

Incremental Entry Capacity Release Methodology Statement

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INCREMENTAL ENTRY CAPACITY RELEASE STATEMENT

Modification History

Modification Reference Number	Date of Implementation	Notes

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Document Revision History

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1.0	July 2002	
2.0	August 2003	Minor clarifications and price schedules for new entry points (Milford Haven and Barton Stacey) included
3.0	July 2004	Minor clarifications, price schedules removed to now only appear in the Transportation Statement
4.0	July/August 2004	Changes following consultation responses
4.1	July 2005	Proposed changes consultation
5.0	August 2005	Proposed changes agreed
5.1	14 September 2005	Proposed amendment to include formal consent process prior to adjusting investment lead times
5.2	30 September 2005	Final proposed amendment to include formal consent process prior to adjusting investment lead times incorporating consultation representations
6.0	6 th April 2006	Proposals for the introduction of a methodology for the determination of investment costs
6.1	11 th May 2006	Final proposals for the introduction of a methodology for the determination of investment costs

CONTENTS

A. FOREWORD	5
B. INTRODUCTION	6
1. PURPOSE OF DOCUMENT	6
2. PLANNING REQUIREMENT	6
3. PLANNING PROCESS	8
4. METHODOLOGY OBJECTIVE.....	8
C. DECISION MAKING METHODOLOGY	9
1. ACCUMULATE INFORMATION RECEIVED FROM LONG TERM AUCTION	9
2. PROCEDURE FOR ALLOCATING INCREMENTAL CAPACITY	10
2.1 <i>Qualifying Bids</i>	10
2.2 <i>Baseline Capacity</i>	10
2.3 <i>Incremental Capacity Allocation</i>	10
2.4 <i>Additional Considerations</i>	14
SCHEDULE 1: ENTRY CAPACITY INVESTMENT INCENTIVE PRICE SETTING METHODOLOGY FOR EXISTING SYSTEM ENTRY POINTS	15
A. INTRODUCTION	15
B. LONG RUN INCREMENTAL COSTS (LRICs) OVERVIEW.....	15
1. NTS CAPACITY PLANNING	16
1.1 <i>Supply/demand forecasting</i>	16
1.2 <i>Identify base network</i>	16
1.3 <i>Construct base networks</i>	16
2. LRIC CALCULATION	17
2.1 <i>Calculate incremental investment costs</i>	17
2.2 <i>Aggregation into Exit Zones</i>	18
2.3 <i>Project Management and Operating Costs</i>	18
2.4 <i>Calculation of Annuitised Costs</i>	18
2.5 <i>Calculation of Discounted Annual Costs and Incremental Volumes</i>	19
2.6 <i>Calculation of LRIC</i>	19
2.7 <i>Optimisation Procedure</i>	19
2.8 <i>Calculation of Costs above 12 Mscm/d</i>	20
3. COST CALCULATION	20
3.1 <i>Calculation of Baseline Reserve Prices</i>	20
3.2 <i>Convert Entry Only Capital Cost into £M and ensure capital cost for each increment is greater or equal to the next lowest increment</i>	21
3.3 <i>Conversion to £/GWh using terminal specific CVs</i>	21
3.4 <i>Annuitisation and conversion to p/kWh/day</i>	21
3.5 <i>Use Linear Interpolation to calculate prices for each increment</i>	21
4. PRICE STEPS IN EXCESS OF 150% OF BASELINE	22
5. PRICING RECALCULATION.....	22
SCHEDULE 2: ENTRY CAPACITY INVESTMENT INCENTIVE PRICE SETTING METHODOLOGY FOR NEW SYSTEM ENTRY POINTS	23
1. INTRODUCTION	23
2. PRICING RECALCULATION.....	23
APPENDIX 1: EXAMPLE OF THE NPV TEST	24

A. FOREWORD

National Grid's National Transmission System (NTS) plays an important role in facilitating the competitive gas market and helping to provide the UK with a secure gas supply. National Grid NTS believes it is appropriate for it to continue to develop the NTS in a way that provides its customers and Great Britain generally, with a gas transmission system that is robust against supply shocks and which keeps pace with changes in the gas market, such as increasing dependency on imported supplies.

To continue developing a flexible and responsive NTS, National Grid NTS believes it is important to seek wide views on the process for determining how it invests in its network as well as on the underlying assumptions that underpin such investment. National Grid NTS has consistently argued that it does not believe it is appropriate to rely on entry capacity auctions alone to provide investment signals. National Grid NTS intends, therefore, to continue to develop a planning approach that draws upon views of a range of stakeholders across the gas chain, and will continue to aim to invest where this is necessary to meet statutory obligations. As now, National Grid NTS will publish its conclusions within the Ten Year Statement.

National Grid NTS expects the results of long term auctions to influence its plans for investment through two routes. First, information from auctions can be considered alongside planning data as an additional piece of data. Second, a sufficiently strong, unambiguous, signal in long term auctions may trigger the sale of entry capacity which National Grid NTS would expect to support through investment. This statement describes the process by which such sales of entry capacity might be triggered.

B. INTRODUCTION

1. Purpose of Document

This methodology statement has been produced to meet the requirements of Special Condition C15 of National Grid's GT licence. National Grid NTS believes the content is consistent with its duties under the Gas Act and is consistent with the standard, amended standard and Special Conditions of its GT Licence.

