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Determining Revenue Drivers for Entry and Exit Points: Canonbie and Gilwern

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Target audience: Network licensees, gas terminal developers, gas shippers, investors, gas storage developers, consumer representatives and other interested parties

Overview:
National Grid Gas (NGG) has requested that revenue drivers be included in its gas transporter licence for a new entry point at Canonbie and an existing exit point at Gilwern. Revenue drivers are used to automatically flex NGG's allowed revenue upwards in response to demand for additional capacity which is financially backed by user commitment. This consultation invites comments on the proposed methodology to determine these revenue drivers. It discusses the two main issues in setting the revenue drivers at Canonbie, which are the cost assumptions used and how NGG is to be remunerated for gas telemetry measuring equipment. We also set out our analysis of the different options and our preferred approach. Our preference at this stage, subject to consideration of consultation responses, is to use the cost assumptions used at the Fourth Transmission Price Control Review (TPCR4) and to remunerate the costs of gas telemetry measuring equipment in the same manner as any other reinforcement work. We also set out our proposed preferred approach for determining the revenue driver at Gilwern. We invite views on these proposals.

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Context

At the Fourth Transmission Price Control Review (TPCR4) revenue drivers were set for all existing and anticipated entry points to the National Transmission System (NTS) as well as for specific anticipated large exit points from the NTS and for smaller incremental exit capacity amounts at exit points in the South-West Zone. Revenue drivers enable National Grid Gas's (NGG's) allowed revenue to flex in response to demand which is backed by financial commitment from users. Revenue drivers protect consumers from the risk of having to pay for new investment that is not required and also assists NGG to form views about where and when to invest in network capacity. In turn, this will help reduce the risk that such investment is disallowed at future price controls.

Since TPCR4, two NTS points have requested revenue drivers: Gilwern (where an exit revenue driver has been requested) and Canonbie (where an entry revenue driver has been requested). The development of these revenue drivers is the focus of this consultation.

We expect to make our conclusions on the actual revenue drivers in May 2009 and make any necessary Licence changes by 1 July 2009.

Associated Documents

- Decision to modify the gas transport licence under Section 23 of the Gas Act 1986, 5 September 2007 (Ref No. 217a/07)
- Section 38A Notice in respect of reasons for the decision to modify the licence of National Grid Gas plc, 5 September 2007 (Ref No. 217b/07)
- Schedule to Decision to modify the gas transport licence under Section 23 of the Gas Act 1986, 5 September 2007 (Ref No. 217c/07)
- TPCR 2007-2012 Final Proposals, 4 December 2006 (Ref No. 206/06)
- TPCR 2007-2012 Final Proposals, Appendices, 4 December 2006 (Ref No. 206/06b)
- TPCR 2007-2012 Updated Proposals, 25 September 2006 (Ref No. 170/06)
- TPCR 2007-2012 Updated Proposals, Appendices, 25 September 2006 (Ref No. 170/06a)
- TPCR 2007-2012 Initial Proposals, 26 June 2006 (Ref No. 104/06)
- TPCR 2007-2012 Initial Proposals, Appendices, 26 June 2006 (Ref No. 104b/06)
- TPCR 2007-2012 Third Consultation, 30 March 2006 (Ref No. 51/06)
- TPCR 2007-2012 Third Consultation, Appendices, 30 March 2006 (Ref No. 51b/06)

Copies of these can be found on the Ofgem website (www.ofgem.gov.uk).

Table of Contents

Summary

Revenue Drivers

Revenue drivers enable National Grid Gas's (NGG's) allowed revenue to automatically flex upwards in response to demand that is backed by financial commitment from users. NGG earns the additional revenue driver amount for a fixed five year period. At the price control following the end of the five year period any investment is reviewed so that NGG is allowed to earn a return on any efficiently incurred investment. Essentially, the revenue drivers fund the depreciation and return on a deemed amount of capex, with an allowance for opex.

NGG requires revenue drivers so that it has greater certainty over the additional revenue it will earn from releasing incremental capacity, which allows for more informed investment decisions.

At the time of the Fourth Transmission Price Control Review (TPCR4), which covers the period 2007-2012, revenue drivers were determined for existing and anticipated entry and exit points. Ofgem has now been requested to provide revenue drivers for an additional entry point and an additional exit point.

Canonbie

At the time of TPCR4, it was not anticipated that there would be a need for a new entry point at Canonbie. Since the completion of TPCR4 developments have been made for a project to enter gas onto the National Transmission System (NTS) at Canonbie. Revenue drivers are now required so that NGG has greater certainty over its resulting revenues and to establish the entry point with a baseline of zero so that it can invite shippers to participate in auctions for capacity there. This consultation sets out our proposed methodology for deriving the revenue drivers at Canonbie.

In deriving the proposed revenue drivers for Canonbie a similar network modelling approach as used for setting revenue drivers at TPCR4 was adopted. NGG's modelling suggested that for an anticipated increment of below 25 GWh/day at Canonbie only multijunction modifications (this can include replacement of site pipework and control valves to increase physical site capacity, uprating of existing pipework, replacement of metering equipment and installation of gas filtering equipment) are required.

In estimating the revenue driver figures for Canonbie we consider that there are two key issues: (i) which cost assumptions to use, and (ii) how to remunerate NGG for the gas telemetry measuring equipment.

(i) We consider there are two possible approaches to cost assumptions:

- **Option 1a** - use the TPCR4 unit cost assumptions
- **Option 1b** - use NGG's forecast of unit costs which are higher than those in Option 1a (multijunction modifications cost 100 per cent higher than Option 1a)

NGG argues that costs have increased since TPCR4 and that they may increase further. We consider that NGG's proposed cost assumptions may not be appropriate and furthermore that this may not be the right time to open up a debate over costs - this is something which is more appropriately conducted at the next price control review. Our provisionally preferred approach is to use cost assumptions implied by Option 1a. This would better protect consumers because it would not allow the recovery of inappropriately high costs. It would also maintain consistency of approach over the 2007-2012 period.

(ii) There are two possible approaches for remunerating NGG for gas telemetry measuring equipment, these are as follows:

- **Option 2a** - include the cost in the reinforcement works for calculating the revenue drivers
- **Option 2b** - include the cost as a fixed item separate from and in addition to the revenue drivers

NGG favours Option 2b arguing that it may under-recover on gas telemetry measuring equipment if less than 25 GWh/day is requested at Canonbie, as is anticipated. However, this would treat gas telemetry measuring equipment differently to other reinforcement work and would not balance the risks that consumers face. This would expose consumers to the potential downside risk from larger projects, however, consumers would not face the potential upside risk from smaller projects such as Canonbie. Subject to consultation our provisionally preferred approach is to use Option 2a.

We invite views on our analysis of the various options and the above options.

Gilwern

A similar modelling approach as that used at TPCR4 was adopted. The reinforcement work required for the lowest cost option is to uprate the pressure to operate the pipeline feeding the offtake. Our provisionally preferred approach is to accept NGG's modelling and cost estimation and set a revenue driver at £1,304 per GWh/day per year. We invite views on this analysis and our preferred approach.

Timeline

We welcome views on all aspects of setting the revenue drivers at Canonbie and Gilwern. The consultation will close on 11 May 2009. We do not intend to provide another round of consultation before reaching our final decision. Where, in this document, we refer to Ofgem's views these are provisional views and are subject to further consideration of any points raised in this consultation process. Responses to this consultation will be carefully considered in reaching a decision on the appropriate methodology for deriving the revenue drivers at Canonbie and Gilwern. We would envisage a decision document in May 2009 along with a Section 23 notice to modify NGG's gas transporter licence before 1 July 2009.

1. Introduction

Chapter Summary

This chapter sets out why we are consulting on the methodology for setting revenue drivers at the entry point of Canonbie and the exit point of Gilwern.

It also gives a brief description of what is contained in each of the main chapters.

Purpose of this document

1.1. At the Fourth Transmission Price Control Review (TPCR4), which covered the period 2007-2012, Ofgem set revenue drivers for all existing and anticipated entry points. It also set revenue drivers for specific large anticipated exit projects and for smaller anticipated incremental projects in the South-West zone. National Grid Gas (NGG) is progressing work for incremental capacity at Canonbie (which is such a new entry point) and Gilwern (which is an existing exit point) on the National Transmission System (NTS). This was not anticipated at TPCR4. As such, NGG has requested that its gas transporter licence (the "Licence") be amended to include revenue drivers for the new entry point at Canonbie and for incremental capacity at the exit point at Gilwern.

