

The long-term capacity auctions:

A review of the UK gas entry capacity regime



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AUTHORS

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Introduction to the capacity regime

Shippers wishing to deliver gas into Transco's supply system are required to hold entry capacity rights. Entry capacity is available at the six major beach terminals, as well as a number of smaller entry points. Capacity is variable depending on demand and network flows. The cost and availability of entry capacity is major factor in UK gas producers' and shippers' profitability.

The new long-term capacity regime has been designed to meet producers' and shippers' demands for long-term capacity rights, to mitigate capacity price and availability risk on long-term investments, while also providing Transco with better long-term investment signals to inform its capacity investment regime.

Key features of the new regime include long-term capacity sales as QSEC for years 3 to 15, and short-term capacity sales as MSEC for years 1 and 2, and DSEC before or on the day.

Types of capacity and capacity release

Transco is obliged to provide a gas transportation system capable of meeting a 1-in-20 years peak demand day. Transco has traditionally planned capacity investment to meet this demand through a consultative planning process, however, Ofgem is concerned by the quality of the signals received by Transco through this process, and Transco's response to them. The 2002-07 Price Control is designed to give Transco stronger incentives to invest to meet new capacity demand.

There are a number of capacity definitions in use including:

- TO baseline – based on the maximum physical capability of an entry point
- SO baseline – 90% of TO baseline, the amount of capacity Transco is obliged to offer for sale
- Incremental capacity – additional capacity above baseline that Transco may choose to make available, which may be either obligated or non-obligated
- Quarterly, monthly and daily capacity
- Firm and interruptible capacity

Transco's release of obligated incremental capacity is driven by principles set out in its Incremental Entry Capacity Release (IECR) Statement. The IECR outlines how Transco will interpret auction results in deciding whether to release incremental capacity. A key factor to facilitate release include sustained demand above baseline for at least four, preferably 12, quarters. Capacity released for more than 20 quarters may be permanent obligated capacity.

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Entry capacity auctions and allocations

Under the new regime there are a variety of different capacity allocations. This chapter provides details of the capacity available, pricing, bidding structure, allocation methodology, and results of auctions held so far, for the following types of capacity:

- Long-Term System Entry Capacity (LTSEC) or Quarterly System Entry Capacity (QSEC)
- Monthly System Entry Capacity (MSEC) up to September 2004
- Monthly System Entry Capacity (MSEC) from October 2004
- Rolling Monthly System Entry Capacity (RMSEC)
- Daily System Entry Capacity (DSEC)
- Daily Interruptible System Entry Capacity (DISEC)

Constraint management

Due to its obligation to offer for sale SO baseline capacity, Transco almost always finds itself with an obligation to sell more capacity than it can physically provide. When there a capacity constraint Transco may be required to take action to reduce the amount of capacity held by shippers at that entry point. This chapter describes, and analyses the use of, the various capacity management tools available to Transco, such as:

- Interruption of DISEC
- Daily buy-back
- Buy-back via capacity forwards and options
- Bilateral buy-back agreements
- Terminal Flow Advice (TFAs) and other operational system tools

Entry capacity revenue flows and Transco incentives

Under its 2002-07 Price Control, Transco's assets have been split into a number of separate price controls, including the NTS TO and SO Price Controls. This chapter considers the treatment of entry capacity revenues under the price controls. In simple terms revenues from the sale of baseline capacity before the day flow into the TO actual revenue, revenues from the sale of obligated incremental capacity before the day flow into the SO entry capacity incremental investment incentive, and revenues from capacity sales on the day flow into the SO entry capacity buy-back incentive as credits.

Transco is incentivised to keep buy-back costs (minus credits from on-the-day capacity sales and over-run charges) beneath a target cost, by being allowed to keep a proportion of savings, or being exposed to a proportion of additional costs. Transco is incentivised to invest in obligated incremental capacity by being allowed to make up to a 12.25% rate of return for five years on incremental capacity investment. Transco is also incentivised to defer baseline capacity investment, where auction

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results suggest that capacity is not demanded, by being allowed to keep TO allowed revenue, and balancing the savings on investment against the risk of increased buy-back exposure.

Review of the January 2003 long-term auctions results

The first set of long-term capacity auctions were held in January 2003. There were reasonable, if rather low, levels of capacity bids at most of the six major entry points, with demand above baseline for early years of capacity at St Fergus. There were no capacity bids at any other entry point, apart from the Hole House Farm storage facility.

Analysis of the auction results show that demand at St Fergus for part of the first two years was significantly above the level of capacity on offer. However, no incremental capacity is likely to be released, leading to pro-rata allocation of bid volumes, at the highest price, 0.0324p/kWh. Periods at St Fergus from Q2'06 onwards, and all periods at all other points, cleared at the reserve prices. Analysis of the bid volumes at each major entry point is provided.

The bidding behaviour over the 10 days of the auction at St Fergus is analysed, with explanation of the impact of pro-ration on bidding strategies. Key trends emerging include low bid volumes at all entry points apart from St Fergus, significantly lower than expected flows at most points, and very little interest in securing long-term capacity at storage facilities and minor entry points.

The bid volume curve for the major terminals provides clues to expected supply profiles in the future. The auctions have clearly provided some improved long-term investment signals to Transco, but there remain doubts about the accuracy and reliability of this data, due to the low level of bidding at entry points other than St Fergus, and the artificial constraint of releasing only 80% of baseline capacity long-term. Future long-term auctions may see considerable changes to bidding strategies, particularly as decisions are announced on a number of major new gas import schemes.

Chapter 1: Introduction to the capacity regime

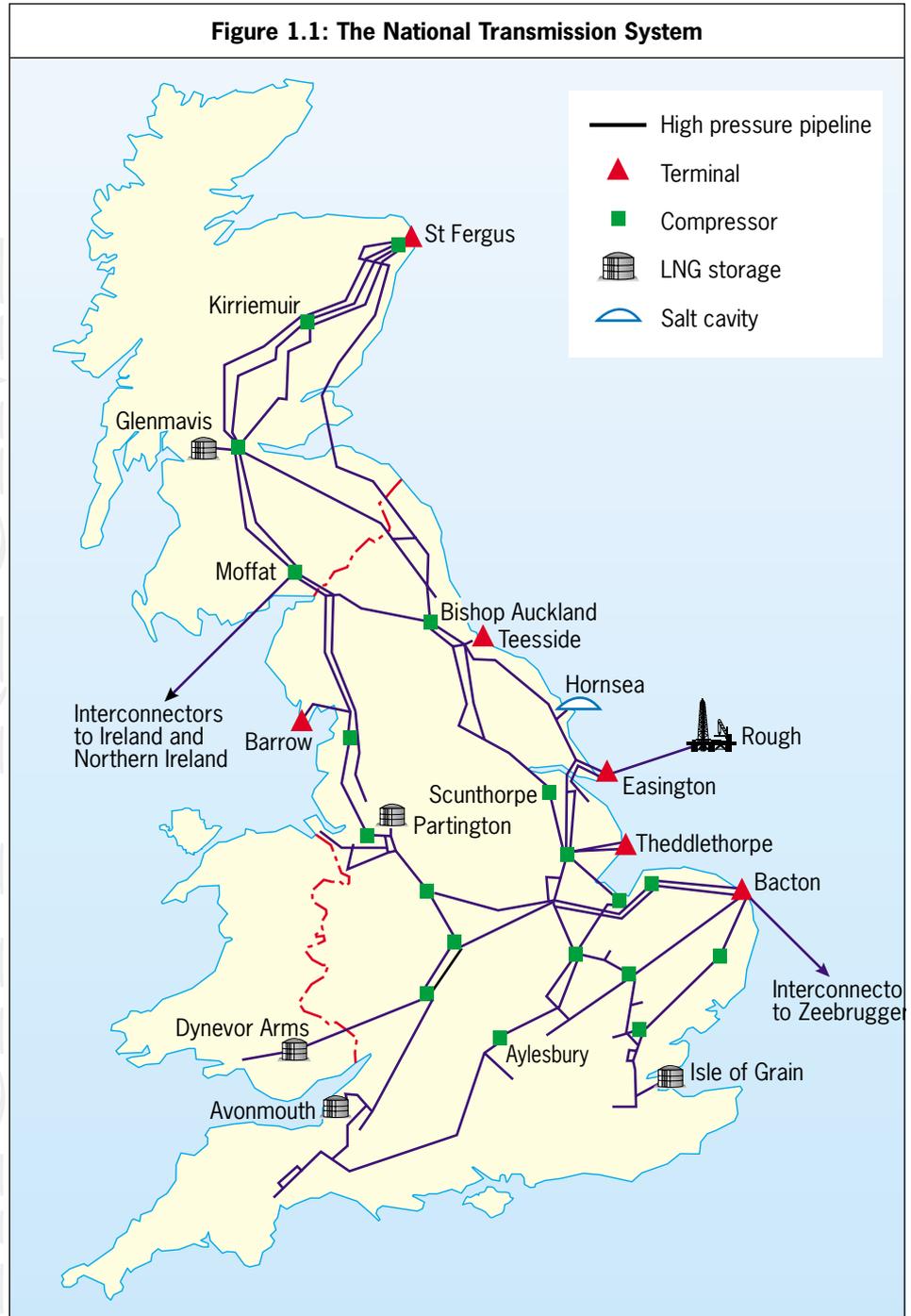
1.1 What is entry capacity?

Transco's National Transmission System (NTS) is an interconnected high-pressure pipeline system transporting gas around Britain, for delivery direct to large customers, and via distribution grids to smaller customers. Gas is delivered to the NTS at a number of entry points, notably six major beach terminals (St Fergus, Bacton, Barrow, Easington, Teesside and Theddlethorpe) as well as a number of smaller inputs from onshore fields or connections, and gas storage facilities. The NTS and major entry points are shown on Figure 1.1 below. Transco's ability to receive gas into its system at each of these system entry points is constrained, both by fixed physical factors, such as the size of the pipe and its safe operating pressure, and variable factors, such as system demand and network flow patterns. Under Transco's Network Code, shippers wishing to deliver gas into Transco's gas supply system are required to hold NTS entry capacity rights. Entry capacity may be purchased from Transco via a series of auctions for capacity products of differing duration. Entry capacity may also be traded between shippers, with trading facilitated by Transco's RGTA capacity bullet-board. Entry capacity holdings are typically measured in kWh/d, although as entry capacity availability at the major entry points measures hundreds of millions of kWh per day, it is often referred to in GWh/d.

Entry capacity may be firm or interruptible. Firm capacity gives the holder the right to flow gas up to a certain rate on a specified date at specified location or to receive financial compensation from Transco, if Transco is not able to receive the gas flow. Interruptible capacity is typically much cheaper than firm capacity, but may be interrupted by Transco without paying compensation. As capacity is a scarce resource, particularly at St Fergus, the northernmost beach terminal in the UK, there has to be a means of allocating capacity between competing shippers. This is now conducted through a number of different types of capacity auction, as outlined in section 1.3 below. The ability to acquire capacity at a suitable price remains a major factor in the profitability of UK gas producers and shippers, and therefore the design and operation of the capacity allocation regime is a matter of great importance to the industry as a whole.

1.2 Rationale behind the new regime

The new long-term capacity regime encompasses a number of different interests in the UK gas industry. UK gas producers, and to a lesser extent, shippers, have long requested long-term entry capacity rights. This is because producers are required to make long-term investment decisions when planning for the development and production of new and existing gas fields. With most gas developments taking at least two years to come onstream, and production possibly continuing for 20 years



Source: EPN

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or more, it was clearly a concern of producers to determine the price and quantity of capacity available at Transco entry points a number of years ahead. The recent history of constraints and high capacity prices at St Fergus, has increased producer concerns about the cost and availability of capacity. Long-term capacity rights are designed to give producers and shippers greater certainty about their ability to deliver gas to the system.

Alongside these aspirations, Ofgem, Transco, and the industry as a whole, have been concerned about Transco investment decision-making process and the long-term investment signals that receives to inform this process. Transco, and its predecessors, have for many years relied upon a voluntary planning consultation (now known as TBE or Transporting Britain's Energy). However, it is clear that either this system failed to provide signals of, or Transco failed to adequately respond to, increased demand for capacity at St Fergus over recent years, leading to significant constraints. Ofgem has therefore sought a new system which will improve the accuracy and reliability of the long-term investment signals provided. Long-term capacity auctions are intended to provide these improved signals, both in terms of their duration – stretching up to 15 years forward – and in terms of their reliability – backed up with a commitment by shippers to pay for capacity requested. When combined with the investment incentive package set out in Transco's 2002-07 Price Control, the intended result is better targetted, and where requested additional, investment.

From Transco's perspective, the auctions are expected to complement the existing planning consultation process, but in the context of increasing uncertainty regarding the timing and location of new supplies of gas for the UK market, the auctions should also help Transco in making its important investment decisions, such as which terminals to build additional capacity to receive new supplies at.

1.3 Overview of the new regime

1.3.1 Long-term capacity

Under the new regime capacity will be available in units of various duration. Long-term capacity will be available as Quarterly System Entry Capacity (QSEC) and is offered by Transco in annual auctions for Years 3 to 15. The of level of capacity available as QSEC is initially 80% of the SO baseline (SO baseline the amount of capacity Transco is obliged to offer for sale under its GT Licence). In addition, Transco may choose to release additional incremental capacity, if the auctions demonstrate sufficient demand for it. Transco is also incentivised to provide incremental capacity under it SO entry capacity investment incentive (obligated capacity) and its SO buy-back incentive (non-obligated capacity). The QSEC auctions are based on shippers submitting bid volumes against an ascending series of price steps. Capacity is allocated at a cleared price.

1.3.2 Short-term capacity

Transco will offer short-term capacity in monthly parcels as Monthly System Entry Capacity (MSEC). During the transition period, up to September 2004, MSEC will continue to be offered on the current system of six-monthly or annual, four round, blind, pay-as-bid auctions, and the volume of capacity on offer will be 100% of SO baseline. For months from October 2004 onwards, MSEC will be offered in the same annual auctions as QSEC. Transco will offer any unsold long-term capacity as MSEC in Year 2 of the auction, and 20% of SO baseline capacity, plus any remaining unsold long-term capacity for the relevant year in Year 1. In addition any unsold MSEC will be available as Rolling Monthly System Entry Capacity (RMSEC). RMSEC auctions are held during the five business days preceding the start of the relevant month.

At the day-ahead stage, Transco may sell Daily System Entry Capacity (DSEC) and Daily Interruptible System Entry Capacity (DISEC). DISEC is capacity that Transco is permitted to interrupt without cost, and is primarily provided as an anti-hoarding measure. Capacity that shippers have bought but are not using may be released to the market by Transco as DISEC. Under its GT Licence Transco is obliged to offer for sale its SO baseline capacity by the gas flow day. Therefore any unsold baseline capacity, and any additional capacity that Transco believes it can make available, will be offered by Transco within-day at a zero reserve price. This is also referred to as DSEC.

1.3.3 Constraint management

The new regime will lead to a situation in which Transco is obliged to offer for sale a volume of capacity that is higher than its ability to provide that capacity at most system entry points on-the-day. Therefore, the regime also includes a system of constraint management, whereby Transco is able to reduce shippers' capacity holdings at particular points by buy-backing capacity. On-the-day this will normally be achieved by interrupting DISEC, and then scaling back DSEC, for which Transco pays compensation to relevant firm capacity holders. As a means of mitigating the cost of compensation, Transco may purchase buy-back in advance, either at the day-ahead or within-day stage through the RGTA capacity system, or, since April 2002, further in advance through tenders for capacity forwards and options contracts. Where circumstances demand it, Transco may also enter into direct bilateral negotiations with shippers to buy-back capacity as required. Transco's performance as the NTS capacity system operator is incentivised through the SO entry capacity buy-back incentive. This incentive sets Transco a target for total costs of buying back capacity, minus any revenue from on-the-day capacity sales, and allows Transco to keep a proportion of savings below this target, or requires it to bear a proportion of costs above this target, within an agreed cap and collar.

Chapter 2: Types of Capacity & Capacity Release

2.1 Introduction

A key justification for the development of the long-term entry capacity regime has been to provide Transco with better long-term investment signals for its gas transportation network, to tie in with additional incentives placed on Transco to invest in its 2002-2007 Price Control. This chapter describes the types of capacity that Transco may offer and outlines the approach Transco is expected to take in interpreting auction results and information from other sources, as part of its overall investment decision-making process. Areas covered include:

- Transco's obligation on capacity investment
- Types of capacity
- Releasing incremental entry capacity

2.2 Transco's obligation on capacity investment

Transco has various obligations and incentives on the operation, maintenance and development of its gas transportation system in Britain. In terms of capacity investment the traditional approach is encapsulated by Standard Condition 16 of Transco's Gas Transporter Licence, which requires the transporter to plan and develop its system to meet a 1-in-20 years peak day¹. Transco has traditionally used its Base Plan Assumptions consultation process (in 2002 BPA was renamed Transporting Britain's Energy or TBE) to devise a system supply and demand forecast stretching ten years forward and then has planned investment to provide sufficient transportation capacity to meet this demand (Transco's forecasts and investment plans are published annually in its Ten Year Statement²). However, the constraints at St Fergus over recent years are evidence that the BPA process in itself, when coupled with the 1997-2002 Price Control framework, may not have given Transco sufficient signals to invest in new capacity in the right locations. With Transco emphasising considerable uncertainty about the supply routes for new gas coming into the UK from 2005, and shippers and producers desiring flexibility to vary gas flows based on oil production rates and other factors, there are further complications for Transco's investment processes.

¹ Most measures of the ability of a gas supply system to meet demand on very cold days recognise that occasionally weather conditions will be so severe as to necessitate the curtailment of supply to some firm customers. The 1-in-20 years peak day criteria requires that the system has sufficient transportation capacity so that it is statistically probable that firm demand will have to be curtailed on only one day in twenty years. Although not a statutory obligation, Transco and its predecessors have also planned on the basis of meeting demand over a prolonged period of very cold weather defined as a 1-in-50 years winter.

² The 2002 Ten Year Statement, published in December 2002, is available from www.transco.uk.com/publish/tys/home.asp

Ofgem has responded to these uncertainties by using a two-pronged approach, through the Price Control and the new long-term capacity regime. The 2002-07 Price Control and Transco's revised GT Licence now specify output measures as a minimum volume of capacity that Transco must make available at specified locations in order to recover its allowed revenue, and also allow Transco to earn additional revenue at a higher rate of return for additional capacity investment. The long-term capacity auction regime is designed to complement this by improving the signals to Transco as to when and where there is demand for additional capacity. Ofgem's argument for long-term entry capacity auctions is that in the auctions, shippers will be required to make a financial commitment to their forecasts of future capacity requirements, thus providing more certain signals to Transco, as well as responding to shipper demands for long-term capacity rights. Transco is then encouraged, under its licence and price control formula, to respond to demand for future capacity by offering incremental capacity. Transco's Incremental Entry Capacity Release (IECR) Statement is designed to indicate what Transco considers would be sufficient signals for further investment. While this may be a highly desirable result, it is unclear if auctions will be successful in providing these signals, due to the reluctance of many players to commit to capacity purchases many years in advance. A possible concern regarding the use of long-term auctions is a degree of regulatory uncertainty regarding the impact of future price control regimes on the long-term capacity product. With shippers committing to spending many millions of pounds over a number of years a degree of insecurity in the exact nature of the product exists. For example, if Ofgem was to move to an hourly balancing and allocation regime, what impact would that have on capacity sold via the current auctions? Nonetheless, the addition of long-term capacity auctions is at least providing a new source of information for Transco to go alongside its existing consultative planning process.

2.3 Types of capacity

One result of the introduction of the long-term entry capacity regime, coupled with the recent changes to Transco's GT Licence and the 2002-2007 Price Control, has been the introduction of a confusing array of definitions of different types of capacity. In this section the key types of capacity on offer will be defined.

2.3.3 TO baseline capacity

Transco has two basic measures of entry capacity, TO and SO baseline. TO (Transmission Asset Owner) baseline for each system entry point³ is based on the maximum physical capability of that entry point to receive gas on a peak day, with

³ An Aggregate System Entry Point (ASEP) is the Network Code term for a point at which gas enters Transco's system. ASEPs include the six major coastal or beach terminals (Bacton, Barrow, Easington, St Fergus, Teesside and Theddlethorpe), storage sites (Glenmavis, Partington, Avonmouth, Isle of Grain, Dynevor Arms, Hornsea, Hatfield Moor, Aldbrough, Hole House Farm and Cheshire), onshore gas fields (Hatfield Moor, Wytch Farm and Caythorpe), and minor coastal terminals (Burton Point).

all system flows configured to facilitate maximum capacity at that particular terminal. In real terms this level of capacity is probably never achievable, but it provides a marker in the sand for the maximum capacity availability at each entry point. TO Baseline capacity output measures were agreed by Ofgem and Transco in the 2002-07 Price Control, and are listed in table 2.1 below.

<i>Terminal</i>	<i>2002/03⁴</i>	<i>2003/04</i>	<i>2004/05</i>	<i>2005/06</i>	<i>2006/07</i>
Bacton	1527	1646	1839	1939	1939
Barrow	812	790	790	791	791
Easington	1105	985	1141	1180	1180
St Fergus	1689	1721	1809	1831	1863
Teesside	910	823	834	845	845
Theddlethorpe	758	628	879	942	942
Glenmavis	110	110	110	110	110
Partington	239	239	239	239	239
Avonmouth	165	165	165	165	165
Isle of Grain	243	243	243	243	243
Dynevor Arms	55	55	55	55	55
Hornsea	195	195	195	195	195
Hatfield Moor (storage)	60	60	60	60	60
Hatfield Moor (onshore)	1.1	1.1	1.1	1.1	1.1
Aldborough	0	259	259	259	259
Cheshire	0	0	119	179	238
Hole House Farm	29	29	29	29	29
Wytch Farm	3.6	3.6	3.6	3.6	3.6
Burton Point	61.3	61.3	61.3	61.3	61.3

Source: Ofgem, Transco Price Control and NTS Incentives 2002-2007 Licence Modifications

2.3.4 SO baseline capacity

As TO baseline capacity is only theoretically available at most terminals⁵, a different measure is used to determine the actual level of capacity Transco is obliged to offer for sale. Initial SO (System Operator) baseline capacity is defined as 90% of TO

⁴ These are Price Control years, rather than Gas Years, therefore, 2002/03 refers to the period April 2002 to March 2003.

⁵ In recent years Transco flows have reached TO baseline at St Fergus on occasions, but at certain other terminals it may be difficult for Transco to make available 90% or even 80% of TO baseline.

baseline (winter) entry capacity at each terminal. Under its licence conditions Transco is obliged to offer as a minimum the SO baseline capacity. As will be explained later, in practice Transco should offer 80% of the SO baseline capacity in advance in long-term auctions, and the remaining 20% short-term in monthly and daily auctions. SO baseline capacity forms the foundation of Transco's obligated capacity. SO baseline is referred to as initial **NTS SO baseline entry capacity** in Transco's licence and elsewhere sometimes as **Initial Baseline Entry Capacity** or **IBEC**.

Month					
	$1 \leq m \leq 12$	$13 \leq m \leq 24$	$25 \leq m \leq 36$	$37 \leq m \leq 48$	$m \leq 49$
<i>Terminal</i>	<i>2002/03</i>	<i>2003/04</i>	<i>2004/05</i>	<i>2005/06</i>	<i>2006/07</i>
Bacton	1374	1481	1655	1745	1745
Barrow	731	711	711	712	712
Easington	995	887	1027	1062	1062
St Fergus	1520	1549	1628	1648	1677
Teesside	819	741	751	761	761
Theddlethorpe	682	565	791	848	848
Glenmavis	99	99	99	99	99
Partington	215	215	215	215	215
Avonmouth	149	149	149	149	149
Isle of Grain	218	218	218	218	218
Dynevor Arms	50	50	50	50	50
Hornsea	175	175	175	175	175
Hatfield Moor (storage)	54	54	54	54	54
Hatfield Moor (onshore)	1	1	1	1	1
Aldborough	0	233	233	233	233
Cheshire	0	0	107	161	214
Hole House Farm	26	26	26	26	26
Wytch Farm	3.2	3.2	3.2	3.2	3.2
Burton Point	55	55	55	55	55

Source: Ofgem, Transco Price Control and NTS SO Incentives 2002-2007 Licence Modifications

Fulfilling the obligation to sell capacity

It should be noted at this point that the obligations on Transco relating to SO baseline capacity apply to capacity sales rather than physical capacity availability. The only legal obligation on Transco to develop the system in this context relates to its 1-in-

20 peak day obligation. Transco is obliged to offer for sale in a clearing allocation⁶ system entry capacity up to the SO baseline. However, system entry capacity may not actually exist in physical terms – it is instead a firm commercial right that grants the holder the right either to flow gas or to receive financial compensation. Therefore there is no guarantee that any sale of entry capacity by Transco will result in investment in pipeline capacity or compression.

Long-term and short-term IBEC sales

As the regime was being developed there was a concern that a high proportion of entry capacity might be sold in advance in the long-term auctions, possibly raising competition concerns and making it difficult for new players to enter the market. Therefore Ofgem stipulated that Transco should offer 80% of IBEC in advance in the long-term auctions (**referred to as long-term NTS baseline capacity or LBEC**), and withhold 20% for short-term auctions (referred to as **short-term NTS baseline capacity or SBEC**). In practice the level of capacity offered for sale in the short-term auctions is likely to be higher than 20% as any baseline capacity left unsold from the long-term auctions will also be offered short-term. The date which divides long-term from short-term is set at 548 days ahead of the day on which capacity will be used. This period enables Transco to sell capacity in relation to Gas Years rather than Price Control formula years. The 80:20 long-term:short-term ratio is subject to review after two years.

2.3.5 Incremental capacity

The SO baseline forms the foundation of Transco's obligated capacity. However, a key aim of the new regime both in terms of the Price Control and the long-term auctions is to encourage Transco to invest in new capacity, where required and done efficiently, in order to develop the system. This additional capacity is **incremental capacity**⁷, and may be offered by Transco at any time.

Obligated and non-obligated incremental capacity

Incremental capacity may be deemed to be obligated or non-obligated capacity. **Incremental obligated capacity** is capacity that Ofgem has approved Transco's sale of. It must be offered for a minimum of one year and is generally capacity associated with Transco investment, either by bringing forward planned investments, or by additional investment over and above the planned levels. **Incremental non-**

⁶ Ofgem defines a clearing allocation as an auction that either results in all capacity on offer being sold, or that has a reserve price of zero. This is intended to ensure that no capacity is withheld from the market artificially. However, Ofgem also accepts that there may be exceptions at terminals where there is insufficient competition (ie Barrow) and therefore there may be a need for reserve prices to prevent distortion of competition between terminals, so that Transco could be considered to have offered all obligated capacity for sale, even if the allocation at Barrow has not cleared or been offered at zero. Transco's Pricing Consultation 76, which Ofgem decided not to veto in December 2002, stipulates that Transco will apply a zero reserve price at all terminals for capacity released on the day from October 2003.

⁷ Confusingly, both initial and incremental capacity are indicated by 'I' in the various capacity acronyms.

obligated capacity is typically additional capacity that Transco decides it can make available close to real-time due to demand patterns or improved system performance. A key distinction in practical terms between the two capacity types is that obligated capacity must be offered on every day of the year, whereas non-obligated capacity may be offered whenever Transco thinks it is appropriate.

Annual and permanent incremental capacity

Incremental obligated capacity may be either annual or permanent, depending on whether the increased demand is expected to be temporary or permanent. In general terms an increase in capacity of one to five years duration would be met by annual capacity, whereas an increase for five years or longer would normally be met by permanent capacity. These forms of capacity are referred to by Transco as **IAOEC (Incremental Annual Obligated Entry Capacity)** and **IPOEC (Incremental Permanent Obligated Entry Capacity)**. The designation of capacity as annual or permanent affects the treatment of revenues from that capacity: annual capacity attracts incentive revenue for the years in which it is offered, whereas permanent capacity attracts incentive revenue for five years and thereafter becomes part of NTS SO baseline capacity, which should mean that it is included in Transco's TO regulatory asset value (RAV) at a subsequent price control. This treatment reflects the different investment patterns associated with annual and permanent capacity – annual capacity is likely to be provided by bringing forward an existing investment plan (ie it is capacity that has already been included as SO baseline capacity for later years) whereas permanent capacity is likely to be provided by additional investment in infrastructure above and beyond the SO baseline levels.

2.3.6 *Other capacity definitions*

The various types of capacity described above largely relate to Transco's regulatory regime: they are driven by licence conditions. Transco's contractual regime, which is mostly captured by the Network Code, defines capacity in somewhat different ways. The most important distinction is between firm and interruptible capacity. **Firm system entry capacity** is a commercial product that gives owner the right either to flow gas on a specified date, at a specified location, up to a specified daily rate, or, if Transco is unable to receive this gas flow, to receive financial compensation. All obligated capacity must be sold as firm capacity. In addition Transco may release non-obligated incremental entry capacity which is also firm. Firm capacity is may be purchased in various different bundles, namely:

- **Quarterly System Entry Capacity** or **QSEC** (sometimes also referred as **Long-Term System Entry Capacity** or **LTSEC**)
- **Monthly System Entry Capacity** or **MSEC**
- **Daily System Entry Capacity** or **DSEC**

Interruptible system entry capacity grants the holder an interruptible right to flow gas into the system on a specified day, at a specified location and rate. However,

Transco is free to scale-back interruptible capacity with no financial consequences (other than the loss of interruptible capacity sales revenue). Interruptible capacity is designed to prevent hoarding of capacity by shippers as any firm capacity that Transco deems will not be used by its holders may be sold as interruptible capacity. This is referred to as a **use-it-or-lose-it (UIOLI)** regime. Interruptible capacity is also designed to ensure that maximum available capacity on the day is released to the market. Under the current regime interruptible capacity is only sold as **Daily Interruptible System Entry Capacity (DISEC)** and may be sold by Transco at the day-ahead stage or within-day. As a daily system management tool, DISEC is unconnected with the long-term entry capacity regime and revenues from DISEC sales are offset against capacity buy-back costs (see chapter 4).

2.4 Releasing incremental entry capacity

Under the terms of its licence Transco is required to publish an Incremental **Entry Capacity Release Statement (IECR)**⁸. The IECR sets out the ways in which Transco will interpret auctions results and other planning information in making decisions on the release of incremental obligated capacity. In simple terms this specifies that in certain conditions where the auction results indicate that there is demand for an increase in entry capacity above the SO baseline level for a sustained period (typically three years or over, as a minimum one year) Transco will propose releasing incremental capacity which would be counted as obligated capacity. Transco's proposal is subject to approval by Ofgem. However, Ofgem has approved Transco's IECR statement and stated that it will follow Transco's IECR methodology in considering whether to approve capacity release. The IECR therefore could be considered to work as a form of automatic Ofgem, although there may be exceptions when the IECR result is ambiguous and non-auction based evidence is required.

