reserve Prices

3.9 Under this option, reserve prices for use in Entry Capacity auctions (prior to any discount that may be applied)[4] would be determined using the same approach as proposed for NTS Exit Capacity Prices, except that the adjustment process would not be undertaken.

3.10 However there is a choice of increment size to be used in the Transcost analysis:

- Option 1a - The same increment size as used for exit price determination (2.834 Mscm/d) could be applied, and hence Entry and Exit prices set in a simultaneous manner from the same Transcost runs; or
- Option 1b - A larger increment size could be used reflective of the typical larger entry flows. 6 mscmd is proposed under this option consistent with that used to determine UCA for the 2002 – 2007 Transmission Price Control.

3.11 Reserve Prices would be updated under this option consistent with updates to the NTS Exit Capacity Prices based on the most up-to-date supply/demand forecasts and network models. This process would typically be undertaken to set updated reserve prices for application in entry capacity auctions held in each Gas Year.

NTS Entry Capacity Charging Methodology – Step Prices

3.12 Under this option, no changes are proposed to the methodology by which incremental step prices are determined. However it is proposed that this methodology which is currently set out in the Incremental Entry Capacity Release Methodology Statement is included in the Charging Methodology for consistency and clarity[5].

[4] Proposals to amend the current discounts applied to the Entry Capacity Reserve Prices will be put forward in a separate Consultation Paper

[5] Removal of the methodology from the IECR will require a separate consultation.

Option 2 – Transportation Model Based Approach

NTS Exit Capacity Charging Methodology

Transport Model

It is proposed that:

3.13 NTS Exit Capacity Prices are determined from a Transportation Model that calculates the Long Run Marginal Costs (LRMCs) of transporting gas from each entry point to a "reference node" and from the "reference node" to each relevant offtake point.

- The transportation model minimises the flow distance of gas around the network given the assumed pattern of supplies and demands and the constraint that at any node, demand plus flow to other nodes must equal supply and flow from other nodes.
- Any incremental flow down a line results in a reinforcement requirement, with a standard reinforcement cost. It does not consider the way in which pressure, pipeline diameter / length and flow interact – it simply assumes that, for the standard reinforcement cost, incremental flow can be routed down each existing pipeline route.
- The transportation model calculates the marginal costs of investment in the transmission system that would be required as a consequence of an increase in demand or supply at each connection point or node on the transmission system. The measure of the marginal investment costs is in terms of £/GWhkm, hence marginal changes in flow distances based on increases at entry and exit points are estimated initially in terms of increases or decreases in units of kilometres of the transmission system for a small energy injection to the system.

3.14 The Expansion Constant is determined from the average cost of incremental capacity for 900mm, 1050mm and 1200mm pipeline of 100km length and recompression to 85 bar(g), calculated according to the methodology set out in Appendix A of this document. Based on this methodology, an expansion constant of £2223/GWhkm would be applied for prices effective from 1 April 2007.

3.15 Prices for each Gas Year are calculated using the relevant year's 1-in-20 peak Base Case data[6] and network model (e.g. if setting Exit Capacity prices for Gas Year 2006/7, the Base Case supply/demand forecast for 2006/7 and the base network model are used). LRMCs are therefore proposed to be set based on analysis for a single year (as opposed to 10 years under the current arrangements).

Tariff Model

3.16 The following changes to the current methodology statement are proposed in respect of the determination of NTS Exit Capacity Prices from the LRMCs for each reference point to exit route calculated using the Transport Model:

[6] The Base Case data is consulted on through the Transporting Britain's Energy (TBE) process and is published in the Ten Year Statement.

3.17 *Project Management and Operating Costs / Calculation of Annuitised Costs* – The operating costs and the annuity discount factor[7] stated within the current Charging Methodology Statement are proposed to be parameterised and set by reference to the relevant values in National Grid NTS's GT Licence. These are used to convert the LRMC route costs into a LRMC route prices (in pence per peak day kilowatt-hour per day).

3.18 Calculation of NTS Capacity Charges

- NTS Exit Capacity Prices are determined from the "raw" reference point to exit route costs, calculated using the Transportation Model, by adjustment to ensure recovery of the relevant amount of allowed TO revenue from exit Users. It is proposed that this is achieved by adjusting additively the prices such that the resulting positive prices would recover the allowed revenue, as opposed to scaling under the current arrangements. This would preserve the locational differentials between the "raw" NTS Exit Capacity prices.
- Any negative prices are set to the minimum level of 0.0001 per kilowatt-hour per day as part of the adjustment process.

3.19 *Capacity Charge Re-balancing* - No year-on-year capping of prices would be undertaken.

3.20 *Aggregation into LDZ Exit Zones* - A single exit capacity price is calculated for each Distribution Network (DN) charging zone, as a flow-weighted average of the NTS Exit Capacity Prices determined for each NTS Exit Point within the DN charging zone (rounded to 4 decimal places)[8].

NTS Entry Capacity Charging Methodology – Reserve and Step Prices

Transport Model

3.21 Under this option, LRMCs for determination of NTS Entry Capacity Baseline Reserve Prices and Incremental Step Prices for use in entry capacity auctions (prior to any discount that may be applied)[9] would be based on the same approach as proposed for NTS Exit Capacity Prices (under option 2), except for the following differences:

In respect of the supply and demand data input into the Transport Model, it is proposed that:

3.22 Prices for each Gas Year are set on the basis of the relevant year's base case data and network model, but with adjustments to the supply flows (see paragraph 3.25) to reflect the capacity level in question (see paragraphs 3.22 and 3.24) to maintain a balanced network for charging purposes. For the avoidance of doubt, 1-in-20 peak demand flows will remain unadjusted.

3.23 Entry Capacity Baseline Reserve Prices are set by adjusting supply flows in the Base Case data to reflect either;

[7] The Licence anuitisation factor is currently 0.10772 based on a rate of return of 6.25%.

[8] Note that under the current methodology this step is undertaken prior to the application of the Project Management and Operating Costs.

[9] Proposals to amend the current discounts applied to the Entry Capacity Reserve Prices will be put forward in a separate Consultation Paper

- Option 2a - the Base Case supply (capped at the baseline/obligated capacity level) at each NTS Entry Point (this will therefore be equal to or less than the obligated NTS SO Baseline Entry Capacity level as defined by National Grid's NTS Licence)[10]. For the avoidance of doubt the Base Case supply level at Interconnector, LNG importation and storage Entry Points will be the expected maximum capability of the facility;
- Option 2b - the obligated NTS SO Baseline Entry Capacity level, as defined by National Grid's NTS Licence, at each NTS Entry Point.

3.24 Entry Capacity Incremental Step Prices for incremental capacity release are set by adjusting supply flows in the Base Case data to reflect the appropriate incremental capacity level at each NTS Entry Point (the incremental capacity steps as defined by the Incremental Entry Capacity Release Methodology).

3.25 The supply flow at each NTS Entry Point is adjusted to reflect the required capacity level as follows:

- The supply flow is fixed at the capacity level to be provided for the entry point in question
- All other supply flows are adjusted up or down in order of merit to balance the network back to the peak 1 in 20 demand level in the Base Case data

3.26 The supply merit order for each NTS Entry Point reflects the least beneficial alternate supply flow, in terms of enabling capacity provision at that entry point.

3.27 The supply merit order is determined by use of the Transportation Model with the Base Case scenario to calculate pipeline distances from each NTS Entry Point to every other entry point.

3.28 For NTS Entry Points where flow needs to be added to the Base Case flow to align with the required capacity level, the remaining entry point flows are reduced in order of pipeline distance merit, starting with the furthest entry point ending with the entry point with the nearest entry point.

3.29 For NTS Entry Points where flow needs to be reduced from the Base Case flow to align with the required capacity level, the remaining entry point flows are increased in order of pipeline distance merit, starting with the nearest entry point and ending with the furthest entry point.

In respect of network model data used in the Transport Model, it is proposed that:

3.30 The appropriate network model for each period of capacity allocation is used i.e. the network model that includes sanctioned projects expected to be completed by the start of the Gas Year that is being modelled.

[10] This is a change of policy from setting baseline reserve prices from Licence UCAs, uplifted for inflation

3.31 The relevant baseline capacity reserve price for each Gas Year is used to set prices in auctions[11], as summarised below

- For RMSEC and DSEC Baseline Reserve Prices published in respect of Gas Year Y), this means the network model including all projects expected to be completed for the start of Gas Year Y;
- AMSEC Baseline Reserve Prices published in respect of capacity allocation across three Gas Years (Gas Years Y, Y+1, Y+2), this means the network models including all projects expected to be completed for the start of each of these Gas Years;
- For QSEC Baseline Reserve Prices and Incremental Step Prices published in respect of future Gas Years (Gas Years Y+2, Y+3 to Y+16), this means the network model including all projects expected to be completed for the start of Gas Year Y+2.12

Table 3-1 summarises the use of network and supply/demand year models for calculation of NTS Entry Capacity Baseline Reserve Prices and Incremental Step Prices applicable from 1 October in calendar Year N (corresponding to Gas Year Y) in chronological order of auction dates and capacity release.

Table 3-1: Gas Years Modelled and Capacity Allocation Periods

Auction	Date Held	Gas Day - Capacity Allocation		Gas Year Modelled
		From	To	
QSEC	September [N]	1 Apr [N+2]	31 Mar [N+17]	Y+2
RMSEC	Sep [N] to Aug [N+1]	1 Oct [N]	30 Sep [N+1]	Y
DSEC (Day Ahead)	30 Sep [N] to 29 Sep [N+1]	1 Oct [N]	30 Sep [N]	Y
DSEC (Within Day)	1 Oct [N] to 30 Sep [N+1]	1 Oct [N]	30 Sep [N]	Y
MSEC	February [N+1]	1 Apr [N+1]	30 Sep [N+1]	Y
		1 Oct [N+1]	30 Sep [N+2]	Y+1
		1 Oct [N+2]	31 Mar [N+3]	Y+2

[11] This is a change from the current policy of using a single reserve price for each entry point over all auctions.

[12] Gas Year Y+2 is the last year where investment projects have been triggered by previous auction outcomes.

Table 3-2 summarises the use of network and supply/demand year models for calculation of NTS Entry Capacity Prices from 1 April 2007.