1.2. This document sets out the methodology for how Ofgem proposes to calculate the revenue drivers for the entry and exit points to be included in the Licence.

Overview of this document

1.3. This document is organised into the following chapters:

- Background - this explains the role of revenue drivers in the current price control in terms of remunerating NGG for incremental entry and exit capacity
- Derivation of revenue drivers at TPCR4 - this describes the methodology used at TPCR4 for modelling the reinforcement work required for providing incremental entry and exit capacity at various anticipated points on the NTS and how the cost for this work was estimated
- Modelling approach for revenue drivers at Canonbie and Gilwern - this sets out our modelling request and NGG's response to identify the reinforcement work required for incremental capacity at Canonbie and Gilwern
- Cost estimation - this sets out the different options for remunerating NGG for incremental capacity at Canonbie and Gilwern
- Way forward - this highlights our future work in determining revenue drivers along with our proposed process and timeline for including revenue drivers for Canonbie and Gilwern in the Licence

2. Background

Chapter Summary

This chapter describes the current regimes for how National Transmission System (NTS) users acquire entry and exit capacity, particularly incremental entry and exit capacity. It explains the role of revenue drivers in the current price control. This chapter also outlines the reasons why we are now consulting on deriving revenue drivers for incremental capacity at a new entry and existing exit point.

2.1. NGG owns and operates the high pressure gas transmission network in Great Britain, the NTS. Shippers bring gas from gas fields or as imports via interconnectors and Liquefied Natural Gas (LNG) import terminals or from storage onto the NTS. The gas can then be delivered direct to Transmission Connected Customers (TCCs) or for further delivery across the low pressure Gas Distribution Networks (GDNs) and Independent Gas Transporters (IGTs) to final consumers, for export via interconnectors or put into storage.

2.2. In order to use the NTS, shippers must first buy entry capacity, to flow gas onto the NTS, and also exit capacity, to take gas off the NTS. If shippers do not buy sufficient capacity for the actual amounts of gas they flow, they will incur overrun charges, as set out in the Uniform Network Code (UNC)[1].

Entry

2.3. NGG is obligated to offer for sale certain amounts of firm entry capacity. This can either be non-incremental obligated entry capacity (i.e. baselines), which approximates to existing entry capacity, or incremental obligated entry capacity, which is capacity above baselines and approximates to new capacity. It does this through various auctions.

2.4. One such auction is the Quarterly System Entry Capacity (QSEC) auction which NGG holds each year. NGG invites shippers to bid for unsold baseline entry capacity at all entry points for between 2 and 17 gas years in advance of actual usage[2]. Shippers are also able to bid for entry capacity in addition to current baselines at the QSEC auctions to signal their demand and willingness to pay for incremental capacity. NGG applies the rules set out in the Incremental Entry Capacity Release

[1] A copy of the UNC can be found on the website of the Joint Office of Gas Transporters i.e. www.gasgovernance.com.
[2] QSEC auctions are currently held every September, whilst the Gas Year runs from 1 October to 30 September.

(IECR) methodology statement[3] to determine whether any incremental entry capacity is to be released as a result of the QSEC auction bidding. Currently, the IECR methodology requires that to trigger the release of incremental entry capacity shippers need to bid such that the Net Present Value (NPV) of the revenues from the bids over a period of eight consecutive years is greater than or equal to 50 per cent of the estimated project value of delivering that incremental amount of capacity.

2.5. NGG runs other medium and short term auctions for the sale of NTS entry capacity. However, these do not trigger the release of incremental obligated entry capacity.

Exit

2.6. Arrangements for booking exit capacity are set out in the Exit Capacity Release (ExCR) methodology statement[4]. The arrangements differ between two periods:

- Transitional Period - this runs from 1 October 2008 until 30 September 2012, and relates to the exit capacity regime in place prior to implementation of exit reform[5]
- Enduring Period - this runs from 1 October 2012 onwards and relates to the exit capacity regime which the Authority recently approved for implementation

Transitional Period

2.7. The process for booking NTS exit capacity in the transitional period depends on the type of exit site. There are different processes for the following types of site:

- NTS Supply Points - these include firm very large daily metered customers such as gas fired power stations
- NTS Connected System Exit Points (CSEPs) - these are offtake sites where gas is not used at that particular site and include mainly Independent Gas Transporters (IGTs)
- NTS Interconnectors
- Storage Sites
- Gas Distribution Networks (GDNs)

[3] A copy of the current IECR methodology statement can be found on NGG's website www.nationalgrid.com.
[4] A copy of the current ExCR methodology statement can be found on NGG's website www.nationalgrid.com.
[5] For more information regarding exit reform see the Authority's decision 'Uniform Network Code (UNC): Reform of the NTS Offtake Arrangements (UNC 0116V, 0116BV, 0116CVV, 0116VD, 0116A) and Introduction of Enduring NTS Exit Capacity Arrangements (UNC 0195 and 0195AV)', published on 19 January 2009 on Ofgem's website www.ofgem.gov.uk.

NTS supply points

2.8. Once shippers register their supply point capacity NTS exit capacity is allocated to that supply point on an 'evergreen' basis. Shippers can make a request to NGG for an increase in their System Offtake Quantity (SOQ), or prevailing supply point capacity. Shippers can only reduce the capacity requirement at NTS supply points during the October to January period and cannot reduce this to below their maximum daily consumption in the previous winter.

NTS CSEPs

2.9. Shippers book NTS exit capacity at CSEPs on a 12-monthly rolling basis at any time during the year. Such applications cannot be submitted earlier than six months or later than four days in advance to being required.

NTS interconnectors

2.10. The rules for booking NTS exit capacity at interconnector sites are similar to those at CSEPs, except that gas exports to continental Europe and Ireland require Downstream Capacity Holder certificates. NGG maintains contact with the individual agent at each of the interconnectors and they give NGG a list of capacity holdings held downstream of the NTS which allows NGG to match upstream and downstream.

Storage sites

2.11. All storage sites have elected to be interruptible, this means that they do not have to book NTS exit capacity but do have to inform NGG of their intended flows through the nomination procedures.

Gas distribution networks

2.12. Each year NGG provides each GDN with an Offtake Capacity Statement (OCS) which sets out for each NTS offtake point for each gas year the following:

- An amount of NTS offtake (flat) capacity
- An amount of NTS offtake (flex) capacity
- Assured Offtake Pressures

2.13. In June or July, prior to the gas year, GDNs can request revisions to their existing capacity allocations (and offtake pressures). NGG then chooses to accept (fully or in part) or reject the requests and publishes revised OCSs by 30 September. The OCS process covers four years of firm bookings and one year of indicative bookings.

Transitional period - existing exit capacity

2.14. For the above type of exit points requests for exit capacity are assessed by NGG as to whether they can be accommodated by existing exit capacity. Existing exit capacity is a measure of the capability of the NTS and is determined by network analysis conducted by NGG. It includes allocated and unallocated exit capacity. If there is enough existing exit capacity to satisfy the demands then these are allocated on a first-come-first-served basis. If there is insufficient unallocated existing exit capacity to satisfy the request then the available capacity may be allocated to partially satisfy the request.

2.15. However, if a party makes a request for existing exit capacity beyond 6 months and the request is greater than 20 million therms per annum then the party may request that NGG enters into an Advanced Reservation of Capacity Agreement (ARCA). ARCAs oblige NGG to release the amount of capacity agreed at the date agreed, whilst committing the booking party to pay NGG in respect of lost revenue, should it later decide it no longer wants the capacity amount on the date agreed.

Transitional period - incremental exit capacity

2.16. The process for dealing with requests for incremental exit capacity depends on whether the incremental exit capacity is required within the incremental exit capacity lead time, which is currently bilaterally agreed in the ARCA, or beyond the incremental exit capacity lead time.

2.17. If the request is for incremental capacity within the incremental exit capacity lead time then a series of questions are assessed by NGG regarding whether safe operation of the system can be maintained and whether it is economic and efficient to take any mitigating actions for any impairment to safe operation of the system. This is then used to assess whether NGG:

- can release all the incremental exit capacity requested (possibly with an ARCA)
- can release a partial amount of the incremental exit capacity requested (possibly with an ARCA)
- cannot release any of the incremental exit capacity requested

2.18. If the request is for incremental capacity beyond the incremental exit capacity lead time then NGG assesses whether NTS reinforcement is required and whether it requires an ARCA to be signed.

Enduring period

2.19. On 19 January 2009 Ofgem made its decision[6] to implement the UNC modification proposal UNC195AV regarding the NTS exit capacity regime in the enduring period. This regime will apply for all NTS exit capacity allocations for use from 1 October 2012.