The expectation is that investment in incremental obligated permanent capacity, deemed to be efficiently incurred, would be included in Transco's regulatory asset value (RAV) for a subsequent Price Control⁹, although this is not guaranteed as the regulator is not permitted to fetter his discretion. The IECR is therefore intended to give some measure of reassurance, both to Transco that it will be able to make a return on investment in incremental capacity, and to shippers that Transco will invest to meet market demand and that there is a reasonably transparent process governing Transco's investment decisions.

⁸ The IECR is available from Transco's website at www.transco.uk.com/publish/iecr/home.asp

⁹ The incentive regime encourages additional investment by allowing Transco to earn up to 12.25% rate of return on incremental investment for a period of five years, even if this period straddles two price controls. In this case IPOEC would be considered for inclusion in the subsequent price control, and would be considered as SO baseline capacity in the interim. For example, if Transco decided to offer IPOEC from April 2005, it would be allowed to earn incentive revenue of up to 12.25% during the period April 2005 to March 2010, and then the standard 2007-2012 Price Control rate of return up to March 2012. It would then, subject to Ofgem agreement, become part of Transco's RAV for the 2012-2017 Price Control.

The decision to release capacity under the IECR is complex process with a number of key stages which can be summarised as follows:

- Accumulate information from long-term auctions;
- Assess auction results against IECR criteria to determine whether additional capacity should be released;
- Present incremental capacity proposal to Ofgem;
- If Ofgem approves incremental capacity proposal, allocate incremental capacity to successful bidders;
- Decide how to meet incremental capacity demand, either by investment or buy-back;
- Feed revenues from incremental capacity sales into incentives, while efficiently incurred incremental obligated capacity may eventually become part of Transco's SO baseline capacity and RAV.

2.4.1 *Accumulate information from long-term auctions*

In the long-term auctions shippers will be invited to bid against a set of ascending prices for each quarter at each entry point. The minimum price will be set as the Unit Cost Adjuster (UCA) for that entry point specified in Transco's GT Licence. The UCA reflects Ofgem's assessment of the long-run marginal cost of providing additional capacity at that entry point. There will then be a set of further price steps for increasing capacity above the baseline level. For the major beach terminals the prices are based on the potential costs of increasing SO baseline capacity at that point by 20, 2.5% increments. The price for each step is calculated using the following simple formula:

$$\text{Price} = \text{UCA} + \frac{\text{Increment cost}}{(\text{Baseline volume} + \text{Increment volume})}$$

The baseline and incremental prices for the beach terminals are shown in table 2.3.

	Coastal terminals					
	<i>Bacton</i>	<i>Easington & Rough</i>	<i>Theddlethorpe</i>	<i>St Fergus</i>	<i>Teesside</i>	<i>Barrow</i>
Baseline	0.0056	0.0011	0.0010	0.0198	0.0018	0.0004
2.5%	0.0057	0.0012	0.0011	0.0204	0.0019	0.0005
5%	0.0058	0.0013	0.0012	0.0212	0.0020	0.0006
7.5%	0.0059	0.0014	0.0013	0.0214	0.0022	0.0007
10%	0.0060	0.0015	0.0014	0.0222	0.0025	0.0008
12.5%	0.0061	0.0016	0.0015	0.0229	0.0028	0.0009
15%	0.0062	0.0017	0.0016	0.0236	0.0029	0.0010
17.5%	0.0063	0.0018	0.0017	0.0243	0.0030	0.0011
20%	0.0064	0.0019	0.0018	0.0251	0.0032	0.0012
22.5%	0.0065	0.0020	0.0019	0.0259	0.0033	0.0013
25%	0.0066	0.0021	0.0020	0.0266	0.0034	0.0014
27.5%	0.0067	0.0022	0.0021	0.0273	0.0036	0.0015
30%	0.0068	0.0023	0.0022	0.0281	0.0037	0.0016
32.5%	0.0069	0.0024	0.0023	0.0288	0.0038	0.0017
35%	0.0070	0.0025	0.0024	0.0295	0.0039	0.0018
37.5%	0.0071	0.0026	0.0025	0.0301	0.0040	0.0019
40%	0.0072	0.0027	0.0026	0.0306	0.0041	0.0020
42.5%	0.0073	0.0028	0.0027	0.0310	0.0042	0.0021
45%	0.0074	0.0029	0.0028	0.0315	0.0043	0.0022
47.5%	0.0075	0.0030	0.0029	0.0319	0.0044	0.0023
50%	0.0076	0.0031	0.0030	0.0324	0.0045	0.0024
Baseline (GWh)	1374	995	682	1520	819	731

Source: Transco plc, Incremental Entry Capacity Statement, October 2002.

2.4.2 Assess auction results against IECR criteria

The auction and capacity allocation process is explained in more detail in chapter 3. In general terms, in order for Transco to consider releasing a particular volume of incremental capacity, Transco must receive a volume of bids at the relevant price equal to or greater than the baseline plus relevant incremental capacity. For example, Transco would consider releasing baseline capacity + 2.5% incremental capacity at

Bacton if the volume bid at 0.0057p/kWh was equivalent to 100% of baseline capacity plus the 2.5% capacity increment¹⁰. Transco would consider releasing baseline capacity + 50% incremental capacity at Bacton if the volume bid at 0.0076p/kWh was equal to or greater than 100% of baseline capacity plus the 50% capacity increment.

The discovery that there is sufficient demand for incremental capacity in a particular quarter is only the first step in the IECR process. In order to justify the release of incremental capacity, demand for additional capacity must be sustained continuously over a longer period. This is normally a period of three to five years for incremental annual capacity or more than five years for incremental permanent capacity. Transco may propose releasing incremental obligated capacity based on shorter periods of incremental capacity demand if it has other evidence, such as data from the TBE planning consultation, suggesting that additional capacity will be required. Incremental capacity allocation is based on the following principles:

- If the capacity is required for less than four quarters, no incremental capacity is released;
- If the capacity is required for between four and 11 quarters the result is ambiguous, Transco may choose to seek approval to release incremental annual obligated capacity (IAOEC) if it has additional supporting evidence;
- If the capacity is required for between 12 and 19 quarters the result is clear, Transco would seek approval to release incremental annual obligated capacity (IAOEC);
- For releasing permanent obligated capacity Transco adopts a different approach. There is no specific requirement for capacity to be demanded in a continuous block for a certain period. Rather the assessment is based on comparing the total revenues from a certain volume of incremental capacity bids over an eight-year period (32 quarters)¹¹. Transco would apply a **net present value** test to determine whether to seek approval to release incremental permanent obligated capacity (IPOEC). In order to satisfy the test the net present value¹² of all the bids that would be accepted if the incremental capacity were to be released must be equal to or greater than 50% of the assumed project value¹³ which is based on relevant UCAs. Obviously if incremental capacity is demanded for every quarter of this period, it is highly likely that the NPV test will succeed. Where demand is less consistent it may not pass the test.

¹⁰ This is not simply 102.5% of baseline capacity as the capacity increments are based on percentages of baseline capacity for the year in which the auction is being held, whereas the baseline capacity offered in the auction is the stated SO baseline capacity for the relevant delivery year.

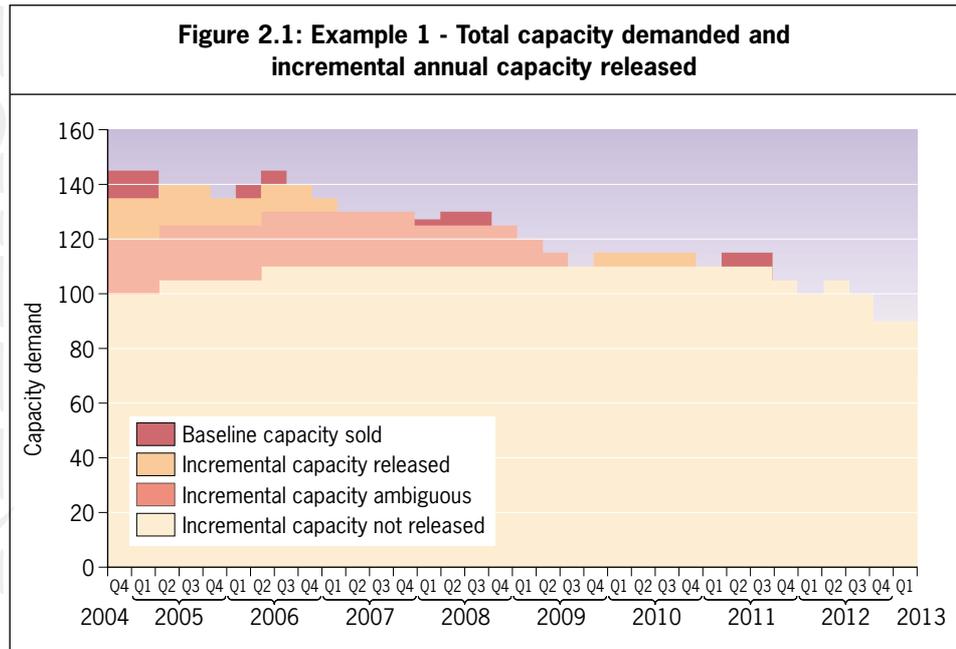
¹¹ The 32-quarter period may be shortened where capacity is demanded up to 15 years ahead, the farthest limit of the long-term auction regime. In such a case the NPV test may be applied from any quarter up to the last quarter on offer.

¹² The net present value will be based on the first quarter in which the incremental capacity is demanded, with all other values discounted to it on a quarterly basis with an 8.3% annual discount factor.

¹³ The assumed project value is calculated by multiplying the volume of incremental capacity by the gross UCA for that entry point (assuming a 6.25% rate of return).

- In addition, where capacity is demanded for a continuous period of between 20 and 31 quarters, but the incremental capacity demand does not pass the NPV test, Transco would seek approval to release annual obligated incremental capacity.

Example 1: releasing annual capacity

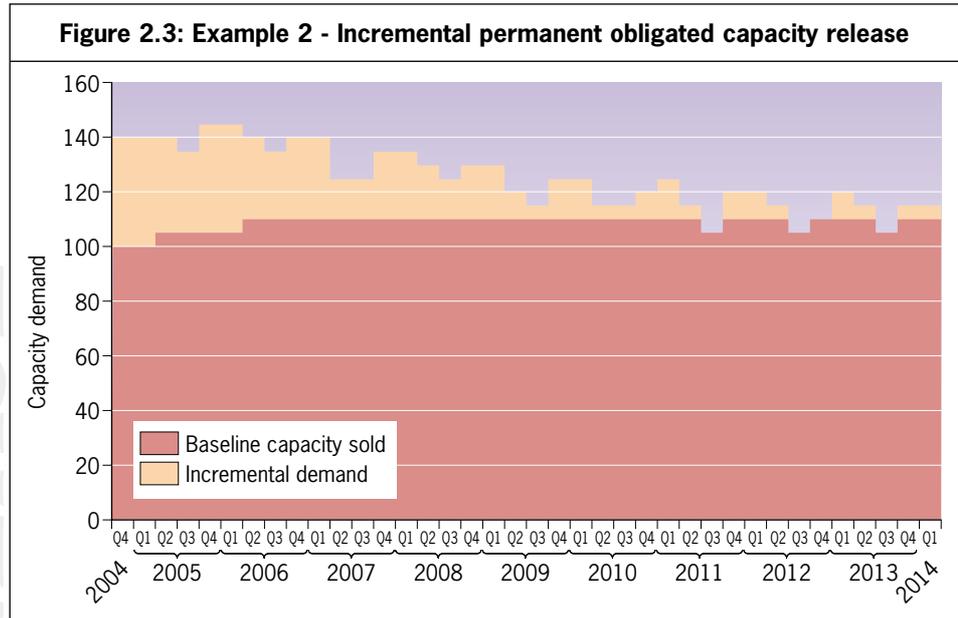


Source: EPN

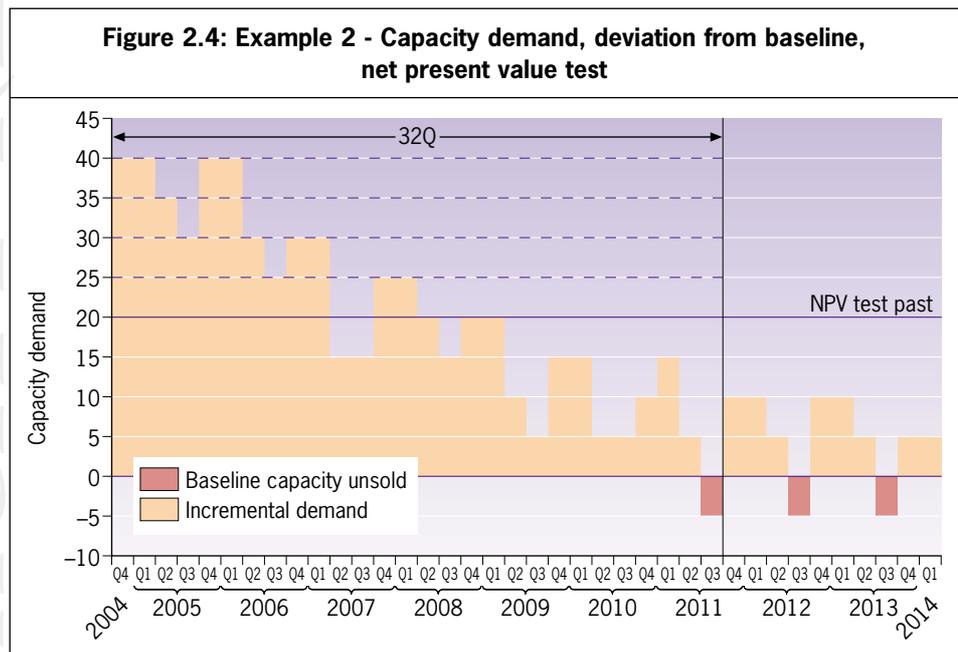
Figure 2.1 provides a theoretical example of incremental capacity demand and release at a particular beach terminal following the first set of long-term capacity auctions. In this example baseline capacity is displayed as increasing annually for each formula year Q4 2004 to Q1 2007, corresponding to the output measures specified in Transco’s current Price Control. From the beginning of the next Price Control in Q2 2007 baseline capacity is considered to be flat. This reflects Ofgem’s assumption that for future price controls capacity availability will be driven by market demand, expressed through the long-term capacity auction process. In assessing whether to release incremental capacity Transco has to assess the level and duration of demand above baseline levels. Therefore figure 2.2 displays the same capacity volumes in terms of deviation from baseline¹⁴.

¹⁴ It is worth noting that the level of capacity demanded in this theoretical example has been set very high, with capacity demanded only falling below baseline levels in 2011. Although at the time of writing the first long-term capacity auctions have not yet been completed, it is unlikely that such a high level of capacity will be demanded so far in advance.

TYPES OF CAPACITY & CAPACITY RELEASE



Source: EPN



Source: EPN

In order to pass the NPV test the total value of the auction bids that would be accepted by Transco if a particular level of capacity were allocated over a 32-quarter¹⁵ period must be at least 50% of the assumed project value of the investment. In assessing NPV Transco is expected to run a series of tests, to determine whether the NPV test is passed at each particular level. For example, using figure 2.4, Transco would first calculate the total value of bids that would be accepted if 40 units of incremental capacity were allocated for Q4 2004 to Q3 2012. If this level passed the NPV test, Transco would propose to allocate 40 units of IPOEC for the whole period. If the bids at 40 units did not pass the NPV, Transco would conduct the same calculation for 35 units of capacity, and so on, until the test is passed or there is no further incremental capacity to be assessed. Note that even if there is no incremental capacity demanded in a particular quarter, for example Q3 2011, the period as a whole may still pass the NPV test.

2.4.3 *Present incremental capacity proposal to Ofgem*

Following concerns that previous price controls did not give Transco adequate incentives to invest in new infrastructure, the 2002-07 price control has been designed to encourage Transco to invest, where appropriate, by allowing Transco to earn up to 12.25% rate of return on investment in incremental capacity. However, giving Transco the ability to recover investment at these high rates raises the possibility of false incentives to leading to unnecessary investment. It was partly these concerns that led to the distinction between obligated and non-obligated capacity. In effect, Transco is rewarded for increasing obligated capacity by being allowed to recover extra revenue under its price control and, in the case of permanent obligated capacity, with the expectation that investment costs will be included in Transco's adjusted regulatory asset value at subsequent price controls. Revenue from non-obligated capacity feeds in to Transco's buy-back fund and affects Transco performance against its short-term system management incentives. As a check on Transco's release of incremental capacity, proposals to do so require approval from Ofgem (or strictly from the Gas and Electricity Markets Authority (GEMA), the regulatory board of which Ofgem is the secretariat).

The IECR process has been designed with a maximum approval period of 28 days to ensure swift decisions on incremental capacity release. Once Transco submits an incremental capacity proposal to Ofgem, the regulator has five business days to object or ask for more information. If there is no word from Ofgem within five days the plan is approved and Transco may release obligated capacity. If Ofgem requests

¹⁵ This period may be shorter than 32 quarters if it begins less than 32 quarters before the last quarter on offer in the auctions and includes the last quarter on offer. For example in the January 2003 auctions, which sold QSEC for Q4 2004 to Q3 2017, the NPV test could also be applied to any period from Q4 2009 to Q3 2017.

Under the 1997-2002 price control Transco's allowed revenue was directly linked to total annual throughput, but had no direct link to entry capacity or peak day capability, a formula which, it was argued, incentivised Transco to increase offpeak flows, but not to invest in new capacity.

further information it then has a total of 28 days in which to reject the application or it will become approved. Ofgem has emphasised that it will apply the same criteria as Transco in assessing capacity proposals, in other words the IECR methodology described above. However, it has been noticeable throughout the long-term capacity development process that Transco and Ofgem have used placed different emphases on the importance and reliability of the two main information sources available to Transco under the new regime: results from long-term auctions, and data from planning consultations (TBE). The Ofgem approach has been that auctions are the primary source, with support from planning, whereas Transco has tended to reverse the order of these sources. These questions may come into focus if the auctions fail to give clear investment signals, but Transco believes that other data shows demand for incremental capacity at a particular location.

2.4.4 *Allocate incremental capacity to successful bidders*

Following the closure of a set of long-term auctions, Transco has a maximum of two months in which to determine whether to release incremental obligated capacity. By the end of the two months Transco must allocate capacity offered in the auctions to the successful bidders. The volume of capacity allocated and the price will depend to a large extent on the incremental capacity release process. If Transco does not propose to release incremental capacity, then only baseline capacity will be allocated to the bidders. However, if the release of obligated incremental capacity is approved by Ofgem, Transco will also allocate the relevant level of incremental capacity. Further details of the calculation of capacity allocation and prices is provided in chapter 3.

2.4.5 *Decide how to meet incremental capacity*

Under the IECR process Transco may decide to sell incremental capacity for use between three and 15 years in advance. It then has to decide how to meet this increased capacity demand. Transco is under no obligation to build new infrastructure to support the capacity sales, as firm capacity is a commercial right to flow gas or receive financial compensation, rather than a physical right to flow gas. Depending on the lead-time for the capacity, and a variety of network design issues, Transco may choose one of the following options:

- New infrastructure investments in order to increase capacity, such as constructing new pipelines or compressors, or upgrading compressors – this is most likely to be used where permanent capacity has been released;
- Bringing forward existing infrastructure investments – this is most likely to be used where annual capacity has been released;
- Adjusting network flows in order to increase capacity at a particular location where incremental capacity has been sold (probably leading to a decrease in capacity elsewhere on the system);

- Buying back capacity in advance using forwards, options or bilateral contracts;
- Taking the risk of buying-back capacity on the day.

Although the long-term capacity regime has been designed with the aim of encouraging Transco to invest in new capacity and improving the signals it receives to do so, the auction results may also indicate to Transco locations where there is limited or decreasing demand for capacity. Under the new regime, Transco should be able to respond to these signals, either by rearranging system flows or even postponing or abandoning planned investment, where it comes to believe these investments are unnecessary. The new regime is intended therefore to lead to greater efficiency on the part of Transco, including the freedom not to invest where investment would be inefficient.

2.4.6 *Feed revenues from incremental capacity sales into incentives*

Assuming that Transco does release capacity above its baseline levels, it should have additional revenues from the capacity auctions. In order to provide Transco with a strong incentive to invest in capacity, Ofgem has granted Transco the right to earn additional revenues above its allowed revenue. Precise details of Transco's revenue flows are provided in chapter 5, but the basic principle is that sales of baseline capacity contribute to NTS TO allowed revenue through the standard Price Control rate of return (6.25%), sales of obligated incremental capacity flow in the NTS SO entry capacity incentive, where rate of return on investment is capped at 12.25%, and has a collar of 5.25%, and sales of non-obligated incremental capacity are credited to Transco's entry capacity buy-back incentive.

Chapter 3: Entry capacity Auctions & allocations

3.1 Introduction

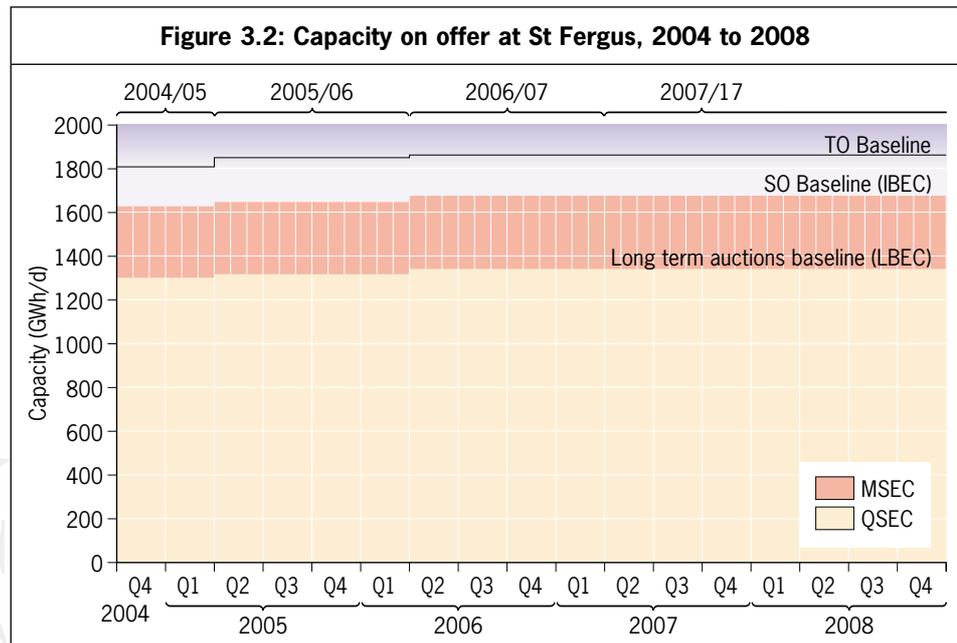
The purpose of this chapter is to provide the reader with an overview of the capacity allocation arrangements for NTS entry capacity. As previously stated, Transco is now moving to a process whereby all available capacity is offered via a suite of capacity allocation arrangements for a period of up to 15 years in advance of the time of use. Entry capacity will be offered in segments of differing granularity (see below) in order to minimise the complexity of long-term auctions while at the same time providing the option to fine-tune capacity needs with a number of other services of shorter duration. At the time of writing in January 2003, capacity was being offered in the following degrees of granularity:

- Quarterly System Entry Capacity (QSEC)
 - Offered for 2004 to 2017 (years 3 to 15)
- Monthly System Entry Capacity (MSEC)
 - Offered for October 2002 to September 2004 (years 1 and 2) in an annual auction
 - Unsold MSEC offered from October 2002 on a rolling monthly basis
- Daily System Entry Capacity (DSEC)
 - Offered from the day before through to 02:00 hours on a relevant gas day
- Daily Interruptible System Entry Capacity (DISEC)
 - Offered from the day before through to 02:00 hours on the gas day

3.1.2 The auctions timetable

Under the new regime there is an ongoing cycle of auctions selling various types of capacity. QSEC is sold in annual auctions. Following the end of the transition period, these auctions will also include MSEC from October 2004. The auctions must normally be completed by the end of August before the beginning of the Gas Year in October¹. For example in August 2003 there will be an auction offering QSEC for Years 3 to 15 (October 2005 to September 2018), and MSEC for Year 2 (October 2004 to September 2005). In August 2004, as the MSEC transition period ends, the auction will offer QSEC for Years 3 to 15 (October 2006 to September 2019), and MSEC for Years 1 and 2 (October 2004 to September 2006). MSEC up to September 2004 will continue to be sold in six-monthly or annual auctions, probably in February and August each year. In addition there are auctions during the last five

¹ The first set of long-term entry capacity auctions are an exception. These were originally intended to have been held in August or September 2002, but due to delays implementing the regime (which was not finally approved by Ofgem until October 2002) the long-term auctions were held in January 2003. During the transition period (2002-2004) MSEC continues to be sold under the old regime of auctions in August and February to sell capacity for the six months beginning in October and April respectively.



Source: EPN

Notes: Although this graph only lists years up to 2008, baseline capacity is assumed to continue at the same level until 2017. This reflects Ofgem's assumption that following the current Price Control (2002-2007) capacity outputs will be driven by incremental capacity demand as revealed in the auctions.

It can be seen from Figure 3.2 that the quantity of capacity available throughout the quarter does not vary, hence the need for system users to purchase other shorter duration capacity to meet operational requirements in an efficient manner.

3.2.2 Capacity available for sale

Under the terms of Transco's Gas Transporter Licence, Ofgem has determined a maximum physical throughput for each entry point, referred to as NTS TO baseline entry capacity. This figure does not take into account the configuration of the network or any interaction between the various entry points, rather it is a maximum capacity figure based on the physical characteristics of each entry point. Although it is unlikely that these maximum capacity figures will ever be reached at most terminals², they do provide a measurable and auditable figure which Ofgem and Transco can agree.

² With the exception of St Fergus.

Table 3.1 provides a summary of the TO baseline entry capacity figures in GWh/day.

Table 3.1: NTS TO Baseline Entry Capacity (GWh/day)					
<i>Terminal</i>	<i>2002/03³</i>	<i>2003/04</i>	<i>2004/05</i>	<i>2005/06</i>	<i>2006/07</i>
Bacton	1527	1646	1839	1939	1939
Barrow	812	790	790	791	791
Easington	1105	985	1141	1180	1180
St Fergus	1689	1721	1809	1831	1863
Teesside	910	823	834	845	845
Theddlethorpe	758	628	879	942	942
Glenmavis	110	110	110	110	110
Partington	239	239	239	239	239
Avonmouth	165	165	165	165	165
Isle of Grain	243	243	243	243	243
Dynevor Arms	55	55	55	55	55
Hornsea	195	195	195	195	195
Hatfield Moor (storage)	60	60	60	60	60
Hatfield Moor (onshore)	1.1	1.1	1.1	1.1	1.1
Aldborough	0	259	259	259	259
Cheshire	0	0	119	179	238
Hole House Farm	29	29	29	29	29
Wytch Farm	3.6	3.6	3.6	3.6	3.6
Burton Point	61.3	61.3	61.3	61.3	61.3

Source: Ofgem, Transco Price Control and NTS Incentives 2002-2007 Licence Modifications

Also under Transco's licence, NTS SO baseline capacity is set at 90% of the NTS TO baseline capacity figure. SO baseline capacity is the level of capacity that Transco is actually required to offer for sale. However, the level of capacity available in the LTSEC auctions is only 80% of SO baseline (and therefore 72% of TO baseline) as 20% of SO baseline capacity is reserved for short-term (monthly and daily) allocation. During the course of the discussions on the development of long-term entry capacity auctions, the withholding of 20% of entry capacity for sale in the short-term auctions was hotly disputed. Ofgem argued that unless a significant proportion of capacity was withheld from long-term auctions to be sold closer to real-time, there would be a barrier to entry for new players, as they might not be able to acquire capacity to bring

³ Baseline capacity volumes are quoted for Price Control years, which run from April to March, rather than Gas Years, which run October to September.

gas into the market. As Transco generally has a minimum two-year lead time for new capacity, new players might have to wait at least this long to acquire capacity rights. The contra argument is that any capacity that is withheld from the long-term auctions provides an artificial constraint and indicator in the market. Therefore, any economic signals that might be derived from auctions would be unclear, as the market has been distorted. Although Ofgem's 20% withheld capacity option was eventually accepted by the industry, the level is subject to a review after two years.

Table 3.2 provides a summary of the NTS SO baseline figures (also referred to as Initial Baseline Entry Capacity or IBEC).

Table 3.2: Initial Baseline Entry Capacity (GWh/day)					
	<i>Month</i>				
<i>Entry Point</i>	<i>2002/03</i>	<i>2003/04</i>	<i>2004/05</i>	<i>2005/06</i>	<i>2006/07</i>
Bacton	1374	1481	1655	1745	1745
Barrow	731	711	711	712	712
Easington	995	887	1027	1062	1062
St Fergus	1520	1549	1628	1648	1677
Teesside	819	741	751	761	761
Theddlethorpe	682	565	791	848	848
Glenmavis	99	99	99	99	99
Partington	215	215	215	215	215
Avonmouth	149	149	149	149	149
Isle of Grain	218	218	218	218	218
Dynevor Arms	50	50	50	50	50
Hornsea	175	175	175	175	175
Hatfield Moor (storage)	54	54	54	54	54
Hatfield Moor (onshore)	1	1	1	1	1
Aldbrough	0	233	233	233	233
Cheshire	0	0	107	161	214
Hole House Farm	26	26	26	26	26
Wytch Farm	3.2	3.2	3.2	3.2	3.2
Burton Point	55	55	55	55	55

Source: Ofgem, Transco Price Control and NTS SO incentives 2002-2007 Licence Modifications

Notes:

1. The above NTS SO baseline entry capacity is equal to 90% of TO baseline entry capacity.
2. The initial amount of capacity available for Long-Term QSEC auction is equal to 80% of SO baseline capacity or 72% of the TO ba

Although 80% of the SO baseline capacity for October 2004 onwards shown in table 3.2 was initially made available in January 2003 in the first LTSEC auctions, the level of capacity offer in subsequent auctions may be lower due to volumes of long-term entry capacity already allocated.

3.2.3 Pricing of entry capacity

The pricing of entry capacity is a controversial subject. By its very structure the energy industry is based on long-term investments in infrastructure such as offshore platforms, pipeline and processing facilities, which are all investments involving hundreds of millions of pounds. There are number of factors that impinge on the design of a capacity pricing and allocation regime, including:

- the need for Transco to recover sufficient revenue to underwrite investment;
- the concern that as a monopoly selling a scarce resource Transco may over-recover revenue;
- market distortions caused by the reallocation of over or under-recovery;
- the need to prevent capacity hoarding by players;
- the need to fairly allocate a scarce resource between competing players;
- the need to manage the interaction between the physical capability of Transco's system and the commercial rules for capacity.