Table 3-2 Network Data Summary

Auction	Date Held	Gas Day - Capacity Allocation		Gas Year Modelled
		From	To	
DSEC (Day Ahead)	1 Apr 2007 to 29 Sep 2007	2 Apr 2007	30 Sep 2007	2006/7
	30 Sep 2007 to 29 Sep 2008	1 Oct 2007	30 Sep 2008	2007/8
DSEC (Within Day)	1 Apr 2007 to 30 Sep 2007	1 Apr 2007	30 Sep 2007	2006/7
	1 Oct 2007 to 30 Sep 2008	1 Oct 2007	30 Sep 2008	2007/8
RMSEC	Apr 2007 to Aug 2007	1 May 2007	30 Sep 2007	2006/7
	Sep 2007 to Aug 2008	1 Oct 2007	30 Sep 2008	2007/8
QSEC	September 2007	1 Apr 2009	31 Mar 2024	2008/9
MSEC	February 2008	1 Apr 2008	30 Sep 2008	2007/8
		1 Oct 2008	30 Sep 2009	2008/9
		1 Oct 2009	31 Mar 2010	2009/10

Tariff Model

3.32 The same process to covert LRMCs into entry baseline reserve prices and incremental step prices is proposed as for NTS Exit Capacity Prices, with the exception that there is no adjustment to prices for revenue recovery purposes.

NTS Entry Capacity Baseline Reserve Prices for New NTS Entry Points

For the avoidance of doubt, no changes are proposed to the current policy in respect of new NTS Entry Points:

3.33 For new NTS Entry Points, where no permanent obligated entry capacity has been sold i.e. where an entry point does not have an obligated baseline entry capacity level (as currently defined National Grid's NTS Licence), the entry capacity baseline reserve price is set at zero.

3.34 Where permanent obligated capacity has been sold at an NTS Entry Point in previous auctions, it is treated consistently with those entry points that have a Licence-defined obligated baseline capacity level.

4 Responses

National Grid NTS received 13 responses to its consultation on NTS GCM 01. None of the responses were marked as confidential, and copies of the responses have been posted on the Gas Charging section of the National Grid information website.

Support for the Proposal

Respondent	Abbr.	View
Total E&P UK Plc	TOTAL	**Support for Option 1**
ExxonMobil Gas Marketing Europe Limited	EXXON	**Support for Option 2a**
Scottish and Southern Energy plc	SSE	**Qualified support for Option 2b.**
Mulberry Capital Limited	MCL	**Support for Option 2b**
EDF Energy	EDF	**Support for Option 2b**
RWE npower	RWE	**Support for Option 2b**
The Association of Electricity Producers	AEP	**Support for Option 2b**
Statoil UK	STUK	**Support for Option 2b**
International Power	IP	**Support for Option 2b**
The Chemical Industries Association	CIA	**Support for Option 2**
Scotia Gas Networks	SGN	**Support for Option 2**
National Grid UK Distribution	UKD	**Against any change to Exit**
Wales & West Utilities	WWU	**Comments**

Summary of Responses by Consultation Question

Transport and Tariff Model Changes

Q1. LRMCs are calculated from either; (a) Option 1: The Engineering model Transcost, consequentially including peak spare capacity but excluding any backhaul benefit, or; (b) Option 2: a Transportation model of the NTS, consequentially excluding spare transmission capacity and including a backhaul benefit equal to the avoided cost of reinforcement, or; (c) An alternative approach outlined in the Gas TCMF Progress Report GTCMF PR 01.

Respondents' Views

Nine respondents (EXXON, MCL, EDF, RWE, AEP, STUK, CIA, IP and SGN) offered support for Option 2 with one respondent (SSE) offering qualified support. One respondent (TOTAL) offered support for option 1.

Transparency

SSE notes the indicative prices for the Transportation model," are intuitively more explainable. Exit nodes that are geographically distant from sources of supply have higher charges and those exit nodes that are close to sources of supply are lower.

The prices resulting from the Transcost model do not reflect this intuitive expectation." STUK "supports Option 2, using a Transportation model of the NTS, as the most appropriate mechanism to calculate LRMCs. As we noted in our response to GCD 01, enabling users to repeat the charge setting process will reduce complexity and, therefore, aid transparency and improve understanding of the charging process, for Users."

EDF "believe that Transparency is the foundation of any competitive market, and crucial for the planning and development of any business that operates in a competitive market. We therefore fully support the implementation of the Transportation Model and the associated transparency that this will bring to the market."

Intuitive Prices

AEP "would support option 2 as this requires less subjective assessment of settings compared with option 1. It can therefore produce repeatable results and be made available to the industry in a user-friendly manner. A transportation model would also appear to give results which may more readily be understood in terms of changes to supply / demand than the TRANSCOST model."

SSE "does not support the usage of the Transcost model as the indicative prices "..." do not reflect intuitive expectations. For example, exit nodes next to large entry sources are predicted to have large increases compared to current prices. This appears counter-intuitive considering that each GWh of offtake in such a situation should reduce the requirement for investment to transport the gas to a more distant exit node."

Spare Capacity

AEP "consider that the inclusion of spare capacity can give rise to unstable charges that may swing between zero and the investment cost for reinforcement. Such swings in charges would also lead to parties paying vastly different amounts over time for the same product depending on whether there was spare capacity available at the time of purchase or not and whether or not a signal for incremental investment was required at a particular point in time. Very low capacity charges could also lead to under-recovery of allowed revenue effectively creating a cross subsidy from capacity holders at other entry points as they would have to pay a TO commodity charge as well as the capacity charge. This does not seem to be a sensible way to set charges to recover the cost of long–lived assets, hence it would be more pragmatic to exclude spare capacity. "

CIA believes that "it is important to make charges stable over time" and is "concerned that the inclusion of spare capacity could give rise to unstable charges. We would like to point out that our members favour a solution that would avoid pricing volatility. "

MCL "believe that shippers at a terminal with spare capacity already receive a significant benefit in relation to their ability to 'catch up' later in the day after system failures, thus avoiding imbalance and scheduling charges. As a result of this significant benefit, we do not believe there is any requirement to modify the Transportation Model approach which would have to be subjective and could appear to be arbitrary."

RWE recognise that "the treatment of spare capacity in the derivation of LRMCs is the key issue to be resolved here. Although including spare capacity would set a reserve price that provided a locational signal in one long-term auction at declining ASEPs, its transient nature could lead to significantly much higher reserve prices in subsequent years. Furthermore, it is not clear to us whether producers could respond to these locational signals, as new gas fields may not have much flexibility over their choice of beach terminal, although there could be an effect for marginal supplies from existing fields. On this basis we believe that including spare capacity will:

(a) Create windfall gains and losses depending on the timing of shipper participation in long-term entry capacity auctions;

(b) Introduce significant volatility in reserve prices as spare capacity becomes utilised and new investment is triggered;

(c) Lead to an under-recovery of allowed revenue as capacity holders would be paying very low prices for capacity that did not reflect underlying long-run costs nor the actual assets being used; and

(d) Require a commodity-based mechanism to recover any shortfall which RWE believe undermines the incentives provided by the current capacity: commodity split."

Backhaul

SGN notes "The treatment of spare capacity and backhaul in the Transportation model seems to be more appropriate to the current circumstances of the NTS with some of the older terminals declining and alternative sources of supply becoming more important. The detailed modelling of the system required by Transcost, which includes spare capacity and excludes backhaul, is both more difficult to carry out and less appropriate for the foreseeable future. Backhaul is likely to become more of a feature of the NTS in the future, and therefore it seems appropriate to include it in the model."

Avoiding Undue Preference

SGN notes "Good arguments can be made for including or excluding spare capacity but on balance SGN agree with the case put forward by NG NTS that it will be more cost reflective and result in fairer charges to Users (including DNs) if spare capacity is excluded."

SGN notes "The Transcost model does not appear to be future proof to changes in flow directions arising from new entry flows at Milford Haven and the Isle of Grain; it is manually intensive to operate and requires User judgements to be made. Even if the Transcost model is modified so that it can continue to be used post 2007 (one of the options considered in GCM 01), users will find it difficult to operate themselves."

Cost Reflectivity

MCL "support the Transportation Model Option 2 as it reflects the costs associated with moving gas more than Transcost. To move St Fergus and Teesside gas to sources of demand requires the use of assets that were built in the last 10 years which will be in the regulated asset base of National Grid for a further 40 years or so and hence have an ongoing cost that quite properly should be focused on the users of such terminals. "

Continuity

TOTAL "supports Option 1, the Transcost Model. The changes proposed to this model achieve most of the sought after benefits, with out a complete change in methodology. This option improves the current arrangements by allowing pricing to be dynamic and respond to changes in the system and in supply/demand scenarios but at the same time it keeps its basis on the previous model, so that there is continuity."

TOTAL note "Since the introduction of the LTSEC Auctions shippers have been asked to make economic commitments that would signal their needs for entry capacity as far as 17 years ahead. At St. Fergus, Shippers did make this commitment, and it is one of

the few entry points where capacity has been bought long term (even as far as 2019-2020). By keeping the current methodology, signals and investment that shippers at this entry point have triggered, will be maintained, supporting stability and predictability, which are central to any pricing methodology."

TOTAL "would suggest that the only changes that take place are those that are absolutely necessary, and would prefer if the objectives can be achieved through minor modifications to the current system whenever possible." TOTAL "believe that this will be widely appreciated by both local and foreign shippers at a time when the UK is dedicated to attracting new gas imports into the country."

National Grid NTS' View

Transcost was designed to estimate LRMCs by calculating incremental costs for small increments of flow, where demands were increasing year-on-year and system flow patterns were stable. Charges generated from Transcost were reasonably stable while entry flows at the large beach terminals were forecast to increase steadily year-on-year to meet increasing demand and NTS flows represented a stable North/East to South/West flow.

The developments of new entry flows at the Milford Haven and Isle of Grain LNG Importation Facilities coupled with declining flows at many of the large beach terminals have caused significant changes to system flow patterns. NTS flows are forecast to change direction as Milford Haven and Isle of Grain gas penetrates deeper into the system over the ten year planning period. This changing flow pattern means that the choice of ideal network configuration and compressor and regulator parameters used within Transcost is less clear, and more of the decision making employed by planning engineers is required to run the model. As the model is sensitive to these settings, the increasing subjectivity will impact on pricing stability and repeatability.