The methodology described will be used by National Grid NTS when determining whether to propose making incremental entry capacity available to users of its system. In this context, incremental entry capacity means capacity in excess of the volume of obligated entry capacity determined in accordance with paragraph 14(5)(g) of part 2 of Special Condition C8B of National Grid's GT Licence. The methodology will be applied only for periods when National Grid NTS is able to physically respond to any signal that additional investment is required. In view of the lead times associated with investment in the NTS, this means applying the methodology for three years ahead – such that capacity may be typically offered with a three year lead time from the October following the auction. However, given other factors which may be specifically known before an auction such as the length of time to obtain consents in particular circumstances or special construction challenges (for example, which would require a construction timescale of more than one year), the methodology may be applied in respect of periods for years more than three years ahead provided that National Grid NTS shall first have obtained the written consent of the Gas and Electricity Markets Authority (the "Authority") to do so. In certain circumstances, it may be that National Grid NTS can release capacity in less than three years. In assessing any lead time, National Grid NTS will take into account any preliminary works agreements signed with and underpinned by relevant counter-parties ahead of the relevant auction¹.

Consistent with National Grid's NTS GT Licence and network code, system entry capacity is a firm commercial right that may be offered on a daily basis or multiples thereof: it does not reflect a commitment or obligation upon National Grid NTS to provide a matching investment in pipeline or similar.

2. Planning Requirement

Standard Special Condition A9 of the GT Licence requires National Grid NTS (subject to its statutory duty under Section 9 of the Gas Act) to plan and develop its pipeline system so that it will meet, after operational measures such as storage and contractual interruptions in the supply of gas, the peak aggregate daily demand for conveyance for supply to premises

¹ For information, National Grid NTS has previously released incremental obligated entry capacity within the three year timescale where it was able to do so, in response to National Grid NTS' incremental entry capacity incentives to release incremental capacity as soon as is practicable

which is likely to be exceeded in only one in 20 years, having regard to historical weather data derived from at least the previous 50 years.

Special Condition C2 requires National Grid NTS to comply with a direction to prepare a ten-year statement setting out forecasts as to the use likely to be made of its pipeline system and likely developments of that system.

National Grid NTS proposes to continue its existing planning process to facilitate compliance with Standard Special Condition A9 and Special Condition C2. The output of the planning process will continue to inform forecasts as to the use likely to be made of the National Grid NTS pipeline system and will underpin capital expenditure which National Grid NTS anticipates being reflected in allowed revenues in future price controls.

3. Planning Process

With the benefit of detailed consultation in 2001, National Grid NTS was able to enhance its 2002 Base Plan Assumptions (BPA) process. In addition to the established process of consulting on its BPA supply/demand forecasts, National Grid NTS has introduced an enhanced consultation process under the banner of 'Transporting Britain's Energy' with a view to obtaining industry views on the levels of flexibility and network resilience that users of the system would like to see developed. Views have been sought on a number of broad areas including gas/electricity interactions, central case gas supply and demand forecasts, likely remedies to projected supply deficits and sources of demand growth. The planning process is continually updated and, in conjunction with emerging signals from auctions, is capable of providing a base case projection of supply and demand at any point in time. The base case then provides a basis for determination of National Grid NTS statutory investment requirements.

National Grid NTS may propose to release incremental entry capacity in light of the planning data received, and would expect to do so where the information meets the criteria specified below in respect of information derived from long term entry capacity auctions. In accordance with the conditions of its NTS GT Licence, any such application by National Grid NTS would be subject to approval by the Authority. National Grid NTS believes that, by giving that approval, the Authority accepts that investment undertaken by National Grid NTS with a view to physically meeting the demand for obligated entry capacity should be reflected in subsequent regulatory decisions, notably regarding proposals to modify the price controls and incentives defined within National Grid's NTS GT Licence. In this context, National Grid NTS believes that any such approval should be regarded as establishing an expectation that associated investment should be reflected in its assumed regulatory asset value (subject, as with the approach to price controls to date, to that expenditure being economically and efficiently incurred); that any proposals for revising the quantities of baseline entry capacity should be demonstrably consistent with the entry capacity incentive structure (such that the terms on which capacity may have previously been released will not be significantly altered for either National Grid NTS or Shippers); and that proposals for revising the entry capacity buy-back incentive parameters should demonstrably allow for the level of incremental capacity released. National Grid NTS believes this is consistent with the Authority's duty to ensure National Grid NTS is able to finance its functions.

4. Methodology Objective

The primary purpose of this methodology for determining incremental entry capacity volumes is to indicate the way in which National Grid NTS will interpret the results of long term entry capacity auctions in terms of whether or not to seek to allocate obligated incremental entry capacity rights to Users. In considering this, National Grid NTS believes it is appropriate to consider the financial incentives it faces under its NTS GT Licence

conditions, in particular as a result of the entry capacity investment incentive. However, National Grid NTS also believes it is important for the assessment to be set in the context of its wider obligations. The methodology set out in this statement therefore seeks to describe the circumstances in which National Grid NTS believes there would (or would not) be a sufficient signal from entry capacity auctions to create a presumption in favour of releasing incremental entry capacity.

C. DECISION MAKING METHODOLOGY

1. Accumulate Information Received From Long Term Auction

The information for considering whether or not to release incremental entry capacity will be based on indications of Users' demand for entry capacity as revealed by the relevant allocation process described in National Grid's network code.