Balancing these competing claims has been a difficult issue since the introduction of the Network Code in March 1996 and several different approaches have been tried. From 1996 until September 1999 capacity was sold on the premise of infinite capacity being available at an administered price based on an estimate of the long-run marginal cost (LRMC) of incremental investment in Transco's system. This system seemed to work well apart from when Transco found it could not physically provide as much capacity as it had sold, and was therefore forced to scale back capacity holdings pro-rata⁴. From October 1999 a new approach was implemented whereby Transco was required to conform the level of firm capacity sold to shippers with the physical capability of the system. This was achieved by permitting Transco to auction capacity in advance in monthly tranches based on seasonal normal demand (SND), and then allowing Transco to buy or sell additional capacity day-ahead, and later, on the day, to match capacity holdings to physical capability. Reserve prices in the monthly auctions were set based on LRMC. However, as this system imposed an artificial constraint on capacity (SND) and bids were accepted on a pay-as-bid basis, prices sometimes reached very high levels, particularly at St Fergus, leading to significant over-recoveries by Transco and extended debates over the redistribution of this over-recovery. In this context the new long-term auction regime has been developed combining features of various of its predecessors. In terms of pricing a

⁴ There were particular problems with this system at St Fergus during the Summer and Autumn of 1998, when Transco was repeatedly forced to scale back a very large volume of capacity, leading to significant compensation payments.

similar system has been continued in that capacity is sold at an auction with a reserve price based on unit cost adjusters (UCAs) which are similar to LRMCs. However, the major difference is that the long-term auctions are volume auctions, using a cleared price. In other words all successful bidders pay the same price per unit of capacity for a particular location in a particular quarter. Although reserve prices have been retained in order to give Transco a measure of security that its allowed revenue will be recovered, Transco's new obligation to offer capacity for sale in a clearing allocation implies that if not all capacity is sold reserve prices must be reduced, eventually to zero if necessary⁵. However, Transco is only obliged to have done this on the day. In other words Transco is free to retain reserve prices for long-term, monthly and day-ahead capacity auctions, as long as the reserve price in the DO auction can be reduced to zero if all baseline capacity is not sold.

Under this system all capacity sold in the long-term entry capacity auctions which is less than or equal to the baseline capacity is sold at the Reserve Price. Capacity bids that are accepted by Transco which are in excess of the baseline capacity will be sold at the cleared price⁶.

In accordance with its IECR statement, Transco publishes a table of prices relating to the cost of increasing capacity at each entry point up to 150% of baseline capacity⁷. The purpose of these incremental price steps is to identify to potential bidders a series of marginal costs which broadly reflect the cost of providing the additional capacity increment above the existing baseline output measure. It is worth noting that the increments are based on percentages of the SO baseline capacity in the year in which the auction is taking place, not the years for which long-term capacity is offered⁸. Tables 3.3 to 3.6 provide a summary of incremental price steps for:

- Coastal terminals
- Onshore fields and connections
- Storage sites
- Constrained LNG sites

⁵ Ofgem defines a clearing allocation as one in which all capacity on offer is sold or there is a reserve price of zero.

⁶ This does not necessarily mean that capacity above baseline will be released – if the long-term auctions indicate demand above baseline and Transco chooses not to make incremental capacity, the baseline capacity will be allocated at the lowest price at which the auction clears, or if this not possible at the highest prices, with bid allocations pro-rated. See section 3.2.5 for a worked example.

⁷ There are 21 price steps at each of the major coastal terminals. However, there may be fewer price steps at other ASEPs. This is typically because the difference between the reserve price and the cost of providing 150% of baseline capacity at these entry points is too small to allow 20 price steps at 4 decimal places. To reflect this in the Network Code ASEPs where baseline capacity is below 300GWh/d may have a smaller number of price steps.

⁸ For example, the price steps for Bacton in the January 2003 auctions were based on 2.5% to 50% of 2002/03 SO baseline capacity of 1374GWh/day, but in terms of capacity on offer for 2004/05 (the first year for which long-term capacity was offered) the relevant SO baseline figure of 1655GWh/day was used and the volume on offer for the long-term auctions was 80% of this, or 1324GWh/d.

	<i>Bacton</i>	<i>Easington & Rough</i>	<i>Theddlethorpe</i>	<i>St Fergus</i>	<i>Teesside</i>	<i>Barrow</i>
<i>Baseline</i>	0.0056	0.0011	0.0010	0.0198	0.0018	0.0004
2.5%	0.0057	0.0012	0.0011	0.0204	0.0019	0.0005
5%	0.0058	0.0013	0.0012	0.0212	0.0020	0.0006
7.5%	0.0059	0.0014	0.0013	0.0214	0.0022	0.0007
10%	0.0060	0.0015	0.0014	0.0222	0.0025	0.0008
12.5%	0.0061	0.0016	0.0015	0.0229	0.0028	0.0009
15%	0.0062	0.0017	0.0016	0.0236	0.0029	0.0010
17.5%	0.0063	0.0018	0.0017	0.0243	0.0030	0.0011
20%	0.0064	0.0019	0.0018	0.0251	0.0032	0.0012
22.5%	0.0065	0.0020	0.0019	0.0259	0.0033	0.0013
25%	0.0066	0.0021	0.0020	0.0266	0.0034	0.0014
27.5%	0.0067	0.0022	0.0021	0.0273	0.0036	0.0015
30%	0.0068	0.0023	0.0022	0.0281	0.0037	0.0016
32.5%	0.0069	0.0024	0.0023	0.0288	0.0038	0.0017
35%	0.0070	0.0025	0.0024	0.0295	0.0039	0.0018
37.5%	0.0071	0.0026	0.0025	0.0301	0.0040	0.0019
40%	0.0072	0.0027	0.0026	0.0306	0.0041	0.0020
42.5%	0.0073	0.0028	0.0027	0.0310	0.0042	0.0021
45%	0.0074	0.0029	0.0028	0.0315	0.0043	0.0022
47.5%	0.0075	0.0030	0.0029	0.0319	0.0044	0.0023
50%	00.76	0.0031	0.0030	0.0324	0.0045	0.0024
Baseline (GWh)	1374	995	682	1520	819	731

Source: Transco plc, Incremental Entry Capacity Release Statement, October 2002.

Table 3.4: Price steps for onshore fields and connections								
	<i>Hatfield Moor</i>		<i>Wythch Farm</i>		<i>Burton Point</i>		<i>Hole House Farm</i>	
	<i>Baseline</i>	0.0013	<i>Baseline</i>	0.0000	<i>Baseline</i>	0.0001	<i>Baseline</i>	0.0001
	10%	0.0014	10%	0.0001	10%	0.0002	10%	0.0002
	20%	0.0015	20%	0.0002	20%	0.0003	20%	0.0003
	30%	0.0016	30%	0.0003	30%	0.0004	30%	0.0004
	40%	0.0017	40%	0.0004	40%	0.0005	40%	0.0005
	50%	0.0018	50%	0.0005	50%	0.0006	50%	0.0006
<i>Baseline (GWh)</i>		55		3		55		26

Source: Transco plc, Incremental Entry Capacity Release Statement, October 2002.

Table 3.5: Price steps for storage sites (p/kWh/day)									
<i>Aldborough</i>		<i>Cheshire</i>		<i>Hornsea</i>		<i>Glenmavis</i>		<i>Partington</i>	
<i>Baseline</i>	0.0018	<i>Baseline</i>	0.0001	<i>Baseline</i>	0.0047	<i>Baseline</i>	0.0165	<i>Baseline</i>	0.0003
3.13%	0.0019	7.14%	0.0002	4.2%	0.0049	7.1%	0.0170	3.6%	0.0004
6.25%	0.0020	14.29%	0.0003	8.3%	0.0051	14.3%	0.0174	7.1%	0.0005
9.38%	0.0021	21.43%	0.0004	12.5%	0.0053	21.4%	0.0180	10.7%	0.0006
12.5%	0.0022	28.57%	0.0005	16.7%	0.0054	28.6%	0.0184	14.3%	0.0007
15.63%	0.0023	35.71%	0.0006	20.8%	0.0056	35.7%	0.0191	17.9%	0.0008
18.75%	0.0024	42.86%	0.0007	25%	0.0058	42.9%	0.0198	21.4%	0.0009
21.88%	0.0025	50%	0.0008	29.2%	0.0060	50%	0.0205	25%	0.0010
25%	0.0026			33%	0.0061			28.6%	0.0011
28.13%	0.0027			37.5%	0.0062			32.1%	0.0012
31.25%	0.0028			41.7%	0.0063			35.7%	0.0013
34.38%	0.0029			45.8%	0.0064			39.3%	0.0014
37.5%	0.0039			50%	0.0065			42.9%	0.0015
40.63%	0.0031							46.4%	0.0016
43.75%	0.0032							50%	0.0017
46.88%	0.0033								
50%	0.0034								
<i>Baseline (GWh)</i>	233		107		175		99		215

Source: Transco plc, Incremental Entry Capacity Release Statement, October 2002.

Table 3.6: Price steps for constrained LNG sites					
Avonmouth		Dynevor Arms		Isle of Grain	
Baseline	0.0020	Baseline	0.0000	Baseline	0.0058
5%	0.0021	10%	0.0001	3.3%	0.0059
10%	0.0022	20%	0.0002	6.7%	0.0060
15%	0.0023	30%	0.0003	10	0/0061
20%	0.0024	40%	0.0004	13.3%	0.0062
25%	0.0025	50%	0.0005	16.7%	0.0063
30%	0.0026			20%	0.0064
35%	0.0027			23.3%	0.0065
40%	0.0028			26.7%	0.0066
45%	0.0029			30%	0.0067
50%	0.0030			33.3%	0.0068
				36.7%	0.0069
				40%	0.0070
				43.3%	0.0071
				46.7%	0.0072
				50%	0.0073
Baseline (GWh)	149		50		218

Source: Transco plc, Incremental Entry Capacity Release Statement, October 2002.

3.2.4 The bidding process

The first LTSEC auctions were held between 15th and 28th January 2003. Under the current regime Transco offers LTSEC in a bid-period of between five and 10 business days. Users are invited to enter bids for quantities of entry capacity at each price step. Each user is expected to submit a bid stack with decreasing bid volumes at each price steps. Table 3.7 provides details of the information required for each bid

Table 3.7: Information required by Transco for a QSEC bid
The identity of the user.
The ASEP.
The calendar year(s) and calendar quarter(s) when QSEC is applied for.
The amount of QSEC in kWh/day.
The minimum amount (not less than the minimum eligible amount) of QSEC which the user is willing to be allocated

Source: Transco plc

At the end of the day Transco aggregates bids to determine the total requirement for entry capacity at each price step for that particular ASEP and quarter. Transco will also calculate a notional clearing price, which is the price step at which the aggregate bid volume is equal to or less than the notional supply level⁹. Following the close of the auctions at 6pm Transco will publish the information listed in table 3.8.

Table 3.8: Information provided by Transco following daily rounds of LTSEC auctions
Aggregate quantity at each price step for each quarter and each ASEP.
The clearing prices.

Source: Transco plc

The following morning users can resubmit bids. Transco may close the auctions after the fifth day if the notional clearing prices are the same on two sequential days. If it has not closed earlier the auction ends on the 10th day.

3.2.5 Long-term capacity allocation and pricing

Once the auction is completed, Transco then has two months in which to decide whether to release incremental capacity, following the IECR process outlined in chapter 2. Whether or not incremental capacity is released, Transco is obliged to allocate capacity to successful bidders within two months of the end of the auction period.

In allocating capacity Transco will first add up all the quantities of capacity required. If the requirement for capacity at a particular entry point and quarter is less than the baseline quantity, then all users will be allocated their capacity at the reserve price. If, however, the requirement for capacity exceeds the baseline quantity, then the IECR guidelines will be triggered and incremental capacity may be provided under certain circumstances. The IECR, and the methodology for determining whether to release incremental capacity, are described in chapter 2¹⁰. The following section provides examples of the allocation and clearing process based on the interim bid volumes and notional clearing prices at St Fergus for Q2 and Q3 2005 reported by

⁹ The notional supply is calculated by determining the highest price step at which aggregate bid volume is greater than potential capacity (baseline + the relevant increment).

¹⁰ Even if the incremental capacity is not justified under the IECR, Transco may choose to release non-obligated incremental capacity. Unlike obligated capacity, this could be for a single quarter, or even a single day. It is unlikely that Transco will release non-obligated incremental capacity in the long-term auctions, as there would be a considerable risk that Transco might not be able to make this capacity available on the day and would therefore face an additional buy-back burden.

Transco on the second day of the January 2003 long-term auctions (16th January 2003)¹¹.

Example 1: Demand less than supply at baseline, Q3'05

Table 3.9: Example 1 – Demand less than supply at baseline, St Fergus Q3'05				
<i>Price step</i>	<i>Capacity increment (%)</i>	<i>Capacity on offer (GWh/d)</i>	<i>Price (p/kWh)</i>	<i>Aggregate bid volume (GWh/d)</i>
P5	+12.5%	1508.4	0.0229	1184
P4	+10%	1470.4	0.0222	1187
P3	+7.5%	1432.4	0.0214	1196
P2	+5%	1394.4	0.0212	1198
P1	+2.5%	1356.4	0.0204	1201
P0	Baseline (LBEC)	1318.4	0.0198	1206

Source: EPN

Notes:

1. TO baseline capacity at St Fergus in 2005/06 is 1831GWh/d. SO baseline (IBEC) is 90% of this, or 1648GWh/d. Of this 1648GWh/d, 80% is on offer as long-term baseline capacity (LBEC = 1318.4GWh/d) and the remaining 20% is reserved for short-term allocation (SBEC = 329.6GWh/d) as MSEC and DSEC.
2. The capacity increments are based on baseline capacity in the year in which the auction is being held, in this case 2002/03, not the year for which it is being sold. St Fergus SO baseline capacity in 2002/03 is 1520GWh/d.
3. Cleared price and allocated bid volume.

In table 3.9 the level of capacity bids at P0 (1206) is below the baseline capacity on offer of 1318.4. Therefore there is no signal for incremental capacity demand and 1206 GWh/day of baseline capacity is allocated to bidders at the reserve price (0.0198p/kWh). There is 112.4GWh/day of unused capacity which would then be offered in the MSEC auctions¹².

¹¹ These are the actual bid volumes for the 16th January 2003. Note, however, this is only the second day of a potential ten for the auction and the final results may be quite different. Full analysis of the auction final results is provided in the Appendix. Aggregate bid volumes are rounded up apart from where there is a need for greater detail.

¹² As this capacity is for 2004/05, this is the last long-term auction in which it can be offered and therefore unsold volumes will be offered as MSEC and DSEC in short-term auctions. Unsold long-term capacity for later years will be offered as QSEC in the next year's long-term auction.

Example 2: Demand exceeds supply at baseline, incremental capacity signalled, Q2'05

Table 3.10: Example 2 – Demand exceeds supply at baseline, St Fergus Q2'05

Price step	Capacity increment (%)	Capacity on offer (GWh/d)	Price (p/kWh)	Aggregate bid volume (GWh/d)
P20	+50%	2078.4	0.0324	1328
P19	+47.5%	2040.4	0.0319	1334
P18	+45%	2002.4	0.0315	1335
P17	+42.5%	1964.4	0.0310	1336
P16	+40%	1926.4	0.0306	1337
P15	+37.5%	1888.4	0.0301	1342
P14	+35%	1850.4	0.0295	1375
P13	+32.5%	1812.4	0.0288	1376
P12	+30%	1774.4	0.0281	1377
P11	+27.5%	1736.4	0.0273	1383
P10	+25%	1698.4	0.0266	1384
P9	+22.5%	1660.4	0.0259	1388
P8	+20%	1622.4	0.0251	1389
P7	+17.5%	1584.4	0.0243	1394.41
P6	+15%	1546.4	0.0236	1401
P5	+12.5%	1508.4	0.0229	1402
P4	+10%	1470.4	0.0222	1403
P3	+7.5%	1432.4	0.0214	1409
P2	+5%	1394.4	0.0212	1410
P1	+2.5%	1356.4	0.0204	1411
P0	Baseline (LBEC)	1318.4	0.0198	1415

Notes:

1. Notional supply level, notional clearing price and notional volume allocated.
2. Volume allocated and final clearing price if incremental capacity is not released.
3. Volume allocated and final clearing price if incremental capacity up to the notional supply level is released.
4. Volume allocated and final clearing price if baseline +2.5% incremental capacity (1356.4GWh/d) is released.

In table 3.10 the level of capacity demanded at P0 is above baseline. The process of determining the notional clearing price and any incremental capacity signal is summarised below:

1. The first step is to determine the highest capacity increment at which demand exceeds supply – in Q2'05 this occurs at P2 where aggregate bid volume is 1410GWh and capacity on offer is 1394.4GWh (at P3 bid volume of 1409GWh is below the capacity on offer of 1432.4GWh). Therefore 1394.4GWh is set as the notional supply level.
2. In order to allocate capacity at the notional supply level without pro-rating bids, the notional clearing price is set at the lowest price step at which aggregate bid volume is equal to or less than notional supply level. In this example this occurs at P8 (the volume at P7 is just above the notional supply level). Therefore the notional clearing price is 0.0251p/kWh.
3. With demand above baseline there is a signal for this particular quarter that incremental obligated capacity could be released up to the notional supply level of 1394.4GWh/d. Transco would then run the IECR process to determine whether this incremental capacity is released. IECR is described in detail in chapter 2, but in simple terms, if this level of capacity demand is sustained for at least one year, Transco may consider releasing incremental obligated annual capacity. The eventual price and volume of capacity allocated in this auction will depend on the IECR results¹³.
4. If Transco decides to release incremental capacity up to the notional supply level, the final clearing price will remain at 0.0251p/kWh and 1389GWh/d of capacity will be allocated to successful bidders, with 5.4GWh/d remaining unsold for sale as MSEC or DSEC.
5. If Transco decides not to release incremental capacity, the clearing price then increases to the lowest price step at which the aggregate bid volume is equal to or less than baseline capacity. The aim of the process is to arrive at a price at which capacity can be allocated without pro-ration. However, in this example the level of capacity demand at the highest price step, P20, is still above baseline, therefore P20 (0.0324p/kWh) would be set as the the final clearing price and successful bidders at this price step would have their bid volumes pro-rated by a factor of 0.9928 (1318.4/1328) to enable complete allocation. There would be no unsold long-term baseline capacity.
6. There could also be a situation in which Transco decides to release incremental capacity, but at a lower level than the notional supply level for this particular quarter. For example, there may be a sustained demand for releasing incremental capacity up to baseline +2.5% (1356.4GWh/d) over more than four quarters including Q2'05. If Transco decided to release incremental capacity up to 1356.4GWh/d, this capacity would be allocated at P15 (0.0301p/kWh) which is the lowest price step at which aggregate bid volume is less than or equal to

¹³ It should be noted in this particular example, because demand is below baseline for Q3'05, Transco would not consider releasing incremental obligated capacity.

1356.4GWh/d. 1342GWh/d would be allocated to successful bidders and 12.4GWh/d would remain unsold for MSEC auctions.

Results and analysis of the January 2003 LTSEC auctions is provided in the Appendix.

3.3 Monthly System Entry Capacity (MSEC) for April 2002 to September 2004

3.3.1 General description of service

Since the industry is effectively in transition from the existing annual MSEC auctions to long-term auctions using QSEC, there is an intermediate period where both regimes are in transition, as shown in table 3.12

<i>Auction type</i>	<i>Date held</i>	<i>Capacity date</i>
LSTEC	January 2003	Q4 2004 – Q3 2017
MSEC	February 2003	April 2003 – September 2003
MSEC	August 2003	October 2003 – September 2004 ¹⁴
RMSEC	This auction will take place in the week before the beginning of the next month	

Source: EPN

Until October 2004 MSEC will be offered under the same system as was used before the introduction of the long-term capacity regime. This based on six-monthly or annual auctions. Auctions for April to September 2002 capacity were held in February 2002, and for October 2002 to March 2003 in August 2002. MSEC auctions are scheduled for February 2003 to sell capacity for April to September 2003. It is not yet clear whether there will be a single 12-month auction in August 2003 for the last section of the transitional regime, or two 6-month auctions in August 2003 and February 2004.

3.3.2 Capacity available

In each auction Transco will make available capacity at each ASEP up to the SO baseline level.

3.3.3 Pricing of capacity

There have recently been two different systems for setting reserve or floor prices in the MSEC auctions. Up to and including the August 2002 auctions reserve prices

¹⁴ There may be an additional auction in February 2004 to allocate MSEC for April to September 2004.

have been set based on LRMCs, with prices for all terminals scaled to ensure the appropriate portion of Transco's NTS entry capacity allowed revenue is recovered. These prices have then been reduced by 25% to reflect competition at the terminals. For the February 2003 auctions onwards reserve prices will be the Unit Cost Adjusters (UCAs) specified in Transco's licence, bringing MSEC into line with QSEC auctions. Although UCAs are based on similar premises to LRMCs and generally produce similar results, there have been some significant differences. In particular the UCA for Bacton, although still comparatively low, is some eight times higher than the reserve price based on LRMCs had been. Also the Hornsea reserve price has increased substantially. Table 3.13 lists the reserve prices for MSEC in the August 2002 and February 2003 (and subsequent auctions).

<i>Entry Point</i>	<i>Reserve price (p/kWh/d)</i>	
	<i>October 2002 to March 2003</i>	<i>April 2003 onwards</i>
Bacton	0.0006	0.0056
Barrow	0.0023	0.0004
Easington/Rough	0.0020	0.0011
St Fergus	0.0189	0.0198
Teesside	0.0047	0.0018
Theddlethorpe	0.0008	0.0010
Glenmavis	0.0088	0.0165
Partington	0.0007	0.0003
Avonmouth	0.0000	0.0020
Isle of Grain	0.0000	0.0058
Dynevor Arms	0.0000	0.0000
Hornsea	0.0028	0.0047
Hatfield Moor (storage)	0.0026	0.0013
Hatfield Moor (onshore)	0.0026	0.0013
Aldbrough	NA ¹⁵	0.0018
Caythorpe	0.0020	0.0021
Hole House Farm	0.0002	0.0001
Wytch Farm	0.0000	0.0000
Burton Point	0.0000	0.0001

Source: Transco plc, Gas Transportation Charges from 1 January 2003, December 2002

¹⁵ The salt cavity storage facility under construction at Aldbrough is expected to begin operations later in 2003 and will be a new system entry point.

3.3.3 *MSEC bidding process*

The auction is split over four rounds, with 25% of the total capacity available in each round, plus any unsold capacity from previous rounds being carried forward to the fourth round. Auction rounds are held three working days apart. The auction structure is a blind pay-as-bid process. Shippers may submit up to 20 price and volume bids at each ASEP for each month in each round. After each round Transco publishes the information listed in table 3.14, which assists players in determining bidding strategies for subsequent grounds.

Table 3.14: Information provided by Transco following MSEC auction rounds
Weighted average price of all accepted bids
Weighted average price of highest 50% of bids
Highest and lowest bids accepted
Volume sold
Volume sold at highest and lowest prices
Total number of shippers whose bids have been accepted
Total number of shippers who bid

Source: Transco plc

3.3.4 *Monthly capacity allocation*

At the end of each auction round, Transco creates a bid price stack and allocates capacity in descending price order until there is no capacity left. Shippers are charged the price of their successful bids.

3.3.5 *Analysis of auction results since April 2002*

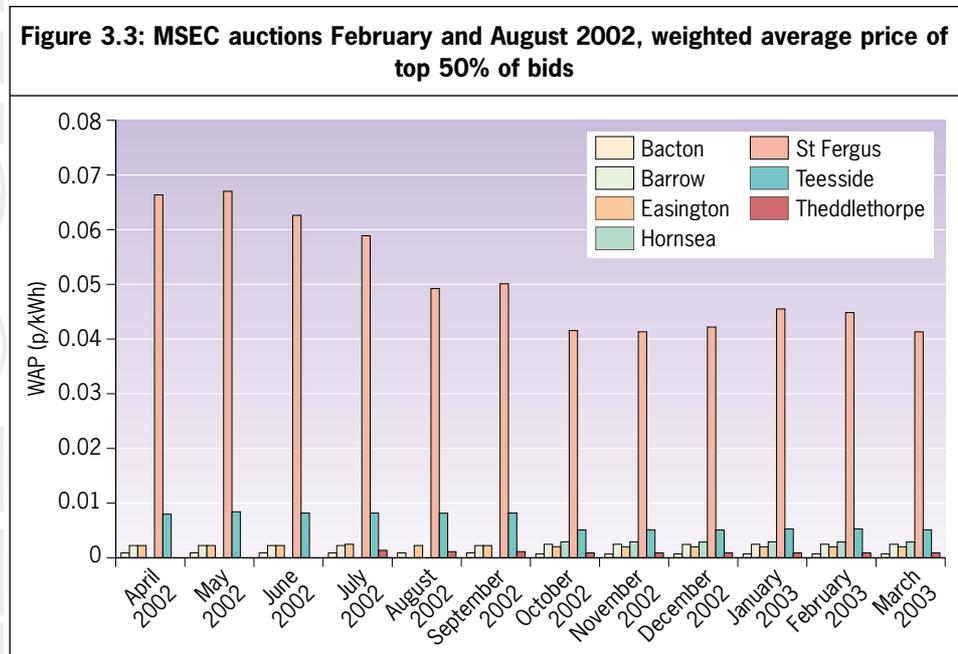
Prior to August 2001 the volume of monthly on offer had been linked to seasonal normal demand (SND), which had the effect of creating a perception of scarcity, particularly at St Fergus during the summer months. In the auctions held in February 2000 and 2001 for their respective summers, capacity at St Fergus reached very high prices, leading to significant over-recoveries of revenue by Transco. In August 2001, following a last-minute rule change, Transco agreed to offer capacity up to the maximum physical capability at each terminal. As expected, auction prices then declined. In the February and August 2002 auctions, offering monthly capacity for April 2002 to March 2003, the level of capacity on offer was SO baseline (in effect 90% of maximum physical levels). This led to a decline in prices, although capacity at St Fergus remained significantly above the reserve price. As can be seen in Figure 3.3 the cost of capacity at St Fergus, and to a lesser extent, is much higher than at the other terminals, which reflects both the higher reserve prices at these two terminals, and the greater demand from shippers and producers to flow gas from Northern North Sea fields. Table 3.15 lists the results of the 2002/03 MSEC

auctions. In the August 2002 auctions all capacity at St Fergus and Barrow was sold, but significant capacity remained at the other entry points for sale as RMSEC or DSEC. Results are provided for the major beach terminals and the Hornsea storage facility. In general terms there was low demand for capacity at the other entry points (onshore fields, storage facilities and minor beach terminals) and auctions at all these points cleared at the floor price.

Table 3.15: Results of February and August 2002 MSEC auctions

Entry point	Capacity on offer (GWh/d)	Floor price, August 2002 (p/kWh)	February 2002 average WAP top 50% bids (p/kWh)	August 2002 average WAP top 50% bids (p/kWh)
Bacton	1374	0.0006	0.0008	0.0006
Barrow	731	0.0023	0.0016	0.0024
Easington	995	0.0020	0.0023	0.0020
Hornsea	175	0.0028	0.0000	0.0028
St Fergus	1520	0.0189	0.0591	0.0428
Teesside	819	0.0047	0.0082	0.0051
Theddlethorpe	682	0.0008	0.0006	0.0008

Source: EPN, based on data from Transco plc



Source: EPN, based on data from Transco plc

3.4 Monthly system entry capacity (MSEC) from October 2004 onwards

3.4.1 General description of service

For capacity from October 2004 onwards the new regime will be fully in place and a new system will be implemented for selling MSEC. MSEC auctions will be held simultaneously with and as part of the LTSEC auctions – shippers will be able enter bids for QSEC for Years 3 onwards and for MSEC for Years 1 and 2. The expectation is that the auction will take place in July/August each year. The LTSEC auction in August 2003 will only offer MSEC for Year 2 (October 2004 to September 2005), with the August 2004 auction being the first to offer Years 1 and 2 together.

3.4.2 Monthly capacity available

There are two major elements of MSEC capacity:

- Unsold capacity from the long-term auctions; and
- Baseline capacity reserved for short-term allocation (SBEC).

Any baseline or incremental obligated capacity that has been offered in the long-term auctions but that remains unsold two years ahead becomes available as MSEC. Unsold capacity may be offered as MSEC for Years 1 and 2. In addition Transco is currently required to withhold 20% of SO baseline capacity for the short-term auctions because of competition concerns. This 20% (referred to as SBEC) is available for Year 1 only. For example in the auctions that are currently scheduled for August (or possibly July) 2004, Transco will offer the following capacities and volumes:

<i>Period</i>	<i>Capacity bundle</i>	<i>Capacity definition</i>	<i>Capacity volume</i>
Year 1 (October 2004 to September 2005)	MSEC	SBEC	20% of SO baseline
Years 1 & 2 (October 2004 to September 2006)	MSEC	Unsold baseline capacity	(80% of SO baseline – all previously sold capacity)
Years 3 to 15 (Q4 2006 to Q3 2019)	QSEC	LBEC	80% SO baseline

Source: EPN

Any unsold MSEC for Year 2 will be offered again in the next year’s annual auction (when it will have become Year 1 MSEC). Any Year 1 MSEC that remains unsold will be offered in subsequent RMSEC, DSEC and DISEC auctions, as discussed later in this chapter.

3.4.2 Pricing of MSEC

Reserve prices in the MSEC auctions will be identical to the UCAs used for the QSEC auctions as well as MSEC under the transitional regime from February 2003. See table 3.13 above.

3.4.3 The bidding process

In order to accept a particular MSEC bid, Transco requires the following information:

Table 3.17: Information required by Transco for a MSEC bid
User ID
ASEP
Relevant period (i.e. month)
Maximum bid quantity (kWh)
Minimum bid quantity (kWh)
Bid price (p/kWh) (NB: Bids below the reserve price will not be accepted)

Source: Transco plc

Following the annual MSEC auction, Transco will publish the following information for each ASEP on its Information Exchange website¹⁶:

Table 3.18: Information provided by Transco following an annual MSEC auction
Weighted average price for all accepted bids.
Weighted average price of highest 50% of accepted bids.
Aggregate volume of allocated SO baseline entry capacity (and Incremental System Entry Capacity, if any).
Total amount of revenue derived in respect of allocated SO baseline entry capacity (and the Incremental System Entry Capacity, if any).
Highest and lowest bids accepted.
Volume allocated at highest and lowest prices.
Total number of shippers who submitted successful capacity bids.
Total number of shippers who submitted unsuccessful capacity bids
The amount of baseline entry capacity which remains unsold (if any) following the allocation

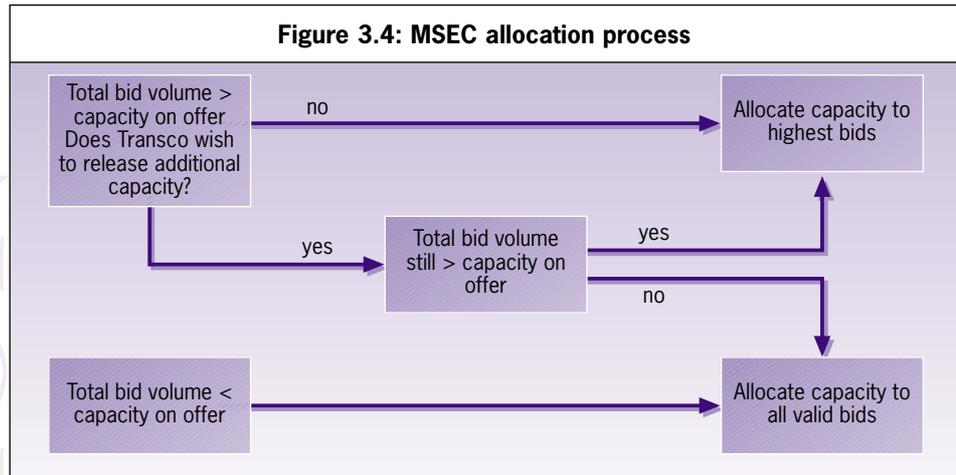
Source: Transco plc

Under the proposed arrangements, a bid period will last one day from 08:00 to 17:00 hours, with bids being made in p/kWh to four decimal places.