Some of the Exit prices generated from Transcost are counter-intuitive, particularly Scotland and the North of England where non-minimal prices are being generated at a time when National Grid NTS believes that Exit Capacity in these areas could be made available with minimal reinforcement implications. Some of the southern Entry prices are also counter-intuitive as National Grid NTS believes that Entry Capacity in these areas for small new entry points could be made available with minimal reinforcement implications.

National Grid NTS therefore believes that the use of Transcost, for capacity charging purposes has the following weaknesses;

- Charges generated from the Transcost approach may no longer be sufficiently reflective of costs incurred, particularly the entry and exit charges for Scotland and the north.

- Entry charges, while reflective of the cost of increasing flow, do not reflect the costs incurred with continuing to provide capacity over the lifetime of existing NTS assets. The cross subsidies that would be generated by applying the low northern terminal prices might represent undue preference and might also be in contravention of EU gas regulations[13].

[13]See Appendix B.

- The Transparency and repeatability benefits of the Transportation model, outlined in the industry responses, in regards to promoting competition, are not so easily achieved through Transcost.

Attempts were made to include a backhaul benefit and exclude spare capacity within the Transcost model, as documented in Gas TCMF Progress Report PR01, but these proved unsuccessful as counter intuitive prices persisted.

The Transportation model approach would overcome the issues arising from Transcost. Charges would be more reflective of the costs of capacity utilised and hence reflective of costs incurred. Scotland and northern exit prices and southern entry prices are consistent with expected reinforcement costs. The benefits of the Transportation Model are more fully discussed under Section 7 of this report.

Q2. NTS Capacity Prices are determined from either; (a) Option 1: a ten year Supply & Demand forecast using the current Gas Year's Base Case data and network model, or; (b) Option 2: a single year Supply & Demand forecast using the relevant Gas Year's Base Case data and network model for the capacity released.

Respondents' Views

Seven respondents (AEP, EXXON, IP, SGN, SSE, STUK and RWE) offer support for Option 2.

Cost Reflectivity

SSE notes "Given the difficulty with accurate forecasting this methodology introduces potential errors compared with the Transportation model solution of using a single year forecast of supply and demand for a particular individual year" and "the smearing of costs that results from taking a weighted average will not be as cost reflective as a taking a single years forecast."

EXXON "believe that long term forecasts will prove to be inaccurate and result in distortions of pricing and a ten year forecast is inconsistent with the capacity purchase timeframe." This view is supported by AEP, SGN, SSE and STUK.

Temporal Price Signals

SGN note "The removal of the ten year averaging will allow NG NTS to provide more specific temporal and locational pricing signals which should enable Users to make more informed investment decisions. It will also remove the circularity in Transcost where LRMCs are based on future network and supply/demand data which are themselves forecasts of entry auction outturns."

AEP "would support the use of a single year supply / demand model as this most closely reflects the network in the year in which the charges will apply, and are more likely to be cost reflective of that network. It also avoids the need to use forecasts of supply / demand further into the future which will inevitably be less accurate. The averaging effects of a multi year model will also dilute temporal price signals. "

Stability

SSE "understands that if a single year model is chosen then it would be more appropriate to exclude spare capacity as this would result in more stable charges due to the removal of lumpiness of network investment."

Transparency

"EDF Energy fully supports transparency in the UK market to aid purchase and investment decisions. This transparency however is only delivered through the Transportation model which Users will be able to manipulate to reflect their views on the supply demand fundamentals. This will allow potential developers that require an NTS connection to undertake a full investment appraisal based on the outcome of this model."

EDF "would also note that under the current regime the method of calculating exit capacity prices is a black art, with Users unable to replicate the outcome of this model for themselves. Introducing a more Transparent process that Shippers can duplicate will aid competition between Shippers in the gas market, and between generators in the electricity market as they will be able to locate in the most advantageous position from both market models." EDF "would further note that "we regularly utilise the electricity DCLF ICRP model within our business when making strategic decisions. This model provides us with Transparency that currently is not available within the gas market when making our strategic decisions."

National Grid NTS' View

A single year model will allow National Grid NTS to generate both locational and temporal pricing signals to Users. For example, where a large new entry project is anticipated to come on stream, exit users will be able to determine when connection to the NTS in the same locality is most efficient in terms of capacity provision (as local exit prices will be predictable and likely to fall after the entry point first flows onto the NTS). National Grid can therefore avoid investment to continue to meet its security of supply obligations where users can make more informed choices regarding the timing of their connection to take advantage of lower prices in the future. This would not be the case for prices based on ten years of data.

In addition, a single year model will avoid the circularity caused by entry capacity auction prices being based on future network and supply/demand data which are, by their very nature, forecasts of auction outturns.

Q3. Baseline Entry capacity prices are determined either; (a) Option 1: using a single analysis of the Base Case scenario adjusted to the 1-in-20 demand level, or; (b) Option 2: from the TYS base case scenario, with Entry point specific analysis, such that each NTS Entry Point was at the relevant supply level and a supply/demand balance achieved via supply substitution.

Respondents' Views

Two respondents (RWE, STUK) offered support for option 1 while three respondents (AEP, IP, EXXON, SSE) offered support for option 2.

AEP "would support option 2 otherwise the charges could be too sensitive to assumptions on where supply is coming – this may in turn lead to less stability and predictability of charges. We consider that more stable and predictable charges are consistent with promoting competition. However we also recognise that the adoption of option 2 will make the charging model less user friendly as it will have to be run a number of times with different supply numbers to create entry charges."

EXXON believes "that using the Transportation Model which takes the TYS Base Case and uses Entry Point specific analysis, with an overall supply demand balance being achieved by supply substitution, will more accurately determine the appropriate prices to be charged for Baseline Capacity."

SSE "understands that the current model adjusts supply points to balance supply & demand based on 1 in 20 demand levels. This results in supply points not being at their base case levels within the charging model and therefore the results of the

analysis may not be cost reflective. As a result SSE supports option 2, and believes that entry capacity prices should be determined from the TYS base case scenario. SSE understands that specific analysis is then undertaken at each entry point such that each point is at the relevant supply level and supply & demand balance is achieved by supply substitution.

National Grid NTS' View

Option 1: "using a single analysis of the Base Case scenario adjusted to the 1-in-20 demand level" is the prevailing methodology. The main issue with this approach going forward is that entry points may not be at their capacity level in the charging analysis, particularly storage sites, as they may have been reduced to achieve a supply and demand balance. In these circumstances it is difficult to argue that the resulting charges are cost reflective if storage sites if NTS Entry Capacity is booked and utilised for the maximum facility capability.

Storage facilities are increasingly being used to cycle within year and, going forward, can be expected to compete with variable LNG importation and Interconnector supplies and are therefore more likely to flow at their maximum capability. It is therefore increasingly important that NTS Entry Capacity prices for storage sites represent the expected facilities utilisation of the NTS.

Option 2: "Entry point specific analysis, such that each NTS Entry Point was at the relevant supply level and a supply/demand balance achieved via supply substitution" should ensure that NTS Entry charges are generated for all sites at the appropriate supply level i.e. a supply level equal to the capacity being made available and is therefore National Grid NTS's preferred approach.

Q4. Views are invited as to whether the relevant supply level referred to in Q3, used to determine Baseline Entry Capacity prices, should be either; a) Option 2a: the Base Case supply (capped at the baseline/obligated capacity level) at each NTS Entry Point (this will therefore be equal to or less than the obligated NTS SO Baseline Entry Capacity level as defined by National Grid's NTS Licence), or; b) Option 2b: the obligated NTS SO Baseline Entry Capacity level, as defined by National Grid's NTS Licence, at each NTS Entry Point.

Respondents' Views

Seven respondents (AEP, EDF, IP, MCL, RWE, SSE, STUK) offered support for option 2b with one respondents (EXXON) offering support for 2a.

Cost Reflectivity

AEP "consider that this question is really seeking views on the likelihood of asset stranding vs the socialisation of spare capacity costs via an increased TO commodity charge to be paid by all and whether this creates a cross subsidy. The use of the obligated baseline for determination of charges is consistent with the network that NG must provide it would also provide for more stable charges than a base case supply model. However it would set charges at a higher level, at declining terminals, than if the base case supply was used. This would mean that the charges were more effectively 'use of system' charges based on the pipes already installed. It would also mean that any TO commodity charge would be lower (for a given level of bookings) than if the Base Case supply model was used. "

Spare Capacity

MCL "support Option 2b as we do believe that the decline in UKCS gas production means that flows will land at the nearest NTS entry point based on offshore

infrastructure and distance rather than because of any differences in NTS entry charges. The SO Commodity charge is not focused on any entry point at present but a significant proportion of such costs are related to compressor fuel use. If Option 2a is chosen, there would be an incentive to land gas at St Fergus which would therefore increase the use of compressor fuel and hence increase overall system costs. This is inefficient."

AEP "consider that asset stranding is unlikely to be reduced simply because capacity charges are slightly lower, this is because we would expect any new fields or incremental supply would utilise existing offshore infrastructure which should also develop spare capacity as existing filed decline. We also consider that it would not be desirable to increase the TO commodity charge further as this leads to poor cost targeting. We would therefore support the use of baselines (option 2b) in determining entry capacity charges. "

Transparency

EDF notes that "in order to implement Option 2a National Grid will be required to forecast the base case supplies through each entry point, rather than the capacity. Whilst possible the ability to predict flows will be harder than predicting capacity which has been signalled through the long term auctions and licence obligations. We believe that whilst this may allow spare capacity to be incorporated into the model this will reduce the transparency and stability of prices that the model produces."

SSE notes "The method described to take account of spare capacity in model 2a would appear to be too user subjective and may create issues with repeatability and transparency.

Cross-subsidies

AEP notes "The use of a Base Case supply model would give rise to lower charges at declining terminals but if this did not lead to increased booking would require the revenue differential to be raised via a higher TO commodity charge. This would effectively mean that all users of entry capacity would be funding / or subsidising the spare capacity at certain terminals. There may also be cross subsidies created where users have committed to capacity purchases long term at higher prices prior to the introduction of the lower charges. The use of a Base Case supply model would also introduce a degree of subjectivity as there would be decisions to be made over where the gas is supplied, whereas the baseline option would be based on published baseline values." RWE support this view.

EDF note "The benefit of Option 2b is that there is no cross subsidisation, and the modelling process is Transparent. However the impact of this is that the concept of spare capacity is not incorporated into the model, and so no signals will be given to Shippers that spare capacity could be available. This could potentially lead to stranded assets, however we would note that could be overcome by maintaining the current short term reserve price discounts, which may encourage Shippers to utilise the spare capacity if it is available."