In accordance with the Network Code requirements introduced by Modification Proposal 0500, Users will be invited to indicate, for each of a set of prices, the quantity of entry capacity they wish to acquire (if any) at each terminal in each available period. These prices will be published in the National Grid NTS Transportation Statement. The methodology used to generate these prices is included in Schedule 1, and forms part of this methodology.

Broadly, the methodology establishes the prices per unit of capacity which are the minimum National Grid NTS would expect to receive, over a sustained period and for all capacity made available, in order to justify releasing incremental entry capacity at any given terminal. In general, the price steps have been estimated based on potentially releasing capacity increments equal to 2.5% of the baseline capacity at the relevant terminal. That is, the second price step represents the minimum price at which valid bids for at least 105% of baseline capacity would need to be received before National Grid NTS would consider releasing incremental entry capacity equivalent to 5% of the baseline quantity at that terminal.

The baseline price is that at which National Grid NTS would release, in response to valid bids, up to the available quantity of obligated entry capacity – all bids will be accepted so long as the available quantity is not exhausted. This minimum available quantity will be calculated in accordance with National Grid's NTS GT Licence conditions and will be published in the Transportation Statement.

The baseline price at each terminal, is generally the relevant Unit Cost Allowance specified in National Grid's NTS GT Licence. This reflects Ofgem's determination, based on information supplied by National Grid NTS, of an appropriate measure of the long run marginal cost of providing additional entry capacity at each terminal. National Grid NTS believes that making baseline entry capacities available at long run marginal cost is consistent with its obligations and duties, including under the Gas Act and

GT Licence. The exception is at terminals where the baseline capacities specified in National Grid's NTS GT Licence are zero for all years. In these cases, the baseline price will also be zero.

As described in Schedule 1, subsequent price steps have been calculated for each terminal by estimating annualised investment costs associated with physically providing incremental entry capacity, dividing this cost by the baseline plus incremental volume of capacity, and adding this value to the baseline price. This approach produces price steps whereby the change in National Grid NTS' income from bidders, assuming all of the available quantity is sold at the baseline or incremental price step as appropriate, is equal to the estimated cost of providing incremental capacity. The signal of bidders willingness to pay is therefore set against estimated marginal cost in the methodology described below for proposing that incremental obligated entry capacity should be released, which National Grid NTS believes is consistent with its obligations and duties, including under the Gas Act and GT Licence.

2. Procedure for Allocating Incremental Capacity

2.1 Qualifying Bids

- a. In accordance with the Network Code, receive all Quarterly System Entry Capacity (QSEC) bids posted by the end of the bid process. Only bids that satisfy the relevant User credit requirements as specified in the Network Code will be considered in this procedure.

2.2 Baseline Capacity

Allocate capacity in all instances where the aggregate quantity specified in valid bids at the baseline price is less than or equal to the available quantity of obligated entry capacity. This available quantity will be determined in accordance with paragraph 14(5)(g) of part 2 of Special Condition C8B of National Grid's NTS GT Licence. That is, that any unsold incremental obligated capacity carried over from previous auctions will be offered at baseline price (P_0) in any subsequent auction.

2.3 Incremental Capacity Allocation

- a. At any terminal, for a continuous period that is less than four quarters in length, if a minimum quantity of incremental capacity is demanded in each quarter² then National Grid NTS would not expect to seek approval to designate and allocate that minimum quantity of incremental capacity as annual obligated entry capacity. There

² The minimum quantity of incremental capacity demanded over a period is established by firstly identifying in each quarter the highest price steps at which the aggregate quantity specified in valid bids exceeds or is equal to that potentially available at that price level – obligated entry capacity plus the increment assumed when setting the price steps; and secondly identifying over a series of consecutive quarters the lowest price step identified in the previous step.

would be a presumption that incremental entry capacity should not be released.

- b. At any terminal, for a continuous period that is greater than eleven quarters in length but less than twenty quarters, if a minimum quantity of incremental capacity is demanded in each quarter, then National Grid NTS would seek approval to designate and allocate that minimum quantity of incremental capacity as annual obligated entry capacity. There would be a presumption that incremental entry capacity should be released.
- c. At any terminal, for a continuous period that is greater than three quarters in length but less than twelve quarters, or greater than nineteen quarters but less than thirty two quarters, if a minimum quantity of incremental capacity is demanded in each quarter, then National Grid NTS may seek approval to designate and allocate obligated entry capacity. There would be a presumption that non-auction based evidence would be required to support any decision to recommend releasing incremental entry capacity.
- d. At any terminal, if a minimum quantity of incremental capacity is demanded in any quarter, and taking this plus the subsequent thirty one quarters (or less where this would be beyond the period for which capacity has been offered), the net present value³ of the revenue from bids for incremental entry capacity which would be accepted if a given quantity of incremental entry capacity was released equals at least 50% of the “assumed project value”, then National Grid NTS would seek approval to designate and allocate that quantity of incremental capacity as permanent obligated entry capacity. There would be a presumption that incremental capacity should be released. The “assumed project value” will be calculated by multiplying the size of the increment of capacity being considered for release by the gross entry terminal UCAs uplifted for RPI as specified in National Grid’s NTS GT Licence. An simple example showing how the NPV test works is given in Appendix 1. For reference, the UCA based values for the main beach terminals are shown in the table below.