2.20. The enduring NTS exit capacity regime that will be implemented as a result of UNC195AV will have two main types of NTS exit capacity products:

- NTS exit (flat) capacity - this gives holders the right to offtake daily quantities of gas at an NTS exit site with implied obligation to offtake at an even flow rate across the day
- NTS exit (flexibility) capacity - this allows holders to depart from flowing at an even rate across the day. This can only be acquired by GDNs.

2.21. For NTS exit (flat) capacity there are four sub-products based on time and whether these rights are firm or interruptible, these products are:

- Enduring Annual NTS exit (flat) capacity - this is firm capacity for each day in that and each following gas year unless holders notify NGG of a reduction in these enduring rights
- Annual NTS exit (flat) capacity - this is firm capacity for each day in that gas year
- Daily NTS exit (flat) capacity - this is firm capacity for one day only
- Daily off-peak NTS exit (flat) capacity - this is exit capacity for one day only which can be curtailed if NGG considers there to be a capacity constraint. This is comprised of:
    - Use-It-Or-Lose-It (UIOLI) exit capacity
    - Discretionary release
    - *(Maximum Supply Point Offtake Rate x 24) - Aggregate firm holdings*: this will be triggered for release when the day-ahead demand forecast is less than 80 per cent of 1-in-20 peak day demand

2.22. The enduring exit regime will mean that all types of exit capacity users[7] will go through the same processes in acquiring NTS exit (flat) capacity.

2.23. There will be three processes for acquiring enduring annual NTS exit (flat) capacity, these are:

[6] See our decision 'Uniform Network Code (UNC): Reform of the NTS Offtake Arrangements (UNC 0116V, 0116BV, 0116CVV, 0116VD, 0116A) and Introduction of Enduring NTS Exit Capacity Arrangements (UNC 0195 and 0195AV)', published on 19 January 2009 on our website www.ofgem.gov.uk.
[7] Users refer to UNC signatories.

- July application window - these run each year in July for users to acquire enduring annual NTS exit (flat) capacity in gas years[8] Y+4, Y+5 and Y+6
- Ad-hoc applications - NGG will receive ad-hoc applications from users between 1 October and 30 June each year for enduring annual NTS exit (flat) capacity from 6 months in advance and up to 1 October Y+4
- enduring annual NTS exit (flat) capacity can also be requested by developers via and ARCA

2.24. In order to participate in the July application window for enduring annual NTS exit (flat) capacity at a particular exit point then it is proposed that the specific exit point is included in the Licence and that, in normal circumstances a revenue driver should also be included in the Licence. However, due to the tight timescales in which the July 2009 application will be run this may not strictly be the case in 2009.

2.25. The process for acquiring annual NTS exit (flat) capacity is through an application window held each July for capacity in gas years Y+1, Y+2 and Y+3. NGG will make available in these auctions any unsold NTS exit capacity that it is obligated to make available.

2.26. The other two NTS exit capacity products (daily NTS exit (flat) capacity and daily off-peak NTS exit (flat) capacity) will be allocated by means of auction at times specified in the UNC.

Role of revenue drivers in current transmission price control

2.27. Revenue drivers adjust automatically NGG's revenue allowances in response to demand. Revenue drivers seek to represent the opex, depreciation and return on a deemed amount of investment at a particular entry or exit point and remunerate NGG accordingly.

2.28. One principle in setting revenue drivers is to reflect costs that NGG would incur in releasing incremental capacity. If the correlation between incremental revenue from the revenue driver and incremental costs to deliver the incremental output is poor then the incentives for delivering outputs can be distorted. If the revenue driver is too low and so does not recover the investment costs then NGG may fail to invest where warranted by demand, which could result in the use of buy-back. If the revenue driver is too high then NGG is remunerated by more than the cost of making the incremental capacity available and so consumers would face unnecessarily high prices. These considerations will be taken into account by NGG when it assesses the needs-case basis for the specific investment over the long-term i.e. based on the

[8] The Gas Year begins on 1 October each year and runs through to 30 September in the following calendar year.

regulatory asset life of 45 years (which includes the five year period of System Operator (SO) allowances).

2.29. The SO maximum allowed revenue calculation in the Licence includes two elements made up from gas entry and gas exit revenue drivers. The specific details of how these work in the Licence are given in Appendix 2. Essentially, NGG's SO allowed revenue increases by the amount of incremental capacity multiplied by the revenue driver[9]. The SO allowances are increased in this way for a period of five years.

Need for revenue drivers at Canonbie and Gilwern

2.30. At TPCR4, which covered the period 2007-2012, revenue drivers for all existing and anticipated entry points, large anticipated exit projects and smaller incremental exit projects in the South-West zone were calculated.

2.31. Since then NGG has received requests for revenue drivers for a couple of projects, these are:

- for entry capacity at a new entry point at Canonbie
- for exit capacity at an existing exit point at Gilwern of 20.215 GWh/day

2.32. As these projects were not anticipated at TPCR4 there is currently no revenue driver included in the Licence. As such NGG has now requested that Ofgem provides revenue drivers for these projects. This will allow NGG greater certainty over its revenues resulting from the release of incremental capacity when deciding to allocate capacity in response to QSEC auctions for entry and exit application windows.

[9] However, for incremental exit projects anticipated at TPCR4 with a specific revenue driver the SO allowed revenue increases by the exit revenue driver amount once the specific anticipated level of incremental exit capacity has been delivered.

3. Derivation of revenue drivers at TPCR4

Chapter Summary

This chapter describes the network modelling and cost estimation work which was undertaken at the Fourth Transmission Price Control Review (TPCR4), which covered the period 2007-2012, to re-set the revenue drivers for all existing entry points and potential new entry points as well as to set the revenue drivers for large anticipated exit projects and smaller incremental exit projects in the South-West zone.

Entry

Network Modelling

3.1. In 2006, as part of TPCR4, Ofgem revised the levels of non-incremental entry capacity which NGG is obligated to offer for sale, i.e. baselines, and used a similar modelling approach when revising the entry capacity revenue drivers.

Modelling Input

3.2. As part of the work to revise the entry baselines and to set the entry revenue drivers at TPCR4 Ofgem asked NGG to carry out network modelling using its existing Graphical Falcon software. We asked NGG to assess the network capability for one year, 2008/9, on an entry point by entry point basis, and to include potential new entry points in the analysis. The following assumptions were used in the modelling:

- **Physical Network**: we asked NGG to assume that the physical network was the one used in NGG's latest (at the time) Ten Year Statement (TYS) (dated December 2005) for 2008/9
- **Demand**: model the '1-in-20 winter peak' demand scenarios for 2008/9, taken from the 2005 TYS
- **Supply**: model the three supply scenarios from the 2005 TYS, namely 'Transit UK', 'Global LNG' and 'Auctions+'
- **Supply and Demand Balancing**: We asked NGG to use a 'Least Helpful Supply Substitution' approach to balance the network. This involves choosing the entry points with the least benefit to the NTS, in terms of allowing lower network reinforcement costs to be incurred, and reducing their supply flows first, in order to match demand. These are likely to be the entry points furthest from the one being considered and so assumes flows are high at nearby entry points. NGG

used a merit order approach[10] to balance the base network and to balance the incremental network it used a 'Least Helpful Supply Substitution' approach.

- **Increment Size**: We asked NGG to model what reinforcement work would be required, and the costs, for four different increment sizes, namely 25 GWh/day, 100 GWh/day, 500 GWh/day and 1000 GWh/day

Modelling work

3.3. The modelling undertaken involved setting baselines to reflect the physical capability of the NTS. This was done through the process described below.

3.4. For each of the three supply scenarios, supply flows at entry points other than the one under investigation were adjusted to balance demand and supply on the physical network assumed for 2008/9, i.e. the base network. This gave the 'baseflow' figure of supply flows.

3.5. In assessing the network capability NGG estimated the maximum additional capacity that could be released at system peak without triggering network investment. It did this by increasing flows at the entry point under investigation to see if more capacity could be made available at that entry point at system peak without triggering system reinforcements. If any additional capacity above the flows in the supply scenario could be made available at that entry point without reinforcements then this was recorded as the 'nodal free increment'. This was done for all three supply scenarios and for each entry point, thus providing the 'nodal free increment' figures for all entry points under all three supply scenarios. NGG then selected the highest nodal free increment in each zone and divided it across all the nodes in the zone. Each node received at least the amount of capacity which had been sold in that zone, any remaining amount was allocated to all entry points on the basis of size. For size of entry point the peak terminal supply associated with that entry point in the most recent TYS was used, however, where no data was available the current baseline was used.