EDF note that option 2a "would lead to cross subsidisation from entry points with no spare capacity to those entry points that have spare capacity. This process would therefore be subjective as National Grid would be required to identify the volume of spare capacity that it believes is available and discount the entry points appropriately." "It would therefore appear that Option 2b is the most user friendly solution, providing transparency and cost reflectivity to the market." EDF "do not believe that this Option should be manipulated to incorporate spare capacity as this process will be subjective and distract from the benefits that this model provides."

Price Stability

STUK "support option 2(b) as this should effect more stability and consistency when the determination of Baseline Entry Capacity Prices."

National Grid NTS' View

National Grid NTS recognises the transparency and stability benefits, identified by respondents, of using obligated baseline quantities within the Transportation model (option 2b) to set Baseline reserve prices.

Option 2a generates costs that are reflective of the capacity provided to meet forecast flows in the given scenario whereas option 2b generates costs that are reflective of the baseline capacity that National Grid NTS is obligated to release.

National Grid NTS believes that option 2a may not be appropriate going forward as it results in prices that do not reflect the costs incurred in making baseline capacity available and would therefore lead to cross subsidies if actual flows were in excess of the Base Case forecast flows. This is a real possibility given that baseline capacity can be procured up to sixteen years ahead of the day and it is unlikely that flow forecasts will be accurate over such a time span.

Q5. Incremental Entry Capacity prices are determined either; (a) Option 1: the prevailing methodology, or; (b) Option 2: using the TYS Base Case scenario, from a series of Entry Point specific analyses with the relevant NTS Entry Point adjusted to the obligated capacity plus step increment level and a supply/demand balance achieved via supply substitution.

Respondents' Views

Seven respondents (AEP, EDF, EXXON, IP, RWE, SSE and STUK) offer support for Option 2.

EDF "believe that the arguments in favour of transparency and stability can be applied to both exit and entry points. We therefore believe that deriving incremental entry capacity prices from the Transportation Model is the most favourable solution." EXXON believe that it is appropriate to use a single charging model for Baseline Entry capacity prices and Incremental Entry Capacity prices.

National Grid NTS' View

The prevailing incremental entry capacity charging methodology contained within the IECR methodology statement uses Transcost to calculate Long Run Incremental Costs (LRICs) i.e. the cost of moving from the prevailing capacity release level to a higher level. These costs are used for incremental entry pricing and also as a proxy for Long Run Marginal Costs (LRMCs) i.e. the cost of the last/next unit of capacity, to set Exit Charges. Transcost was designed to estimate incremental costs for small increments of flow (i.e. to approximate LRMCs), but for larger increments (above 12 mscmd), Transcost does not produce reliable results and more detailed analysis using Falcon is undertaken.

While this consultation has covered changes to the incremental entry capacity pricing methodology, National Grid NTS does not recommend a final proposal to make changes to this methodology at this stage. National Grid NTS is of the view that the interactions between the User commitment model within the IECR methodology and the incremental entry pricing methodology are such that they warrant a combined consultation to ensure that decoupling of the UCA from the User commitment test and revisions to the entry capacity pricing methodology achieve the relevant objectives. National Grid NTS will seek to develop a consistent set of changes to the IECR based on the introduction of the Transportation model and will consider the relocation of the incremental entry pricing methodology, from the IECR methodology statement to the Charging Methodology, at a future date.

Q6. Entry and Exit LRMCs be calculated from either; (a) Option 1: route costs disaggregated into Entry and Exit costs using the Excel Solver such that in aggregate 50% of route costs are targeted at NTS Entry Points and 50% of costs at NTS Exit Points (the average positive values of the entry LRMCs equals the average positive values of the exit LRMCs), or; (b) Option 2: the cost from a "reference node" to each relevant offtake point and the cost from each entry point to the "reference node" and that the LRMCs is adjusted to give a 50:50 split between average positive value of these adjusted Entry & Exit costs, or; (c) the prevailing methodology.

Respondents' Views

Seven respondents (AEP, SGN, SSE, EXXON, IP, RWE and STUK) offer support for Option 2. AEP "considers that Option 2 is consistent with a transportation model approach and that the choice of reference node is immaterial if the entry / exit split is adjusted to 50:50 at a later stage." SGN supports Option 2 as it is consistent with the use of the Transportation model to determine the LRMCs.

National Grid NTS' View

National Grid NTS notes that the proposed reference node approach (option 2) coupled with the introduction of the Transportation Model will lead to the exact mapping of entry plus exit costs to route costs and hence should be the most cost reflective approach. This would not be the case for options 1 and 3 coupled with Transcost.

Q7. LRMCs are converted into prices using the anuitisation factor set out in National Grid's NTS Transportation Licence.

Respondents' Views

Seven respondents (AEP, EXXON, IP, RWE, SSE, SGN and STUK) offer support. STUK "agree that LRMCs should be converted into prices using the anuitisation factor set out in National Grid's NTS Transportation Licence."

National Grid NTS' View

National Grid NTS believes that this aspect of the proposal will simplify the process and make it more transparent. It should also reduce the requirement for a future consultation should the Licence anuitisation factor change. It should be noted that the term used for the anuitisation factor within the Licence is the "exit capacity adjustment factor".

Q8. The raw Exit Prices are adjusted such that the positive values can be used to set prices to recover allowed revenue and that the negative prices are removed as part of the adjustment step.

Respondents' Views

Adjustment of Exit Prices

Five respondents (AEP, IP, SGN, SSE, and STUK) offered support. SSE supports adjusting prices to collect allowed revenue as "this approach as it means that most of the targeted revenue will be collected via the capacity charge, minimising the need for an additional recovery mechanism. This reduces complexity and cost of managing the network and will be more economic and efficient. "

Removal of Negative Prices as the Final Step

Four respondents (AEP, IP, RWE and STUK) offered support for the proposal. Two respondents (SSE and SGN) did not offer support for the proposal.

AEP note "the removal of negative prices, as these only really have any meaning if they could be coupled with a 'must flow' obligation which would add unwarranted complexity". RWE note "As there is no concept of negative prices, we agree that they should be removed. Their removal should be at a stage in the adjustment process that preserves locational signals at exit."

SSE considers that negative charges "may be even more cost reflective and would provide locational pricing and allow more informed investment decisions to be made by Users."

SSE "can understand the logic that is applied to not allow negative charges to end users of energy. This also applies in electricity. It is imposed for environmental and energy efficiency reasons so that end users of energy should not be paid to use more energy. However, power stations are in a unique position in that they link both the gas and electricity markets, but they are not end users of gas energy. Electricity customers are the end customers of the gas energy. An appropriately floored (i.e. it can't go negative) locational signal is already provided to the end users of electrical energy. Not allowing gas charges to power stations to go negative will in addition apply a second and inappropriate charge that will flow to these end electricity users. In these circumstances, the electricity customer is being charged for its location on the electricity network, but is not seeing any benefit from the location of the power station (e.g. Peterhead) on the gas network. The result is that the positive gas charge to the power station is not cost-reflective of the power station's location on the gas network, and inappropriately increases the costs to the electricity customer, the only end user of the gas energy through the power station. "

National Grid NTS' View

National Grid NTS agrees that negative prices only really have any meaning if they are coupled with a 'must flow' obligation which would add unwarranted complexity to the regime. Negative capacity prices would create an incentive on Users to over state their capacity requirements and hence might lead to inefficient system design. Large Gas consumers can already offer demand increase through the locational market of the On-the-day Commodity Market (OCM) and hence can benefit from these offers being accepted if the location of their offtakes represents a material benefit.

The removal of negative prices should be at a stage in the adjustment process that preserves locational signals at exit and this is achieved by removing them as part of the final revenue recovery adjustment step. Deferring the removal of negative prices until the final step should therefore improve cost reflectivity.

While negative capacity prices can be discounted there may be merit in the Gas TCMF investigating how negative LRMCs might be commoditised, and whether this would achieve the relevant objectives.

Q9. No year-on-year capping of NTS Exit Capacity prices is included in the methodology.

Respondents' Views

Four respondents (AEP, IP, RWE, and STUK) offered support for this aspect of the proposal. Three respondents (EDF, SSE, and SGN) did not support the proposal.

AEP "support the removal of year-on-year capping in principle as we recognise this can constrain the cost reflectivity of charges. However it is important that charging 'shocks' are avoided. The publication of indicative charges with commentary on the reasons for variations from the previously published indicative charges should help to avoid this. "RWE "agree that year-on-year capping should be removed." RWE "offer support on the basis that it will improve cost reflectivity of the prices and also the Transportation model methodology together with availability of the model will improve transparency and predictability of the price setting process. " STUK agree that year on year capping of NTS Exit Capacity Prices should be removed from the methodology as this should result in more cost reflective charging.

SSE does not support the removal of a cap on year on year price changes. Large year on year changes to charges will lead to a lack of stability and greater uncertainty. This lack of stability and increased risk will dissuade investment in the UK, potentially having a detrimental affect on security of supply. SSE note Ofgem has determined that changes to electricity DUoS charges are capped at 10 % [15%] per annum. SSE supports a similar cap being applied to Gas Transmission charges to help maintain cost stability.

EDF "fully supports the removal of the current price caps as we believe that they are distortionary and prevent the charges being cost reflective. We are however also aware that in the past they have provided stability to the market when Users have not had predictability around the exit capacity charges. It would therefore appear that these caps are not necessary when combined with the Transportation Model, as Shippers generally value predictability over stability. It also apparent that in the absence of predictability, stability is an issue, it may therefore be appropriate to retain the price caps, but reset the exit capacity charges at the start of every price control so that the charges remain more cost reflective."

SGN "believe that consideration should be given to capping any significant increase in NTS Exit Capacity prices. Indeed, under the enduring regime DNs will be required to make economic decisions between booking additional NTS Exit Capacity and investing in their own networks. It will be extremely difficult for the DNs to make rational decisions in a regime where one element of these decisions, the Exit Capacity charges, may be subject to large year-on-year changes. SGN therefore does not support the proposal. "

National Grid NTS' View

National Grid NTS recognises the benefits that stability provides to Users but also notes that it has a primary Licence charging obligation to generate cost reflective charges. The price capping contained within the prevailing Exit charging methodology is primarily to offset the uncertainty associated with the use of a ten year forecast and modelling of spare capacity within the Transcost process. Option 2 would involve setting charges on a single year Transportation Model and hence should no longer require price capping to stabilise prices. National Grid NTS believes that capping distorts the cost reflectivity of the Transportation model and hence would no longer be consistent with the relevant objectives. While users would not benefit from price capping, with the proposed approach, the use of a single year of data to set charges could lead to the forecasting of future years prices which should maintain if not improve price predictability.