Table: Main beach terminals (gross UCA)

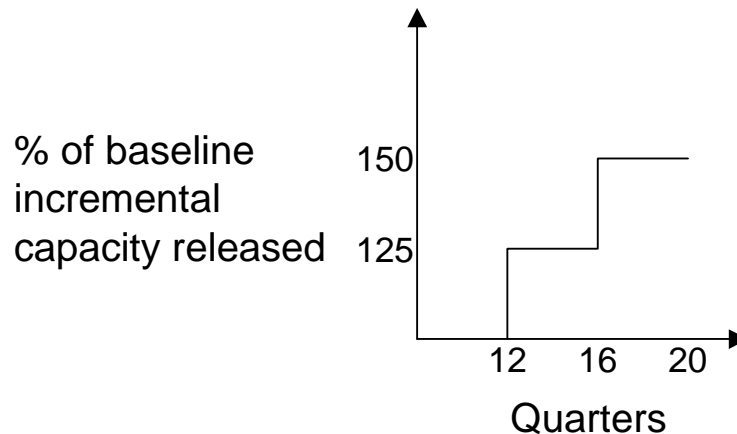
	£ million / mcm	£/kWh
Bacton	1.97	0.182
Barrow	0.16	0.014
Easington	0.37	0.034
St. Fergus	6.92	0.639
Teesside	0.64	0.059

³ For the purposes of this methodology, the first period considered will be that where the aggregate volume of valid bids received first exceeds or equals the available obligated quantity plus the quantity of incremental capacity that is being considered. All values will be discounted to this period on a quarterly basis using an annual discount factor of 8.3% (6.25% plus inflation).

Theddlethorpe	0.33	0.031
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- e. Where National Grid NTS assesses prior to a capacity release that it may be unable to physically deliver all or part of anticipated incremental capacity within a three year lead time prior to the auction invitation, National Grid NTS will, **provided that it shall first have obtained the written consent of the Authority pursuant to paragraph 2.3h below**, specify a revised lead time to be applied to all or part of capacity released at the affected entry point before the auction is held. This may be caused by the length of time required to obtain consents or construction challenges (for example, which would require a construction season of more than one year). National Grid NTS will notify bidders of the amount, if any, of the anticipated incremental capacity that could be released with a three year lead time and also the earliest practicable capacity release date beyond the typical three year lead time for the remaining anticipated incremental quantity that would be appropriate at the affected entry point. The lead time will be specified in the relevant auction invitation to tender alongside the UCA in the example format shown in Diagram 1 below:

Diagram 1: Example of format of pre-auction notification of earliest possible release of incremental entry capacity at a given entry point



- f. In the above example, at a given entry point, only 125% of the baseline capacity will be offered for sale as incremental entry capacity with a three year lead time. The remaining volume up to 150% of baseline capacity will be made available with a four year lead time.
- g. In assessing any lead time, National Grid NTS will take into account any preliminary works agreements signed with and underpinned by relevant counter-parties ahead of the relevant auction.

- h. Where National Grid NTS makes an assessment as described in paragraph 2.3e above, it may make an application to the Authority for its written consent to specify a revised lead time to be applied to all or part of the capacity to be released at an entry point. National Grid NTS shall, prior to making the application to the Authority, undertake a consultation with shippers and other interested parties on the proposed application and allow them a period of not less than 14 days in which to make representations (unless otherwise directed by the Authority). Within 7 days of the close of consultation, National Grid NTS will send to the Authority:
 - i. A report on the outcome of the consultation;
 - ii. Any written representations or objections from shippers and other interested parties, including proposals for revision to the application not accepted by National Grid NTS, arising during the consultation; and
 - iii. A final version of the application.

National Grid NTS has developed this methodology in good faith reflecting its understanding of the statutory obligations attached to both National Grid NTS and the Authority, and its understanding of the regulatory framework which ensures continued remuneration of properly incurred expenditure on regulated assets. For the avoidance of doubt, National Grid NTS believes that any release of obligated incremental entry capacity is subject to approval by the Authority, whether explicitly in response to a specific proposal or implicitly through application of the methodology specified in this statement. National Grid believes that, by giving that approval, the Authority accepts that the implications of applying this methodology, including subsequent investment undertaken by National Grid NTS with a view to physically meeting the demand for obligated entry capacity, should be reflected in subsequent regulatory decisions, notably regarding proposals to modify the price controls and incentives defined within National Grid's NTS GT Licence. In this context, National Grid NTS believes that any such approval should be regarded as establishing an expectation that associated investment should be reflected in its assumed regulatory asset value⁴; that any proposals for revising the quantities of baseline entry capacity should be demonstrably consistent with the entry capacity incentive structure (such that the terms on which capacity may have previously been released will not be significantly altered for either National Grid NTS or Shippers); and that proposals for revising the entry capacity buy-back incentive parameters should demonstrably allow for the level of incremental capacity released. National Grid NTS believes this is consistent with the Authority's duty to ensure National Grid is able to finance its functions.

⁴ National Grid NTS believes that, as with the approach to price controls to date, Ofgem would wish to assure itself that any such capital expenditure had been efficiently incurred.

2.4 Additional Considerations

In circumstances and periods where the bids received in long term auctions do not meet the criteria set out above for the release of incremental entry capacity, National Grid NTS may still seek to designate and allocate incremental obligated entry capacity. In these circumstances, National Grid would presume that Ofgem would only consider such a proposal if it were supported by other information, such as that generated through the National Grid NTS planning process, as described above.