3.6. The baseline for each entry point was then calculated by taking the arithmetic average of the baseflow across the three supply scenarios plus allocated free increment, with some adjustments made.

Modelling Output

[10] A merit order approach for balancing involved NGG turning down supplies from storage sites first from the levels set out in the supply scenario, irrespective of the level of interaction between the sites being turned down and the entry point being investigated. A consequence of using the merit order approach instead of least helpful supply substitution is that the entry point under investigation may have been able to flow at higher levels above that stated in the supply scenario before constraints are observed. Therefore the capability of the entry point would appear greater and this could result in higher baseline levels being recorded.

3.7. NGG modelled four flow increments, namely 25 GWh/day, 100 GWh/day, 500 GWh/day and 1000 GWh/day, in order to assess what reinforcement work would be required to allow such additional flows.

3.8. This modelling work produced three sets of reinforcement works per increment, one for each of the following supply scenarios,

- 2008/9, Transit UK, supply substitution
- 2008/9, Global LNG, supply substitution
- 2008/9, Auctions+, supply substitution

Baseline review 2007-8

3.9. On 30 May 2008[11] after reviewing the baselines set during TPCR4 we made our final decision to revise baselines slightly upwards at a number of entry points[12]. A slight revision was made for those entry points whose baseline would be below the 2002-2007 baseline figure and below NGG's forecast maximum supply figure. In such circumstances an upwards adjustment was made to set the baseline at the lower of the 2002-2007 baseline figure or NGG's forecast maximum supply figure. This review of baselines did not result in any fundamental change to the apportionment of the free increment made during TPCR4.

Cost estimation

3.10. The reinforcement works required for each scenario and increment were then used to derive an incremental cost figure using the following equation[13], this assumes that costs of all incremental work are allocated to entry:

$$IncrementalCost = (2 \times UnitCost_{Compressor} \times InstalledCompression) + \sum_{d=900,1200} Length_d \times UnitCost_d + Other$$

3.11. From the three supply scenarios the scenario with the maximum baseflow plus free increment was selected and the costs associated with each increment for this supply scenario were used. However, where there was no obvious maximum, the

[11] See 'TPCR gas entry baseline review - final proposals, 30 May 2008 (Ref No. 72/08)' on Ofgem website www.ofgem.gov.uk
[12] These were at Isle of Grain, Teesside, Hatfield Moor (Storage), Hornsea, Glenmavis, Partington and Dynevor Arms.
[13] IncrementalCost = incremental capacity cost (£m), $UnitCost_{compressor}$ = Cost (£m) per MW of installed capacity, InstalledCompression is in MW, $Length_d$ = length of pipelines with diameter d, $UnitCost_d$ = Unit cost of pipeline with diameter d, d = 900mm or 1200mm, 'Other' can include costs for reverses and rewheels, etc

highest incremental cost for each increment is chosen across the three supply scenarios, this was then repeated for each increment size.

3.12. The incremental cost is multiplied by a conversion factor. This conversion factor is equal to the weighted price index[14] for 2007/8 divided by that for 2010/11[15].

3.13. The average incremental cost between adjacent increment sizes, X and Y, was then calculated using the equation below. However, for the lowest increment i.e. 25 GWh/day a simple average was taken.

$$AverageIncrementalCost = \frac{TotalIncrementCostX - TotalIncrementalCostY}{IncrementX - IncrementY}$$

3.14. The average incremental cost for each increment size was then annuitised to get an annual revenue driver figure. This assumed a pre-tax rate of return of 6.25 per cent, opex allowance of 1 per cent and straight-line depreciation over 45 years. The monthly revenue driver figures which appear in the Licence were therefore calculated by dividing this by 12 months.

Exit

Network Modelling

3.15. Ofgem approached NGG to ask what reinforcement work would be required for each specific project of incremental exit capacity.

3.16. NGG responded with a list of reinforcement works required for each project.

Cost estimation

3.17. The costs of the reinforcement works were calculated by applying a unit cost to the length of the pipeline required for each project and costs of installed compression where applicable. The total project cost figures were then converted into 2005/6 prices and some adjustments made for:

[14] The Weighted Price Index has a weighting of 53 per cent for construction prices, 30 per cent for material prices and 17 per cent for other prices.
[15] As noted in Appendix 2 the revenue driver figure in the Licence is multiplied by the real additional cost inflation index (this is the weighted price index for the year of contractual delivery divided by the weighted price index in 2007/8) in the year of contractual delivery of the incremental entry capacity. The net effect of this means that in the year 2011/12 and beyond an additional amount of price indexation is applied of around 2 per cent above inflation.

- Langage Phase I - downward adjustments made to account for allowance made at 2002-2007 price control for this project
- Pembroke and Grain - downward adjustments made to account for the possibility of long term contract solutions

3.18. The figures were then annuitised and in the case of the South-West zone revenue driver a per GWh/day value was calculated.

4. Modelling approach for Canonbie and Gilwern

Chapter Summary

In this chapter we set out the request we made to National Grid Gas (NGG) for the modelling required for deriving the reinforcement work for incremental capacity at Canonbie and Gilwern, to be used in calculating the revenue drivers. We also set out NGG's response.

Question box

Question 1: Do you agree with the modelling assumptions we instructed National Grid Gas (NGG) to use?
Question 2: Do you agree with the modelling approach used by NGG and its modelling output for the entry point at Canonbie?
Question 3: Do you agree with the modelling approach used for the exit point at Gilwern?
Question 4: Do you agree with our view that the modelling undertaken meets our request?
Question 5: Are there any other issues we should have considered in the modelling approaches outlined in this chapter?

4.1. On 18 November 2008 we sent a request for NGG to conduct some modelling in order to provide us with information on what reinforcement work would be required for incremental capacity at Canonbie and Gilwern. This was to allow us to calculate revenue drivers at Canonbie and Gilwern.

Entry: Canonbie

Modelling request

4.2. In our data request for the entry point at Canonbie we asked NGG to provide us with a list of reinforcement work which would be required for incremental entry capacity amounts of 25, 100 and 500 GWh/day at the entry point at Canonbie. More specifically this was in terms of:

- Additional compressors (in MW)
- Additional NTS pipelines, highlighting any pipeline for connection purposes to the NTS (by diameter and length)
- Additional gas telemetry measuring equipment and associated cost
- Any other relevant work

4.3. We also sought confirmation of the treatment of any connecting pipeline as to whether this was to be built by the developer (and whether this is then to be sold to NGG or another gas network owner) or by NGG itself.

4.4. We also asked NGG to use the following assumptions when doing the modelling work to provide us with the list of work projects for Canonbie:

- **Number of years modelled**: 2010/11
- **Base network**: model the 2010/11 physical network using the information used in the most recent Ten Year Statement (TYS), i.e. 2007[16]
- **Demand**: model the 1-in-20 winter peak demand scenario for 2010/11
- **Balancing network**: use the Least Helpful Supply Substitution method
- **Supply**: model the above with the three supply scenarios used in the most recent TYS, 2007, which most resemble the three supply scenarios used in the modelling for TPCR4, i.e. Global LNG, Auctions+ and Transit UK, for 2010/11
- **Approach to estimating additional capacity required**: From the modelling assumptions set out above we would also require details of each of the supply scenarios in terms of their baseflow i.e. the highest capacity that NGG estimates could be released within a balanced network where supplies across entry points are equal to a 1-in-20 winter peak demand scenario for 2010/11

4.5. This differs to the request we made for entry capacity revenue drivers during TPCR4 in a few respects. In particular:

- we did not request modelling to be done for the 1000 GWh/day increment as Canonbie is not expected to be greater than 500 GWh/day and this would result in possibly unnecessary work from NGG and delay the revenue driver decision.
- in TPCR4 we asked NGG to use data from the 2005 TYS whilst for Canonbie we asked NGG to use data in from the 2007 TYS. This would be consistent with the TPCR4 approach in using the most recent TYS.
- during TPCR4 we asked NGG to model supply based on the three supply scenarios published in its most recent TYS (i.e. 2005) i.e. Global LNG, Auctions+ and Transit UK. However, NGG no longer use and publish these supply scenarios in its modelling for its TYS. Therefore, we asked NGG to use the three supply scenarios it did use in the 2007 TYS which most closely resemble the three aforementioned supply scenarios.
- in the TPCR4 work conducted in 2006 we asked NGG to model the network in 2008/9 whilst for Canonbie we asked for modelling to be done for 2010/11. This was to preserve the approach used in the TPCR4 of modelling with a two-year time horizon.
- we asked specifically for data on required gas telemetry measuring equipment and associated costs as this was omitted by NGG at TPCR4.