Implementation

Q10. The combined Transport and Tariff model used by National Grid NTS to determine NTS Capacity Prices, be made publicly available.

Respondents' Views

Eight respondents (EDF, AEP, EXXON, IP, RWE, SSE, SGN and STUK) offered support for this aspect of the proposal.

EDF "believe that transparency is essential for a well functioning competitive market. We therefore full support the release of the combined Transport and Tariff model to the industry. This will aid transparency and encourage competition in both the gas and electricity markets." AEP offer support and notes "This will provide greater transparency of process and enable users to model their own scenarios." "To aid transparency," EXXON agrees that "the Transport and Tariff model should be made publicly available to enable users to replicate charges." "Subject to resolution of confidentiality issues, RWE support release of the combined Transport and Tariff Model." SSE and SGN also offer support. STUK note "In the interests of transparency, it seems appropriate that the combined Transport and Tariff model, used by National Grid NTS to determine NTS Capacity Prices, should be made publicly available, subject to interested parties signing the Software Licence Agreement."

National Grid NTS' View

National Grid NTS has made the proposed Transportation Model available with example supply and demand data and will seek to make any data used for charge setting purposes available subject to confidentiality restrictions. National Grid NTS may seek to address the confidentiality issues via a UNC Modification Proposal.

Q11. The Incremental Entry Capacity price determination methodology is included within the Gas Transmission Transportation Charging Methodology.

Respondents' Views

Seven respondents (AEP, EXXON, IP, RWE, SGN, SSE and STUK) offer support for this aspect of the proposal. AEP note "It would seem more logical to include this in the charging methodology statement than the IECR."

National Grid NTS' View

Please see response to question Q5. National Grid NTS will seek to update the price setting elements of the Incremental Entry Capacity Release (IECR) methodology statement as part of the annual consultation ahead of the LTSEC auctions. National Grid NTS will seek to relocate the incremental Entry Pricing methodology to the Charging Methodology at a future date.

Q12. This proposal is implemented for price determination in relation to all exit capacity from 1st April 2007 to 30th September 2010

Respondents' Views

Six respondents (AEP, IP, RWE, SGN, SSE and STUK) offered support for the proposal. One respondent (UKD) did not support the proposal.

AEP "would support implementation from April 2007 provided the appropriate notice periods are maintained." RWE and STUK have concerns about the relatively short timescales to implement these changes by April 2007 but in principle both parties agree that it is sensible to implement the new arrangements at the same time for the derivation of both entry and exit prices.

AEP "would not support end dating of the methodology as a principle this creates uncertainty and could lead to changes being rushed through to meet a deadline. Rather the methodology should persist until changed." This view is supported by the CIA and EDF.

UKD note "As a Distribution Network operator we have an interest in the NTS exit charges in the period to 2010 since they impact upon our offtake capacity incentive. We also consider that the decision on the methodologies to be applied in the period up to 2010 needs to be considered alongside the decision on the methodologies to be applied in the period from 2010 onwards since it would seem to make little sense to introduce a different methodology for the next three years in respect of exit charges if this is not consistent with the longer term methodology. "

UKD considers that "signals to Users regarding the long run marginal costs, and hence level and balance of exit charges, will be provided by the exit charges for the enduring regime from 2010 which are planned to be first made available in 2007. Even for any new exit loads connecting prior to 2010 the charges signalled in 2007 for the enduring period will be far more significant than the charges in the transitional years prior to 2010. There would therefore seem to be little point in introducing a new methodology for determining exit charges, or even rebalancing the exit charges in line with the existing methodology prior to 2010."

UKD "therefore favour retaining the existing balance of exit charges for the next three years. Although it might be considered that this will not reflect the current costs well, we consider that, unless there are significant anomalies that need to be resolved, the benefits of stability and certainty of relative exit charge levels for the next three years

outweigh any possible benefits from rebalancing exit charges. If exit charges were to be rebalanced in line with any of the proposed methodologies during the transitional period this would lead to charging uncertainty and to winners and losers amongst Users without any of the benefits of providing ongoing price signals, for the reasons already stated. Although we favour retaining the existing balance of exit charges in the period prior to 2010 we see no reason for this to restrain the methodologies which might apply in respect of determining NTS entry capacity charges in this period. "

National Grid NTS' View (Questions 12 & 13)

National Grid NTS anticipates that Ofgem will initiate an Impact Assessment in regard to the proposal contained within this consultation report. It is expected that this Impact Assessment would not leave National Grid NTS sufficient time to provide the required two months notice of charge changes. In light of respondents' views that charges should be changed simultaneously if the Transportation Model is introduced and the expectation of appropriate notice periods, National Grid NTS proposes that the methodology should be implemented for NTS Exit Capacity on 1st October 2007 and for all NTS Entry Baseline Capacity sold for 1st October 2007 as outlined in the following table.

Auction	Implementation Date
QSEC	September 2007
DSEC (Day Ahead)	30 Sep 2007
DSEC (Within Day)	1 Oct 2007
RMSEC	Sep 2007
MSEC	February 2008

National Grid NTS notes the concerns of the DNs in regard to the DN offtake capacity incentives but is mindful of its Licence obligation to have a cost reflective charging methodology. National Grid NTS notes that there are mechanisms in place to allow review of the conditions set within the DN GT Licences, including those to reflect the impact of external influences outside the control of the DN.

Q13. This proposal (NTS GCM 01) is implemented for price determination in relation to all entry capacity auctioned from 1st April 2007.

Respondents Views

Six respondents (AEP, EXXON, IP, SGN, SSE, and STUK) offered support for the proposal. One respondent (MCL) did not support the proposal.

AEP offer support and note "it would seem sensible to implement new approaches to charging at the same at entry and exit, to avoid and inconsistencies that could otherwise arise." STUK "is concerned with the tight timescales", but "generally agree that the proposals, in the form, which we would wish to see put into effect, as above,

are implemented for price determination in relation to all exit and entry capacity from 1st April 2007."

MCL note "Given that the key issue of discounted reserve prices remains unresolved (with any necessary Licence amendments) and discussions are continuing in relation to the Exit reforms and the SO Commodity charge (and its application to storage users), MCL believe that it may be appropriate to delay the introduction of the new charging until 1 October 2007. This will allow National Grid, Ofgem, shippers and all stakeholders to fully appreciate the entirety of the changes proposed."

National Grid NTS' View

(See response to question 12)

5 The Proposal

5.1 Having considered all the respondents' views, and taking into account the detailed points put forward, National Grid NTS has reached the view that the following proposal, defined as option 2b within pricing consultation paper NTS GCM 01, would achieve the relevant methodology objectives as defined in Standard Special Condition A5(5) of its GT Licence.

Proposal

Transportation Model Based Approach

5.2 It is proposed that use of Transcost under the prevailing methodology is replaced by a Transportation model.

NTS Exit Capacity Charging Methodology

Transport Model

It is proposed that:

5.3 NTS Exit Capacity Prices are determined from a Transportation Model that calculates the Long Run Marginal Costs (LRMCs) of transporting gas from each entry point to a "reference node" and from the "reference node" to each relevant offtake point.

- The transportation model minimises the flow distance of gas around the network given the assumed pattern of supplies and demands and the constraint that at any node, demand plus flow to other nodes must equal supply and flow from other nodes.
- Any incremental flow down a line results in a reinforcement requirement, with a standard reinforcement cost. It does not consider the way in which pressure, pipeline diameter / length and flow interact – it simply assumes that, for the standard reinforcement cost, incremental flow can be routed down each existing pipeline route.
- The transportation model calculates the marginal costs of investment in the transmission system that would be required as a consequence of an increase in demand or supply at each connection point or node on the transmission system. The measure of the marginal investment costs is in terms of £/GWhkm, hence marginal changes in flow distances based on increases at entry and exit points are estimated initially in terms of increases or decreases in units of kilometres of the transmission system for a small energy injection to the system.

5.4 The Expansion Constant is determined from the average cost of incremental capacity for 900mm, 1050mm and 1200mm pipeline of 100km length and recompression to 85 bar(g), calculated according to the methodology set out in Appendix A of this document. Based on this methodology, an expansion constant of £2223/GWhkm would be applied for prices effective from 1st October 2007.

5.5 Prices for each Gas Year are calculated using the relevant year's 1-in-20 peak Base Case data[14] and network model (e.g. if setting Exit Capacity prices for Gas Year 2006/7, the Base Case supply/demand forecast for 2006/7 and the base network model are used). LRMCs are therefore proposed to be set based on analysis for a single year (as opposed to 10 years under the current arrangements).

Tariff Model

5.6 The following changes to the current methodology statement are proposed in respect of the determination of NTS Exit Capacity Prices from the LRMCs for each reference point to exit route calculated using the Transport Model:

5.7 *Project Management and Operating Costs / Calculation of Annuitised Costs* – The operating costs and the annuity discount factor[15] stated within the current Charging Methodology Statement are proposed to be parameterised and set by reference to the relevant values in National Grid NTS's GT Licence. These are used to convert the LRMC route costs into a LRMC route prices (in pence per peak day kilowatt-hour per day).

5.8 Calculation of NTS Capacity Charges

- NTS Exit Capacity Prices are determined from the "raw" reference point to exit route costs, calculated using the Transportation Model, by adjustment to ensure recovery of the relevant amount of allowed TO revenue from exit Users. This is achieved by adjusting the prices additively such that the resulting positive prices would recover the allowed revenue, as opposed to scaling under the current arrangements. This would preserve the locational differentials between the "raw" NTS Exit Capacity prices.
- Any negative prices are set to the minimum level of 0.0001 pence per kWh per day, as part of the adjustment process.

5.9 *Capacity Charge Re-balancing* - No year-on-year capping of prices would be undertaken.