Schedule 1: Entry Capacity Investment Incentive Price Setting Methodology for existing system entry points

A. Introduction

This methodology has been established to provide a price schedule against which Quarterly System Entry Capacity (QSEC) can be demanded in accordance with Network Code section B2. Prices calculated in accordance with this methodology are applicable to the release of aggregate quantities of QSEC that are above the Baseline quantities identified in National Grid's NTS GT Licence.

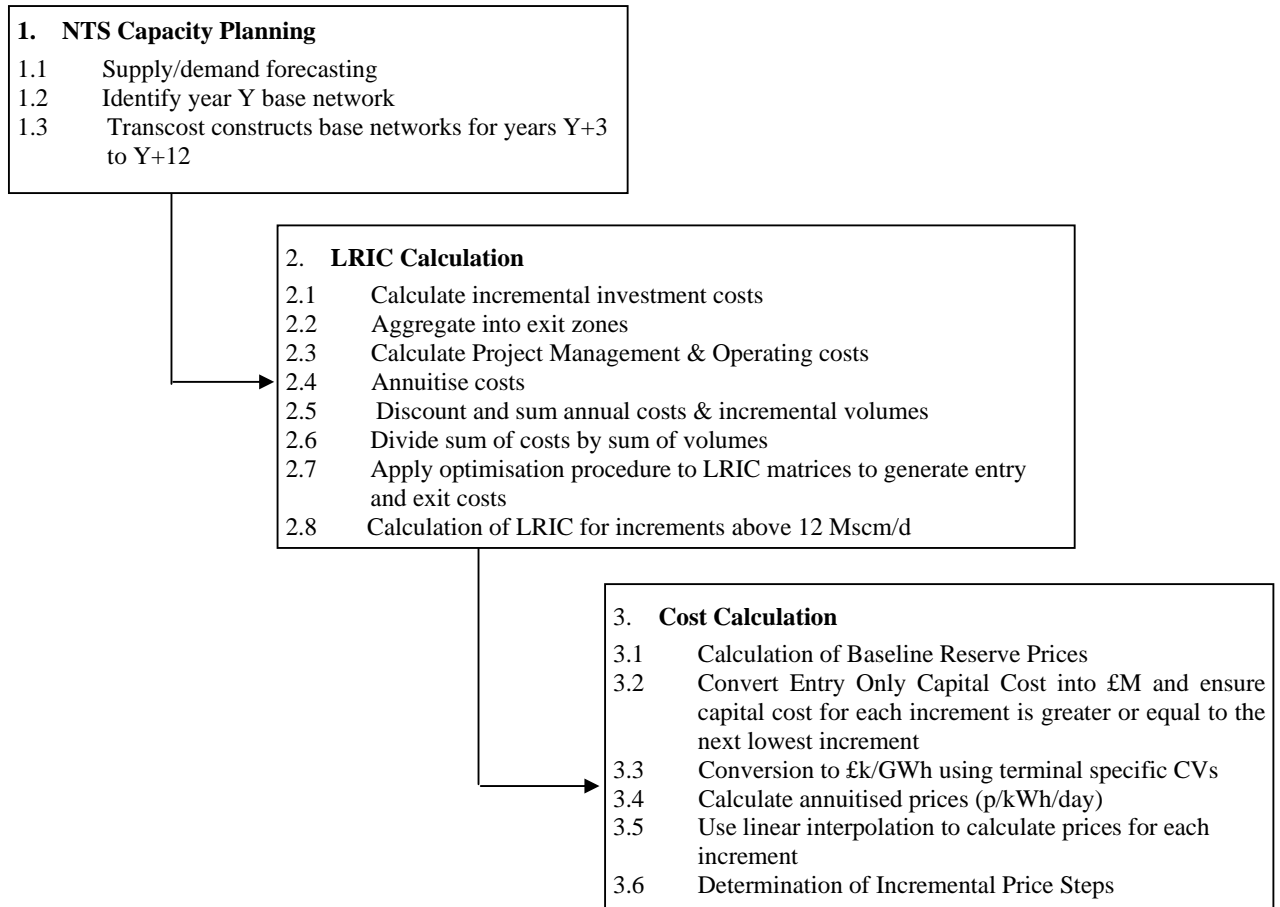
The objective of the methodology is to produce a range of price steps which affords Users an opportunity to reveal their demand for entry capacity, but which also reflects the estimated construction costs potentially incurred by National Grid NTS for providing Entry Capacity at levels beyond the Baseline quantities identified in its GT Licence. The underlying cost assumptions are forward looking and are informed by present day cost estimates for pipe laying and associated activities to provide new capacity.

The methodology uses trend analysis to ensure a logical progression of prices in either ascending or descending direction. Application of this logic also ensures that programming is simplified for the purpose of providing readily soluble algorithms.

B. Long Run Incremental Costs (LRICs) Overview

The LRIC approach derives entry to exit costs which represent the cost of providing capacity to transport increments of gas through the NTS. The LRIC methodology is broadly similar to the Long Run Marginal Cost (LRMC) methodology described within the Gas Transportation Charges statement, except that whilst LRMC considers only one increment size of 2.834 mcm/d (100 mcf), LRIC considers various increment sizes .

The following Figure presents a schematic flow diagram of the steps involved in calculating entry LRICs reflective of NTS costs.



1. NTS Capacity Planning

1.1 Supply/demand forecasting

The starting point for the LRIC calculation is Transcost – a network simulation model which identifies incremental reinforcement requirements and their costs. Further details of the Transcost model are available on National Grid’s web site (www.NationalGrid.uk.com).