[16] We asked for the information to come from the 2007 TYS since at the time of our request, on 18 November 2008, the 2008 TYS had not been published.

Modelling Output

Table : Supply scenarios

TPCR4 Scenario	2008 planning scenario	Description
Auctions+	High LNG	Auctions+ was built mainly on auction signals received up to the end of 2004 - so ignores auction signals received since then. This is reflected more by the High LNG scenario.
Global LNG	Low LNG	Global LNG described potential supply patterns if LNG is drawn to other world markets. This is similar to the underlying assumptions in the Low LNG scenario (where United Kingdom Continental Shelf (UKCS) gas is supplemented by high Norwegian and Continental imports and some gas from storage).
Transit UK	High east coast	Transit UK assumed imports from Norway and LNG were high and with high summer (winter) flows to (from) continent via interconnector. NGG's closest match to this is the High east coast scenario

4.6. In NGG's modelling it followed the procedure below:

- Physical network - Modelling done for the year 2010/11 using the 2010/11 physical network, reflective of what was in the 2008 TYS
- Demand - Forecast of peak day demand for the 2008 planning cycle (as described in 2008 TYS)
- Supply - Since the 2007 TYS NGG has used a single base case supply/demand scenario and in this there are no exact matches for the three scenarios used at TPCR4. NGG therefore used supply scenarios included in the 2008 TYS which most closely resemble the three scenarios used at TPCR4. These are set out in table 1.
- Demand and supply balancing - Least Helpful Supply Substitution approach for base flow17 and incremental flow18 analyses. This involves rebalancing using less interactive supplies.

[17] NGG selected the particular supply scenario and recorded entry point flows for peak demand condition being analysed, this gave the 'Initial Flow'. NGG then increased supplies at all entry points in Northern Triangle zone, where Canonbie located to their obligated levels (done in order of those upstream to Canonbie first, i.e. St Fergus, then Glenmavis, then Barrow and then Teesside). The system was then balanced by using Least Helpful Supply Substitution. If all obligations for Northern Triangle zonal supplies are:
(i) met, then flows were increased at Canonbie until a constraint is seen. Then flows rebalanced using the same order as before with the Least Helpful Supply Substitution. The largest amount of flow at Canonbie without causing a constraint is identified as the free increment available at Canonbie and not already allocated through baselines at existing entry points in the Northern Triangle zone

4.7. One aspect where our information request and NGG's response differed was regarding the TYS version used. Our request asked for information from the most recent TYS, which at the time was the 2007 version. However, NGG based its modelling on data from the 2008 TYS, since this had been published following our information request.

4.8. The modelling resulted in NGG identifying the reinforcement work necessary for each of the three increment sizes modelled for each of the three supply scenarios adopted. NGG confirmed that no connecting pipeline would need to be included.

4.9. As Canonbie is likely to be an entry point less than 25 GWh/day the reinforcement work necessary for the relevant increment size would be Multijunction Modifications[19].

Ofgem view

4.10. We consider that the modelling work undertaken by NGG reflects our request. We consider it appropriate to use the information contained in the 2008 TYS as in the time between our request for information and NGG submitting its response the 2008 TYS had been published.

Exit: Gilwern

Modelling request

4.11. In our data request to NGG regarding the exit point at Gilwern we asked for a list of the reinforcement work which would be required for an incremental exit capacity amount of 20.215 GWh/day at the NTS exit point at Gilwern. More specifically we asked for reinforcement work in terms of:

- Additional compressors (in MW)

(ii) not met, then each entry point in the Northern Triangle zone considered in order (SF, GM, BR, TE) by increasing flow to obligated level. This is done for all entry points in zone until the constraint is reached.
NGG then recorded entry flows when a constraint was reached. This gave the 'baseflow'.
[18] NGG added incremental flow amounts being modelled to baseflow at Canonbie and rebalanced flow using same order as before in the Least Helpful Supply Substitution. It then identified necessary reinforcement and recorded the resulting projects. This was then repeated for the other increment sizes and scenarios.
[19] Multijunction modifications can include replacement of site pipework and control valves to increase physical site capacity, uprating of existing pipework, replacement of metering equipment and installation of gas filtering equipment. The requirements for such works are established at the design stage.

- Additional NTS pipelines, highlighting any pipeline required for connection purposes to the NTS (by diameter and length)
- Work to modify the pressure at the offtake point and associated cost
- Any other relevant work and associated cost

4.12. We also sought confirmation of the treatment of any connecting pipeline as to whether this is to be built by the developer (and whether this is then to be sold to NGG or another gas network owner) or by NGG itself.

4.13. This was similar information that we requested for exit projects to calculate their revenue drivers during TPCR4.

Modelling output

4.14. From the modelling work NGG has identified the lowest cost option of uprating the inlet pipework to the site from its current operation of 70 bar(g) to operate at a pressure of 75 bar(g). However, assurances cannot yet be given on whether this approach is technically feasible[20]. No other work is anticipated to be required. Other options that could be undertaken include installation of additional equipment on site, pipeline (feeder) uprating or major pipeline reinforcements.

4.15. NGG confirmed that no connecting pipeline would be required.

Ofgem view

4.16. We consider that the modelling work undertaken by NGG reasonably reflects our request.

[20] NGG will be contracting a third party to conduct structural tests in the summer before connection.

5. Cost estimation

Chapter Summary

In this chapter we explain the two different unit cost assumptions along with the two different options for how to remunerate National Grid Gas (NGG) for the costs of gas telemetry measuring equipment in calculating the revenue drivers at Canonbie. It also highlights what these different options would mean in terms of actual revenue drivers as included in NGG's gas transporter licence. We also set out our preferred options which are to:

- ➔ use the unit cost assumptions employed at the Fourth Transmission Price Control Review (TPCR4), and
- ➔ include the costs of gas telemetry measuring equipment along with other reinforcement work in calculating the revenue driver

This chapter also sets out what the unit revenue driver for Gilwern would be based on the estimated costs of providing 20.215 GWh/day of incremental capacity there.

Question box

Question 1: Do you agree with our provisionally preferred option regarding costs assumptions i.e. Option 1a which uses the unit cost assumptions as employed at TPCR4?
Question 2: Do you agree with our provisionally preferred option regarding the remuneration of gas telemetry measuring equipment i.e. Option 2a to include it along with other reinforcement work when calculating the revenue driver?
Question 3: Do you agree with our preferred approach of including a revenue driver of £1,304 per GWh/day per year for incremental capacity at Gilwern in NGG's gas transporter licence?
Question 4: Are there any other considerations which we have not highlighted which we should have taken into account?

Entry: Canonbie

5.1. We anticipated applying the unit costs used at TPCR4 to the reinforcement work identified by the modelling undertaken by NGG and so did not request information on the costs of reinforcement works from NGG. However, in its response to our modelling request NGG provided two sets of cost assumptions. These are:

- Option 1a - this is the unit cost assumptions used at TPCR4
- Option 1b - this is NGG's forecast of unit costs

Cost Options

5.2. For reasons of commercial confidentiality we cannot publish the two sets of unit cost assumptions. However, Table 2 shows the price increases of Option 1b compared to Option 1a, which are between 31 and 100 per cent.

5.3. Note also that NGG proposes for its Option 1b that compressors require fixed costs per site in addition to the unit cost per MW; this was not the case at TPCR and so Option 1a does not have a fixed cost per electric compressor site. The fixed costs include items such as buildings, electric drives and, where required, overhead cables - all of which are judged by NGG to not be variable in terms of the compressor power.

Table : Difference in Units Cost Assumptions

	% Increase in Option 1b over Option 1a
1200mm pipe (£m/km)	31%
900mm pipe (£m/km)	54%
Electric Compressors (£m/MW)	10%
Electric Compressors, fixed cost per site (£m)	n/a
Compressor re-wheel, 2 unit site (£m)	53%
Multijunction Modifications (£m)	100%

5.4. NGG considered that unit costs have increased beyond TPCR4 assumptions and that its 2008 planning cycle forecast of unit costs could be used.

Ofgem's view

5.5. We think that NGG's proposed unit costs in Option 1b are inappropriate to use at this time as they appear quite high without sufficient compelling evidence to justify them and would not allow for consistency over the current transmission price control period.