5.10 *Aggregation into LDZ Exit Zones* - A single exit capacity price is calculated for each Distribution Network (DN) charging zone, as a flow-weighted average of the NTS Exit Capacity Prices determined for each NTS Exit Point within the DN charging zone (rounded to 4 decimal places)[16]. This aspect of the proposal represents a continuation of the prevailing Charging Methodology

NTS Entry Capacity Charging Methodology – Baseline Reserve Prices

5.11 It is proposed that the setting of NTS Entry Capacity Baseline Reserve Prices from UCAs under the prevailing methodology is replaced by the use of a Transportation model to calculate LRMCs.

[14] The Base Case data is consulted on through the Transporting Britain's Energy (TBE) process and is published in the Ten Year Statement.

[15] The Licence anuitisation factor is currently 0.10772 based on a rate of return of 6.25%.

[16] Note that under the current methodology this step is undertaken prior to the application of the Project Management and Operating Costs.

Transport Model

5.12 LRMCs for determination of NTS Entry Capacity Baseline Reserve Prices for use in entry capacity auctions (prior to any discount that may be applied)[17] are based on the same approach as proposed for NTS Exit Capacity Prices, except for the following differences:

In respect of the supply and demand data input into the Transport Model, it is proposed that:

5.13 Prices for each Gas Year are set on the basis of the relevant year's Base Case data and network model, but with adjustments to the supply flows (see paragraph 5.15) to reflect the baseline/obligated capacity level (see paragraphs 5.14) to maintain a balanced network for charging purposes. For the avoidance of doubt, 1-in-20 peak demand flows will remain unadjusted.

5.14 Entry Capacity Baseline Reserve Prices are set by adjusting supply flows in the Base Case data to reflect the obligated NTS SO Baseline Entry Capacity level, as defined by National Grid's NTS Licence, at each NTS Entry Point.

5.15 The supply flow at each NTS Entry Point is adjusted to reflect the required capacity level as follows:

- The supply flow is adjusted to the capacity level to be provided for the entry point in question
- All other supply flows are adjusted up or down in order of merit to balance the network back to the peak 1 in 20 demand level in the Base Case data

5.16 The supply merit order for each NTS Entry Point reflects the least beneficial alternate supply flow, in terms of enabling capacity provision at that entry point.

5.17 The supply merit order is determined by use of the Transportation Model with the Base Case scenario to calculate pipeline distances from each NTS Entry Point to every other entry point.

5.18 For NTS Entry Points where flow needs to be added to the Base Case flow to align with the required capacity level, the remaining entry point flows are reduced in order of pipeline distance merit, starting with the furthest entry point ending with the entry point with the nearest entry point.

5.19 For NTS Entry Points where flow needs to be reduced from the Base Case flow to align with the required capacity level, the remaining entry point flows are increased in order of pipeline distance merit, starting with the nearest entry point and ending with the furthest entry point.

In respect of network model data used in the Transport Model, it is proposed that:

5.20 The appropriate network model for each period of capacity allocation is used i.e. the network model that includes sanctioned projects expected to be completed by the start of the Gas Year that is being modelled.

[17] Proposals to amend the current discounts applied to the Entry Capacity Reserve Prices will be put forward in a separate Consultation Paper

5.21 The relevant baseline capacity reserve price for each Gas Year is used to set prices in auctions[18], as summarised below

- For RMSEC and DSEC Baseline Reserve Prices published in respect of Gas Year Y, this means the network model including all projects expected to be completed for the start of Gas Year Y;
- AMSEC Baseline Reserve Prices published in respect of capacity allocation across three Gas Years (Gas Years Y, Y+1, Y+2), this means the network models including all projects expected to be completed for the start of each of these Gas Years;
- For QSEC Baseline Reserve Prices published in respect of future Gas Years (Gas Years Y+2 to Y+17), this means the network model including all projects expected to be completed for the start of Gas Year Y+2.[19]

Table 5-1 summarises the use of network and supply/demand year models for calculation of NTS Entry Capacity Baseline Reserve Prices applicable from 1 October in calendar Year N (corresponding to Gas Year Y) in chronological order of auction dates and capacity release.

Table 5-1: Gas Years Modelled and Capacity Allocation Periods

Auction	Date Held	Gas Day - Capacity Allocation		Gas Year Modelled
		From	To	
QSEC	September [N]	1 Apr [N+2]	31 Mar [N+17]	Y+2
RMSEC	Sep [N] to Aug [N+1]	1 Oct [N]	30 Sep [N+1]	Y
DSEC (Day Ahead)	30 Sep [N] to 29 Sep [N+1]	1 Oct [N]	30 Sep [N]	Y
DSEC (Within Day)	1 Oct [N] to 30 Sep [N+1]	1 Oct [N]	30 Sep [N]	Y
MSEC	February [N+1]	1 Apr [N+1]	30 Sep [N+1]	Y
		1 Oct [N+1]	30 Sep [N+2]	Y+1
		1 Oct [N+2]	31 Mar [N+3]	Y+2

In the event that this proposal is implemented, Appendices C and D present indicative NTS Exit and Entry Capacity Prices for Gas Years commencing 1st October 2007, 2008 and 2009.

[18] This is a change from the current policy of using a single reserve price for each entry point over all auctions.

[19] Gas Year Y+2 is the last year where investment projects have been triggered by previous auction outcomes.

6 Changes to the Original Proposal in Light of Representations Made

6.1 The following changes were made to the original option 2b proposal by National Grid NTS in consideration of all respondents' views received and the requirement to achieve the GT licence relevant objectives.

6.2 While this consultation has covered changes to the incremental entry capacity pricing methodology, National Grid NTS does not recommend a final proposal to make changes to this methodology or to relocate the methodology from the IECR methodology Statement to the Charging Methodology at this stage. National Grid NTS is of the view that the interactions between the User commitment model within the IECR methodology and the incremental entry pricing methodology are such that they warrant a combined consultation to ensure that decoupling of the UCA from the User commitment test and revisions to the entry capacity pricing methodology achieve the relevant objectives. National Grid NTS will seek to develop a consistent set of changes to the IECR based on the introduction of the Transportation model and will consider the relocation of the incremental entry pricing methodology, from the IECR methodology statement to the Charging Methodology, at a future date.

6.3 No end date for the methodology is proposed.

6.4 In light of respondents' views that charges should be changed simultaneously if the Transportation Model is introduced and the expectation of appropriate notice periods, National Grid NTS proposes that the methodology should be implemented for NTS Exit Capacity on 1st October 2007 and for all NTS Entry Baseline Capacity sold for 1st October 2007 as outlined in the following table.

Auction	Implementation Date
QSEC	September 2007
DSEC (Day Ahead)	30 Sep 2007
DSEC (Within Day)	1 Oct 2007
RMSEC	Sep 2007
MSEC	February 2008

7 Assessment against the Relevant Objectives

This section presents National Grid NTS's views in respect of the extent to which the final proposal set out under section 5 would achieve the relevant methodology objectives under National Grid NTS's GT Licence and the EU Gas Regulations (as summarised under Appendix B).

Cost Reflectivity

7.1 Under National Grid NTS' GT Licence, the relevant methodology objectives define cost reflectivity as "charges which reflect the costs incurred by the licensee in its transportation business". This specifically applies to all transportation charges except those established by auctions.

7.2 It is important to note the difference of approach between the Transcost Model (prevailing methodology) and the proposed Transportation Model in respect how each determines LRMCs and hence the degree to which each model is deemed "cost-reflective". It is considered that the licence definition of costs reflectivity is open to interpretation, but in many respects may fit closer with a Transportation Model approach.

Treatment of Spare Transmission Capacity

7.3 Prices generated from the Transcost model are more reflective of the incremental costs that might be incurred in making additional peak capacity available as Transcost models spare capacity. The Transportation model approach generates marginal costs or the costs of making the last/next unit of capacity available. The Transcost approach results in Users paying for capacity on the basis of the capacity that happens to be available in the local vicinity and when peak spare capacity is present Transcost prices are reduced. Recovering the costs incurred in making such capacity available (i.e. the costs associated with the assets utilised) via other charges will therefore lead to cross subsidies, and could therefore be argued to be less cost reflective in this respect.

7.4 If a single year is modelled with Transcost, i.e. without taking out spare transmission capacity, the resulting charges are volatile and will not, over a period of time, be reflective of costs incurred in adding capacity. Prices may be minimal when there is spare capacity and at an annuitised LRMC when there is congestion, which over time would not cover the cost of the investment. Generating prices from a ten year model might reduce the volatility but would mean that prices were reflective of the average cost over the ten year period rather than a specific year. This would be inconsistent with the period when exit capacity is being procured and the period for which entry capacity is procured in the medium and short term auctions.

7.5 In contrast, the prices generated from the Transportation Model are reflective of both the costs that have been incurred in making physical system capacity available (through the assumptions in the Expansion Constant) and the actual marginal costs that would be incurred by capacity release relative to the prevailing system capacity. Calculating prices on a single year analysis with a Transportation Model will therefore result in Users paying differentially for the capacity they hold and potentially use during the relevant Gas Year.

Backhaul Benefit

7.6 A key benefit of this proposal is that the Transportation Model is more easily able to accommodate the beneficial effects of counter-flows than the prevailing Transcost approach due to the fact that it does not include spare capacity. This effects the prices set for northerly exit points in particular as explained below.

Generating Entry and Exit Charges from Route Costs

7.7 In the prevailing Charging Methodology, the Excel Solver is used to generate Entry and Exit prices from a route cost matrix produced by Transcost. The solver iteratively calculates a set of entry and exit prices which minimises the difference between the entry plus exit prices and the route costs estimated by Transcost.

7.8 Through analysis presented at the Gas TCMF, National Grid NTS has demonstrated that entry plus exit costs can only exactly match the route costs when a model does not include spare transmission capacity but does include a backhaul benefit equal to the avoided cost of investment[20]. It is the presence of spare peak transmission capacity and the lack of a backhaul benefit inherent in the Transcost approach combined with the latest supply and demand scenario that produces the counter intuitive allocation of costs to northern exit points and southern entry points demonstrated via the Gas TCMF analysis[21]. A number of Tariff model changes were investigated to attempt to remove these pricing distortions but none were successful.

Exit Tariff Adjustment

7.9 It is National Grid NTS's view that the objectives of NTS Entry Capacity Reserve Prices and Exit Capacity Charges are to provide price signals to Users in relation to the relative cost associated with providing capacity at different locations around the network. The advantage of the proposed Tariff model approach, where exit prices are adjusted (additive) rather than scaled (multiplicative), is that it preserves the locational price differentials between Entry points and between Exit points and hence preserves the relative cost-reflectivity.