1.2 Identify base network

The initial Transcost network is based on the supply/demand match set out in National Grid’s Base Plan Assumptions and the reinforcement plans that are derived from it. Transcost therefore contains a base network, which equates to the present NTS plus any known reinforcement projects that will be completed before year 1 begins.

1.3 Construct base networks

For the first year of analysis, Transcost tests whether, within its parameters, it is necessary to reinforce the base network so that it is just sufficient to support the supply/demand match for that year. For each subsequent year of the analysis Transcost will reinforce the modelled network from the previous year so that it is just sufficient to support the supply/demand match for that year. Since LRIC is estimated over a ten year period, there are ten separate but related “base” networks used in the analysis.

2. LRIC Calculation

2.1 Calculate incremental investment costs

Transcost calculates the additional investment required in new pipelines and/or compressors to support a sustained incremental increase in flow along each route. The more constrained a route is, in terms of available capacity, or the longer a route is, the higher will be the level of investment necessary. This analysis is carried out using the base case networks described above for 10 years starting from the first year that new investments can be delivered given a three year planning horizon i.e. year Y+3. Increments of varying size from 1.5 Mscm/d through to 12 Mscm/d (or 50% of baseline if less than 12 Mscm/d) have been used.

Range and Size of Increment

This is set such that the economic signals resulting from the LRIC process are clear: The increment chosen, 1.5 Mscm/d represents in general, around 2% to 10% of the flow along a route. The present version of Transcost can reliably assess increments up to the point when a new “greenfield” compressor station is identified as being required along a route, which typically occurs at approximately 12 Mscm/d. For increments of greater magnitude, more detailed network analysis is required to provide robust cost estimates. (see Section 2.8 Calculation of Costs above 12Mscm/d for details)

Investment Cost Methodology

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.

Linear regression techniques will be used to determine the best fitting trendline 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.

The project investment costs will then be adjusted by applying the Structural Steelwork Labour Costs price index⁵ to take into account the rates of change in the provision of network infrastructure, such as steel prices, construction costs and general inflation which will then produce a cost per kilometre which relates to the appropriate construction year.

The cost data from the various investment projects will be plotted on a scatter graph showing pipeline diameter versus calculated cost per metre. A trendline 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.

The final cost formula derived from this process is in the form:-

$$\text{Cost (£M/km)} = a * \text{diameter (mm)} + b / \text{km}$$

Where the 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.

The results from applying this methodology, including the values 'a' and 'b' will be released by National Grid NTS with the consultation report issued as part of the IECR annual review.

The estimated costs of other relevant types of investment are set out below.

Description	Cost £M
Compressor – Greenfield	30.0 per station
Compressor – Existing site	15.0 per turbine

2.2 Aggregation into Exit Zones

NTS exit points that deliver gas into the Local Transmission System (LTS) are grouped into 33 exit zones within Transcost, consistent with National Grid's approach to NTS Transportation Charges. Investment costs for an exit zone are calculated by means of a flow-weighted average of all the individual exit points within that zone. Flow weighting is based upon the projected peak day delivery volumes at each exit point. It should be noted that individual supply points that are supplied directly from the NTS are excluded from this aggregation process.

2.3 Project Management and Operating Costs

Project management costs are variable costs that are dependent upon many factors including location, timing, type and size of investment. However, size of investment is the main indicator of the scale of expected project management costs. In the LRIC estimation process project management costs are assumed to be 15% of the previously identified investment costs. Similarly, the change in operating costs associated with the increased throughput of the increment is assumed to be 1.5% of investment costs.

2.4 Calculation of Annuitised Costs

⁵ This index is available from the DTI via their website www.DTI.Gov.UK/construction/stats

The capital cost is annuitised, that is spread evenly over the expected life of the asset taking into account the required rate of return and the 20% of costs that are incurred in the year before an investment project is delivered. The annuity period assumed is 45 years, reflecting the assumption of the average economic life of new NTS pipeline assets. The annuity discount factor is 6.25% per annum, consistent with the cost of capital used to set maximum allowed revenue under NTS TO and SO price controls applicable from 1 April 2002.

2.5 Calculation of Discounted Annual Costs and Incremental Volumes

The LRIC for the entire period of the analysis is the weighted average of each individual year's estimate of the marginal cost, with earlier years having a greater weight than later ones. In order to provide appropriate weighting the costs and incremental volumes for future years are discounted at 6.25% per annum. Capacity charges are expressed in terms of pence per peak day kilowatt-hour per day. However incremental volumes are expressed in terms of millions of cubic metres. Therefore, at this stage in the process, the incremental volumes are converted into energy units.

2.6 Calculation of LRIC

The LRIC in pence per peak day kilowatt-hour (pkdkWh) per day is calculated by dividing total discounted cost by total discounted volume.

Total Discounted Cost (£s m)	31.07
Total Discounted Volume (GWh)	233.37
LRIC (p / pkdkWh / annum)	13.3136
Days in Year	365
LRIC (p / pkdkWh / day)	0.0365

2.7 Optimisation Procedure

An LRIC estimate is determined for each entry point and each exit point such that, when these are combined for any particular pairing of entry and exit point, they replicate as closely as possible the calculated LRIC for that pairing.