5.6. It is likely that it would take a considerable amount of time to conduct a robust analysis of the most appropriate cost assumptions to use. It may not be the most appropriate time, i.e. in the middle of a price control period, to conduct such a time consuming and resource intensive study. This would be better placed at the next price control review. Therefore our preferred proposed view, subject to consideration of any points raised in response to this consultation, is to use the cost assumptions in Option 1a i.e. those used at TPCR4.

5.7. We would therefore welcome responses to this consultation from all interested parties including industry views.

Treatment of gas telemetry measuring equipment

5.8. Following the modelling work undertaken by NGG, it submitted the list of reinforcement works required for each increment size and scenario. However, there was one piece of equipment required for a new entry point at Canonbie which NGG did not include in the list of reinforcement work - this was for gas telemetry measuring equipment. NGG states that telemetry was omitted from the calculation of revenue drivers at new entry points at TPCR4 and so there is no TPCR4 approach to follow in how NGG is remunerated through revenue drivers for gas telemetry

measuring equipment. NGG proposed that gas telemetry measuring equipment is a fixed cost additional to the reinforcement costs required for each increment. It argues that if the signal for incremental entry capacity is below 25 GWh/day, as is anticipated for Canonbie, then it will not recover the full cost of the gas telemetry measuring equipment.

5.9. One way of remunerating NGG for the gas telemetry measuring equipment is through a fixed item separate to the revenue drivers. Another possibility is to treat the gas telemetry measuring equipment in the same manner as other project works and include it in the list of works for each increment. This gives two options:

- Option 2a - include in revenue drivers - this would include the gas telemetry measuring equipment in the reinforcement work for the each of the increments
- Option 2b - exclude from revenue drivers - this would remunerate NGG for gas telemetry measuring equipment through a fixed cost element separate to the revenue driver as set out in the Licence

Ofgem's view

5.10. Ofgem considers that the costs for gas telemetry measuring equipment are like other 'lumpy' investments, such as the multijunction modifications, which are required to provide incremental amounts of entry capacity. As with other 'lumpy' reinforcement work in the first increment of 25 GWh/day if the full 25 GWh/day is not signalled then NGG recovers less through the revenue driver than the estimated project works. However, this downside risk is balanced with upside risk for larger projects when NGG has greater potential to provide increments at lower cost than estimated, through the incentives inherent in the revenue drivers.

5.11. Our provisionally preferred option is to include gas telemetry measuring equipment in the reinforcement work for each increment. This is for reasons of consistency, simplicity and balancing risk between NGG and consumers. The modelling for each increment size produces a set of project works which are required to deliver that capacity increment. By including the gas telemetry measuring equipment in the list of projects for each of the increments it will be treating gas telemetry in a consistent manner with other project works. Using this approach will also allow the formulae in the Licence to be used in their current format without revision. This should allow for minimal modifications to the Licence and maintain levels of understanding in the industry. NGG faces an upside risk on larger projects in that it may recover more revenue through the revenue driver than it costs to deliver the incremental capacity (through greater potential to deliver below estimated cost); however, this is a downside risk to consumers who would face higher charges than implied by actual costs as a result. To balance this downside risk consumers face on larger projects, consumers should face an upside risk on smaller projects where NGG's allowed revenues may be less than the cost of providing the increment. However, our preferred approach is subject to consideration of any points raised in response to this consultation.

Options

5.12. In paragraphs to we described how Ofgem uses the project work identified for each increment size along with the unit cost assumptions to derive the revenue drivers to be included in the Licence. Here we outline what the revenue driver figures would be under the different options outlined above; this is set out in Table 3. Note that for Option 2b remunerating the gas telemetry measuring equipment using a fixed cost item separate to the revenue drivers would mean that the cost of gas telemetry measuring equipment would be recovered by NGG in addition to the amount generated from the revenue driver calculation. Therefore, the revenue driver figures in Option 2b appear lower as they do not include the cost of gas telemetry measuring equipment which would be recovered through a fixed term elsewhere in the Licence.

Table : Licence Revenue Driver Figures under various options

£m/GWh/month	**Remuneration of Gas Telemetry Measuring Equipment**					
Cost Assumption	**Option 2a - Include in revenue driver**			**Option 2b - Via fixed cost item**		
	0-25 GWh/d	25-100 GWh/d	100-500 GWh/d	0-25 GWh/d	25-100 GWh/d	100-500 GWh/d
Option 1a (TPCR4)	0.0020	0.0038	0.0072	0.0016	0.0038	0.0072
Option 1b (NGG)	0.0036	0.0060	0.0094	0.0032	0.0060	0.0094

5.13. We assume that all incremental costs are allocated to entry capacity irrespective of whether the reinforcement work provides benefits to the exit regime.

Exit: Gilwern

5.14. The total cost of the uprating option includes cost of the feasibility study (which is already incurred), structural tests and expected work. If the approach identified in the feasibility study cannot be done then alternative works would be included, but NGG consider this to be very low risk. This also assumes all incremental costs are allocated to exit irrespective of whether the project works provide benefits to the entry regime.

Ofgem view

5.15. We consider that NGG has identified the least cost option of delivering 20.215 GWh/day of incremental exit capacity at Gilwern. Furthermore, our preferred proposed approach is to use a similar approach as that used in TPCR4 in order to calculate the revenue driver from NGG's estimated incremental costs of providing that level of incremental capacity. This approach is outlined in paragraphs to . This leads us to our proposal of including a revenue driver in the Licence at £1,304 per GWh/day per year in order to remunerate NGG for the costs of the incremental work identified in paragraph . This is our provisionally preferred option, however, it is subject to consideration of any points raised in response to this consultation.

6. Way forward

Chapter Summary

This chapter sets out upcoming work we plan to do regarding developing a generic methodology for deriving entry and exit revenue drivers. It also sets out our envisaged timeline for this consultation and final decision.

Generic revenue driver methodology

6.1. Following this consultation on the setting of specific revenue drivers at the entry point of Canonbie and the exit point at Gilwern we plan to develop a generic methodology for deriving entry and exit revenue drivers for the period until the end of the current price control period i.e. to 31 March 2012. This generic methodology will be consulted on. Once in place the generic methodology would not require specific consultations for the setting of a revenue driver for each entry and exit point and therefore should allow a shorter time period between a request to NGG for a revenue driver and it being included in the Licence.

Timeline

6.2. We welcome views on all aspects of setting the revenue drivers at Canonbie and Gilwern. The consultation will close on 11 May 2009. We do not intend to provide another round of consultation before reaching our final decision. Where, in this document, we refer to Ofgem's views these are provisional views and are subject to further consideration of any points raised in this consultation process. Responses to this consultation will be carefully considered before we decide on the appropriate methodology for deriving the revenue drivers at Canonbie and Gilwern. We would envisage a decision document in May 2009 along with a Section 23 notice to change NGG's gas transporter licence in respect of the NTS before 1 July 2009.

Appendices

Index

Appendix 1 - Consultation Response and Questions

1.1. Ofgem would like to hear the views of interested parties in relation to any of the issues set out in this document. In particular, we would like to hear from transmission licensees, gas transporters, users of the transmission networks, gas terminal developers, investors, gas storage developers, consumer groups and other interested parties.

1.2. We would especially welcome responses to the specific questions which we have set out at the beginning of each chapter heading and which are replicated below.

1.3. Responses should be received by 11 May 2009 and should be sent to:

Stuart Cook
Director of Transmission
Ofgem
9 Millbank
London SW1P 3GE

Email responses should be sent to:
gas.transmissionresponse@ofgem.gov.uk

1.4. Unless marked confidential, all responses will be published by placing them in Ofgem's library and on its website www.ofgem.gov.uk. Respondents may request that their response is kept confidential. Ofgem shall respect this request, subject to any obligations to disclose information, for example, under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004.

1.5. Respondents who wish to have their responses remain confidential should clearly mark the document/s to that effect and include the reasons for confidentiality. It would be helpful if responses could be submitted both electronically and in writing. Respondents are asked to put any confidential material in the appendices to their responses.

1.6. Next steps: Having considered the responses to this consultation, Ofgem intends to publish its decision in May along with a Section 23 notice to change NGG's gas transporter licence. Any questions on this document should, in the first instance, be directed to:

Richard Miller
Senior Gas Transmission Policy Manager
Ofgem
70 West Regent Street
Glasgow G2 2QZ
0141 331 6013
Email questions should be sent to:

gas.transmissionresponse@ofgem.gov.uk

CHAPTER: Four

Question 1: Do you agree with the modelling assumptions we instructed National Grid Gas (NGG) to use?
Question 2: Do you agree with the modelling approach used by NGG and its modelling output for the entry point at Canonbie?
Question 3: Do you agree with the modelling approach used for the exit point at Gilwern?
Question 4: Do you agree with our view that the modelling undertaken meets our request?
Question 5: Are there any other issues we should have considered in the modelling approaches outlined in this chapter?