Decoupling of Revenue Drivers

7.10 National Grid NTS's view is that removing the link between UCAs and NTS Entry Capacity Baseline Reserve Prices, and setting prices using annually updated LRMCs, as defined within this proposal, would be more cost reflective. Allowing reserve prices to continue to be set from revenue drivers, where those revenue drivers may not be updated over the formula period, may become less cost reflective over time.

Exit Rebalancing

7.11 Rebalancing of exit capacity tariffs to reflect changes in supply/demand and network configuration has not been undertaken since 2001. This was due to the desire to delay rebalancing on the expectation that NTS exit reform would be implemented in 2002. Subsequent delays to reform have lead to a significant divergence in current tariffs and underlying LRMCs in certain locations. The benefit of updating exit capacity prices would be delivered under this proposal.

[20] Gas TCMF Analysis Report October 2006– Section 5

[21] Gas TCMF Analysis Report October 2006– Section 7

Removal of Exit Price Capping

7.12 Prices are inherently driven by the supply & demand changes and hence subject to change year-on-year. The prevailing exit capacity price capping rules limit the year-on-year change and hence erode genuine cost reflectivity. The proposed Tariff model would increase cost reflectivity by removing year-on-year price capping. This can in part be justified by the move to a single year model as the price capping rules are mainly removing the impact of forecast error. Moving to a single year model also allows future years prices to be forecast from the ten year supply and demand forecast data hence mitigating the risk of price shocks.

Promoting Efficiency and Avoiding Undue Preference

Single Year Model Price Signals

7.13 A single year model will allow National Grid NTS to generate both locational and temporal pricing signals to Users. For example, where a large new entry project is anticipated to come on stream, exit users will be able to determine when connection to the NTS in the same locality is most efficient in terms of capacity provision (as local exit prices will be predictable and likely to fall after the entry point first flows onto the NTS). National Grid can therefore avoid investment to continue to meet its security of supply obligations where users can make more informed choices regarding the timing of their connection to take advantage of lower prices in the future. This would not be the case for prices based on ten years of data.

7.14 In addition, a single year model will avoid the circularity caused by entry capacity auction prices being based on future network and supply/demand data which are, by their very nature, forecasts of auction outturns.

Supply Data

7.15 All network analysis requires a balance between supply and demand and this is equally true of charging models. Under the prevailing Charging Methodology the supply forecasts are adjusted to obtain a supply and demand match given the 1-in-20 demand level. Some supply points will also not be forecast to flow at their Baseline level. This means that some Entry Points are not explicitly at their Baseline supply levels within the charging model.

7.16 This would be overcome under this proposal by carrying out Entry Point specific analysis for those Entry points that were not at their Baseline levels in the initial analysis and obtaining a supply and demand balance by supply substitution.

7.17 For example, where an Entry point was not at its Baseline level, or had been reduced due to a supply surplus, it could be adjusted to that baseline level with the entry point furthest from the entry point in question being adjusted in the opposite direction.

7.18 This approach ensures that all prices would be generated on a consistent basis hence avoiding the undue preference that might be conferred by pricing some Entry Points based on reduced flows.

Decoupling of Revenue Drivers:

7.19 The removal of the link between UCAs and prices would also ensure that the most economic and efficient locational signals for capacity between entry points are maintained over the course of the formula period. This would help users to make informed choices about where it is more efficient to signal their capacity requirement, in terms of the operation of the NTS.

7.20 Entry pricing based on the baseline/obligated level will ensure that prices reflect the requirement on National Grid to release up to the baseline level of capacity on each gas day, and also reduces the sensitivity of the prices to forecasts of supply flows.

Stability and Predictability

7.21 Prices are inherently driven by the supply and demand scenario and hence subject to change. Transcost was developed to replicate and simplify the decision making used in determining network investment with the engineering planning tool Falcon. Transcost was developed when flow patterns in the network were stable and when network load was forecast to grow steadily. At the time, due to the stable flow pattern, the choice of network configuration and compressor and regulator parameter setting within Transcost were simply based on the prevailing flow direction. By contrast, due to unstable and uncertain patterns of flow forecast in the near future, the choice of network configuration and compressor and regulator parameters is more time consuming and requires more sophisticated and arguably subjective network analysis. In particular, the choice of model parameters can influence the way that spare transmission capacity is generated for different flow scenarios.

7.22 National Grid believes, for the reasons given above, that the Transportation Model better reflects the costs incurred with providing NTS entry and exit capacity. Replacing Transcost within the charging process with a Transportation Model removes the potential for subjectivity and sensitivity in the generation of capacity prices as the parameters that lead to instability (the choice of network configuration and compressor and regulator parameters) would no longer be modelled.

Consistency

7.23 Implementation of this proposal from 1st October 2007 will ensure that all entry and exit NTS Capacity Prices are set on a consistent basis with prices being determined from a single transparent charging model.

Promoting Competition

Transparency

7.24 It is National Grid's view that competition can be promoted in terms of the development of the Gas Transmission Transportation Charging Methodology by making it simple and easy to understand such that prices can be replicated and forecast by Users. The Transportation Model confers significant benefits in terms of transparency and predictability over Transcost. Using a single year's forecast would allow the prices for the remaining years of the ten year plan to be forecast by both National Grid NTS and the wider industry. It is anticipated that this feature of the revised methodology would give greater confidence to users and reduce risk associated with price uncertainty hence promoting competition and reducing barriers to entry. National Grid believes the use of a single charging model (Transportation Model) will allow it to make more consistent estimates of LRMCs and therefore avoid undue preference in capacity pricing. The single charging model also allows both National Grid NTS and the users to easily make quick assessments of the value of capacity, therefore enabling the user to make informed decisions about purchasing capacity.

8 Timetable for Implementation

8.1 National Grid NTS is submitting this conclusions report to the Authority, which it is anticipated will allow a veto/non-veto to be provided that fill allow final charge rates to be published within the notice period as required by the UNC. In the event that the proposal is not vetoed by the Authority National Grid intends to notify Users of the new Exit Capacity charge rates by 1 August 2007 and Users of the new Entry Capacity reserve prices by 1 July 2007 for implementation on 1 October 2007.

8.2 The Entry prices will apply in the September 2007 QSEC and RMSEC auctions and in the 30th September 2007 DSEC (day ahead) auction but only in relation to capacity release from 1st October 2007 onwards and hence for the determination of charges from 1st October 2007 onwards, in accordance with Standard Special Conditions A5 (2A) (b) and A4 (2) (a) of National Grid Gas' Gas Transporter Licence in respect of the NTS.

Appendix A – Expansion Constant Calculation

1. Expansion Constants are utilised in the Transportation Model to represent the estimated typical capital cost of the transmission infrastructure required to transport 1 peak day GWh over 1 km. The incremental cost is then determined by multiplying pipe lengths by the appropriate expansion constant. Table A-1 below provides the expansion constants for 900mm, 1050mm and 1200mm pipe diameter based on the following assumptions:
   (a) latest forecast cost of pipelines;
   (b) 100km feeder duplication (parallel pipeline, same diameter) i.e. assumes compressor required every 100km on average;
   (c) maximum inlet pressure per pipe section of 85bar;
   (d) optimum outlet pressure per pipe diameter with a minimum of 38 bar
2. Project management costs are included in the figures and are based on 15% of investment costs.
3. Operating costs, currently at 1.5%, are factored into the prevailing Licence anuitisation factor of 0.10772 and so are not included in the Expansion Constant.
4. The single expansion constant for use in the Transportation model is based on an average of the expansion constants for pipe diameters of size 900 to 1200mm typically used over recent years and planned to be built to reinforce the system. Use of an average increases price stability and price determination repeatability compared to using actual pipe lengths built.

Table B-1: Estimated Investment Costs (September 2006)

Description	Cost (£M)
Pipeline (per km length)	0.0012507 × diameter (mm) - 0.01507
Compressor – existing site (per MW)	0.875

Table B-2: Expansion constants used in the Transportation Model (September 2006)

Pipe Diameter (mm)	A Pipe Cost (£M)	B Compressor Cost (£M)	C Maximum Capacity (GWh)	$=10^6*((A+B)/C)/100$ Expansion constant (£/GWhkm)
1200	148.58	49.59	1069	1853
1050	129.82	40.82	783	2179
900	111.06	32.37	544	2635
Average				2223

Investment Cost Methodology

5. This methodology utilises the costs from all NTS investment work carried out over an 8 year period, including NTS investment work carried out during the previous 4 years in addition to the NTS investment planned for the next 4 years. If there are fewer than 5 projects for a particular diameter of pipeline, the number of years' worth of data being considered to determine the formula will be extended.

6. Linear regression techniques will be used to determine the best fitting trend line to allow for the prediction of the pipeline cost as a cost per kilometre using the diameter of the pipeline in mm as the independent variable.
7. The project investment costs will then be adjusted by applying the Structural Steelwork Labour Costs price index to take into account the rates of change in the provision of network infrastructure, such as steel prices, construction costs and general inflation. This index is available from the DTI via their website. www.DTI.Gov.UK/construction/stats This process will produce costs per kilometre and per megawatt of compressive power which relate to the appropriate construction year.
8. The pipe cost data from the various investment projects will be plotted on a scatter graph showing pipeline diameter versus calculated cost per metre. A trend line will be added to the graph to provide the best fit and allows a new formula to be derived for predicting pipeline costs per kilometre.
9. The compressor cost data from the various investment projects will be averaged to allow a new formula to be derived for predicting compressor unit costs per MW of compressive power.
10. The final pipe cost formula derived from this process is in the form:-

    Cost (£M/km) = a * diameter (mm) + b / km
11. The pipe cost constants ‘a’ and ‘b’ will be established by National Grid NTS each year using investment data as specified above and will be specified to 6 decimal places.
12. The results from applying this methodology including the compressor unit cost and values ‘a’ and ‘b’ will be released by National Grid NTS when new prices are published.

Appendix B - Licence Relevant Objectives and EU Gas Regulations

The National Grid Gas plc Gas Transporter Licence in respect of the NTS requires that proposed changes to the Charging Methodology shall achieve the relevant methodology objectives.