¹⁶ <http://info.transco.uk.com>

3.4.4 MSEC allocation

The current proposal is that the annual MSEC auctions will be operated in a similar fashion to the existing MSEC auctions, but held over a single auction round. Therefore, the allocation will be based on a blind pay-as-bid allocation, with the minimum price being constrained by the reserve price. Once the bidding period has been closed, Transco will allocate the available entry capacity at each ASEP using the following system.



Source: EPN

3.5 Rolling Monthly System Entry Capacity (RMSEC)

3.5.1 General description of the service

RMSEC is a monthly allocation of unsold entry capacity from the previous LTSEC and annual MSEC capacity allocations. Therefore, within the gas year a rolling MSEC auction will be conducted during the last five days of each month, selling unsold capacity for the following month. In accordance with the terms of the Network Code (B.2.3.1), Transco has been running RMSEC auctions since October 2002. At the time of writing this report, the November and December 2002 auctions had taken place.

3.5.2 RMSEC capacity available

The amount of capacity available for the RMSEC auctions is any remaining unsold baseline capacity for the relevant month. In RMSEC auctions held so far there has been no capacity available at St Fergus and Barrow, but significant levels of capacity available at Easington, and to a lesser extent Bacton and Theddlethorpe.

3.5.3 Pricing of RMSEC

The MSEC reserve prices are also used for RMSEC auctions. See table 3.13 for MSEC reserve prices.

3.5.4 *The bidding process*

The auctions window for RMSEC auctions begins at 08:00 and ends at 17:00 on the same day. During this period, bids may be withdrawn or amended. RMSEC is offered in a single tranche pay-as-bid auction.

Table 3.19: Information required by Transco for a RMSEC bid
User ID
ASEP
Relevant period (i.e. month)
Maximum bid quantity (kWh)
Minimum bid quantity (kWh)
Bid price (p/kWh) (NB: Bids below the reserve price will not be accepted)

Source: Transco plc

3.5.5 *RMSEC allocation*

Once all the bids have been received and processed, the allocation of capacity will be published to users by close of business on the following business day. The actual bid allocation process is as follows:

- If the aggregate quantity of valid bids is less than the appropriate proportion of the initial NTS SO baseline entry capacity and, after taking into account any previous allocated capacity, then all valid bids will be accepted.
- When considering each ASEP, if the aggregate quantity of valid bids is greater than the appropriate proportion of Initial NTS SO baseline entry capacity after taking into account previously allocated capacity, then Transco may allocate additional quantities of entry capacity after giving consideration to the risks and rewards associated with further incremental sales of entry capacity.
- If the allocation is conducted in an environment of surplus demand over availability, after taking into account additional quantities which Transco may consider it appropriate to make available, then:
 - All bids will be ranked in price order.
 - Allocation will start with the highest ranked (priced) bid, and proceed until all capacity on offer has been allocated.
 - In the case of bids of equal price, the aggregate bid quantity will be allocated unless there is insufficient capacity available, in which case capacity will be allocated on a pro-rata basis, subject to minimum quantity threshold.

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Table 3.20: Information provided by Transco following the monthly RMSEC auction
Weighted average price for all accepted bids.
Weighted average price of highest 50% of accepted bids.
Aggregate volume of allocated SO baseline entry capacity (and Incremental System Entry Capacity, if any).
Total amount of revenue derived in respect of allocated SO baseline entry capacity (and the Incremental System Entry Capacity, if any).
Highest and lowest bids accepted.
Volume allocated at highest and lowest prices.
Total number of shippers who submitted successful capacity bids.
Total number of shippers who submitted unsuccessful capacity bids.
The amount of baseline entry capacity which remains unsold (if any) following the allocation

Source: Transco plc

3.5.6 RMSEC results summary

Tables 3.20 and 3.21 list the results of the November and December 2002 RMSEC auctions. It is noticeable that there was no RMSEC available at St Fergus or Barrow as capacity at these terminals already been sold in the MSEC auctions in August 2002.

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Table 3.21: RMSEC November 2002 results						
	<i>Capacity available (GWh/d)</i>	<i>Capacity sold (GWh/d)</i>	<i>Remaining unsold capacity (GWh/d)</i>	<i>Reserve price (p/kWh)</i>	<i>WAP (p/kWh)</i>	<i>No. of successful bidders</i>
St Fergus	0	0	0	0.0189	N/A	N/A
Barrow	0	0	0	0.0023	N/A	N/A
Teesside	145.6	37	108.6	0.0047	0.0073	5
Theddlethorpe	469.5	45.3	424.2	0.0008	0.0008	2
Easington	712.4	0	712.4	0.0020	N/A	0
Bacton	466.6	43.3	423.3	0.0006	0.0013	6
Hornsea	167.2	0	167.2	0.0028	N/A	0
Avonmouth LNG	139	0	139	0.0000	N/A	0
Dynevor Arms LNG	17.4	0	17.4	0.0000	N/A	0
Glenmavis LNG	99	0	99	0.0088	N/A	0
Isle of Grain LNG	152.3	0	152.3	0.0000	N/A	0
Partington LNG	215	0	215	0.0007	N/A	0
Hatfield Moor Storage	54	0	54	0.0026	N/A	0
Hatfield Moor Onshore	1	0	1	0.0026	N/A	0
Hole House Farm	26	26	0	0.0002	0.0002	1

Source: EPN, data adapted from Transco plc

	<i>Capacity available (GWh/d)</i>	<i>Capacity sold (GWh/d)</i>	<i>Remaining unsold capacity (GWh/d)</i>	<i>Reserve price (p/kWh)</i>	<i>WAP (p/kWh)</i>	<i>No. of successful bidders</i>
St Fergus	0	0	0	0.0189	N/A	N/A
Barrow	0	0	0	0.0023	N/A	N/A
Teesside	328.2	44.3	283.9	0.0047	0.0052	7
Theddlethorpe	468.3	122.6	345.7	0.0008	0.0008	5
Easington	392.6	40.2	352.4	0.0020	0.0023	3
Bacton	404.9	42.3	362.6	0.0006	0.0008	7
Hornsea	80.1	20.5	59.6	0.0028	0.0028	1
Avonmouth LNG	109.0	109.0	0	0.0000	0	1
Dynevor Arms LNG	11.8	11.8	0	0.0000	0	1
Glenmavis LNG	99	0	99	0.0088	N/A	0
Isle of Grain LNG	121.3	121.3	0	0.0000	0	1
Partington LNG	215	0	215	0.0007	N/A	0
Hatfield Moor Storage	27	0	27	0.0026	N/A	0
Hatfield Moor Onshore	1	0	1	0.0026	N/A	0
Hole House Farm	26	0	26	0.0002	N/A	0

Source: EPN, data adapted from Transco plc

3.6 Daily System Entry Capacity (DSEC)

3.6.1 General description of service

Another capacity service offered by Transco which allows users to further refine their capacity usage is Daily Entry System Entry Capacity (DSEC). DSEC is available to users from the day-ahead stage and during the relevant gas day¹⁷. Capacity allocated within (rather than before) a particular gas day will be allocated on the basis of equal hourly use through to the end of the gas day.

¹⁶ For example, Gas Day 15 March 2003 runs from 06:00 on 15th to 05:59 on 16th, DSEC may be allocated by Transco from 13:00 on D-1 (14th) through to 02:00 on D (which is Gas Day 15 March but in terms of date is actually 2am on 16th).

3.6.2 Capacity available for sale

DSEC can be made available in two ways:

- On the gas day, at Transco's discretion.
- On the day before the gas day up to Transco's obligation to offer capacity for sale (this is initially SO baseline, although obligated incremental capacity would also be included).

Since capacity is only being made available for either a whole day or part of a day, the following constraints apply to delivery rate:

- For DSEC purchased in advance of the gas day, the delivery rate per hour must not exceed 1/24th of the daily entitlement.
- For DSEC purchased within the gas day, the delivery rate must not exceed 1/Nth of the registered end of day quantity, where N is the number of hours remaining in the gas day.

3.6.3 Pricing DSEC

DSEC reserve prices are currently set as 2/3rd of the relevant MSEC reserve price. The switch to using UCAs for MSEC reserve prices from April 2003 will obviously affect DSEC reserve prices. Table 3.23 lists DSEC reserve prices before and after 1 April 2003. However, it should be noted that, under its GT Licence, Transco is obliged to make offer for sale in a clearing allocation its obligated capacity up to and including on the gas day. In order to meet this requirement Transco must either sell all relevant capacity or offer it for sale with a zero reserve price. Therefore Transco has decided from October 2003 to set a zero reserve price for all DSEC offer on the day. The reserve prices in table 3.23 are expected to still apply to D-1 DSEC sales.

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Table 3.23: DSEC reserve prices		
<i>Entry Point</i>	<i>Reserve price (p/kWh/d)</i>	
	<i>October 2002 to March 2003</i>	<i>April 2003 onwards</i>
Bacton	0.0004	0.0037
Barrow	0.0016	0.0003
Easington/Rough	0.0014	0.0007
St Fergus	0.0126	0.0132
Teesside	0.0031	0.0012
Theddlethorpe	0.0005	0.0007
Glenmavis	0.0059	0.0110
Partington	0.0005	0.0002
Avonmouth	0.0000	0.0013
Isle of Grain	0.0000	0.0039
Dynevor Arms	0.0000	0.0000
Hornsea	0.0019	0.0031
Hatfield Moor (storage)	0.0017	0.0009
Hatfield Moor (onshore)	0.0017	0.0009
Aldbrough	NA ¹⁸	0.0012
Caythorpe	0.0013	0.0014
Hole House Farm	0.0002	0.0001
Wytch Farm	0.0000	0.0000
Burton Point	0.0000	0.0001

Source: Transco plc, Gas Transportation Charges from 1 January 2003, December 2002

3.6.4 The bidding process for DSEC

When a user places a bid on the Transco system for DSEC, the bid may be placed up to seven days prior to the gas day but not later than 02:00 hours on day (D). Bids are required to specify the following information:

¹⁸ The salt cavity storage facility under construction at Aldbrough is expected to begin operations later in 2003 and will be a new system entry point.

Table 3.24: Information required by Transco in order to accept a DSEC bid
ASEP.
Quantity expressed in kWh/day.
Minimum quantity expressed in kWh/day.
Price expressed in pence/kWh.
Evergreen (constant quantity) of decreasing (constant rate).
Transco will reject a bid where:
<ul style="list-style-type: none"> ● The bid price is less than the applicable reserve price for bid ASEP or ● The quantity (or minimum quantity) is less than 100,000 kWh/day or ● Where a bid is a reducing bid, the maximum quantity has become less than the minimum quantity.
The start time of a bid is deemed to be the later of:
<ul style="list-style-type: none"> ● The start of the gas day (06:00) or ● The next hour plus one after the acceptance of the bid by Transco.
Users will be able to place up to 20 live bids in respect of each ASEP.
Bids can be withdrawn or revised.

Source: Transco plc

3.6.5 DSEC allocation

There are slight differences in Transco’s of allocating DSEC before the day and on the day.

Acceptance of bids prior to the gas day

- Transco will accept bids for DSEC before the gas day after 13:00 (D-1).
- When Transco do make DSEC available (specific to an individual ASEP), it will rank all bids for DSEC at that ASEP in price order with the highest priced first.
- Transco may choose to make additional capacity available at one or more ASEPs (but not all ASEPs).
- Transco will rank all bids at ASEPs where incremental capacity could be made available.
- Where Transco has bought back capacity, it may release additional capacity if additional capacity has become available.
- Transco may choose to buy back capacity and release an equal quantity of daily firm capacity (at either the same ASEP or another relevant ASEP) where:
 - The revenue from the sale of daily firm capacity exceeds the cost of capacity buy back.
 - The expected increase in flow rate associated with the daily firm sale (taking account of the rate at which the user will be able to deliver gas) will not cause a constraint
 - Buy back actions to resolve a constraint have been completed.

Acceptance of bids within the gas day

The basic principle for the acceptance of bids within day is the same as for bids accepted prior to the day with the exception that the impact of the hourly rates and the hourly available capacity needs to be taken into account.

Following a DSEC auction, DSEC allocation statistics will be made available within one hour of notification of results, and, where appropriate, DSEC will be updated on a cumulative basis after each subsequent allocation period for a relevant gas day. The information will be made available by Transco via the RGTA Capacity system and the Information Exchange web site. The statistics published are:

Table 3.25: Information provided by Transco following a DSEC auction
ASEP.
Highest accepted bid price (p/kWh) and volume.
Lowest accepted bid price and volume.
Weighted (by volume) average accepted price.
Volume (kWh) allocated (successful bids).
Number of successful bidders in each period.
Number of unsuccessful bids in each period.
Weighted (by volume) average accepted price of the highest priced accepted bids.
Quantity of unsold baseline capacity.

Source: Transco plc

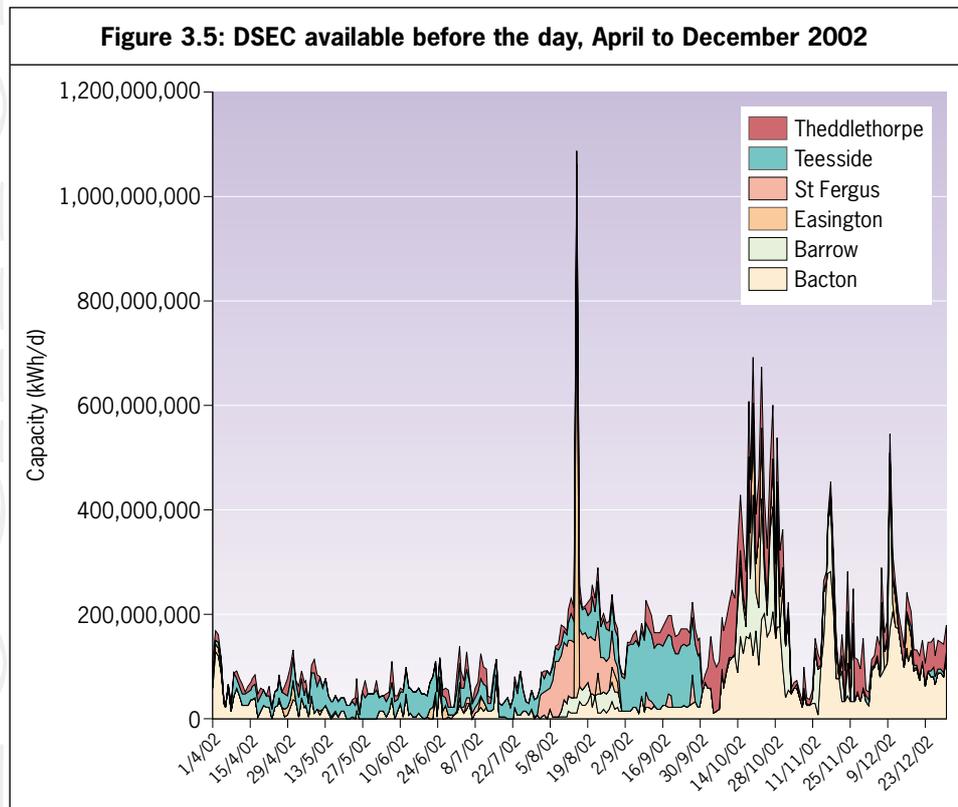
3.6.6 Results of DSEC auctions since April 2002

Table 3.26 lists DSEC maximum, minimum and average prices April to December 2002. At most entry points average DSEC prices are close to the reserve price, with high prices occurring rarely. However, there is a different picture at St Fergus and Barrow, where most capacity had already been sold in the MSEC auctions. Figures 3.5 and 3.6 depict the volume of capacity on offer as DSEC before the day and on the day at the major entry points. This illustrates the prices as, there is typically only limited DSEC available at St Fergus and to a lesser extent, Barrow. The periods when more DSEC is available at specific terminals typically relate to field maintenance outages or other periods when flow through that terminal are reduced.

Table 3.26: DSEC prices, April to December 2002

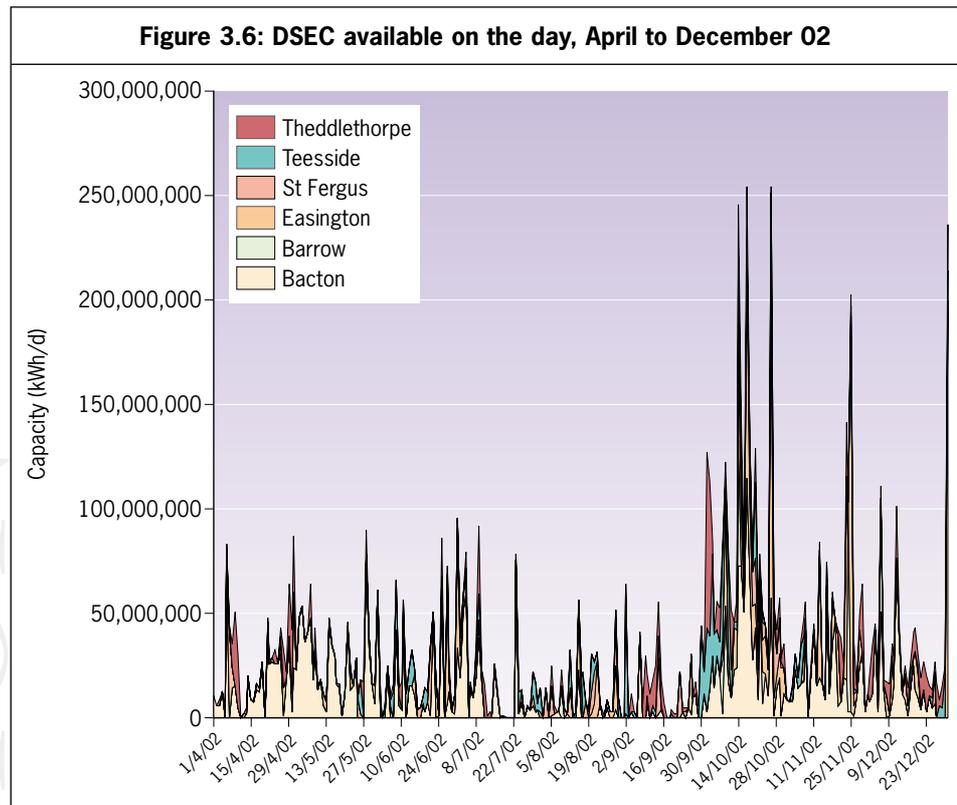
Entry point	Reserve price (p/kWh)	Maximum price (p/kWh)	Minimum price (p/kWh)	Average price (p/kWh)
Bacton	0.0004	0.0050	0.0004	0.0005
Barrow	0.0016	0.0600	0.0016	0.0393
Easington	0.0014	0.0204	0.0014	0.0016
Hornsea	0.0019	0.0170	0.0019	0.0019
St Fergus	0.0126	0.3325	0.0126	0.0921
Teesside	0.0031	0.0400	0.0031	0.0044
Theddlethorpe	0.0005	0.0050	0.0005	0.0005

Source: EPN, based on data from Transco plc



Source: EPN, based on Transco plc data

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Source: EPN, based on Transco plc data

3.7 Daily Interruptible System Entry Capacity (DISEC)

3.7.1 General description of service

DISEC capacity is basically is daily capacity sold by Transco, which Transco is able to scale back without cost (other than the loss of potential DISEC sales revenue). DISEC is primarily provided as an anti-hoarding measure, as firm capacity held by shippers which Transco estimates will not be used by it owners, can be re-released to the market as DISEC.

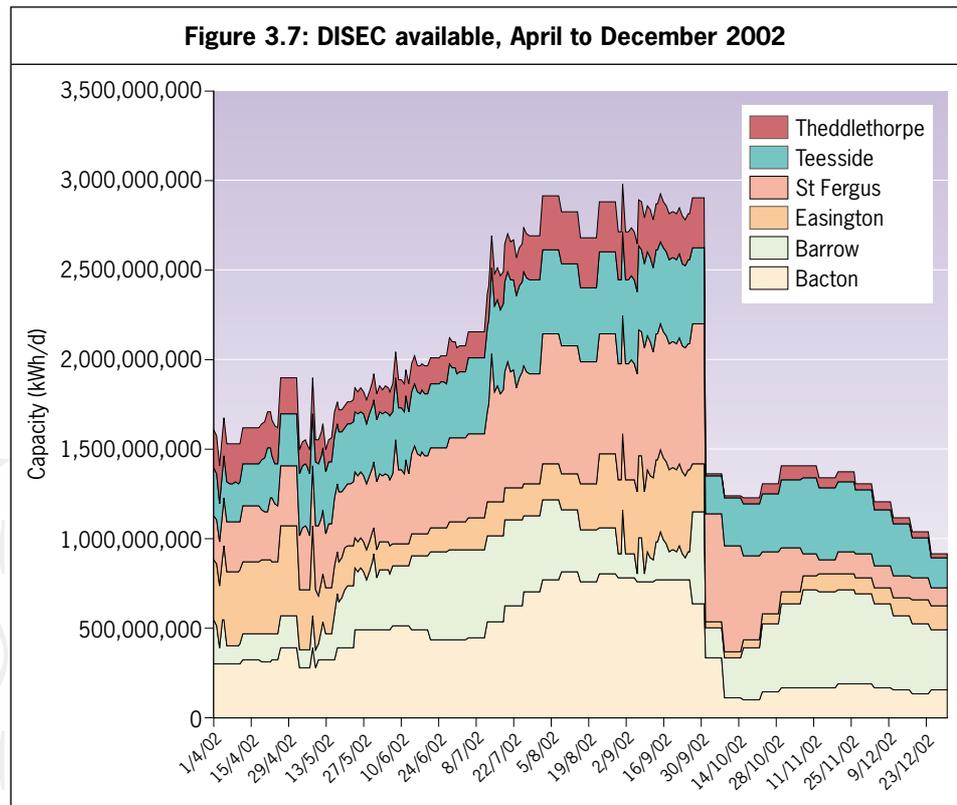
3.7.2 Capacity available for sale

The volume of DISEC capacity released on any day at any entry point is based on the lesser of 10% of baseline capacity or a 30-day rolling average of the level of unused firm capacity holdings¹⁹.

¹⁹ The level of use-it-or-lose-it DISEC offered is calculated using the following formula:

$$\text{Available DISEC} = \text{AUC}/30$$

where AUC = the aggregate amount for each relevant day by which the Firm System Entry Capacity at the entry point by users in aggregate exceeds the sum of the Entry Point Daily Quantity Delivered for each System Entry Point in the ASEP (the relevant day referred to here is defined as a period of 30 days up to and including the day falling seven days before the first day in a relevant period which is a period of seven consecutive days).



Source: EPN, based on Transco plc data

3.7.3 Pricing of DISEC

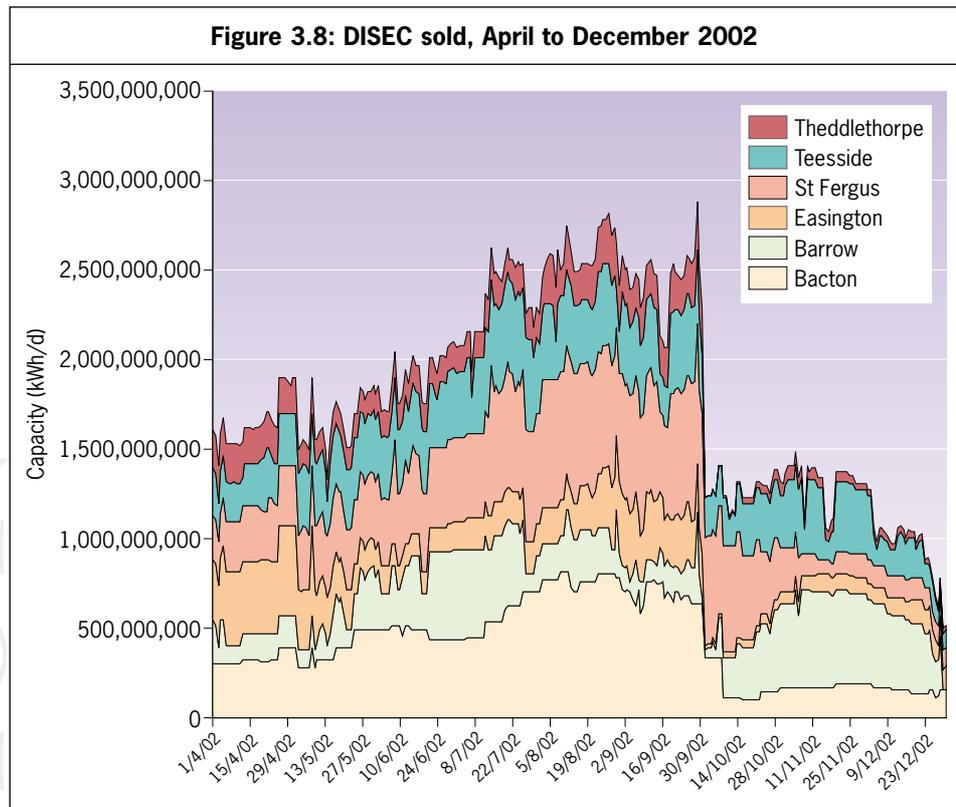
In order to ensure that all maximum capacity possible is released to the market, DISEC reserve prices are set at zero. However, as can be seen from table 3.27, DISEC prices may go significantly above this level when capacity is in high demand.

3.7.4 The bidding process

The bidding process for DISEC is basically the same as for DSEC in section 3.6.4 above.

3.7.5 Results of DISEC auctions, April to December 2002

As can be seen by comparing figures 3.7 and 3.8 almost all interruptible capacity available at the major entry points is sold. This is because DISEC provides shippers with a low-cost means of acquiring additional capacity and it can be seen as insurance policy in case shippers are required to flow more gas than expected in order to meet increased demand or trading patterns. However, DISEC also carries the risk of interrupted as has frequently been the case at St Fergus during 2002.



Source: EPN, based on Transco plc data

Table 3.27 DISEC prices April to December 2002

Entry point	Maximum price (p/kWh)	Minimum price (p/kWh)	Average price (p/kWh)
Bacton	0.0027	0.0000	0.0002
Barrow	0.0060	0.0000	0.0004
Easington	0.0015	0.0000	0.0002
Hornsea	0.0015	0.0000	0.0003
St Fergus	0.0228	0.0000	0.0018
Teesside	0.0007	0.0000	0.0001
Theddlethorpe	0.0550	0.0000	0.0003

Source: EPN, based on Transco plc data

Chapter 4: Constraint management

4.1 Introduction

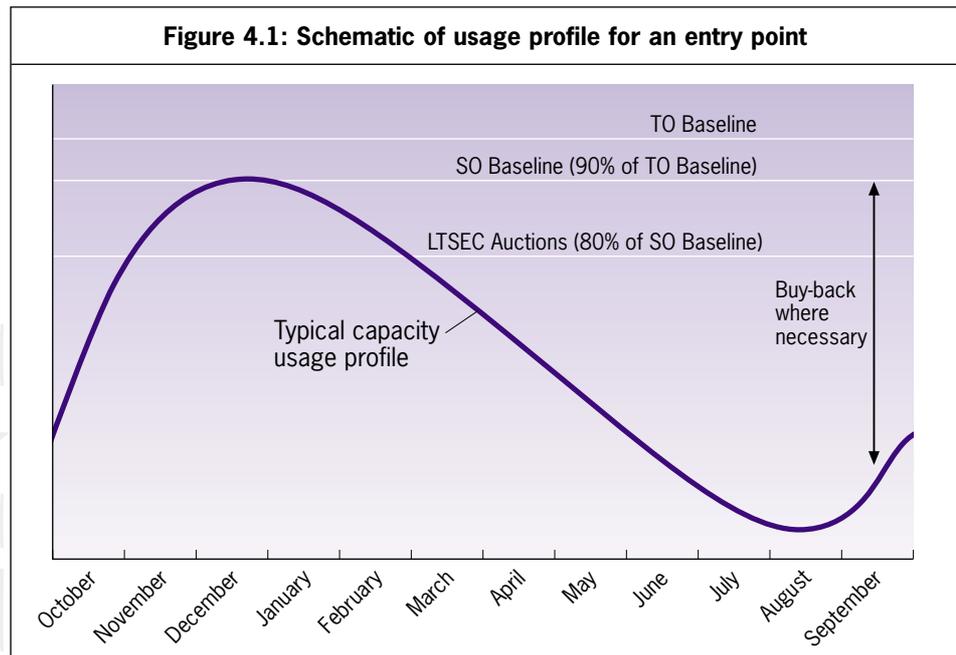
The purpose of this chapter is to examine the various tools that Transco has available in order to manage any system constraints. Under its new licence conditions and various Network Code modifications, Transco is incentivised to manage the risk/reward associated with the capacity regime. In theory at least, the Transco GT Licence and the Network Code have been developed in such a way as to provide appropriate financial incentives on Transco to ensure that Transco's operational and investment decisions are taken to the benefit of the whole industry.

Under the new capacity allocation arrangements, a minimum of 90% of the TO Baseline capacity at each ASEP must be made available for sale by Transco. Since the TO Baseline capacity refers to the absolute physical maximum of each entry point, it is widely recognised that the capacity made available for sale by Transco is likely to exceed the physical capability of the system on any given day¹. This is because capacity at any particular entry point depends not only on the physical infrastructure at that point (pipe diameter and safe operating pressures etc), but also on variable factors such as gas flows elsewhere on the system and total system demand. Therefore physically-available entry capacity, particularly during the summer months, may be significantly lower than TO, and indeed SO, baseline levels². As a consequence of this methodology, Transco almost always finds itself with a commercial obligation to make capacity available that outstrips its physical ability to provide capacity on the day. Under the Network Code, Transco is able to buy back this capacity from users, although it is worth noting that Transco will often find itself in the position of being a distressed buyer.

Figure 4.1 shows the three basic levels of capacity for a typical entry point, with a typical annual flow profile for the year.

¹ Even on a 1-in-20 peak day TO baseline capacity would not be available at all terminals, as the NTS is an interconnected system and the TO baseline figure for each terminal is based on optimising system flows to maximise capacity at that terminal only.