An optimisation procedure (Microsoft Excel Solver) is used to determine LRIC reflective entry and exit costs. For each combination of entry point and exit point, the solver uses the cost figure as the dependent variable in an equation that represents the sum of one entry cost and one exit cost. Each valid combination of entry to exit can be represented by the following equation:

$$y_{ij} = x_i + x_j + e_{ij}$$

Where:

y_{ij} is the LRIC for the route from entry point i to exit point j ;

x_i is the entry cost at point i ;
 x_j is the exit cost at point j ; and,
 e_{ij} is the absolute error.

The optimisation procedure calculates the best fit by minimising the sum of the squared error terms, e_{ij} , for all entry and exit combinations. To achieve a unique solution to the procedure, it is necessary to fix at least one parameter. To achieve this the optimisation is constrained such that costs allocated to either an entry or exit point cannot be negative.

Regression fitting techniques enable the solver to determine the allocation between entry and exit, which achieves the closest fit for each route cost. This does not, therefore, produce a constant, or indeed pre-determined, allocation of costs between entry and exit, such as the 50:50 ratio presently used by National Grid NTS when setting NTS exit capacity charges.

2.8 Calculation of Costs above 12 Mscm/d

Since Transcost was not designed to accurately model relatively large increments, costs for providing increments above 12 Mscm/d will be estimated using the Graphical Falcon Network Analysis modelling program and the planning assumptions that are encoded within Transcost. The estimated costs for projects identified will also be based on the same asset costs used for the Transcost analysis. The years analysed will be Y+3, Y+5 and Y+8 (2008, 2010 and 2013 initially) with costs for the intervening years interpolated. Costs for 2010 are used to set the costs for 2014 onwards, consistent with the Transcost analysis, as baseline levels do not change from 2013 onwards. The increments considered will represent 50% of baseline. Where an increment of 25% of the baseline is greater than 12 Mscm/d further analysis will be carried out. Routes for Graphical Falcon analysis will be identified from the Transcost analysis for which the reinforcement costs identified most closely represent entry costs. Once incremental entry costs have been identified for each of the ASEPs and for all ten years, the LRICs will be calculated using the process described in paragraphs 2.3 to 2.6 above.

3. Cost Calculation

3.1 Calculation of Baseline Reserve Prices

Baseline quantities (as specified by the current obligated level of capacity as calculated in accordance with Special Condition C8B Part 2 14(5)(g) of National Grid's NTS GT Licence) will generally be offered at reserve prices calculated each year through adjustment of the UCAs by RPI, in accordance with Special Condition C8B Part 2 14(5)(a) of National Grid's NTS GT Licence.

The exception is where baseline quantities are zero for all periods identified in the GT Licence, where all capacity offered is effectively incremental. In these circumstances, the baseline price will also be zero. Increment sizes will be reflective of the Baseline Capacity requirement for the year in which the Network Code first identifies a requirement to hold an annual MSEC allocation following the date of publication, or y+3 in instances where the NTS GT licence identifies a Baseline Capacity that increases from an initial zero value.

3.2 Convert Entry Only Capital Cost into £M and ensure capital cost for each increment is greater or equal to the next lowest increment

Entry LRIC data calculated in 2.7 is converted from p/peak-day kWh into total capital costs specified as £M/mcm/d. The converted LRIC data from 2.7 is collated with LRIC data calculated in 2.8 to provide a range of increment sizes in £M/mcm/d for each ASEP.

Costs are validated to ensure that the capital cost for each increment is greater than or equal to the next lowest increment.

3.3 Conversion to £/GWh using terminal specific CVs.

Capital costs in £M/mcm/d for each ASEP from 3.2 are converted into costs in £/GWh using terminal specific calorific values.

3.4 Annuitisation and conversion to p/kWh/day

The capital costs (£/GWh) from 3.3 are annuitised (consistent with the methodology specified within the NTS GT Licence), which means that the cost is spread evenly over the expected life of the asset taking into account the required rate of return (see 2.4). The final step converts the result from £/GWh/yr to p/ kWh /day by dividing by 365 and multiplying by 100.

3.5 Use Linear Interpolation to calculate prices for each increment

The increment sizes to be offered at auction are dependent upon the terminal specific NTS SO Baseline Entry Capacity. In accordance with the Network Code (Section B – 2.2.3 (c) & (d)), twenty increments will be offered. However, fewer increments will be specified at the smallest terminals. At Entry Points that have a SO Baseline Capacity requirement that is less than 300GWh per day then the following will apply;

- In the first instance National Grid NTS will determine the number of 15GWh increments required to offer no less than 50% of SO Baseline Capacity. The chosen increment size approximates to the increment that would be required if 300 GWh is offered in 20 equal sized increments.
- No less than five increments are permitted. In instances where the application of a 15GWh increment infers that less than five increments will be required then a quantity that is equivalent to no less than 50% of SO Baseline Capacity at the relevant Entry Point will be divided into five equal sized increments.

Following the calculation of the increments to be offered at each ASEP the annuitised cost of each increment will be interpolated from the Transcost and Graphical Falcon based data to create an initial cost function for each ASEP. Interpolation is necessary because fixed increments, common to each terminal, are considered in the incremental cost analysis rather than considering the increments specific to each terminal.

If any one of these functions includes both positive and negative gradient sections then a smoothing process will be applied. This smoothing process will involve the fitting of functions, using regression analysis, to sections of the data. This will be carried out to ensure that discontinuities are not introduced and that unit cost trends for all volumes are either ascending or descending.