CHAPTER: Five

Question 1: Do you agree with our provisionally preferred option regarding costs assumptions i.e. Option 1a which uses the unit cost assumptions as employed at TPCR4?
Question 2: Do you agree with our provisionally preferred option regarding the remuneration of gas telemetry measuring equipment i.e. Option 2a to include it along with other reinforcement work when calculating the revenue driver?
Question 3: Do you agree with our preferred approach of including a revenue driver of £1,304 per GWh/day per year for incremental capacity at Gilwern in NGG's gas transporter licence?
Question 4: Are there any other considerations which we have not highlighted which we should have taken into account?

Appendix 2 - How revenue drivers work in the licence

1.1. This appendix sets out in detail how the release of incremental capacity provides NGG with additional revenue allowances through application of revenue drivers.

Entry

1.2. As outlined in the main document, at the QSEC auctions incremental obligated entry capacity can be triggered if there is a user commitment signal that passes the NPV test. Incremental capacity that is released and is not met by substitution is treated as funded incremental obligated entry capacity. Once the date for contractual delivery of the funded incremental obligated entry capacity is reached NGG begins to receive an increase in its SO maximum allowed revenue for a period of five years to remunerate it for the provision of this additional capacity.

1.3. The Licence[21] sets out the calculation of the maximum revenue allowed for the release of funded incremental obligated entry capacity in each of the five years. Each entry point requires four separate revenue driver figures (expressed in £million/GWh/month), each relating to a different range of funded incremental obligated entry capacity being released i.e. for increments of 0-25, 25-100, 100-500 and above 500 GWh/day. These 'raw' revenue drivers are then multiplied by the real additional cost inflation index for that year which allows for a fixed adjustment for increases in steel and construction prices above the general rate of inflation beyond 2011/12.

Table : Entry Capacity Revenue Driver Formulae

Incremental Capacity, IC (GWh/day)	Relevant Revenue Driver Formula[22]
IC ≤ 25	IC x RD1
25 < IC ≤ 100	(25 x RD1) + (IC – 25) x RD2
100 < IC ≤ 500	(25 x RD1) + (75 x RD2) + (IC – 100) x RD3
IC > 500	(25 x RD1) + (75 x RD2) + (400 x RD3) + (IC – 500) x RD4

1.4. These 'inflated' revenue drivers are then used in four different equations to calculate the revenue allowance. The relevant equation is selected on the basis of the

[21] Paragraph 2 of special condition C8D in the Licence.
[22] RD_x refers to the 'inflated' revenue driver for increment range X. Where X=1 the incremental range is from 0-25 GWh/day, where X=2 the incremental range is from 25-100 GWh/day, where X=3 the incremental range is from 100-500 GWh/day and where X=4 the incremental range is 500 GWh/day and above.

amount of funded incremental obligated entry capacity that is released. These equations are summarised in table 4 above.

1.5. The output from the relevant equations is then inflated by the general rate of inflation.

1.6. At the next transmission price control, after this fixed 5 year period, any investment that was required will be assessed to ensure that the investment reflected the actual demand for new capacity and was carried out efficiently[23]. If Ofgem decides that the investment was efficient NGG is subsequently allowed to recover through its Transmission Owner (TO) price control the (depreciated) cost of the actual efficient investment, logged up to include any loss in finance costs on the efficient investment i.e. the investment is added to the TO Regulated Asset Value (RAV). If Ofgem decides that investment in the incremental capacity was inefficient or was not required, the funding for the incremental capacity, or part of it, may be excluded from the TO RAV. The incremental capacity then becomes designated as baseline capacity.

Exit

1.7. The arrangements described below apply to both the transitional and enduring periods.

1.8. Once a user commitment signal for the release of incremental exit capacity has been received and that capacity has actually been released, NGG's SO maximum allowed revenue increases for a period of five years.

1.9. The Licence[24] sets out the calculation for how NGG's SO maximum allowed revenue is increased following release of incremental exit capacity. The incremental exit capacity projects are divided into three broad groups:

- Projects with specific revenue drivers - at the last price control specific revenue drivers were calculated for a number of larger projects which were anticipated over the price control period
- Projects in the South West zone (these are listed in the Licence) - at the last transmission price control a zonal revenue driver was only calculated for the South-West zone. There was no zonal revenue driver calculated for other zones as there was not anticipated to be any incremental exit requirements in zones other than the South-West in the 2007-2012 period.

[23] For an investment project with a typical 42 month lead time period plus the 5 years that the incentive revenue is earned it is likely that a price control review will have taken place and some assessment of the investment will have been done.
[24] Paragraph 1(d) of special condition C8E.

- New Projects - this is a term for new projects which are not captured in the other two terms above i.e. those that were not anticipated at the TPCR4 and are not small projects in the South-West zone.

1.10. The incremental exit capacity revenue is equal to the sum of:

- Revenue allowed for projects with specific revenue drivers - in the Licence the anticipated projects' revenue drivers are listed along with the value of incremental exit capacity (see Table 4 below)
- Revenue allowed for projects in the South-West zone
- Revenue allowed for 'new' projects

1.11. The sum of these is then inflated by the general rate of inflation.

1.12. The revenue allowed from projects with specific revenue drivers is set out below, and draws from the figures in table 5 below.

Revenue Allowed for Projects with Specific Revenue Drivers[25] =

$$\sum_{\text{AllAnticipatedProjects}} \left(ProjectSpecificRevenueDriver \times InputPriceIndexationFactor \right)$$

Table : Anticipated Exit Projects

Anticipated Project	Project Specific Revenue Driver (£m/year, 2005/6 prices)
Langage Phase 1	9.5
Langage Phase 2	5.5
Marchwood	4.5
Pembroke	6.4
Grain	10.6

1.13. Where the sum of the incremental exit capacity for all projects in the South-West zone is less than 15 GWh/day in one formula year then:

Revenue allowed for projects in the South-West zone[26] =

$$\sum_{\text{AllAnticipatedProjects}} \left(IncrementalExitCapacity \times InputPriceIndexationFactor \right) \times £820{,}000$$

1.14. The revenue allowed from 'new' projects is calculated below.

[25] The term InputPriceIndexationFactor indexes the cost to the specific year when the project is delivered to account for real changes in input prices for steel and contractors.
[26] The term IncrementalExitCapacity is measured in GWh/day and the term InputPriceIndexationFactor means the same as that in footnote .

Revenue allowed from 'new' incremental exit projects[27] =

$$\sum_{\text{All New Projects}} \left(IncrementalExitCapacity \times NewProjectRevenueDriver \times InputPriceIndexationFactor \right)$$

1.15. The amount of revenue earned by application of the exit revenue driver is earned over 5 years. At the next price control, after this fixed 5 year period, any investment that NGG has made will be assessed to ensure that the investment reflected the actual demand for new capacity and was carried out efficiently. If Ofgem decides that the investment was efficient NGG is subsequently allowed to recover through its TO price control the (depreciated) cost of the actual efficient investment, logged up to include any loss in finance costs on the efficient investment i.e. the investment is added to the TO RAV. If Ofgem decides that investment in the incremental capacity was inefficient or was not required, the funding for the incremental capacity, or part of it, may be excluded from the TO RAV.

[27] IncrementalExitCapacity is the amount of capacity delivered by the new exit project. NewProjectRevenueDriver is the revenue driver for the new exit capacity project in £/GWh/year. The term InputPriceindexationFactor means the same as that in footnotes and .

Appendix 3 – The Authority's Powers and Duties

1.1. Ofgem is the Office of Gas and Electricity Markets which supports the Gas and Electricity Markets Authority ("the Authority"), the regulator of the gas and electricity industries in Great Britain. This Appendix summarises the primary powers and duties of the Authority. It is not comprehensive and is not a substitute to reference to the relevant legal instruments (including, but not limited to, those referred to below).

1.2. The Authority's powers and duties are largely provided for in statute, principally the Gas Act 1986, the Electricity Act 1989, the Utilities Act 2000, the Competition Act 1998, the Enterprise Act 2002 and the Energy Act 2004, as well as arising from directly effective European Community legislation. References to the Gas Act and the Electricity Act in this Appendix are to Part 1 of each of those Acts.[28]

1.3. Duties and functions relating to gas are set out in the Gas Act and those relating to electricity are set out in the Electricity Act. This Appendix must be read accordingly[29].