² See section 2.3.3 and 2.3.4 for definitions and quantification of TO and SO baseline capacity.



Source: EPN

As Figure 4.1 shows there are large periods of time during the year when Transco's obligation to provide capacity exceeds its physical ability to actually provide that capacity. In many cases this may not be a problem as the actual level of capacity utilisation by shippers, irrespective of capacity holdings, will be below the system capability, in which case Transco is not required to buy-back capacity or otherwise reduce flow. However, in certain circumstances nominated or expected flows either into the system as a whole, or at a particular point, may exceed Transco's ability to receive gas. In these circumstances Transco has a number of tools available for constraint management:

- Interruption of capacity via DISEC
- Daily Buy-back
- Buy-back via forwards/options
- Bilateral buy-back agreements
- Terminal Flow Advice (TFAs) and other operational system tools

Description of the use of each of these constraint management tools is provided in the following sections. The principles underlying Transco's use of these tools is outlined in its System Management Principles Statement³, while guidelines for procuring system management services are contained in its Procurement Guidelines⁴. In addition details of Transco daily operational procedures described by the Operational Guidelines⁵.

³ The System Management Principles Statement is available from www.transco.uk.com/publish/smp/home.asp

⁴ The Procurement Guidelines are available from www.transco.uk.com/publish/pg/home.asp

⁵ The Operational Guidelines are available from www.transco.uk.com/publish/opg/home.asp

4.2 Interruption of DISEC

Under the Network Code, Transco will continue to sell capacity on an interruptible basis as **Daily Interruptible System Entry Capacity (DISEC)**⁶. The release of existing unused firm capacity as interruptible capacity is an anti-hoarding measure which discourages users from hoarding capacity or deliberately purchasing large volumes of entry capacity in the hope of selling it back to other users at a profit. However, the change in the Network Code to a ‘top-down’⁷ type of entry capacity arrangement has created a number of problems in managing this product, since the volume of DISEC that might be available could be considerably higher than the system’s physical capability. The volume of DISEC capacity released on any day at any entry point is based on a 30-day rolling average of the level of unused firm capacity holdings⁸. Section 3.7 provides details of the allocation, pricing and availability of DISEC under the current regime.

4.2.1 Curtailment of Interruptible System Entry Capacity

Transco may choose to interrupt users of interruptible system capacity at any time after 15:00 hours on day D-1, i.e. the day before the relevant gas flow, if Transco determines that there will be an Entry Capability Shortfall. An Entry Capability Shortfall can occur at any entry point where the expected rate of gas deliveries for a day exceeds the System Entry Capability. In effect at the D-1 stage Transco compares shippers’ aggregate nominated flows at each entry point with its assessment of physically available capacity at each point on-the-day. Where the nominated flows exceed the capability of the system there is likely to be an entry capability shortfall.

In order to effect the interruption, Transco needs to give an interruptible curtailment notice to all users, specifying the following information.

Table 4.1: Information provided by Transco to facilitate a curtailment
The entry point and the gas day to which the notice relates.
The time from which the curtailment is to take place. This will occur on the hour, and will not be earlier than 06:00 hours nor later than 02:00 hours on the gas flow day, and will not be within less than 60 minutes after such a notice is given.
The interruptible curtailment factor, which will be determined in accordance with the System Management Principles.

Source: Transco plc

⁶ See section 3.7 for details of the DISEC auction process.

⁷ The ‘top-down’ approach to selling entry capacity is based on selling the maximum physical capacity, or a large percentage thereof, and then buying back capacity as necessary, is contrasted to the former ‘bottom-up’ approach, whereby capacity equivalent to seasonal normal demand was offered in advance and then extra capacity beyond this level could be made available on the day.

⁸ The level of DISEC offered is calculated using the following formula:

$$\text{Available DISEC} = \text{AUC}/30$$

where AUC = the aggregate amount for each relevant day by which the Firm System Entry Capacity at the entry point held by users in aggregate exceeds the sum of the Entry Point Daily Quantity Delivered for each System Entry Point in the ASEP (the relevant day referred to here is defined as a period of 30 days up to and including the day falling seven days before the first day in a relevant period which is a period of seven consecutive days).

The interruptible curtailment factor (ICF) determines the level of capacity to be interrupted – ie if the ICF was 1, all interruptible capacity would be curtailed, whereas if it was 0.5 only 50% of interruptible capacity would be curtailed. This is complicated by the fact that there may be a number of curtailment notices of increasing scale during the gas day. Therefore the remaining amount of interruptible capacity held by each user following an interruptible capacity curtailment is calculated using the following formula:

$$\text{End-of-day interruptible capacity holding} = \frac{R * (ICF1 * P1 + ICF2 * P2 + ICFn * Pn)}{24}$$

Where:

R = The amount of the user's Available Interruptible System Entry Capacity at the start of the day.

ICF = The Interruptible Curtailment Factor.

P = The period in hours from the curtailment effective time until the end of the Gas Flow Day or, if earlier, the curtailment effective time of a subsequent notice.

Trevor, where there are formulae and explanations as above please can you put the whole lot into a box or something to separate it out from the rest of the text

Therefore a major tool available to Transco for use in managing any system constraint is the interruption of any DISEC users. This also has the advantage to Transco that there is no cost associated with the interruption of DISEC, other than the loss of the revenue that would be derived from its sale⁹. However, in many cases such action on its own is unlikely to be sufficient, and so Transco is also able to reduce its obligation to make firm capacity available by buying back some of the firm capacity in the market.

4.3 Capacity buy-back

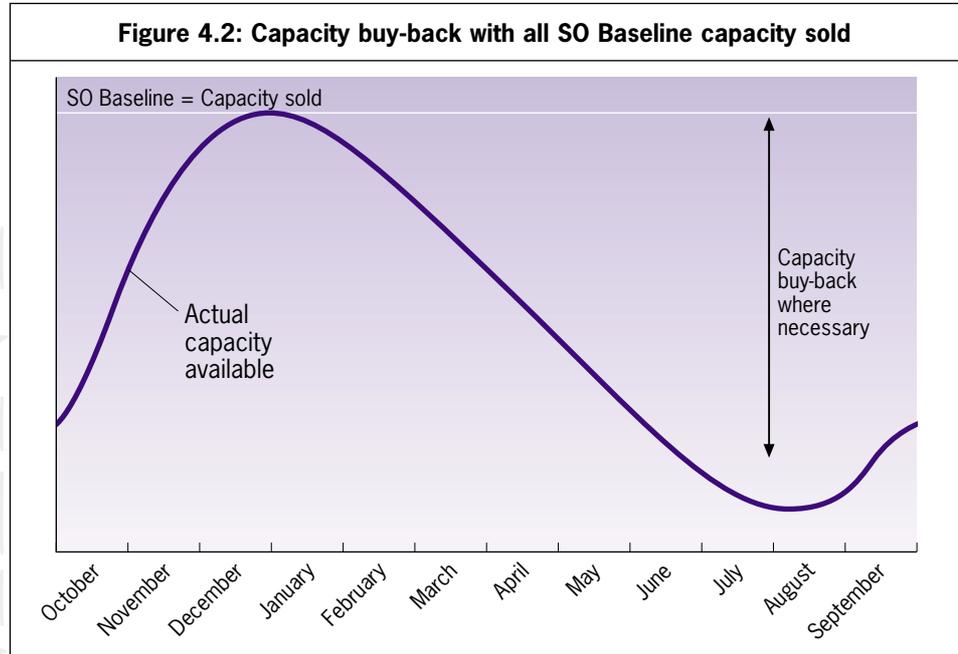
The basic principle of capacity buy-back is that if Transco is unable to make available sufficient firm entry capacity to meet its contractual obligations under the Network Code, it may buy back excess capacity previously sold in order to reduce shippers' firm capacity holdings. Although at the time of writing this report the LTSEC auctions had not yet been completed, there is an expectation that entry capacity will be purchased in two basic patterns:

- Flatline sales up to SO Baseline
- Profiled sales up to SO Baseline

St Fergus the expectation is that advance capacity sales could reach SO Baseline for the entire year, at least for the first few years of the auction. This will still leave Transco with large amounts of capacity to buy back, particularly during the summer

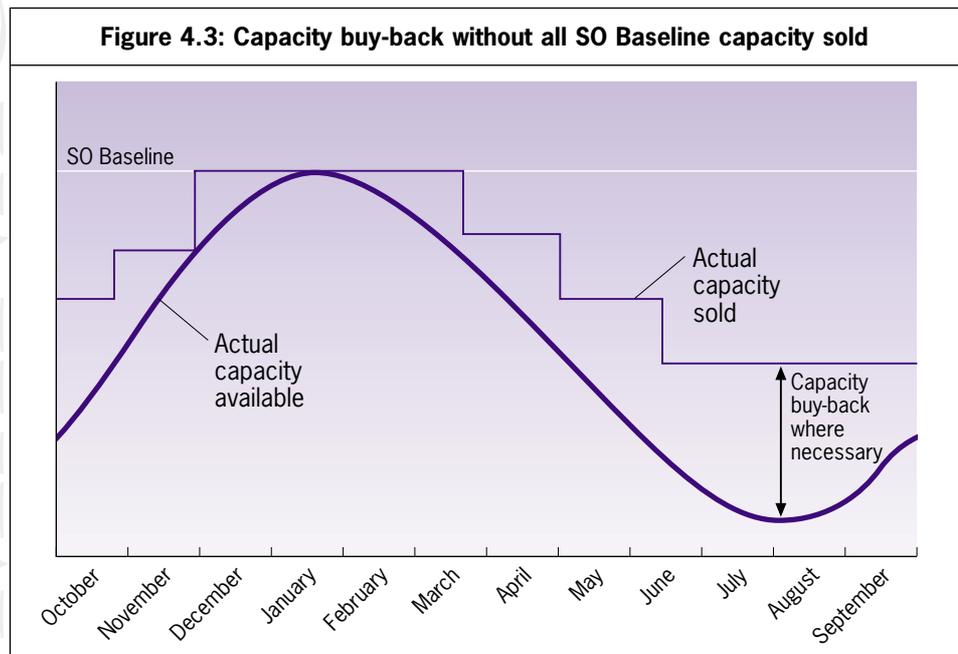
⁹ This is typically fairly low as the floor prices for DISEC are set at zero, see section 3.7.3.

months. This phenomenon is shown in Figure 4.2, where the actual amount of capacity sold equals SO Baseline for a particular entry point, say St Fergus..



Source: EPN

It is also likely that at most other entry points such as Bacton, Barrow, Teesside, Theddlethorpe and Easington may not sell all of their SO Baseline capacity for the entire year, as shown in Figure 4.3.



Source: EPN

Such an arrangement leaves Transco in a slightly peculiar situation, having not sold all of the SO Baseline Entry capacity at a particular entry point, since Transco has an obligation to make available capacity up to SO Baseline by offering MSEC and DSEC capacity right up to the gas day (it is also worth noting that Transco also has an obligation to make DISEC available, in order to prevent capacity hoarding, through the use-it-or-lose-it provisions).

Therefore, if Transco expects flows onto the system to be in excess of the physical capability of the system at a particular entry point, Transco needs to take appropriate action to reduce its obligation. As previously stated, this is achieved first by interrupting DISEC and then by buying back capacity via one of the three mechanisms.

4.3.1 *Daily buy-back provisions*

Capacity buy-back (referred to as surrender of System Entry Capacity in the Network Code) is effectively a reverse of the DSEC auction process, with users posting capacity offers and Transco making bids. A user that wishes to surrender Available Firm System Entry Capacity for a particular day needs to post a bid with the following information:

Table 4.2: Information required for a successful buy-back bid
The identity of the user
The entry point
The Day for which System Entry Capacity is offered for surrender
The amount in kWh/day, which cannot be less than the minimum eligible amount offered for surrender
The minimum amount of System Entry Capacity which the user is willing to sell
The offer price in p/kWh/day which the user wishes to be paid in respect of the surrendered System Entry Capacity
Whether the offer is a fixed or reducing daily capacity offer

Source: Transco plc

Daily capacity surrender offers may be posted any time from D-7 until 02:00 hours on D¹⁰.

If Transco calculates that there will be a Firm Capacity Shortfall at one or more entry points, then by 13:00 hours on D-1 Transco will institute a capacity selection period. During the capacity selection period, which lasts 15 minutes, Transco will accept

¹⁰ The Gas Flow Day, which is referred to as D goes from 06:00 to 05:59. Other days are referred to by their relative position to D (so the day before gas flow is D-1, the day after is D+1).

sufficient offers of capacity surrender in order to reduce the capacity shortfall. The following formula calculates the quantity of capacity offered for surrender:

$$\text{Capacity for surrender} = (\text{FSEC}/\text{OET}) * N$$

where:

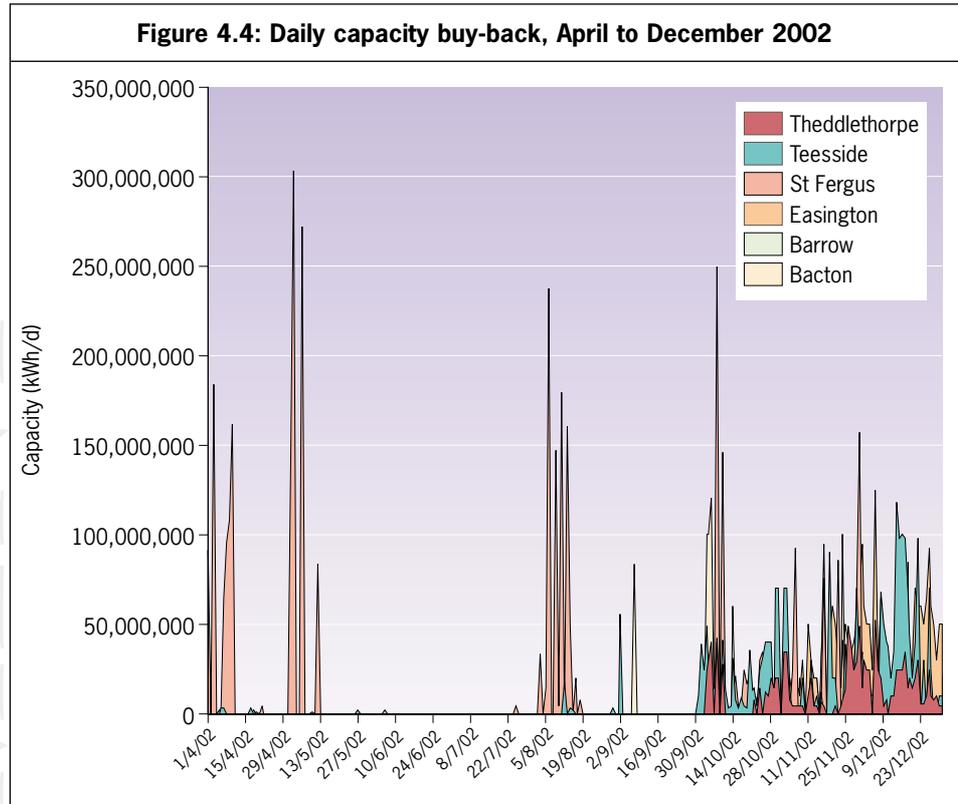
FSEC = The amount of Firm System Entry Capacity offered for surrender when the offer was first submitted;

OET = Commencing from the earliest Offer Effective Time in respect of the bid, and the number of hours remaining in the Gas Flow Day; and

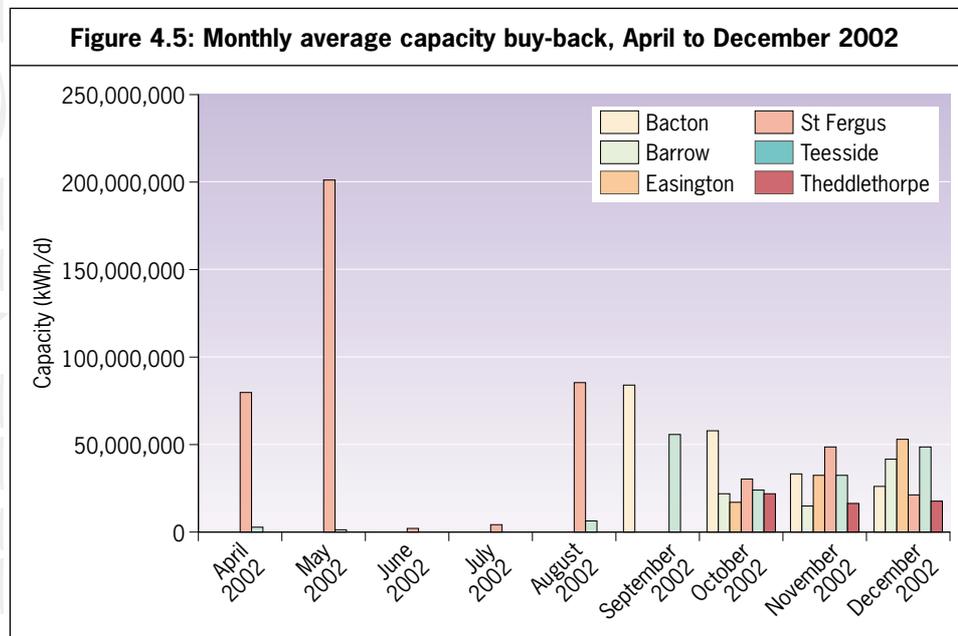
N = The number of hours remaining from the actual Offer Effective Time were Firm System Entry Capacity to be selected for surrender.

The costs associated with Transco's constraint management with regard to SO baseline capacity are allocated between Transco and users in accordance with Transco's buy-back incentives, as described in Transco's GT Licence. Under the terms of its GT Licence, Transco has certain financial incentives to manage the cost of entry capacity buy-back. Transco's annual target is £35 million during the period 1 April 2002 to 31 March 2003. If Transco keeps its buy-back costs below target it benefits, whereas if the buy-back costs exceed the target it is penalised. Under this incentive scheme, Transco's possible revenues are capped at £30 million and its costs are capped at £12.5 million. It is worth noting, however, that Transco is liable for 100% of the costs associated with constraint management arising from incremental QSEC. Therefore, when considering Transco's liability, any buy-backs on a given day are deemed to first relate to any incremental MSEC or DSEC. Any buy-back costs that relate to incremental QSEC will fall to Transco. If both incremental MSEC and baseline capacity are bought back on a particular day, then the aggregated buy-back costs will be allocated on a pro-rata basis relative to the ratio of QSEC to all other types of capacity bought back on that day.

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Source: EPN, based on data from Transco plc



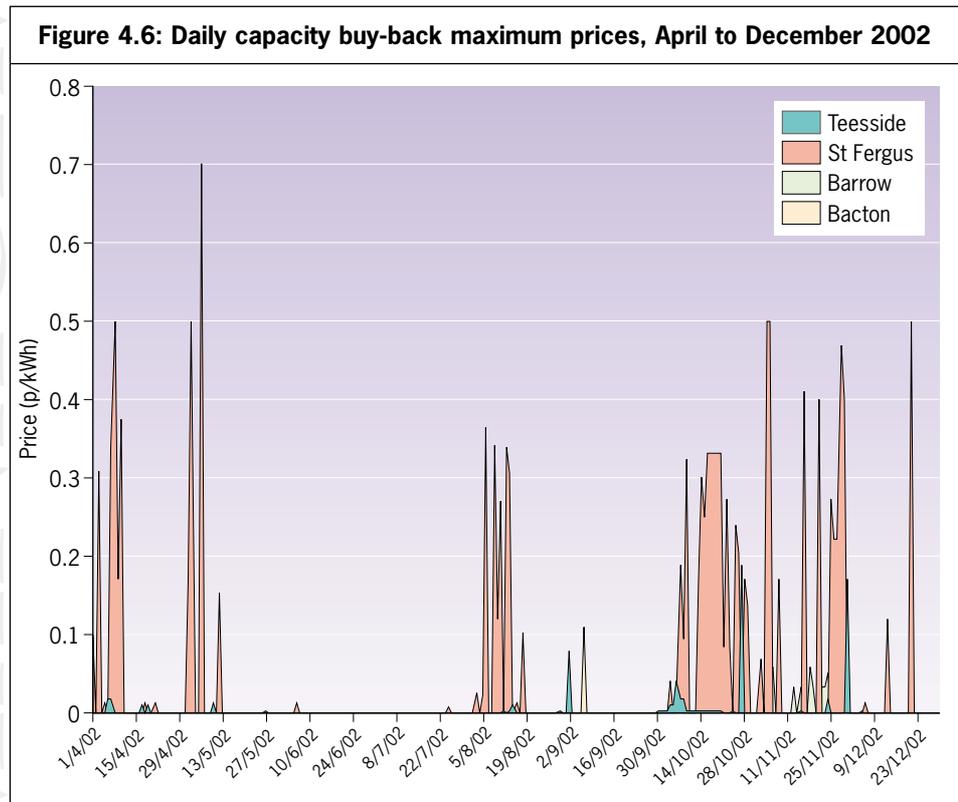
Source: EPN, based on data from Transco plc

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As can be seen in Figures 4.4 and 4.5 capacity buy-backs during the summer months tend to be concentrated on St Fergus, where in recent years, there have been very high flows nominations throughout the year. In the winter, by contrast, increasing flows at other more seasonal terminals has increased buy-backs elsewhere. As would be expected the price of St Fergus capacity is also significantly higher than at other terminals, as shown in table 4.3.

	<i>Maximum</i>	<i>Minimum</i>	<i>Average</i>
Bacton	0.11	0.11	0.11
Barrow	0.058	0.058	0.0356
Easington	0	0	0
St Fergus	0.7	0.0852	0.2334
Teesside	0.1877	0.0028	0.0166
Theddlethorpe	0	0	0

Source: EPN, based on data from Transco plc



Source: EPN, based on data from Transco plc

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4.3.2 *The use of Forwards and Options to buy back capacity*

4.3.2.1 General description

Under its new GT Licence, and amendments to the Network Code, Transco is now free to contract with owners of capacity ahead of the gas day by entering into capacity forwards and options contracts. The objective of allowing Transco to buy back using these types of trading instruments is to reduce Transco's exposure as a distressed buyer and hence reduce the cost of constraint management through capacity buy-back.

Transco has had an obligation to make SO baseline capacity available since its new licence obligations came into force in April 2002, even though the new long-term regime was not finalised until October 2002. In order to meet these obligations Transco has offered SO baseline capacity for sale first as MSEC, with any unsold baseline capacity later being offered as DSEC (from November 2002 unsold monthly capacity has also been offered as RMSEC, see section 3.5). Therefore, having sold capacity up to SO baseline, at least at some terminals, Transco has been attempting since April 2002 to buy back capacity by tendering for entry capacity forwards and options contracts. Transco has so far sought offers for buy-back forwards contracts for May to September 2002. Similarly, Transco has also sought offers for buy-back options to cover the summer and winter periods from 2002/2003. The following sections describe use of these contracts

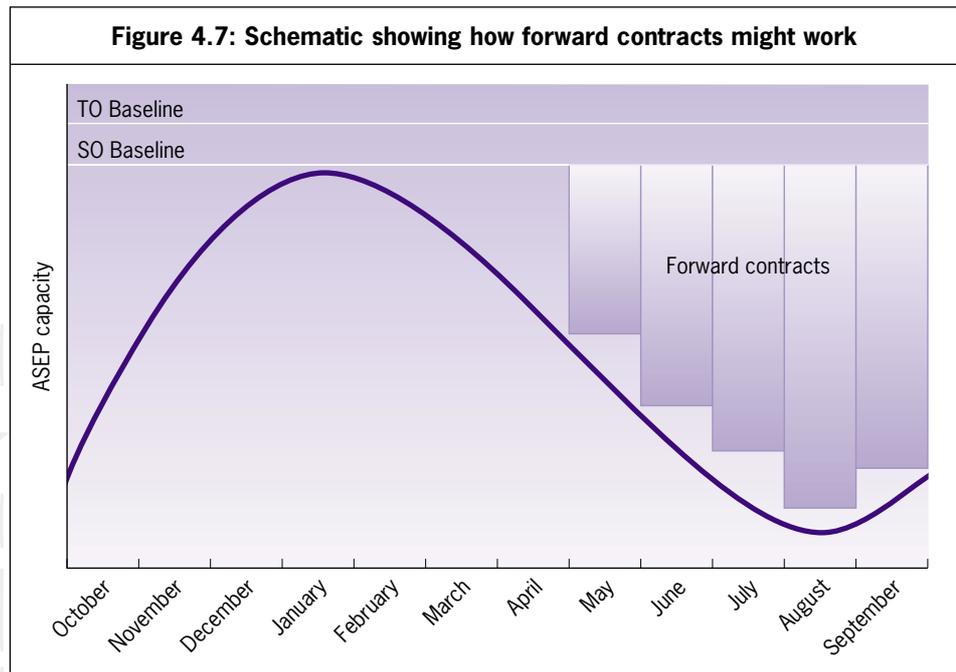
4.3.2.2 Forwards

Transco defines a capacity forward contract as follows:

'A forward is a contractual arrangement between Transco and a particular user where the user and Transco agree in advance for Transco to buy back capacity at an agreed price on specific days or periods of days'

Transco is now operating in a top down capacity regime. As a consequence, particularly during the summer months, there is a need at certain entry points for Transco to buy back large quantities of entry capacity. Rather than finding itself as a distressed purchaser of capacity during these periods, Transco now has the facility to buy back capacity through a forwards contractual instrument. Figure 4.4 provides an example of how forwards contracts can reduce shippers' aggregate capacity holdings and therefore the amount of capacity that Transco may have to buy back.

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Source: EPN

In 2002 Transco has invited tenders for capacity forwards during the five months of May to September. The terms of the initial tender issued by Transco allowed the company to buy back entry capacity at individual entry points in monthly (or later daily) strips in multiples of 100,000 kWh per day. The objective of the forwards tender is to allow Transco to reduce its obligation to provide entry capacity in monthly blocks. There will still be a need to fine tune these buy-back arrangements through the use of options and daily buy-back arrangements, however, in the context of the long-term regime in which Transco sells capacity in advance in quarterly blocks, monthly forward contracts increase Transco's ability to manage its buy-back exposure.

On 23 April 2002 Transco held its first capacity forwards tender. On this occasion Transco requested bids for capacity buy-back at the following terminals and dates:

- Terminals
 - St Fergus
 - Teesside
 - Barrow
- Dates (whole months):
 - 1-31 May 2002
 - 1-30 June 2002
 - 1-31 July 2002
 - 1-31 August 2002
 - 1-30 September 2002

- Other requirements
 - Minimum tender capacity = 100,000 kWh per day
 - Tender offer must be whole multiples of 100,000 kWh per day.

Transco modified its terms for a later tender on 6th June 2002, inviting bids for a minimum of two days rather than whole months, at St Fergus only. It is unclear if any bids were accepted in this tender. Table 4.4 provides information published by Transco on acceptance of capacity forwards for Summer 2002. All capacity bought back was at St Fergus.

Table 4.4: Transco St Fergus forward capacity buy-back, as of 15 August 2002

<i>Month</i>	<i>WAP (p/kWh)</i>	<i>Volume accepted (GWh)</i>	<i>No. of bidders</i>	<i>No. of successful bidders</i>
June 2002	0.0403	2,869	16	10
July 2002	0.0486	4,154	15	10
August 2002	0.0349	6,984	13	12
September 2002	0.0373	608	11	5

Source: Transco plc

4.3.2.3 Options

Transco defines an option as:

‘An agreement between Transco and a particular user for Transco to have an option at a particular price to buy back capacity’.

In effect an option held by Transco gives Transco the right, but not the obligation, to buy back capacity at a certain price (the strike price) at a certain point in the future. In return for granting Transco this right, the option-seller (the shipper) receives an option fee. The options should also specify the exercise period (the period during which Transco can use the option). The capacity options tenders so far issued by Transco have limited the number of possible exercise days for each option to three, although this could be changed for other tenders. For the winter of 2002/03 Transco has asked for offers for capacity options relating to the following:

- Location
 - St Fergus
 - Teesside
 - Barrow
- Option Exercise Periods
 - 1 to 31 December 2002, or
 - 1 to 31 January 2003, or
 - 1 to 28 February 2003, or
 - 1 to 31 March 2003

- The number of permitted exercise days is 3
- The minimum tender capacity is 100,000 kWh per day, with offers being in multiples of 100,000 kWh per day.

The option contracts have two pricing elements: an option fee and an exercise fee. The option fee is paid by Transco when it completes an option contract with a shipper, whether or not the option is ever exercised. The exercise fee is paid by Transco if it chooses to exercise the option. The exercise fee is in effect the strike price of the option. Obviously Transco will choose not to exercise an option where it finds it does not need to buy back capacity, or where the market price for capacity surrender is below the strike price. One could argue that a capacity option contract is in effect an insurance policy against high prices in the capacity buy-back market. Again, the objective of such an arrangement is to mitigate Transco's exposure to being a distressed purchaser on days of low demand such as during the summer months.

There is only very limited information available on Transco's use of capacity options so far (see section 4.3.2.4 below). However, the following information was released by Transco in the Summer of 2002.

Table 4.5: Transco St Fergus capacity options, as of 15 August 2002

Month	WAP Exercise fee (p/kWh)	WAP Option fee (p/kWh)	Volume offered (GWh)	No. of bidders	No. of successful bidders
May 2002	0.1083	0.05	510.5	8	4

Source: Transco plc

At the same time Transco reported that capacity options had so far been exercised on just one occasion, the 5th May 2002.

4.3.2.4 Forwards and options information release

Information release has become a significant issue in this area. Ofgem's decision to grant Transco greater discretion in its capacity management, including the right to trade forward for capacity, rather than limiting Transco's actions to the RGTA Capacity System day-ahead and within-day market, has raised some concerns among shippers. This is largely because the tendering and selection process is less transparent than the RGTA market, and shippers tend to feel at a disadvantage to Transco in trading capacity due to Transco's dominant market position and better market information. Certain shippers have therefore been concerned to ensure that Transco provides information on successful capacity forwards and options offers. On the other hand, each forward or option contract is a confidential bilateral agreement between Transco and a shipper, and Transco has concerns that to release information relating to specific contracts could be breaching commercial

confidentiality. This would not be a significant problem if the capacity forwards and options were traded in a liquid market as Transco could simply release aggregate information on successful bids. However, the forward and options market has been relatively illiquid so far, with perhaps only one or two successful bidders in a typical tender. Therefore Transco has argued that to release aggregate information would risk revealing its counterparties' positions to the market.

With these concerns emerging, the system has been through a number of changes since the introduction of the regime in April 2002. Initially Transco published limited information on the results of tenders. This was changed by the implementation of Network Code Modification 0561 'Publication of capacity forward and option costs', which required Transco to publish information relating to forwards and options contracts as described in table 4.6. However, this modification contained an important proviso: Transco would not be obliged to release this information if there were fewer than three successful bidders, in order to protect the confidentiality of the arrangements.