Where transportation prices are not established through an auction, prices calculated in accordance with the methodology should:

1) Reflect the costs incurred by the licensee in its transportation business;

2) So far as is consistent with (1) properly take account of developments in the transportation business;

3) So far as is consistent with (1) and (2) facilitate effective competition between gas shippers and between gas suppliers.

Where prices are established by means of auctions, either

8.3 No reserve price is applied or

4) Reserve prices are calculated at a level that promotes efficiency, avoids undue preference in the supply of transportation services and promotes competition between gas shippers and between gas suppliers.

National Grid NTS is obliged to keep the NTS Charging Methodology under review at all times for the purposes of ensuring that it achieves the relevant objectives.

National Grid NTS also has an obligation to use all reasonable endeavours to ensure that obligated entry capacity is offered for sale in at least one clearing auction *providing that this does not contravene wider Licence obligations including methodology objective (5) listed above.*

EC Regulation 1775/2005 on conditions for access to the natural gas transmission networks (binding from 1 July 2006) states that the principles for network access tariffs or the methodologies used to calculate them shall:

- Be transparent
- Take into account the need for system integrity and its improvement
- Reflect actual costs incurred for an efficient and structurally comparable network operator
- Be applied in a non-discriminatory manner
- Facilitate efficient gas trade and competition
- Avoid cross-subsidies between network users
- Provide incentives for investment and maintaining or creating interoperability for transmission networks
- Not restrict market liquidity
- Not distort trade across borders of different transmission systems.

All but the last of the principles listed above map onto the objectives for National Grid's Transmission Transportation Charging Methodology. In terms of cross border trade, the Regulation recognises that funding for network investment may require different tariffs across different transmission systems.

Appendix C – Indicative NTS Exit Capacity Prices for 1st October 2007

Introduction

This appendix sets out the indicative NTS Exit Capacity Prices, which would apply from 1 October 2007 for the use of the NTS.

These prices have been calculated based on the revised anuitisation factor included within Ofgem's final Price Control formula proposals and may differ from those published in the original proposals which were for 1st April 2007.

Units

Capacity prices are expressed and billed in pence per kilowatt hour per day.

NTS Exit Capacity Prices

NTS TO exit capacity prices apply to loads supplied through existing NTS offtakes into Distribution Networks (DNs) and to large loads and interconnectors supplied directly from the NTS. The exit zone for a DN supply point is determined by its post code.

For new loads supplied directly from the NTS, the exit zone prices provide an indication of the likely level of prices. However, in general, an individual exit zone is created with its own price for new NTS offtakes.

At present, National Grid NTS makes no charge for NTS Exit Capacity at NTS Storage points. This is on the basis that the transportation service to the storage points is interruptible. If a firm transportation service to storage were provided, a TO exit capacity charge would be payable.

There are four small towns in Scotland where LNG needs to be transported by road tanker to supply end users on distribution systems which are not physically connected to the main gas network. For these locations, NTS TO Exit Capacity Prices are calculated on the basis that they are allocated to exit zone SC4, the location of the LNG storage site which supplies them.

Table C1 Indicative NTS Exit Capacity Prices – Distribution Networks (p/kWh/day)

		Indicative Exit Capacity Prices		
Network	DN Exit Zone	2007/8	2008/9	2009/10
East of England	EA1	0.0117	0.0104	0.0110
	EA2	0.0137	0.0129	0.0128
	EA3	0.0093	0.0085	0.0085
	EA4	0.0190	0.0176	0.0182
	EM1	0.0034	0.0026	0.0026
	EM2	0.0080	0.0042	0.0074
	EM3	0.0170	0.0170	0.0166
	EM4	0.0135	0.0127	0.0128
North of England	NE1	0.0049	0.0072	0.0081
	NE2	0.0019	0.0010	0.0018
	NE3	0.0025	0.0017	0.0017
	NO1	0.0002	0.0021	0.0041
	NO2	0.0002	0.0018	0.0041
London	NT1	0.0233	0.0225	0.0225
	NT2	0.0189	0.0181	0.0181
	NT3	0.0184	0.0176	0.0176
North West	NW1	0.0079	0.0110	0.0134
	NW2	0.0127	0.0159	0.0183
Scotland	SC1	0.0001	0.0001	0.0001
	SC2	0.0001	0.0001	0.0001
	SC4	0.0001	0.0001	0.0001
South of England	SE1	0.0213	0.0205	0.0205
	SE2	0.0233	0.0225	0.0225
	SO1	0.0185	0.0177	0.0177
	SO2	0.0259	0.0239	0.0238
Wales & the West	SW1	0.0187	0.0108	0.0099
	SW2	0.0246	0.0178	0.0169
	SW3	0.0333	0.0253	0.0264
	WN	0.0166	0.0197	0.0221
	WS	0.0142	0.0062	0.0052
West Midlands	WM1	0.0157	0.0186	0.0200
	WM2	0.0183	0.0174	0.0174
	WM3	0.0169	0.0139	0.0130

Table C2 Indicative NTS Exit Capacity Prices - Direct Connects (p/kWh/day)

	Indicative Exit Capacity Prices		
NTS Site	**2007/8**	**2008/9**	**2009/10**
AM Paper	0.0116	0.0147	0.0171
Baglan Bay PG	0.0121	0.0042	0.0032
Barking PG	0.0187	0.0179	0.0179
BASF Teesside	0.0001	0.0024	0.0062
BP Grangemouth	0.0001	0.0001	0.0001
BP Saltend (HP)	0.0025	0.0017	0.0017
Bridgewater Paper	0.0149	0.0180	0.0204
Brigg PG	0.0078	0.0032	0.0072
Brimsdown PG	0.0198	0.0190	0.0190
Brunner Mond	0.0121	0.0152	0.0176
Connahs Quay PG	0.0145	0.0176	0.0200
Corby PG	0.0134	0.0126	0.0126
Coryton PG	0.0190	0.0182	0.0182
Cottam PG	0.0078	0.0032	0.0072
Deeside PG	0.0156	0.0187	0.0211
Didcot PG	0.0218	0.0210	0.0210
Goole Glass	0.0054	0.0045	0.0053
Great Yarmouth PG	0.0072	0.0064	0.0064
Hays Chemicals	0.0134	0.0165	0.0189
ICI Runcorn	0.0165	0.0196	0.0220
Immingham CHP	0.0034	0.0026	0.0026
Keadby PG	0.0064	0.0051	0.0064
Kemira Ince	0.0161	0.0193	0.0216
Kings Lynn PG	0.0122	0.0114	0.0114
Kingsnorth PG	0.0184	0.0176	0.0176
Little Barford PG	0.0152	0.0144	0.0144
Longannet PG	0.0001	0.0001	0.0001
Medway PG	0.0183	0.0175	0.0175
Peterborough PG	0.0113	0.0104	0.0104
Peterhead PG	0.0001	0.0001	0.0001
Phillips Seal Sands	0.0001	0.0024	0.0062
Rocksavage PG	0.0165	0.0196	0.0220
Roosecote PG	0.0003	0.0035	0.0058
Rye House PG	0.0205	0.0197	0.0197
Saltend PG	0.0028	0.0020	0.0019
Sappi Paper Mill	0.0084	0.0115	0.0139
Seabank PG	0.0232	0.0184	0.0175
Sellafield PG	0.0001	0.0017	0.0040
Shotton Paper	0.0156	0.0187	0.0211
Spalding PG	0.0093	0.0085	0.0085
Stallingborough PG	0.0042	0.0034	0.0034
Staythorpe PG	0.0058	0.0049	0.0049
Sutton Bridge PG	0.0108	0.0100	0.0100
Teesside Hydrogen	0.0001	0.0024	0.0062
Teesside PG	0.0001	0.0030	0.0068
Terra Billingham	0.0001	0.0030	0.0068
Terra Severnside	0.0232	0.0183	0.0174
Thornton Curtis PG	0.0034	0.0026	0.0026
Zeneca	0.0001	0.0024	0.0062

Table C3 Indicative NTS Exit Capacity Prices - Storage (p/kWh/day)

	Indicative Exit Capacity Prices		
Interconnectors	**2007/8**	**2008/9**	**2009/10**
Bacton I/C	0.0072	0.0064	0.0064
Moffat I/C	0.0001	0.0001	0.0001
Storage Sites			
Avonmouth	0.0232	0.0184	0.0175
Barton Stacey	0.0252	0.0244	0.0244
Dynevor Arms	0.0137	0.0058	0.0048
Garton	0.0016	0.0008	0.0008
Glenmavis	0.0001	0.0001	0.0001
Hatfield Moor	0.0062	0.0049	0.0062
Hole House Farm	0.0129	0.0160	0.0184
Hornsea	0.0005	0.0001	0.0005
Partington	0.0114	0.0149	0.0173
Rough	0.0011	0.0003	0.0002

Appendix D – Indicative NTS Entry Capacity Baseline Reserve Prices

This appendix sets out indicative NTS Entry Capacity baseline reserve prices which would apply from 1 October 2007 for the use of the NTS. These prices have been calculated based on Ofgem's final Price Control formula proposals including revised baselines and anuitisation factor.

Capacity prices are expressed and billed in pence per kilowatt hour per day.

	Indicative Entry Capacity Baseline Reserve Prices		
ASEP	**2007/8**	**2008/9**	**2009/10**
Avonmouth LNG	0.0001	0.0001	0.0001
Bacton	0.0102	0.0100	0.0109
Barrow	0.0085	0.0059	0.0039
Burton Point	0.0001	0.0001	0.0001
Caythorpe	0.0070	0.0072	0.0077
Cheshire	0.0001	0.0001	0.0001
Dynevor Arms LNG	0.0001	0.0020	0.0038
Easington / Rough	0.0093	0.0100	0.0086
Fleetwood	0.0064	0.0025	0.0022
Garton	0.0082	0.0077	0.0090
Glenmavis	0.0195	0.0156	0.0145
Hatfield Moor	0.0022	0.0025	0.0024
Hole House Farm	0.0001	0.0001	0.0001
Hornsea	0.0080	0.0082	0.0092
Humbly Grove (Barton Stacey)	0.0001	0.0001	0.0001
Isle of Grain	0.0001	0.0001	0.0001
Milford Haven	0.0157	0.0141	0.0144
Partington	0.0001	0.0001	0.0001
St Fergus	0.0391	0.0365	0.0362
Teesside	0.0096	0.0083	0.0067
Theddlethorpe	0.0065	0.0073	0.0076
Wytch Farm	0.0001	0.0001	0.0001