1.4. The Authority's principal objective when carrying out certain of its functions under each of the Gas Act and the Electricity Act is to protect the interests of existing and future consumers, wherever appropriate by promoting effective competition between persons engaged in, or in commercial activities connected with, the shipping, transportation or supply of gas conveyed through pipes, and the generation, transmission, distribution or supply of electricity or the provision or use of electricity interconnectors.

1.5. The Authority must when carrying out those functions have regard to:

- the need to secure that, so far as it is economical to meet them, all reasonable demands in Great Britain for gas conveyed through pipes are met
- the need to secure that all reasonable demands for electricity are met
- the need to secure that licence holders are able to finance the activities which are the subject of obligations on them[30]
- the need to contribute to the achievement of sustainable development; and
- the interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, or residing in rural areas[31]

[28] entitled "Gas Supply" and "Electricity Supply" respectively.
[29] However, in exercising a function under the Electricity Act the Authority may have regard to the interests of consumers in relation to gas conveyed through pipes and vice versa in the case of it exercising a function under the Gas Act.
[30] under the Gas Act and the Utilities Act, in the case of Gas Act functions, or the Electricity Act, the Utilities Act and certain parts of the Energy Act in the case of Electricity Act functions.

1.6. Subject to the above, the Authority is required to carry out the functions referred to in the manner which it considers is best calculated to:

- promote efficiency and economy on the part of those licensed[32] under the relevant Act and the efficient use of gas conveyed through pipes and electricity conveyed by distribution systems or transmission systems
- protect the public from dangers arising from the conveyance of gas through pipes or the use of gas conveyed through pipes and from the generation, transmission, distribution or supply of electricity, and
- secure a diverse and viable long-term energy supply

1.7. In carrying out the functions referred to, the Authority must also have regard, to:

- the effect on the environment of activities connected with the conveyance of gas through pipes or with the generation, transmission, distribution or supply of electricity
- the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed and any other principles that appear to it to represent the best regulatory practice, and
- certain statutory guidance on social and environmental matters issued by the Secretary of State

1.8. The Authority has powers under the Competition Act to investigate suspected anti-competitive activity and take action for breaches of the prohibitions in the legislation in respect of the gas and electricity sectors in Great Britain and is a designated National Competition Authority under the EC Modernisation Regulation33 and therefore part of the European Competition Network. The Authority also has concurrent powers with the Office of Fair Trading in respect of market investigation references to the Competition Commission.

[31] The Authority may have regard to other descriptions of consumers.
[32] or persons authorised by exemptions to carry on any activity.
[33] Council Regulation (EC) 1/2003

Appendix 4 - Glossary

A

The Authority

The Gas and Electricity Markets Authority (GEMA) is the body established by Section 1 of the Utilities Act 2000 to regulate the gas and electricity markets in Great Britain.

B

Baseline

Baselines define the levels of non-incremental entry capacity that the transmission licensee is obligated to release. Baselines also determine the levels above which incremental capacity is defined.

F

Free Increment

The highest amount of additional capacity that can flow into that zone without investment.

G

Gas Distribution Network (GDN)

GDNs transport gas from the National Transmission System (NTS) to final consumers and to connected system exit points. There are currently eight GDNs in Great Britain, four of which are owned by National Grid Gas plc, and four of which were sold by Transco plc (now National Grid Gas plc) to third party owners on 1 June 2005.

I

Incremental Entry Capacity

Entry capacity in addition to the baseline which by National Grid Gas (NGG) releases for allocation. Obligated Incremental Entry Capacity is capacity which has been signalled to be released as a result of Quarterly System Entry Capacity (QSEC) auction.

Incremental Exit Capacity

In the transitional period this is exit capacity which is in excess of existing system exit capacity. In the enduring period this is exit capacity in excess of obligated levels.

Independent Gas Transporter (IGT)

IGTs are gas transporter licence holders that own and operate small local gas networks and levy distribution charges on shippers.

L

Least Helpful Supply Substitution

This is an approach to determine the level of baselines which seeks to identify the maximum capacity that could be released at each entry point at system peak. It can be characterised by increasing the supply at the entry point being investigated whilst reducing supply across other entry points in order to keep the National Transmission System (NTS) balanced. Supply is reduced at other entry points according to which has least benefit to the NTS in terms of incurring lower network reinforcement costs, with the least helpful reduced first. This is likely to be the entry point which is geographically furthest from the one under investigation.

N

National Grid Gas (NGG)

The licensed gas transporter responsible for the gas transmission system, and four of the regional gas distribution companies.

National Transmission System (NTS)

The high pressure gas transmission system in Great Britain.

O

Ofgem

Ofgem is the Office of Gas and Electricity Markets, which supports the Gas and Electricity Markets Authority (the 'Authority').

One in Twenty Obligation

This is a security standard for the licensee to have a pipeline network which meets peak aggregate daily demand at levels which would be expected to occur in one year in twenty when considering the historical weather data for at least the previous 50 years, and other relevant factors.

Q

Quarterly System Entry Capacity (QSEC)

Firm National Transmission System (NTS) Entry Capacity which may be bid for in the Quarterly System Entry Capacity (QSEC) auctions and registered as held by a user for each day in a particular calendar quarter. Entry capacity is sold via QSEC Auctions which offer capacity at each aggregate system entry point between two and seventeen gas years in advance.

R

Regulated Asset Value (RAV)

The value ascribed by Ofgem to the capital employed in the licensee's regulated distribution business (the 'regulated asset base'). The RAV is calculated by summing an estimate of the initial market value of each licensee's regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. These vary between classes of licensee. A deduction is also made in certain cases to reflect the value realised from the disposal of assets comprised in the regulatory asset base. The RAV is indexed to RPI in order to allow for the effects of inflation on the licensee's capital allowances for the regulatory depreciation and also for the return investors are estimated to require to provide the capital.

Revenue Driver

A means of linking revenue allowances under a price control to specific measurable events which are considered to influence costs. An example might be to allow a specified additional revenue allowance for each GWh/day of new entry capacity to the National Transmission System (NTS). Revenue drivers are used by Ofgem to increase the accuracy of the revenue allowances.

S

Substitution of Entry Capacity

As part of the Fourth Transmission Price Control Review (TPCR4) package, which covered the period 2007-2012, National Grid Gas (NGG) is obliged to facilitate the permanent substitution of baseline capacity from one or more entry points to another entry point to meet the demand for incremental obligated entry capacity.

System Operator (SO)

The System Operator (SO) has responsibility to construct, maintain and operate the National Transmission System (NTS) and associated equipment in an economic, efficient and co-ordinated manner. In its role as SO, National Grid Gas (NGG) is responsible for ensuring the day-to-day operation of the transmission system.

T

Ten Year Statement (TYS)

Special Condition C2 (Long Term Development Statement) requires National Grid Gas (NGG) to annually publish a ten-year forecast of National Transmission System (NTS) usage and likely developments that can be used by companies, who are contemplating connecting to the NTS or entering into transport arrangements, to identify and evaluate opportunities.

Transmission Owners (TO)

These are companies that hold transmission owner licences. National Grid Gas (NGG) is the gas Transmission Owner (TO).

Fourth Transmission Price Control Review (TPCR4)

TPCR4 established the price controls for the transmission licensees and took effect in April 2007 for a 5-year period. The review applies to the three electricity transmission licensees, National Grid Electricity Transmission (NGET), Scottish Power Transmission Limited (SPTL), Scottish Hydro Electric Transmission Limited (SHETL) and to the licensed gas transporter responsible for the gas transmission system, National Grid Gas (NGG).

U

Uniform Network Code (UNC)

As of 1 May 2005, the UNC replaced National Grid Gas's (NGG's) network code as the contractual framework for the National Transmission System (NTS), Gas Distribution Networks (GDNs) and system users.

Appendix 5 - Feedback Questionnaire

1.1. Ofgem considers that consultation is at the heart of good policy development. We are keen to consider any comments or complaints about the manner in which this consultation has been conducted. In any case we would be keen to get your answers to the following questions:

1. Do you have any comments about the overall process, which was adopted for this consultation?
2. Do you have any comments about the overall tone and content of the report?
3. Was the report easy to read and understand, could it have been better written?
4. To what extent did the report's conclusions provide a balanced view?
5. To what extent did the report make reasoned recommendations for improvement?
6. Please add any further comments?

1.2. Please send your comments to:

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