Table 4.6: Information provided by Transco under Modification 0561
Weighted average price
Volume contracted
Volume offered
Number of bidders
Number of successful bidders
Volume and WAP of any capacity option exercised

Source: Transco plc

Following implementation of Modification 0561 there has been only limited release of capacity tender results to the market, presumably because there have been fewer than four successful bidders in the relevant tenders. A number of companies are concerned about the lack of information available in the buy-back market and consequently AEP raised Modification Proposal 0588 in an attempt to require Transco to release much more information, even when there are a limited number of successful bidders. There has been an extended debate between Transco, Ofgem and the industry on the release of additional information. A final modification report on Modification Proposal 0588 was sent to Ofgem for approval on 20th September 2002, but at the time of writing in January 2003 it had not been either approved or vetoed by Ofgem. Tables 4.7 and 4.8 detail the information that Transco will be obliged to release if Modification Proposal 0588 is eventually approved.

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Table 4.7: Information that Transco would be required to publish for each ASEP for each Forward Delivery Period under Modification Proposal 0588

The volume of weighted average price of forward tender offers received.
The volume of forward tender offers received.
The maximum price of forward tender offers received.
The volume weighted average price of forward tender offers accepted.
The volume of forward tenders offered.
The minimum price of forward tender offers accepted.
The maximum price of forward tender offers accepted.

Source: Transco plc

Similarly, in relation to capacity option tenders Transco would be required to publish the following information for each Option Exercise Period.

Table 4.8: Information that Transco would be required to publish for each ASEP and for each Option Exercise Period under Modification Proposal 0588

Weighted average price
The volume weighted average of option strike prices received.
The volume of option tender offers received.
The minimum of offered option strike prices.
The maximum of offered option strike prices.
The volume weighed average of accepted option strike prices.
The volume of option tenders accepted.
The minimum of accepted option strike prices.
The maximum of accepted option strike prices.

Source: Transco plc

4.3.3 Bilateral buy-back contracts

Another constraint management tool available to Transco in order to buy back capacity is the use of bilateral contracts. Under the terms of the Network Code, via the Procurement Guidelines, where there is insufficient competition to facilitate a competitive result from a tender for capacity forwards options, Transco may use bilateral contractual arrangements. The use of bilateral contracts may take place where a localised constraint occurs and there are insufficient players interested in bidding for forwards or options via a tender process. A typical example of this might be capacity at an entry point where there are only one or two key players at an onshore field, such as Hatfield Moors.

If Transco has identified a need for constraint management via the use of a bilateral contract, Transco would still need to follow the Procurement Guidelines, which are summarised as follows:

- Contact those players who might be able to enter into a bilateral arrangement.
- Offer non-discriminatory terms of the service.

Nevertheless there may be a need for Transco to resolve a capacity constraint as a matter of urgency, where there may not be time to contact all the potential providers. In this case, under the terms of the Procurement Guidelines, Transco is able to contact specific providers. However, as a check on Transco's discretion, whatever approach it takes in relation to the use of bilateral contracts, Transco needs to:

- Operate within the terms of the Competition Act.
- Operate within its Gas Act obligation to operate in an economic, effective and co-ordinated manner.

At the time of writing it is unclear whether Transco has entered any such bilateral contracts, and if it has what the impact of these contracts has been.

4.4 The use of over-run charges

In establishing the Network Code one of the major challenges for Transco, Ofgem and the industry as a whole has been to ensure that sensible economic and commercial signals are given to the market-place to ensure all users of the Transco gas supply system operate in an appropriate manner. In particular, a key area has been the 'ticket to ride' principle for entry capacity. This is where players are encouraged to use the Transco system only if they have booked adequate capacity. Failure to get these economic and commercial signals correct could mean that on days of very high gas prices some players may deliver gas in excess of their booked capacity, effectively pushing other players off the system.

Therefore entry capacity over-run charges are levied on shippers who flow gas in excess of any booked volumes of capacity on a particular day. The objective of this is to give shippers a clear economic signal to purchase capacity before flowing gas. Under the current terms of the Network Code, the over-run charge is calculated as the greatest of the following:

- 8 times the highest price for entry capacity in any allocation of firm entry capacity relating to that gas day.
- 1.1 times the weighted average price by volume of the top 25% of entry capacity buy-backs accepted during the gas day.
- 1.1 times the weighted average price by volume of the top 25% of offers for entry capacity buy-backs accepted prior to the commencement of the gas day.
- 1.1 times the weighted average price by volume of the top 25% of the exercise prices for capacity option contracts.

This methodology can lead to very high charges, particular in the context of capacity at St Fergus, which over the course of the last two years has traded as low as 0.15p/th (0.005p/kWh) and as high as 12p/th (0.41p/kWh). Although this may prove a useful deterrent on days when capacity is in short supply, it may also lead to harsh penalties on days when there is spare capacity. Such charges break the principle of cost-reflectivity in charging. Therefore there has been a move in the industry to reduce the level of over-run charges, although no modification proposal to do so has yet been accepted by Ofgem.

4.5 Other system tools

Although the constraint management tools described above are intended to be Transco's normal tools for managing the capacity system, there are a number of other tools that Transco may use to manage the system close to real-time, which in effect have an impact on the capacity regime. Of these tools the most important are TFAs and the OCM

4.5.1 Transportation Flow Advice (TFA)

A Transportation Flow Advice (sometimes also referred to as a Terminal Flow Advice, most commonly simply a TFA) is a notice issued by Transco to the subterminal operators at a particular terminal requiring them to limit or stop deliveries into that Transco terminal. TFAs are defined in the contracts between delivery facility operators (terminal operators) and Transco. Although each contract is individually negotiated there is a standard clause covering TFAs.

Transco can issue TFAs for one of two reasons, either pressure, because system pressure at Transco's terminal risks exceeding safe limits or there is a risk of gas backing-out of the terminal, or gas quality, when there is a breach of gas quality requirements measured in Transco's terminals. Transco insist that TFAs are purely operational tools and are not being used for commercial reasons. There are, however, several interactions with the commercial RGTA capacity regime. The interactions depend on the duration, timing and cause of the TFA.

If the problem appears to be temporary (i.e. an excess of pressure that should be relieved within a few hours) there may be no impact on the capacity regime. In this case subterminal operators will be instructed to reduce deliveries for a limited period, but may then overflow (deliver at more than 1/24th hourly rate) in order to catch up on deliveries within-day. This requires no change in the shippers' capacity holdings.

If the problem appears to be of a longer duration (although it may still be confined to a particular day) Transco may issue a TFA and interrupt or buy-back capacity to reflect the reduced availability of capacity.

The time at which Transco System Operations become aware of the problem may affect the action taken. The first action Transco is likely to take for a longer TFA is

to curtail interruptible capacity. If the problem emerges before the gas day, Transco may also buy-back daily firm capacity in the D-1 auctions. If it occurs after the D-1 auctions or during the gas day, Transco may buy-back firm capacity within-day. Finally, if insufficient firm capacity offers are available on the RGTA capacity system, Transco may scale back firm capacity.

Ideally, then TFAs should be used as an operational tool, with any resultant reductions in available capacity at a terminal being reflected in purchases on the RGTA capacity system. However, some shippers have raised concerns about the use of TFAs, particularly late in the day, as Transco may then be able to issue a TFA and reduce in effect reduce firm capacity, without facing the costs of doing so. Although the TFA issue is currently fairly quiet, any increase in the incidence of TFAs under the new regime, is likely to be carefully watched by shippers.

4.5.2 *The OCM*

The On-the-day Commodity Market (OCM) is an independent within-day gas market operated by EnMO which enables Transco and shippers to trade gas at the NBP. Although Transco is no longer required to source or sell its balancing gas on the OCM, it remains one of Transco's major energy balancing tools. In addition it may have a limited use within the capacity regime. When capacity holdings and expected nominations at a particular entry exceed Transco's ability to receive gas, the normal approach would be for Transco to curtail interruptible capacity, and then, if necessary, scale back firm capacity. An alternative approach could be a locational trade on the OCM. Locational trades are sales or purchases of gas at the NBP, but which specify that the gas will be delivered to or from the NBP at a particular entry or exit point. If Transco sold locational gas specifying the relevant constrained entry point, this should lead to reduced nominations at that point, possibly averting the need for other capacity measures. However, it is unlikely that Transco would adopt this approach in most situations as it would normally be more costly and potentially less effective than capacity buy-back.

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Chapter 5: Entry capacity revenue flows & Transco incentives

5.1 Introduction

Transco's business as a monopoly gas transporter is regulated by Ofgem, through, amongst other areas, the price control process. The price control regulates the revenue Transco is allowed to recover through transportation charges for use of its system. Traditionally, Transco's five-yearly Periodic Reviews, which set the rules for the next price control, have focused on cutting costs and increasing efficiency through an RPI-X mechanism, however, in the most recent review, which brought in the 2002-07 Price Control, several new features were developed. These included a separation of Transco's assets into a number of specific price controls and the introduction of additional incentives on Transco to go alongside the RPI-X system¹. These incentives were intended to encourage Transco, not only to reduce costs, but also to increase standards of service or investment in certain areas, in particular the energy balancing and NTS capacity regime. This chapter provides a brief outline of the Transco Price Control and examines the treatment of entry capacity revenue under this price control and the various entry capacity incentive schemes.

5.2 NTS TO and SO Price Controls

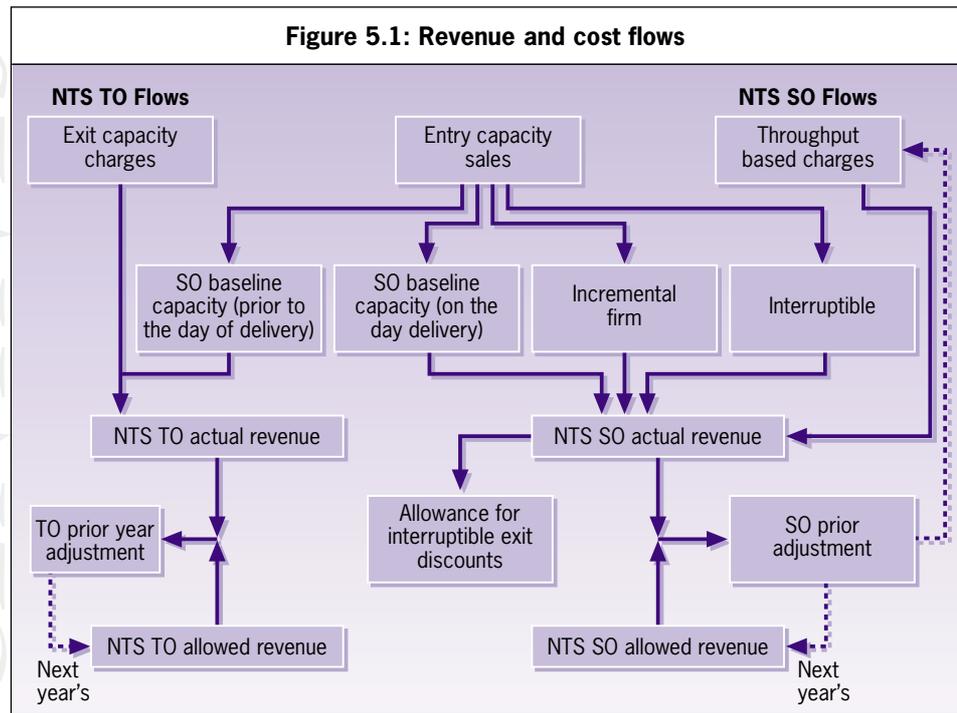
As previously mentioned, following the review of Transco's gas transporter (GT) licence which came into effect on 1 April 2002, the gas supply system has been split into a number of different sections, as follows:

- National Transmission System (NTS) Transmission Asset Owner (TO)
- National Transmission System (NTS) System Operator (SO)
- Local Distribution Zone (LDZ)
- Metering

The objective of these new arrangements is to facilitate new developments in the gas market. By separating Transco's price regulation into NTS TO, NTS SO, LDZ and metering, Ofgem is more able to target specific activities with appropriate incentives. All entry capacity revenues are related to the NTS, however revenues (and costs) are split between the TO and SO depending on their type and timing. Following the separation of NTS price controls, Transco's NTS allowed revenues and actual revenues are as follows:

- i) NTS allowed revenue = NTS (SO allowed revenue) + NTS (TO allowed revenue)
- ii) NTS actual revenue = NTS (SO actual revenue) + NTS (TO actual revenue)

¹ It should be noted that the practice of placing additional incentives alongside Transco's RPI-X price control had been developed earlier, such as the energy balancing and capacity incentives that were introduced in 1999 within the context of the 1997-2002 Price Control.



Source: EPN, adapted from Ofgem

As can be seen in Figure 5.1, the revenue flow from the entry capacity regime into the NTS TO Price Control is fairly simple as all sales of baseline capacity prior to on-the-day sales flow into the TO. However, the situation with the SO is more complex as there are a variety of different capacity revenues and costs that are accounted to it. The NTS SO allowed revenue is the sum of:

- NTS SO incentive revenues
- NTS SO costs incurred
- NTS SO over/under recovery brought forward from previous year.

These elements and their interaction with the capacity regime are considered in greater detail below.

5.2.1 NTS SO incentive revenues

Transco is allowed revenue from a number of sources under its NTS SO allowed revenues scheme. These include:

- Incentive revenue from entry and exit capacity investment incentives
- Day to day incentives:
 - Entry buy-back incentive
 - System balancing incentives
 - Residual balancing incentives
 - Internal cost incentive

These incentives are designed to encourage Transco to invest in developing its transportation system, where required and done efficiently, and to manage the system on a daily basis in an efficient and co-ordinated way.

5.2.2 NTS SO costs

In the course of managing the NTS, Transco will incur costs as a System Operator which it will be able to recover. These costs include:

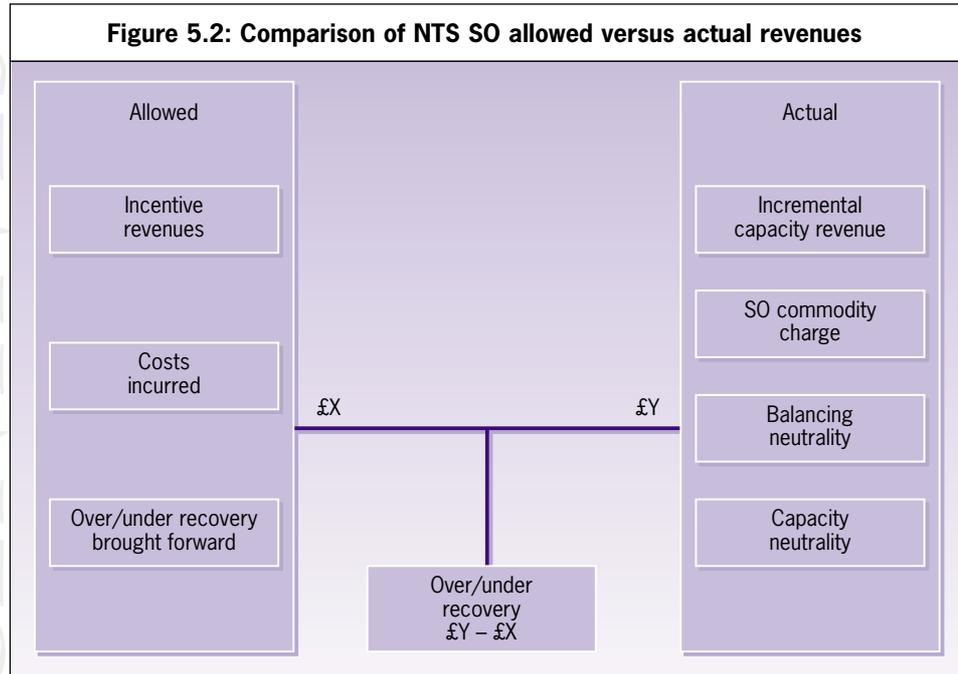
- Constraint management at entry:
 - Buy-back of capacity, on the day and via options and forwards
 - Constraining sites on to use gas
 - The cost of issuing TFAs
- Constraint management at exit:
 - Interruption
 - Constrained storage (LNG)
 - Cost of investment over and above that allowed to the TO
- System balancing due to own use of gas for:
 - Unaccounted for gas (UAG)
 - Unbilled energy
 - Compression costs
 - Cost of operating margins through the use of storage
- Residual balancing

5.2.3 NTS SO actual revenues

During the same 12-month period, Transco can earn actual revenue from the following areas:

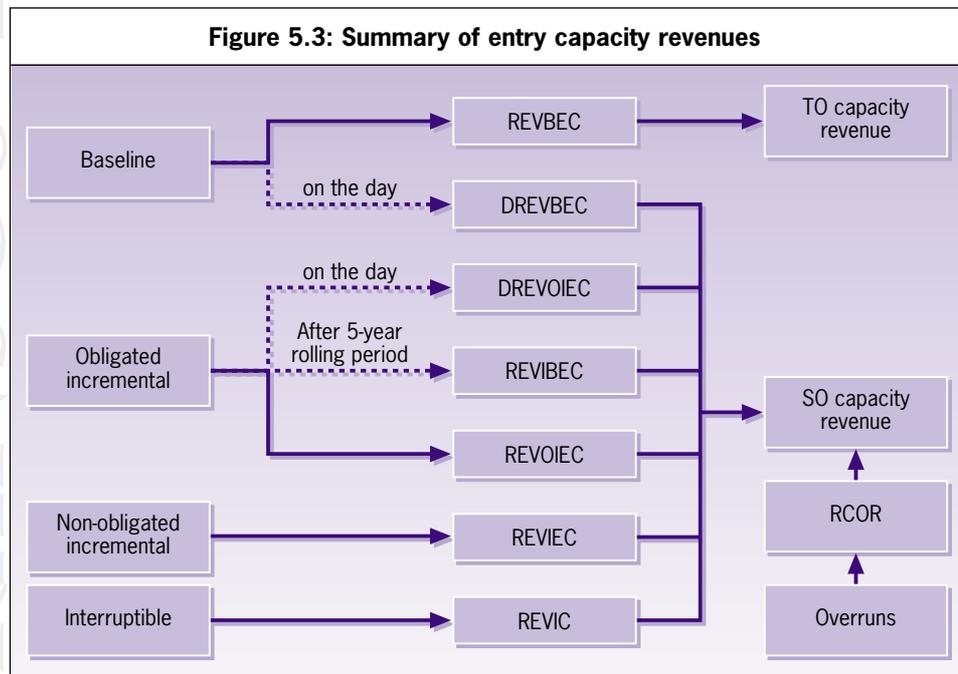
- Entry capacity charges relating to incremental sales
- Incremental exit capacity revenues
- Other SO charges, which include:
 - Entry capacity overrun charges
 - Failure to interrupt charges
- Balancing neutrality
- Capacity neutrality

The interaction of forms of charges is summarised in Figure 5.2. As can be seen, where there is a difference between total actual and allowed revenues, there will be an over or under-recovery. This is then reallocated to shippers, currently through adjustments to the SO Commodity Charge.



Source: EPN, adapted from Ofgem

5.3 The treatment of entry capacity revenue



Source: EPN, adapted from Ofgem

Figure 5.3 provides a schematic view of the treatment of entry capacity revenues within Transco's SO and TO price controls. As can be seen, entry capacity revenues may be allocated to number of different areas, depending on the type and timing of capacity sold. In simple terms there are three major areas into which entry capacity revenue flows: the TO baseline entry capacity, the SO entry capacity investment incentive, and the SO entry capacity buy-back incentive. Of these three the TO baseline entry capacity charges element is expected to be much higher than the others, receiving the revenue from all baseline capacity sold before the day. The SO entry capacity investment incentive works in a similar fashion, but for before-the-day sales of incremental capacity. All other entry capacity revenue flows into the SO entry capacity buy-back incentive where it is used as credit to offset the costs of Transco buying-back entry capacity. The following sections provide greater detail on the treatment of revenue from various forms of capacity.

5.3.1 Baseline capacity

Any revenue received from the sale of (SO) baseline capacity before the day through LTSEC, MSEC or DSEC goes to REVBEC², where REVBEC is defined as:

'The revenue derived by the licensee from the sale of NTS SO baseline entry capacity.'

Since these sales of capacity relate to baseline, the capacity revenues are allocated to the TO. However, a different system is used for sales of baseline capacity on the day (which might include DSEC and DISEC). Any sales of baseline capacity that take place on the day are allocated to DREVBEC, where DREVBEC is defined as follows:

'DREVBEC means the revenue derived by the licensee from the sale of NTS-SO baseline capacity on the day.'

Since the sale of this capacity relates to decisions made by Transco in its role as System Operator, DREVBEC is allocated to SO capacity revenues. This occurs via the entry capacity buy-back incentive scheme, where revenues from on-the-day capacity sales are netted off against buy-back costs.

² Ofgem has developed a large number of acronyms to categorise entry capacity revenue flows. Here is a simple key to the main elements of these acronyms:

BEC – Baseline entry capacity

IBEC – Incremental baseline entry capacity

IEC – Incremental entry capacity

OIEC – Obligated incremental entry capacity

IC – Interruptible capacity

REV – Revenue

DREV – Daily revenue (revenue from on-the-day capacity sales is differentiated from revenue from capacity sales before the day, which is normally indicated by REV)

COR – Capacity over-runs

5.3.2 *Obligated incremental capacity*

As a result of the auction process, Transco may decide to make available obligated incremental capacity³. As shown in Figure 5.3, revenue from obligated incremental capacity sales can be allocated to one of the following:

- DREVOIEC
- REVIBEC
- REVOIEC

As with baseline capacity, there is a similar division between obligated incremental capacity sales on the day, which are fed into DREVOIEC, and before-the-day sales, which are fed into either REVOIEC or REVIBEC. The division between REVOIEC and REVIBEC depends on the timing of the capacity sales. During the first five years of its existence, before-the-day revenue from a particular tranche of obligated incremental capacity will be allocated to REVOIEC, and therefore fed into Transco's entry capacity investment incentive within the SO, which is described in more detail in section 5.5 below. However, obligated incremental capacity can only be included in the capacity investment incentive scheme for a maximum of five years. After five years obligated incremental capacity becomes included in baseline capacity, and Transco is permitted to recover REVIBEC at the price control regulated rate of return until the beginning of the next price control⁴. REVIBEC is included in the TO allowed revenue. DREVOIEC is fed into SO capacity revenues via the buy-back incentive in the same manner as DREVBEC.

5.3.3 *Non-obligated incremental capacity*

Transco may also choose at any point to offer additional incremental capacity that has not been approved by Ofgem. This is referred to as non-obligated incremental capacity. All revenues from sales of non-obligated capacity are referred to as REVIEC and are fed into the buy-back incentive in the same manner as DREVBEC and DREVOIEC.

5.3.4 *Interruptible capacity*

Interruptible capacity is offered by Transco day-ahead and on-the-day. All revenue from interruptible capacity sales is included in REVIC, which is in turn included as a credit in Transco's buy-back incentive.

³ Details of the distinction between obligated and non-obligated incremental capacity, and the grounds on which Transco may make obligated incremental capacity available, are provided in chapter 2.

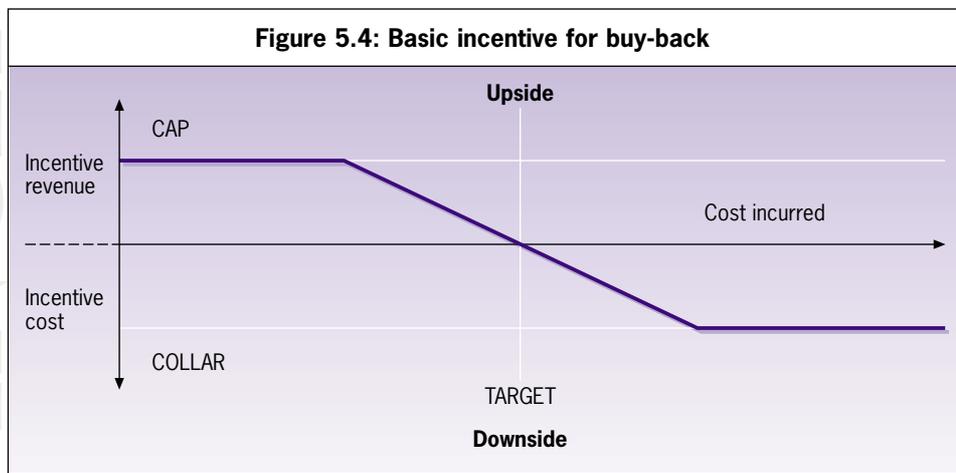
⁴ At this point Ofgem expects to include investment in permanent obligated incremental capacity in Transco's TO baseline capacity, and therefore its TO regulatory asset value, for the new price control.

5.3.5 Other capacity revenues

Revenue from over-run charges and any other entry capacity revenues are fed into the buy-back incentive as a credit.

5.4 The entry capacity buy-back incentive

In seeking to establish a capacity buy-back incentive, Ofgem was keen to give Transco an incentive which interacted with the relevant long-term investment incentive, and which also encouraged the prudent reduction of entry capacity below baseline levels. The baseline structure for the capacity buy-back incentive is based on a sliding scale as used already in the UK gas industry and elsewhere in utility regulation. This is shown in Figure 5.4.



Source: EPN, adapted from Ofgem

The key points to note are:

- There is a target level of costs.
- There are upside and downside sharing factors.
- There is a cap and a collar.

The basic principle behind such an arrangement is that Transco is exposed to a proportion of any additional cost if the buy-back costs are above the target level, through the use of the downside factor, up to a maximum cost limited by the collar. Similarly, if Transco is able to keep buy-back costs below the target cost, then it is allowed to keep a share of those savings (as allocated by the upside sharing factor) up to a maximum level set by the cap.

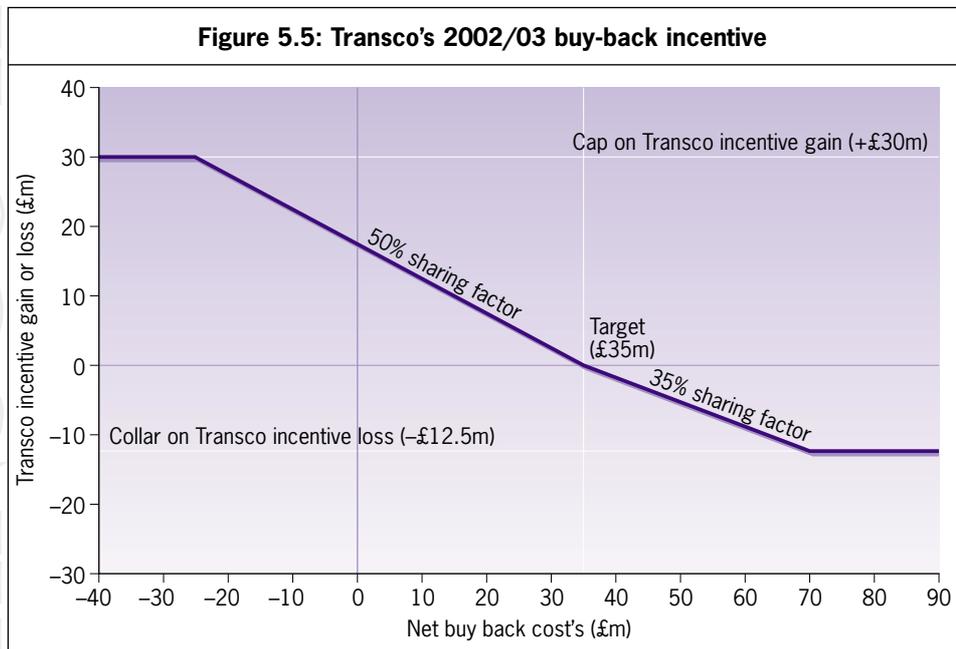
5.4.1 Details of the capacity buy-back incentive scheme

Following a number of discussions between Ofgem, Transco and the industry, the following capacity buy-back incentive levels were agreed as listed in table 5.1.

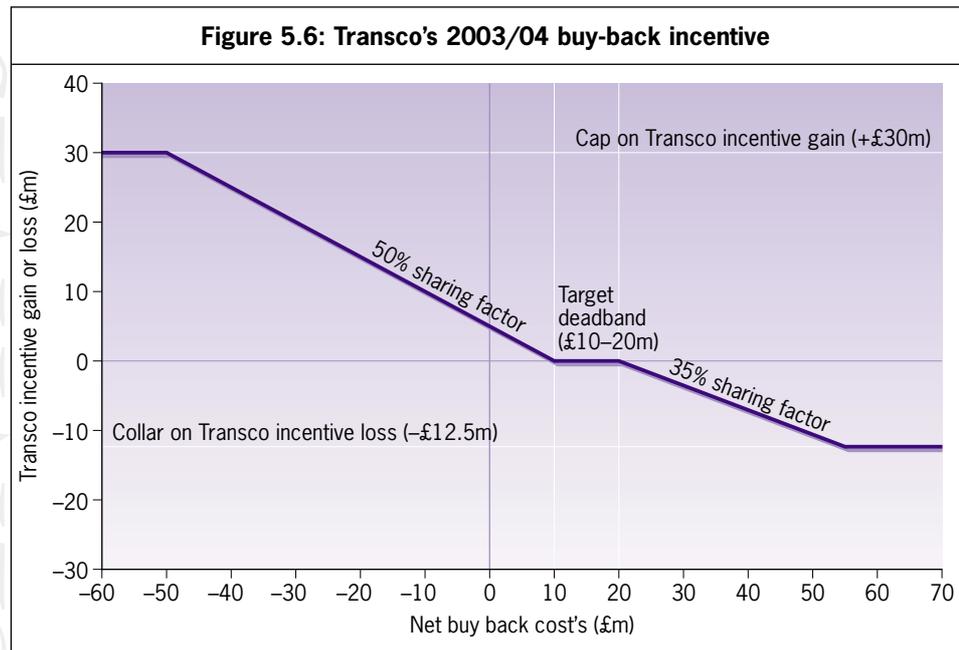
Target (£million)	Cap (£million)	Collar (£million)	Sharing factors	
			Upside	Downside
(2002/03) 35	30	-12.5	50%	35%
(2003/04) 10-20	30	-12.5	50%	35%

Source: Ofgem

During the consultation process, Transco was clearly concerned about committing to a two-year incentive programme, let alone a five-year programme. Ofgem accepted that there was a high level of uncertainty associated with such a new incentive scheme and therefore, following discussions, a buy-back target of £35million was agreed for 2002/03, with the target for 2003/04 set as a deadband of £10-£20million. The agreement on a deadband with a £10million range, rather than a specified target, reflects the greater uncertainty going forward. Figures 5.5 and 5.6 illustrate the buy-back incentive structures for 2002/03 and 2003/04.



Source: EPN



Source: EPN

How the buy-back incentive works

The key measure for the buy-back incentive is the buy-back performance measure. This is the net cost to Transco of all its buy-back activity after taking into account any daily capacity sales or overrun charges. This section illustrates Transco's buy-back performance measure in four theoretical examples, set against the 2002/03 target of £35million.