4. Price Steps in Excess of 150% of Baseline.

Additional price steps might be required in circumstances where demand is expected to exceed 150% of baseline. Broadly this circumstance can arise at locations that have previously experienced high demand and at new entry points for which there is no baseline capacity identified in the NTS GT licence.

At terminals where above Baseline quantities have previously been allocated, price steps will be specified such that twenty steps remain available, with progression continuing on the basis of 2.5% of Baseline capacity steps. For example, if 110% of baseline was allocated in the first long term auction, the twenty price steps in the subsequent auction would enable bids to be lodged in respect of a quantity of capacity that is no less than 160% (110% + 50%) of the Baseline quantity.

At entry points where the planning process has signalled to National Grid NTS' satisfaction that more than 50% above baseline may be demanded in a given year, National Grid would set price steps on the basis of quantities which were expected to exceed the indicated demand.

5. Pricing Recalculation

From time to time, when National Grid NTS believe that there has been a substantial change to cost drivers, including the supply/demand balance, investment cost assumptions or network topology, it will be appropriate for National Grid NTS to recalculate price schedules in light of any change. It is not anticipated that release of non-obligated capacity would normally trigger such a re-calculation unless the release is for a sustained period.

Schedule 2: Entry Capacity Investment Incentive Price Setting Methodology for new system entry points

1. Introduction

From time to time demand may emerge for entry capacity at new terminals. When, through its planning process, a requirement for a new system entry point has been demonstrated to National Grid NTS' satisfaction, a price schedule will be published for subsequent long-term auctions. Preservation of commercial confidentiality is an important consideration when developing a new entry point and therefore National Grid NTS will publish price steps that seek to preserve confidentiality with respect to expected deliverability. The number of price steps will be fixed and the aggregate size will be subject to a range of uncertainty as follows;

- The minimum number of price steps will be 20 increments of 15 GWh each.
- The maximum number of price steps will be 20 increments of equal size, which in total are equivalent to 150% of the capacity requirement signalled to National Grid through its planning process.

If a new terminal is developed, National Grid NTS would expect Ofgem to initiate the process necessary to modify National Grid's NTS GT Licence such that the terminal concerned is identified in National Grid's NTS Licence. If this was not the case, the entry capacity investment incentive scheme would not be effective in the case of new terminals.

The methodology, which applies for new system entry points, is consistent with the methodology outlined in Schedule 1 for existing entry points, except that there are two main differences:

- As previously described in this methodology statement, price steps at locations that have a zero baseline quantity, such as new terminals, will commence at an initial price of zero.
- In the case of National Grid NTS building any connecting pipe, the cost of the extension costs will be added to the general reinforcement costs within the price schedule. This will generally result in a downwards sloping price curve (due to the economies of scale) rather than the more usual upwards sloping price curve.

2. Pricing Recalculation

From time to time, when National Grid NTS believe that there has been a substantial change to cost drivers, including the supply/demand balance, investment cost assumptions or network topology, it will be appropriate for National Grid NTS to recalculate price schedules in light of any change. It is not anticipated that release of non-obligated capacity would normally trigger such a re-calculation unless the release is for a sustained period.

Appendix 1: Example of the NPV test

Assume:

1. for simplicity there are only 5 price steps
2. the baseline volume is 100 GWh/d
3. the UCA to apply is £0.8/kWh (in 2000 prices)
4. Q1 is April 04
5. Inflation from 2000 prices to Q1 is 10.17% (as defined in the GT licence $R_{I_3}/R_{I_0} = 182.37/165.53=1.1017$)

If National Grid NTS publish the following Price Schedule to apply in an LTSEC auction.

Available (GWh)	Price Label	Price (p/kWh/d)
250	P ₅	0.006
220	P ₄	0.005
190	P ₃	0.004
160	P ₂	0.003
130	P ₁	0.002
100	P ₀	0.001

Assume the following bids are obtained through the auction:

Supply			Demand									
Available (GWh)	Price Label	Price (p/kWh/d)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	...	Q32
250	P ₅	0.006	120	120	120	120	120	100	100	100	...	100
220	P ₄	0.005	120	120	120	120	120	100	100	100	...	100
190	P ₃	0.004	120	120	120	120	120	100	100	100	...	100
160	P ₂	0.003	160	120	120	120	120	100	100	100	...	100
130	P ₁	0.002	161	120	120	120	120	100	100	100	...	100
100	P ₀	0.001	161	160	160	120	120	100	100	100	...	100

Therefore, there is a signal to release 160 GWh/d from Q1. The clearing price for Q1 would be P₂ and P₀ for all subsequent quarters. This means that there is a signal for 60 GWh/d of incremental entry capacity. The NPV test is applied as below:

			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	...	Q32
Incremental Capacity to release	GWh	(a)	60	60	60	20	20	0			...	0
Clearing Price	p/kWh/d	(b)	0.003	0.001	0.001	0.001	0.001	0.001			...	0.001
Days per quarter		(c)	92	91	91	92	92	90				92
Incremental Revenue	£m	(a)*(b)*(c)/100	0.17	0.05	0.05	0.02	0.02	0.00				0.00
Assumed Project Value	£m	50% * UCA * (a) * Inflation/100	0.26									
NPV of revenue	£m	8.30%	0.30									

As the NPV of the revenues (£0.30m) > Assumed Project Value (£0.26m), the NPV test passed and 60 GWh/d would be released from Q1 as Permanent Incremental Obligated Entry Capacity.