Buy-back Performance Measure	=	Buy-back costs	-	Relevant capacity sales
		<ul style="list-style-type: none"> ● Forward costs ● Spot costs ● Option costs 		<ul style="list-style-type: none"> ● Overruns ● Daily sales
Example 1:	39	=	40	- 1
Example 2:	100	=	101.5	- 1.5
Example 3:	25	=	25.2	- 0.2
Example 4:	25	=	0	- 25

Source: EPN

Example 1

In example 1, Transco has exceeded the cost target by £4million, but is still well within the collar set down by Ofgem. Therefore, using the scaling factor of 35%, -£1.4million is allocated to buy-back incentive revenues.

Example 2

In example 2, Transco’s buy-back costs have been a huge £101.5million. Having deducted capacity sales revenues of £1.5million, the performance measure is £100million, exceeding the cost target figure by £65million. Applying the downside scaling factor of 35%, Transco would have been exposed to an incentive loss of £22.75million, however, this exceeds the collar of £12.5million, and therefore Transco’s incentive revenue (or in fact cost) is limited to -£12.5million.

Example 3

In this example, Transco has successfully cut buy-back costs to £25.2million, and has also gained £0.2million from relevant capacity sales. The performance measure is therefore £25million, which is £10million less than the target revenue. The upside scaling factor of 50% is used in calculating the incentive revenue as £5.0million, well within Transco’s cap.

Example 4

In this example, Transco has succeeded in cutting buy-back costs to zero. In addition it has made £25million from capacity sales. The performance measure is calculated as -£25million, and therefore the difference between the performance revenue and the cost target is £60million. Using a scaling factor of 50%, the incentive revenue is £30million, which is identical to the cap. As can be seen from this somewhat improbable example, it is unlikely that Transco will exceed its incentive cap.

Table 5.3: Details of example buy-back performance measures (£million)

Example	Cost Target (CT)	Performance Measurement (PM)	Difference (D = CT-PM)	Scaling factors		Incentive Revenue	Comments
				D -ve 0.35	D +ve 0.5		
1	35	39	-4	-1.4	N/A	-1.4	Within collar
2	35	100	-65	-22.75	N/A	-12.5	Limited by collar
3	35	25	+10	N/A	+5	+5	Within cap
4	35	-25	+60	N/A	+30	+30	At cap

Source: EPN

5.5 The entry capacity investment incentive

Prior to looking at the specific area of the NTS entry capacity incentive scheme regime, it is helpful to examine the general principles associated with entry capacity provision. Under the SO incentives, Transco is obliged to offer a minimum of 90% of the NTS TO (winter) baseline entry capacity. This capacity is known as initial NTS SO baseline entry capacity. In order to fulfil its obligation, Transco needs to use reasonable endeavours to ensure that all capacity up to NTS SO baseline capacity is offered for sale on at least one occasion in a clearing allocation (Ofgem defines a clearing allocation as an auction that either results in all the capacity being sold, or

that has a reserve price of zero). Although SO baseline is the level of capacity that Transco is obliged to offer, Transco's 2002-07 Price Control has been set up in order to encourage Transco to invest in additional capacity above baseline, where it believes there will be demand for it. The main means of encouraging Transco to invest in incremental capacity is its SO entry capacity investment incentive. This section provides a description of the incentive in the context of the wider entry capacity revenue regime.

5.5.1 Reserve prices

At this point it is worth mentioning the role and importance of reserve prices. While Ofgem's objective is to expose Transco and the industry to a market-based pricing methodology, nevertheless there are times when the methodology breaks down. For example, if there is an entry point where there is insufficient competition, such as Barrow, a reserve price of zero would result in those players who required capacity benefiting, as it is likely that they would obtain capacity at or near to zero. Therefore, when Transco seeks to fulfil its obligation to offer capacity for sale at a price that will clear, it also has to take account of the somewhat broader objectives relating to charging for transportation through the Transco network which are included in the amended standard condition 4 of the GT licence.

5.5.2 Interaction with TO Price Control

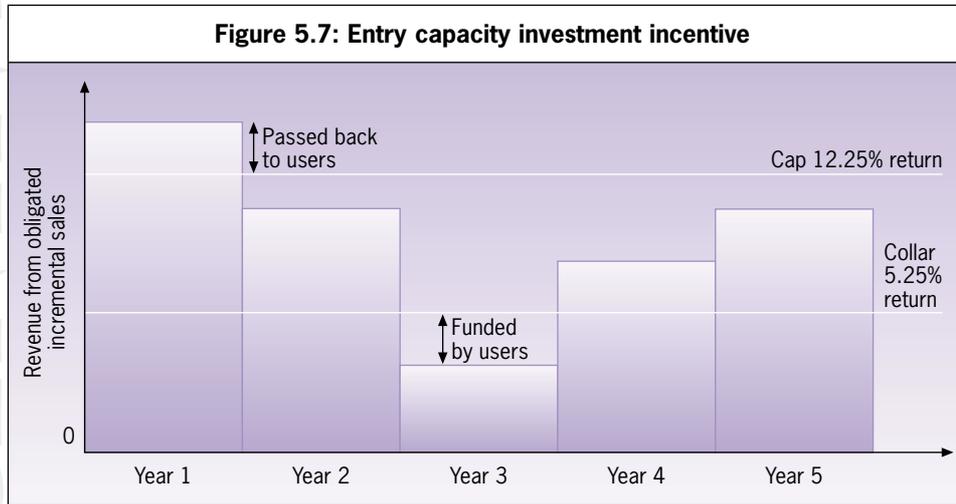
Under the terms of Transco's TO licence control, Transco benefits from funding to provide for the efficient level of operating and capital expenditure required to provide the agreed baseline levels of NTS entry and exit capacity (and linepack). These TO baseline capacity figures are equal to the maximum physical capacity at each entry point, 90% of which is defined as SO baseline and is the actual level that Transco is obliged to offer for sale. Under its TO price control, Transco could provide entry capacity at the agreed levels but would receive no additional income if it only delivered baseline capacity. The objective of the NTS SO investment incentive scheme is to encourage Transco to construct and/or offer for sale additional capacity over and above the baseline level.

5.5.3 General description of the SO investment incentive scheme

- The basic theory behind the SO entry capacity investment incentive scheme is to offer appropriate incentives on Transco to build additional capacity over and above the baseline level. Therefore, if Transco responds to increased demand for capacity by choosing to undertake incremental investment, in addition to those investment projects agreed within the TO price control, Transco will be able to earn additional revenue.

Cap and collar on Transco’s returns

One important aspect of the SO investment incentive is the limitation both on the returns that Transco can make and the losses that Transco might take for additional incremental investment.



Source: EPN adapted from Ofgem

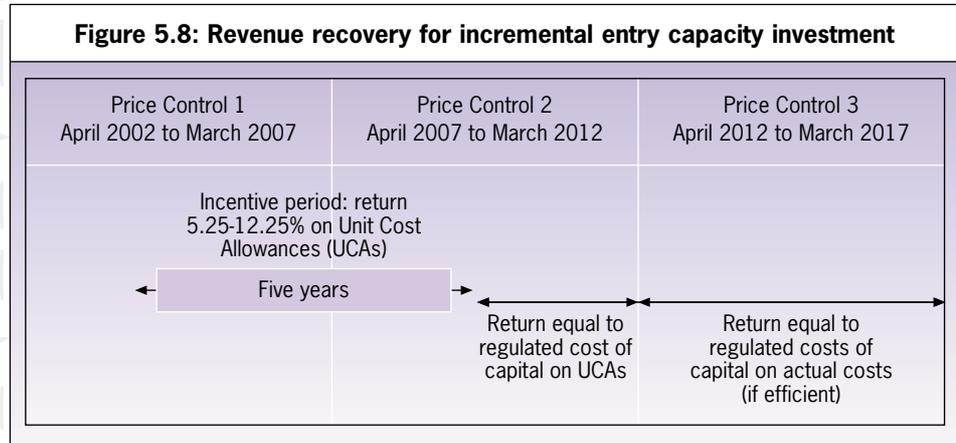
Figure 5.7 illustrates how the cap and collar regime works. Where an investment as shown in Year 1 returns more than the 12.25% return cap, then the revenue above 12.25% is returned to the industry as a whole, with the over-recovery smeared back to shippers. Similarly, where in Year 3 an investment returns less than the 5.25% return collar, then Transco’s return will not fall below 5.25%, with all users of the system picking up the bill. There has been an extended debate over a number of years about how over or under-recoveries from capacity sales should be re-allocated to shippers, but the current system is based on rebalancing via the SO Commodity Charge. This means that over-recoveries or shortfalls are passed onto shippers in relation to their proportion of total system throughput.

It is worth noting that the 5.25% collar is in fact 1% less than Transco’s cost of capital, which provides an additional incentive to make the right investment decisions. The collar on allowed revenues applies for a five-year rolling period, which means that at worst Transco’s maximum exposure at the 5.25% rate on any given investment is five years.

Timing of revenue recovery for entry capacity investment

During the consultation on the NTS SO investment incentives there was a concern that a basic increase in the rate of return during a price control period would provide insufficient incentives on Transco towards the end of the price control period, as Transco would only be allowed to retain the increased revenues for a limited period. It was therefore agreed that any incremental investment incentive would work on a rolling five-year basis. Such an arrangement allows Transco to earn the higher rate of return of 12.25% for a period of five years, even if this period straddles two price controls.

Figure 5.8 summarises the revenues which Transco could possibly earn on incremental investment that takes place during a TO price control period.



Source: EPN

5.6 Deferral of baseline capacity

Under the terms of the Network Code and its GT licence conditions, Transco has an obligation to make available for sale 90% of the TO baseline (or 72% of the TO baseline in LTSEC auctions). What Transco does not have, is an obligation to actually build that capacity. It is perfectly permissible for Transco to offer for sale capacity it does not have, recognising that it will have to buy that capacity back. Clearly Transco would only do this if the company thought there was a commercial imperative for doing so.

The price control methodology and incentive regimes introduced by Ofgem provide commercial incentives for Transco to either postpone or cancel certain required investment under the NTS TO price control. This might occur, for example, if the actual demand signalled by the market was lower than the baseline capacity at certain entry points. Therefore, while Transco is required to offer capacity for sale, it does have some freedom in how much investment it makes to fulfil that obligation. Clearly, any choices that Transco makes in relation to not investing in capacity mean an increased risk from high buy-back prices.

Under the NTS TO price control, Transco's incentive for deferring investment is equivalent to its allowed revenue (depreciation plus financing allowance). Therefore, if Transco does defer investment, no adjustment would be made to Transco's allowed revenues, although any buy-back cost would reduce this benefit. However, it is also worth noting that any potential cost of buying back capacity would be captured through the capacity buy-back incentive which provides a cap of some £30million. Therefore, in the event that the auctions are effectively undersold below baseline, Transco is more likely to take the least risk option and build capacity for which it has investment approval under the NTS TO price control, especially since a lack of demand for entry capacity in the long-term auctions does not necessarily equate to

a lack of customer demand on-the-day. This was illustrated by the results of the January 2003 long-term auctions, in which out of 19 entry points where capacity was on offer, capacity bids were received at only seven points. Transco would probably be foolish to infer from these auction results that there would be no demand for capacity at the 12 unsold entry points in the future.

Clearly the theory is that there will be an interaction between investment decisions taken by Transco and the risks/benefits it might face under the entry capacity buy-back regime. However, due to the uncertainty in both Ofgem's and Transco's minds over what the future target levels should be for buy-back, only a two-year package of entry capacity buy-back incentives was agreed. Since the lead time for putting physical infrastructure in the ground is often greater than two years, it seems unlikely that Transco will defer investment under its NTS TO obligations. However, it does seem likely that if this opening of the NTS TO and NTS SO price controls is to be effective, then Transco's future exposure under the buy-back incentive, and the relative size of the sharing factors, will need to increase in order to ensure that Transco's TO and SO incentives are correctly aligned. It is also worth noting that any future changes to the buy-back incentive regime will require a change in the GT licence. Therefore, when the time comes, it seems likely that any future incentive regime will be the result of an intense debate.

REVENUE FLOWS &
TRANSCO INCENTIVES

Appendix: Review of the January 2003 long-term capacity auctions

I.1 Overview of auction results

The first set of long-term capacity auctions were held between the 15th and 28th January 2003. In general terms the auctions were a success: the system worked, capacity was bought up to 15 years ahead at four major terminals, and bid volumes at the six major entry points were respectable, if rather low. However, bid volumes at 12 of the 13 other entry points, were zero, suggesting that shippers are not concerned about purchasing capacity in advance, other than at the major terminals. Table I.1 provides an overview of the auction results.

Entry point	% LBEC bid for Q4'04 ¹	Clearing price (p/kWh)	Final quarter for which capacity bid
Bacton	41.3%	0.0056	Q3 2017
Barrow	59.3%	0.0004	Q3 2017
Easington	18.8%	0.0011	Q1 2013
St Fergus	117.4%	0.0324 or 0.0198 ²	Q3 2017
Teesside	28.9%	0.0018	Q3 2017
Theddlethorpe	19.3%	0.0010	Q3 2010
Glenmavis	0	0.0165	N/A
Partington	0	0.0003	N/A
Avonmouth	0	0.0020	N/A
Isle of Grain	0	0.0058	N/A
Dynevor Arms	0	0.0000	N/A
Hornsea	0	0.0047	N/A
Hatfield Moor (storage)	0	0.0013	N/A
Hatfield Moor (onshore)	0	0.0013	N/A
Aldborough	0	0.0018	N/A
Cheshire	0	0.0001	N/A
Hole House Farm	100%	0.0001	Q3 2017
Wytch Farm	0	0.0000	N/A
Burton Point	0	0.0001	N/A

Source: EPN, based on data from Transco plc

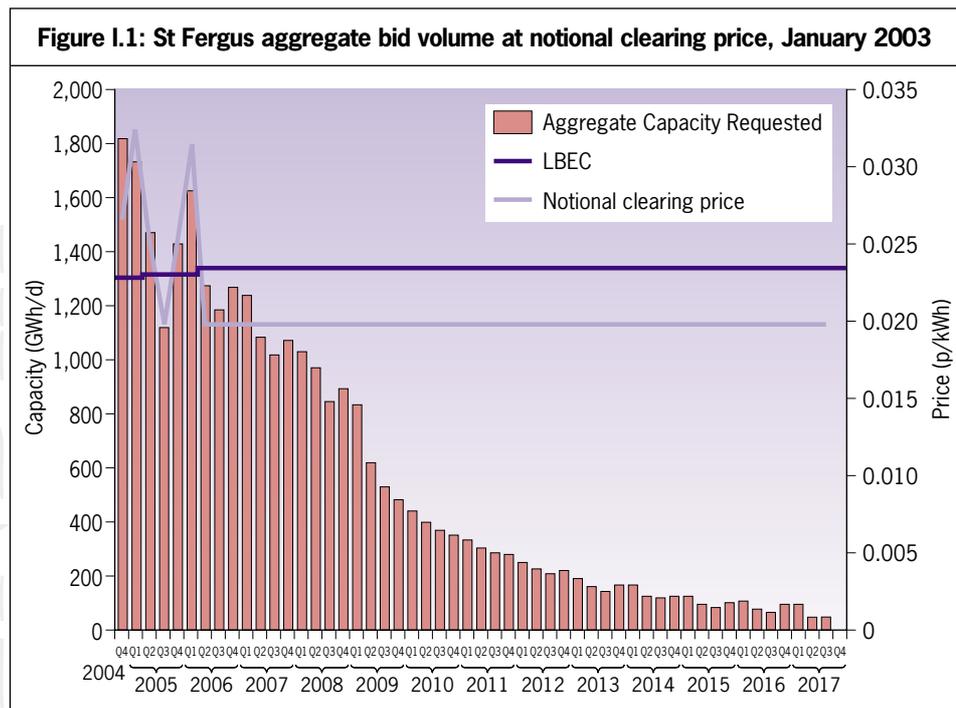
¹ At the prevailing price step (P20 at St Fergus, P0 elsewhere).

² Although this will depend on any decision by Transco to allocate incremental capacity, the expected clearing price at St Fergus is 0.0324p/kWh for Q4'04 to Q2'05, Q4'05 and Q1'06, with a clearing price of 0.0198p/kWh for all other periods.

1.2 Analysis of results by major entry point

1.2.1 St Fergus

As expected there was much higher demand for entry capacity at St Fergus than at any other terminal. As can be seen in figure I.1, aggregate bid volume at the notional clearing price is above long-term baseline for Q4'04 to Q2'05 and again in Q4'05 and Q1'06, with capacity demand remaining fairly high until Q1'09, after which there is a steep decline. However, there remains some demand for capacity right up to the last period on offer, Q3'17, when aggregate bid volume is 47GWh/d. With demand above baseline for certain quarters there is a possibility that Transco may choose to release incremental capacity. However, any capacity that Transco chose to release would be non-obligated incremental capacity, as the maximum period of continuous demand for incremental capacity is three quarters, which is too short to meet the IECR criteria for obligated incremental capacity release³. Transco is unlikely to release non-obligated incremental capacity so far in advance due to the increased risk of having to buy-back capacity on-the-day⁴.



Source: EPN, based on data from Transco plc

³ See chapter 2 for an explanation of Transco's methodology for releasing incremental capacity.

⁴ If Transco does choose at any point to release non-obligated incremental capacity, it is most likely to be in the short-term as DSEC, or possibly MSEC, as Transco should have a better assessment of the risk of buy-back close to real-time.

Assuming that Transco does not release any incremental capacity at this time, the total capacity allocated and price for the first two years of long-term capacity will be as listed in tables I.2 and I.3. Shippers' individual capacity allocations will be the volume they bid at P20 on the 28th January 2003, multiplied by the relevant pro-ration factor as listed in the tables. For each quarter beyond Q3'06, the aggregate bid volume at P0 is below LBEC, and therefore the relevant P0 bid volume for each quarter will be allocated to shippers at the reserve price of 0.0198p/kWh.

	Q4'04	Q1'05	Q2'05	Q3'05
P20 bid volume (kWh/d)	1,513,479,256	1,730,649,173	1,461,133,739	1,011,117,761
P0 bid volume (kWh/d)	1,544,734,091	1,751,257,473	1,477,333,739	1,119,876,237
Capacity allocated (kWh/d)	1,302,400,000	1,302,400,000	1,318,400,000	1,119,876,237
Pro-ration factor	0.861	0.753	0.902	1
Price (p/kWh)	0.0324	0.0324	0.0324	0.0198

Source: EPN, based on data from Transco plc

	Q4'05	Q1'06	Q2'06	Q3'06
P20 bid volume (kWh/d)	1,406,682,481	1,621,268,403	1,208,021,741	1,053,444,015
P0 bid volume (kWh/d)	1,447,980,481	1,647,052,545	1,276,750,484	1,186,782,066
Capacity allocated (kWh/d)	1,318,400,000	1,318,400,000	1,276,750,484	1,186,782,066
Pro-ration factor	0.937	0.813	1	1
Price (p/kWh)	0.0324	0.0324	0.0198	0.0198

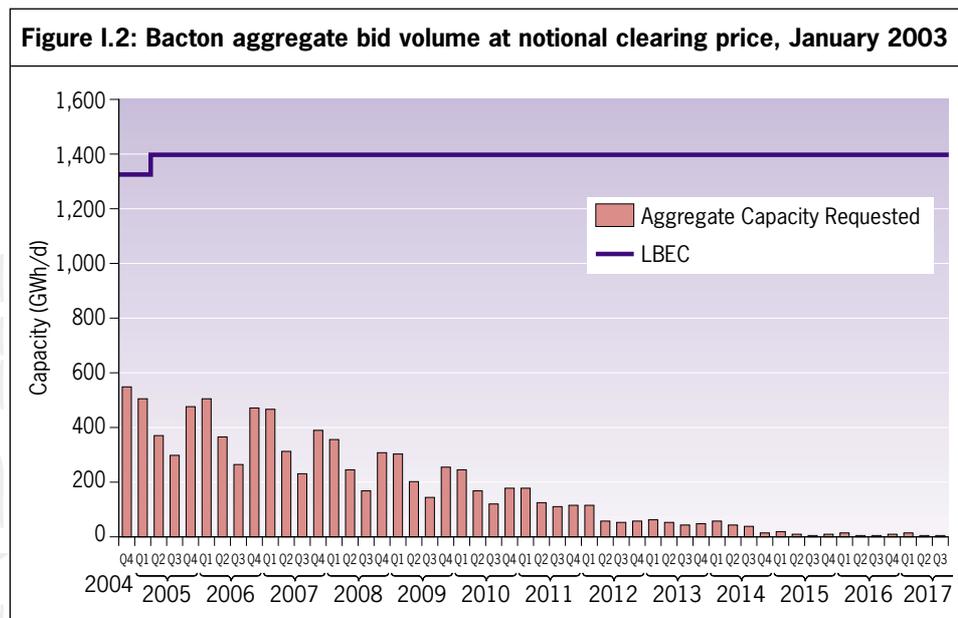
Source: EPN, based on data from Transco plc

Further analysis of bidding behaviour at St Fergus is provided in section 1.3 below.

1.2.2 Bacton

Bacton is the UK terminal with the highest baseline capacity, and is the landfall for the UK-Belgium Interconnector, as well as a large number of Southern North Sea fields. Bacton had the second highest level of capacity bidding after St Fergus. However, the level of capacity actually bid at Bacton was much lower than at St

Fergus, and also than long-term baseline, with the highest bid volume of 547GWh/d, in Q4'04, 41% of Bacton LBEC and 36% of St Fergus bid volume in the same quarter. Therefore, the Bacton auction cleared at the reserve price of 0.0056p/kWh. Bacton bids show a strong seasonal variation, suggesting a continuation of its current pattern of gas flows, which are typically much higher in the winter than in the summer. Bids at Bacton continue, albeit at a low level, until the last period on offer in 2017. The comparatively low level of capacity bid at Bacton reflect continued uncertainty regarding a number of new gas flows that may come into Bacton from 2005 onwards, such as increased Interconnector imports, the proposed Bacton-Balgzand Line linking the UK to the Netherlands, and possibly the landfall for Norwegian imports from Ormen Lange. Any of these projects, if implemented, could lead to significant capacity requirements at Bacton in the future. With decisions on the size of the Interconnector compression upgrade and the landfall for Ormen Lange gas expected before the next set of long-term capacity auctions, there could be much larger volumes of capacity purchased at Bacton in August 2003.

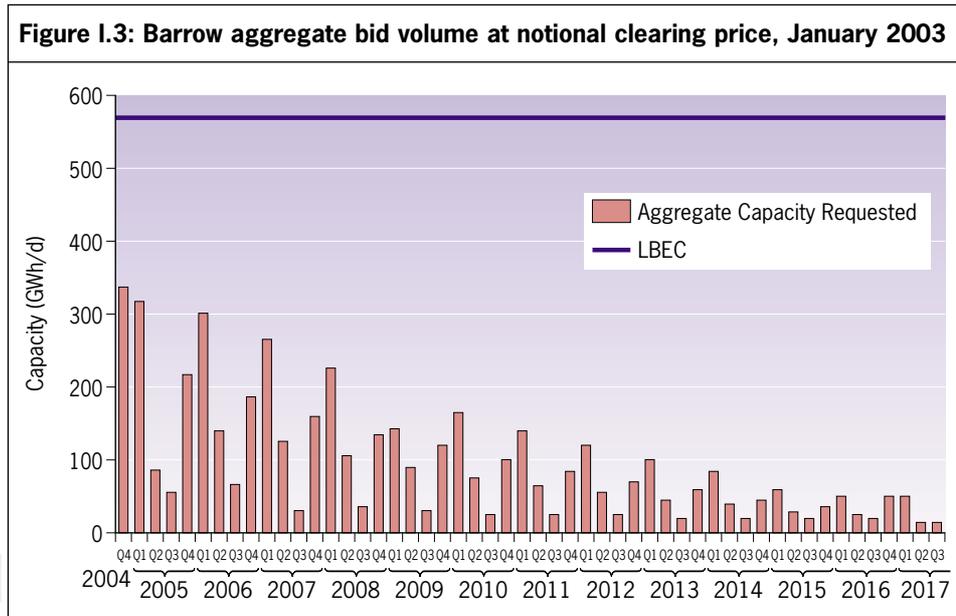


Source: EPN, based on data from Transco plc

1.2.3 Barrow

The Barrow-in-Furness terminal receives gas from the Morecambe Bay fields, which are operated by Hydrocarbon Resources Ltd., a subsidiary of Centrica. Centrica has traditionally used these fields to provide swing gas for its customer portfolio, which is heavily focused on domestic customers and therefore highly temperature-sensitive, as well as to exploit seasonal price variations. This pattern seems likely to continue with the sharpest seasonality in the bid volumes of any terminal seen at Barrow, with capacity bid for the highest quarter (normally Q1) typically 5 to 8 times

capacity bid for Q3. The bid volumes at Barrow are below baseline, with the highest bid volume, for Q4'04, at 338GWh/d, 59% of LBEC. Therefore capacity at Barrow will be allocated at the reserve price of 0.0004p/kWh. The bid volumes decrease steadily over the years on offer, probably reflecting Centrica's expectation of a gradual decline in production from the Morecambe fields. The lack of competition at Barrow was demonstrated in the auctions by the fact that the bid volumes at Barrow remained constant throughout the 10-day auction process.



Source: EPN, based on data from Transco plc

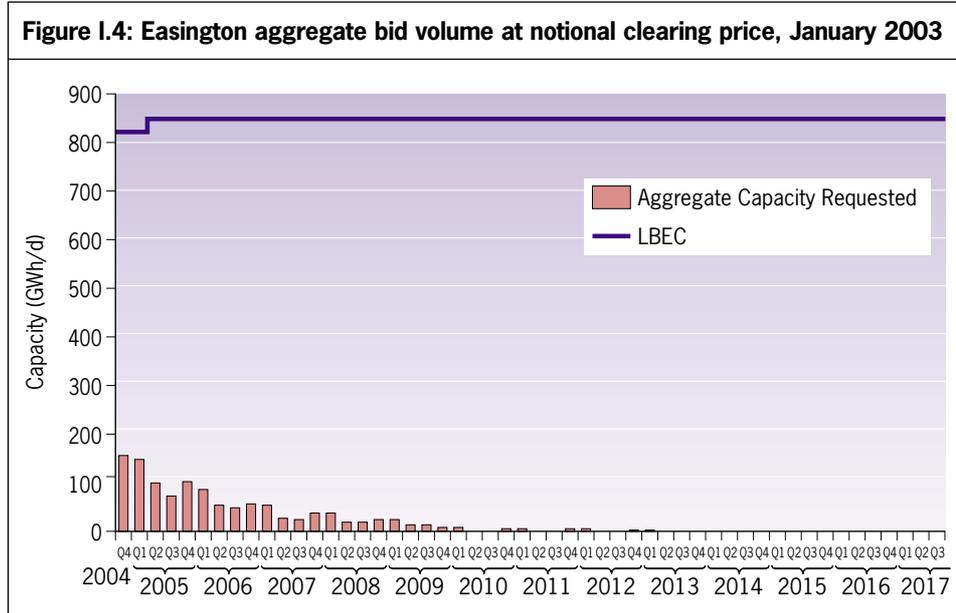
APPENDIX

1.2.4 Easington

Easington is the landfall for number of Southern North Sea fields, and for the large Rough depleted field storage facility. The aggregate bid volume at Easington was low – the highest quarter, Q4'04, being just 19% of LBEC – and capacity will be allocated at the reserve price of 0.0011p/kWh. The results at Easington show significant seasonal variation, with summer bid volumes typically being around 50% of winter bid volumes, although a greater seasonal variation might have been expected due to it being the landfall for Rough storage gas. This may reflect shippers' reluctance to purchase capacity in storage facilities in advance, as reflected in the fact that no long-term capacity has been purchased at any other storage entry point, with the exception of Hole House Farm. Unlike gas fields, where particular shippers or producers may have long-term commitments to deliver or accept gas at a particular entry point, storage facilities are in some ways interchangeable from a shipper's perspective⁵. Demand for summer capacity at Easington disappears in 2010,

⁵ Of course, different storage facilities have different physical, operational and contractual frameworks, and are not strictly interchangeable.

reflecting the expected depletion of the gas fields supplying Easington, with limited winter flows continuing until 2013, which is probably storage gas.

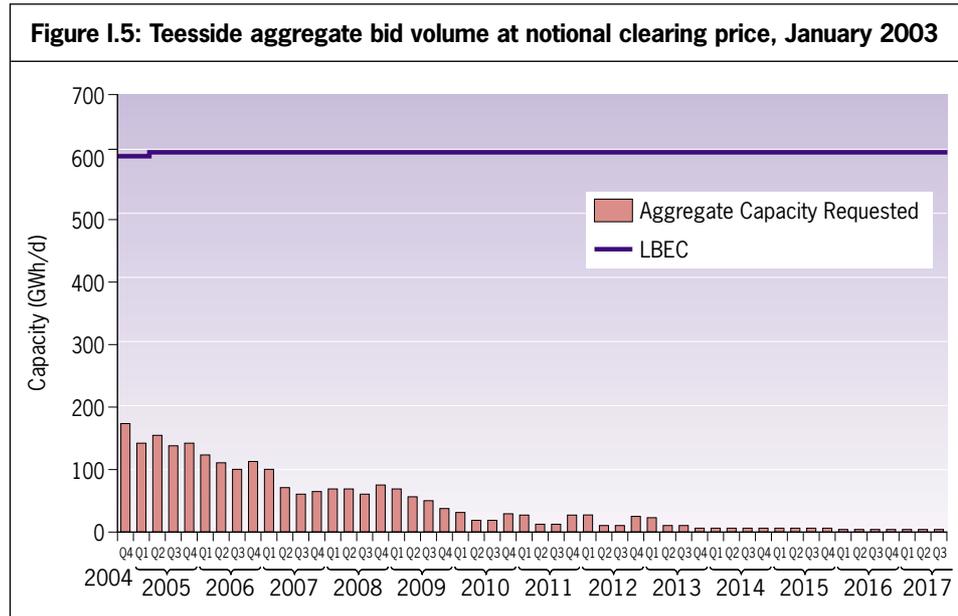


Source: EPN, based on data from Transco plc

1.2.5 Teesside

Teesside is the landfall for the CATS pipeline, delivering gas from the Central area of the North Sea, particularly the Everest, Fleming and Judy fields. As these are gas condensate fields there is less seasonal variability than in the gas fields of the Southern North Sea or Morecambe Bay. This is reflected in the comparatively flat profile of bid volumes throughout the year. Bid volumes are well below baseline, the highest being 28% of LBEC, and capacity will be allocated at the reserve price of 0.0018p/kWh. The demand curve at Teesside continues, albeit at a very low level, to the last period on offer in 2017. There is currently some speculation that Teesside could be chosen as the landfall for Ormen Lange gas, ahead of Bacton. If this is the case, there could be significantly higher demand for capacity in the August 2003 auctions.

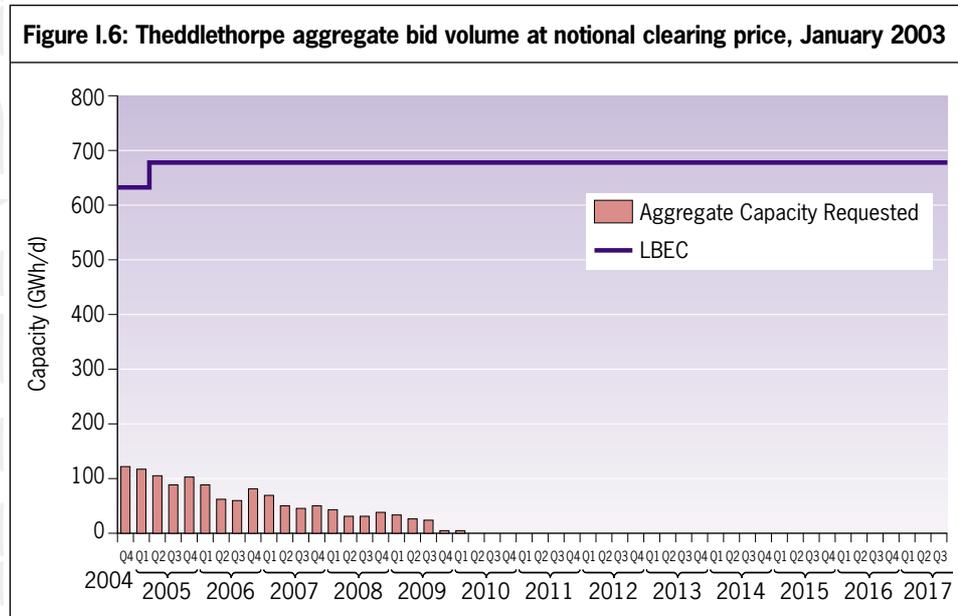
APPENDIX



Source: EPN, based on data from Transco plc

1.2.6 Theddlethorpe

Theddlethorpe receives gas from a number of Southern North Sea fields, many of which are nearing depletion. This is reflected in the auction results, where bid volumes for Theddlethorpe start low, at 19% of LBEC, and drop off entirely from Q4'10 onwards. As aggregate bid volume is below baseline, capacity will be allocated at the reserve price of 0.0010p/kWh.



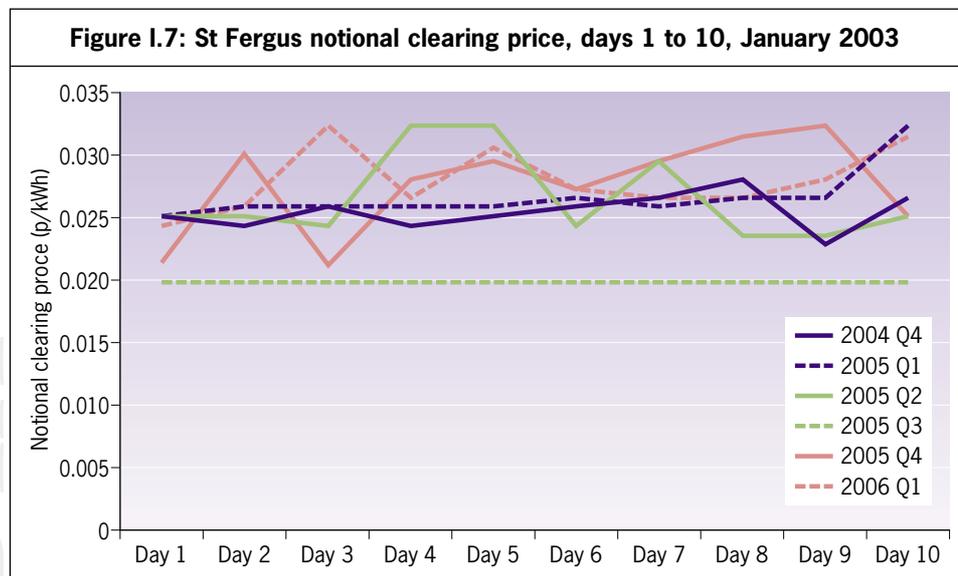
Source: EPN, based on data from Transco plc

APPENDIX

1.3 Bidding behaviour

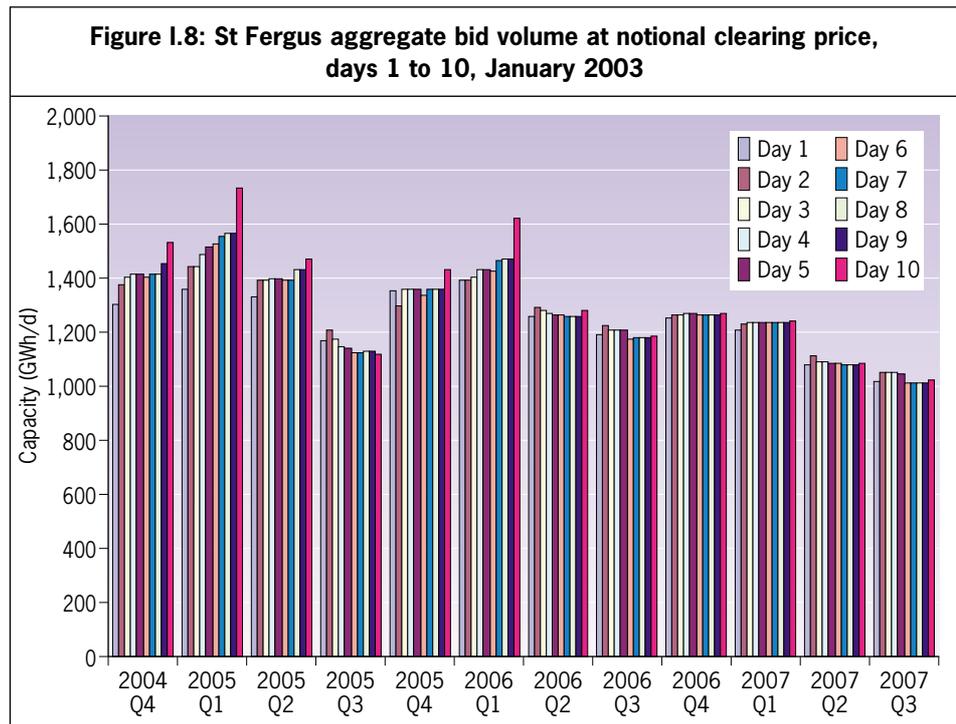
As noted above, bid volumes at most entry points are either significantly below baseline or in fact zero. At these terminals there was only limited changes in bidding behaviour over the ten days of the January 2003 auctions. It was fairly clear from the first day of the auctions that capacity at these terminals was unlikely to be constrained, and that capacity would be allocated at the reserve price. There was, therefore, comparatively little adjustment to bid volumes day-by-day as shippers for the most part stuck with their original valuations and requirements.

At Fergus, however, there was a rather different picture, at least for the first two years of capacity on offer. As can be seen from figures I.7 and I.8, there was considerable volatility from day to day, both in terms of notional clearing price, and aggregate bid volumes at the notional clearing price.



Source: EPN, based on data from Transco plc

APPENDIX

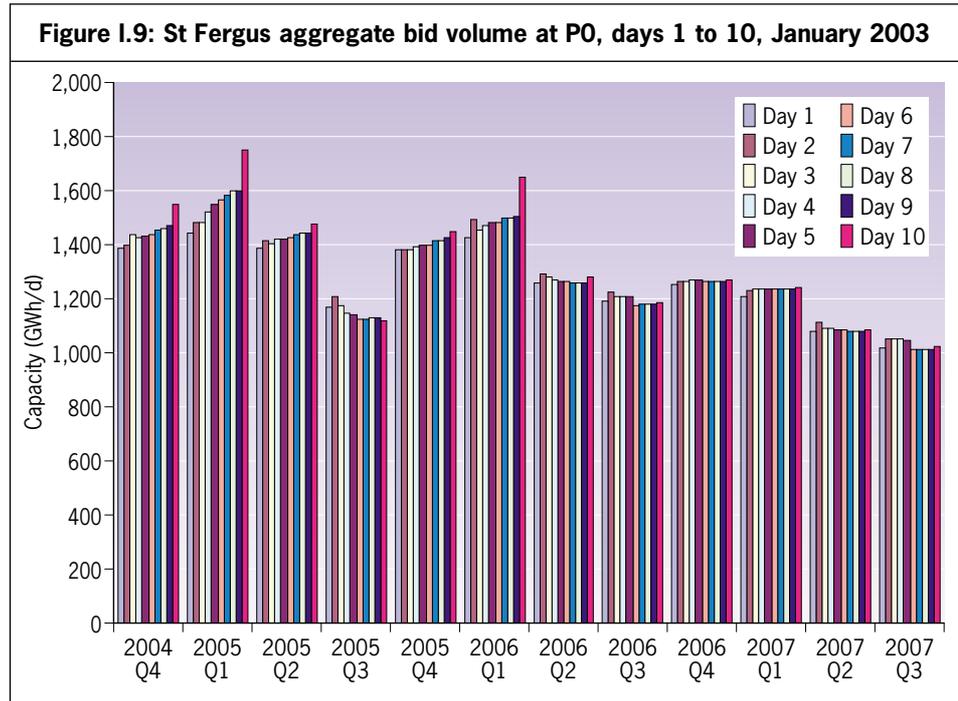


Source: EPN, based on data from Transco plc

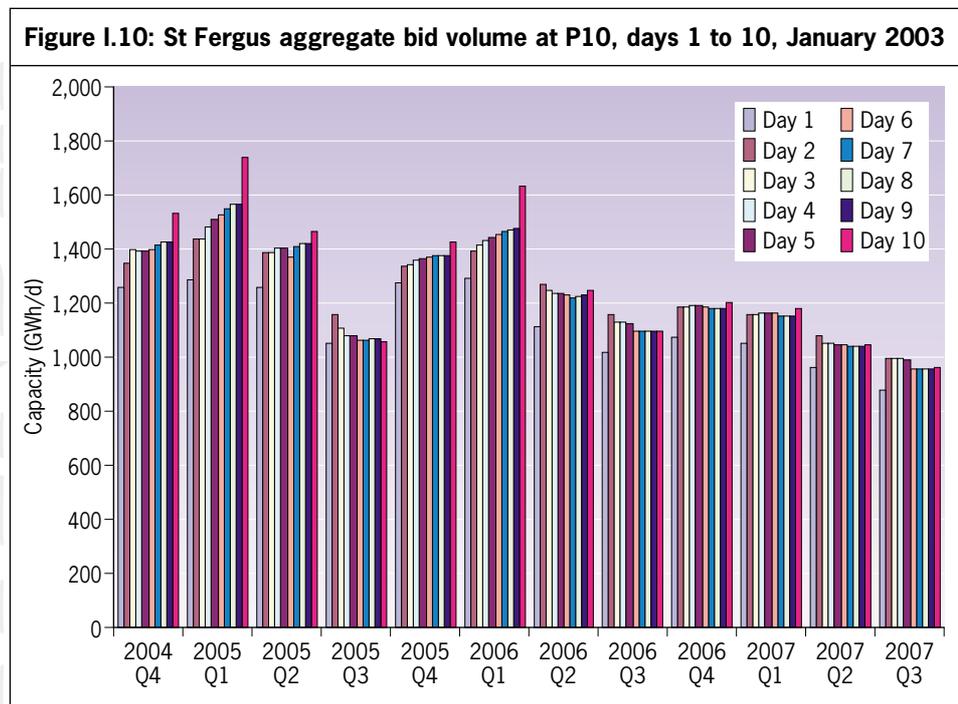
A few points are immediately clear from these figures. Bid volumes at all almost all periods rose from day 1 to day 2, possibly because shippers were more confident with the system on the second day. Thereafter there was a sharp divide in bidding behaviour between those quarters where bid volume on the first day was below capacity on offer (Q3'05 and Q2'06 onwards), and those where bid volume was above capacity on offer (Q4'04 to Q2'05, Q4'05 and Q1'06). Where demand was below supply, bid volumes mostly decreased slightly, as shippers realised that there was spare capacity, and little risk of bids being pro-rated. For periods where demand exceeded supply, bid volumes gradually increased from day-to-day as it became increasingly apparent that bid volumes were likely to be pro-rated. There was a final surge on day 10, as shippers increased bid volumes, presumably again with an eye to pro-ration.

The volatility of the notional clearing price and the bid volume from day-to-day is somewhat deceptive, as it was driven by to a certain extent by the methodology for setting notional clearing prices⁶. In effect notional clearing prices may decrease from day-to-day, despite bid volumes increasing overall, as the notional clearing price is set as the price necessary to clear the notional supply level. A change in bid volumes to either side of a relevant notional supply level may therefore have an effect on the day-to-day notional clearing price. However, this may be a diversion as, in the absence of incremental capacity release, final clearing prices will be based on clearing LBEC, rather than a higher notional supply level. Figure I.9 to I.11 provide a clearer view of St Fergus bidding behaviour by comparing day-to-day bid volumes at fixed price steps, rather than at the notional clearing price.

⁶ See section 3.2.5 for details of notional clearing price setting.

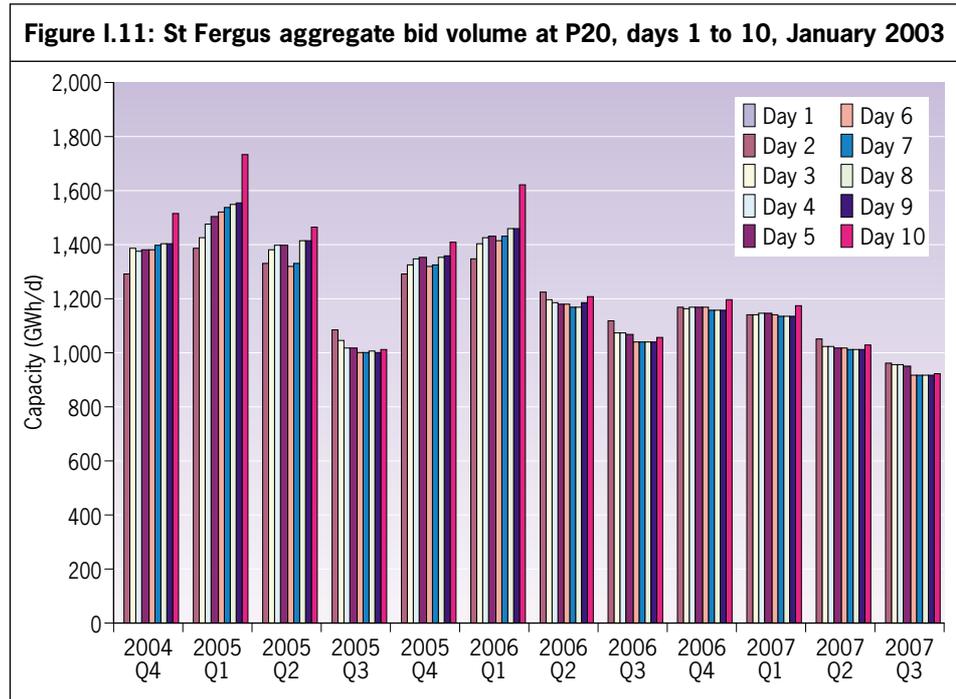


Source: EPN, based on data from Transco plc



Source: EPN, based on data from Transco plc

APPENDIX

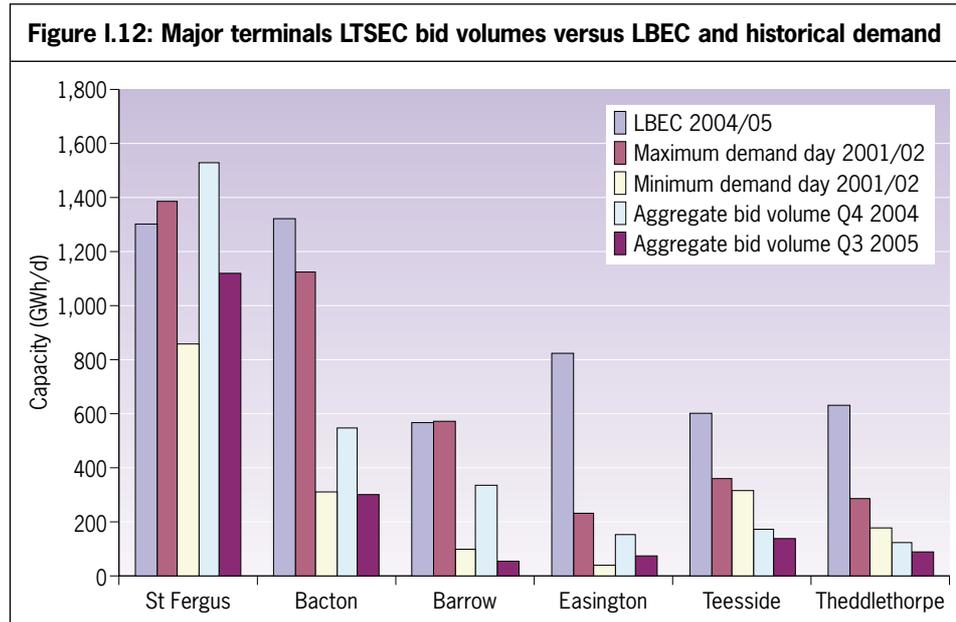


I.4 Key trends emerging

I.4.1 Low bid volumes, apart at from St Fergus

As noted in section 1.2 above, the aggregate bid volume at all major entry points, apart from St Fergus, is significantly below baseline. This is not surprising as baseline capacity is based on the maximum physical capability of each terminal, rather than typical or historical flows. St Fergus is the only terminal that frequently flows at levels approaching its maximum physical capability (TO baseline) or even SO baseline levels. Figure I.12 provides a context for comparison of long-term auction results with baseline levels and historical data, based on actual gas flows on the maximum and minimum gas demand days in 2001/02 (the 3rd January and the 17th August 2002 respectively). Aggregate bid volumes for Q4'04 and Q3'05 are provided for comparison⁷. As can be seen from figure I.12, aggregate bid volumes for Q4'04 are significantly below gas flows on a high gas demand day for all terminals apart from St Fergus. This is not particularly surprising, however, it is noticeable that Q4'04 bid volumes for Teesside and Theddlethorpe are in fact significantly below gas flows on a minimum gas demand day. From this data it may be inferred that either a proportion of shippers have chosen not buy capacity in advance, or those that have, have only purchased a limited proportion of their capacity requirements in advance. In all likelihood both premises are true.

⁷ Q4'04 is the period with the highest aggregate bid volume at most terminals. Q3'05 is the period with the lowest bid volume at all terminals in the first year in which long-term capacity was offered.

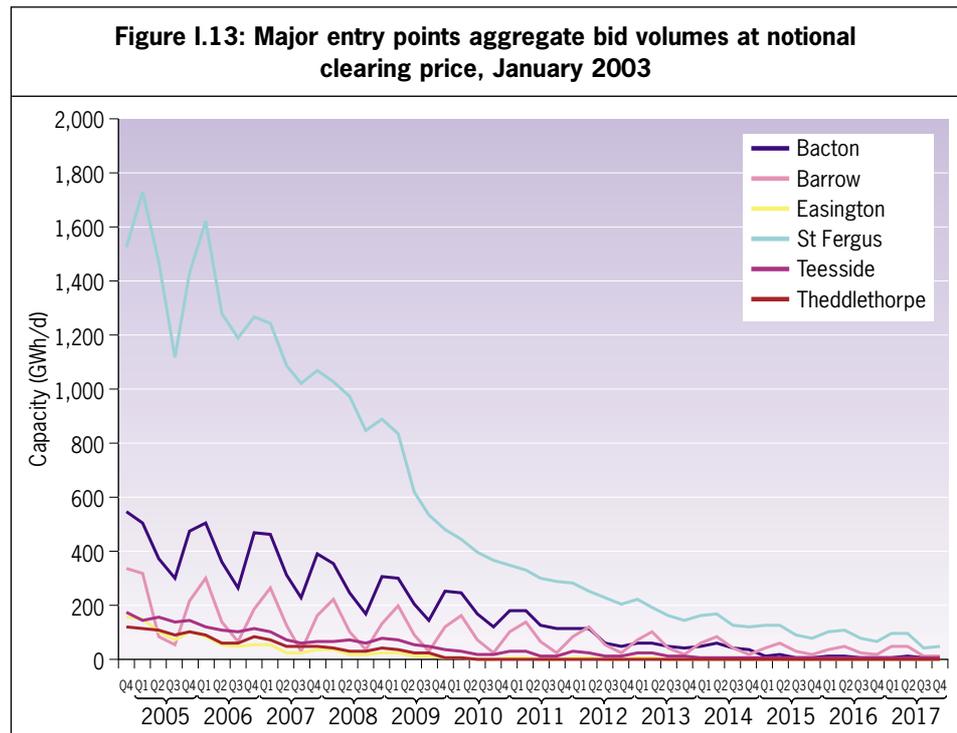


Source: EPN, based on data from Transco plc

1.4.2 There is little interest in purchasing entry capacity for storage facilities or minor entry points long-term

With the exception of Hole House Farm, where the entire capacity of the facility (20.8GWh/d) was purchased as a strip for years 3 to 15, presumably by the site's new owner, there were no bids at any of the storage facilities, onshore fields or minor terminals. In the case of onshore fields, minor terminals and proprietary storage facilities (such as Scottish Power's Hatfield Moors site) this is probably because shippers committed to using these entry points believe that there is little competition and they will be able to secure all their required capacity close to real-time⁸. In the case of most storage facilities, shippers appear to be reluctant to purchase long-term capacity, as it ties them into to a particular storage position in advance, which is probably undesirable in the developing storage market. Uncertainty over the changing ownership of Rough, Hornsea, and the LNG facilities may also have caused concern to shippers. In addition to these points, the relatively low level of reserve prices at these locations may perversely act as a disincentive to purchase capacity in advance, as even if capacity at these point is in high demand in several years' time, the price of capacity there is still likely to be comparatively low. This may be contrasted with the situation at St Fergus where shippers have been keen to purchase capacity, to avoid exposure to potentially very high prices at some point in the future. It should be noted that with MSEC auctions relying on a pay-as-bid, rather than clearing price and pro-ration, principle, there is no upper limit to potential prices for monthly capacity.

⁸ There may be strategic advantage in delaying capacity purchases for as long as possible, both in terms of fitting purchases to meet demand, and because reserve prices will be reduced to zero for on-the-day capacity sales.



Source: EPN, based on data from Transco plc

I.5 Future prospects

I.5.1 Supply prospects

Figure I.13 illustrates the varying demand at the six major entry points. Although the results may be skewed by a number of factors (see section below on long-term investment signals), they provide some indications of expected future flows at the major terminals. Of particular note is the disappearance of Theddlethorpe and Easington flows from 2010 (2013 for Easington winter flows), as contrasted to the expectation that flows will continue at the other terminals, albeit at low rates, up to 2017.

I.5.2 Long-term investment signals

Part of the rationale for the long-term capacity regime was that it would improve the long-term investment signals provided to Transco to support its investment decision-making process. The long-term auction process has clearly provided some signals to Transco, as mentioned in the section above regarding supply prospects at different terminals for example. However, doubt remains regarding the accuracy and value of the signals. The withholding of 20% of baseline capacity for the short-term auctions may have distorted the signals provided by placing an artificial constraint on the market. The highest aggregate bid volumes at St Fergus, for example, although significantly above LBEC for five quarters, are only above SO baseline for

one quarter (Q1'05). Should Transco interpret this result as implying that demand will actually be below SO baseline for every other period? In addition, analysis of the day-by-day bidding highlights the scaling up of bid volumes towards the end of the auction in preparation for a pro-rata allocation of capacity. In general terms, taking into account the low bid volumes at other terminals when compared to historical flows (see figure I.12), it seems likely that actual demand for capacity closer to real-time, at St Fergus as well as elsewhere, may be much higher. Clearly, several years' experience of operations under the new regime, including actual use of capacity in 2004/05, the first year for which long-term capacity is available, will be necessary before the value of the signals provided can truly be assessed.

1.5.3 Future auctions

On the current schedule the next set of long-term capacity auctions will be held in August or possibly July 2003. The January 2003 auctions have demonstrated that the auction system works, and that some shippers are prepared to purchase reasonable volumes of capacity many years in advance. A number of new factors are likely to come into play for the August 2003 auctions, including the decisions regarding landfalls for Ormen Lange gas and Dutch gas purchased at the NBP by Centrica, as well as the size of the Interconnector reverse flow upgrade. In particular the location of the Ormen Lange landfall, which could eventually receive deliveries of 20bcm/year of Norwegian gas, may have a major impact on future capacity demand. The Ormen Lange partners have recently indicated that any UK North Sea terminal other than St Fergus could be considered, although Bacton and Teesside seem to be the main contenders. Another new factor will be the reduced amount of capacity available at St Fergus for future auctions. At the other terminals there are large volumes of unsold capacity, however, any players that did not satisfy their desire for long-term capacity at St Fergus (possibly all players, as a result of the pro-rata effect) may be keen to purchase any nearside capacity available in August 2003, of which there will be a fairly short supply⁹.

The January 2003 auctions have provided an solid start to the new regime. It will be several years before its true effectiveness can be determined.

⁹ Unless Transco makes incremental capacity available, there will be no St Fergus capacity on offer in August 2003 as MSEC for October 2004 to June 2005, or as QSEC for Q4'05 and Q1'06. In August 2004, however, there will be 20% of SO baseline available as MSEC for October 2004 to September 2005.

Glossary

The following glossary terms are an accumulation of terms used by Ofgem in the licence, by Transco in the Network Code, and by EPN in previous publications.

Allocation	Any process by which entry capacity or NTS exit capacity may be allocated by or on behalf of Transco in accordance with the Network Code.
Booked capacity	Any capacity that a shipper buys from a pipeline company.
British thermal unit	The heat required to raise the temperature of 1lb of water by 10°F at or near 39.2°F.
Calorific value	The energy in megajoules produced by the combustion of 1 cu metre of gas.
Capacity	The amount of gas that can be held within the physical structures (pipeline and storage facilities).
Capacity (entry)	The amount of gas that a shipper is entitled to put into the system at a particular input point (terminal) on a day.
Capacity trading	The process by which shippers with spare capacity sell it to other shippers which require more capacity through a process of offers and bids.
Commodity charge	A charge in respect of the use of the system determined by the quantity of gas flow at a certain point.
Constraint management services	Services in relation to the management of capacity rights by Transco in order to maintain system pressures within safe limits
Daily balancing	Shipper inputs and outputs are balanced at the end of each gas flow day, and the appropriate imbalance charges are calculated.
Daily Interruptible System Entry Capacity (DSEC)	Interruptible capacity offered by Transco before the day.
Daily System Entry Capacity (DSEC)	Firm capacity offered by Transco before or on the day.
Entry point	The point at which gas enters the gas transportation system. This could be a sub-terminal, storage facility or onshore field.

Firm entry capacity	Entry capacity right that gives the holder a firm right either to flow gas or to receive compensation from Transco.
Gigawatt hour (GWh)	One million kilowatt hours.
Incremental annual obligated entry capacity (IAOEC)	Any obligated entry capacity in respect of a given terminal which Transco is required to offer for sale for a period of less than five years. This is additional capacity above baseline that Ofgem approves Transco's releases of to the market.
Incremental entry capacity	Capacity that Transco releases to the market above SO baseline. This may be obligated incremental entry capacity or non-obligated incremental entry capacity.
Incremental entry capacity services	The undertaking of engagements relating to the provision of entry capacity other than NTS SO Baseline entry capacity.
Incremental obligated entry capacity	Firm entry capacity in excess of NTS SO Baseline entry capacity which Transco is required to offer for sale, having been approved by Ofgem via the IECR process.
Incremental permanent obligated entry capacity (IPOEC)	Any obligated incremental entry capacity in respect of a given terminal which Transco is required to offer for sale for a period of five years or more.
Interruptible entry capacity	Entry capacity that gives the holder an interruptible right to flow gas into the system. Transco may curtail interruptible capacity without cost.
Kilowatt hour (kWh)	3,600,000 Joules.
LDZ network	The aggregate of the Local Distribution Zones.
Long-term baseline entry capacity (LBEC)	The amount of capacity that Transco is obliged to offer for sale in the long-term auctions, currently set at 80% of SO baseline.
Long-term System Entry Capacity (LTSEC)	Capacity that is offered by Transco in annual auctions for years 3 to 15. Sold as QSEC.
Monthly System Entry Capacity (MSEC)	Capacity offered by Transco for years 1 and 2, in monthly bundles.
National balancing point	An imaginary point on the UK gas supply system through which all gas passes in accounting and balancing terms.

National transmission system (NTS)	The high pressure network of pipes that transports the gas between the terminals, storage facilities and specific regional sites for local distribution in the UK.
Network Code	A set of business rules within a legal framework which defines the rights and obligations of Transco and shippers, and forms the basis for all contracts between them.
Non-obligated incremental entry capacity	Firm entry capacity other than obligated entry capacity. This is additional capacity that Transco may choose to release to the market, without requiring Ofgem approval through the IECR process.
NTS system operator (SO) revenue	Revenue derived by Transco from the carrying on of the NTS SO activity.
NTS transportation asset owner (TO) activity	The activities of Transco connected with the development, administration and maintenance of the NTS and with the supply of NTS services.
Obligated entry capacity	Obligated incremental entry capacity and NTS SO Baseline entry capacity.
Ofgem	Office of Gas and Electricity Markets (the UK regulator for both gas and electricity, previously separate as Ofgas and Offer.
On-the-day commodity market	A screen-based trading system operated by EnMO to allow gas trading within day.
Producer	Company which explores for gas, drills the wells, and flows the gas from the sea bed. It sends the gas along undersea pipelines and hands it over to terminal operators.
Quarterly System Entry Capacity (QSEC)	Entry capacity in quarterly bundles offered by Transco in the long-term auctions.
Rolling Monthly System Entry Capacity (RMSEC)	Unsold MSEC offered by Transco just before the start of the relevant month
Seasonal normal demand (SND)	Forecast demand based on seasonal normal temperatures.
Seasonal normal temperature	The average temperature that might be expected on any particular day, based on historical data.
Shipper	A company that contracts with the pipeline company for the use of transportation and storage facilities.

GLOSSARY

Short-term baseline entry capacity (SBEC)	The amount of SO baseline capacity that Transco is obliged to withhold from long-term auctions in order to offer for sale in the short-term auctions, currently set at 20% of SO baseline.
SO Baseline entry capacity	The minimum amount of capacity that Transco is required to offer for sale at a particular entry point. SO baseline is set as 90% of TO baseline, and is sometimes referred to as IBEC (initial baseline entry capacity).
System	The pipeline system operated by the pipeline company for the conveyance of gas.
System management services	Services in relation to the balancing of gas inputs to and gas offtakes from the NTS and includes balancing trades and balancing trade derivatives and constraint management services
TO baseline entry capacity	A measure of entry capacity at each system entry point agreed by Transco and Ofgem, based on the maximum physical capability of that point.
Unit Cost Adjuster (UCA)	An estimate of the cost of incremental investment in capacity at a particular system entry point. UCAs are used for setting capacity reserve prices.

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