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Proposed disposal of part of NTS for Carbon Capture and Storage - Second consultation and initial impact assessment

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Target audience: National Grid Gas, gas shippers, producers, storage operators, interconnectors, GDNs, other stakeholders and other interested parties

Overview:

National Grid Gas approached Ofgem with an outline proposal for the disposal and possible alternative use of some of its National Transmission System (NTS) assets for Carbon Capture and Storage (CCS) in Scotland. The proposal may have merit because it would allow testing of the feasibility of CCS as a means of abating carbon, and it could benefit customers if an alternative (or more valuable) use for network assets leads to lower transportation bills. However, there may also be downsides if the disposal of the assets leads to bottlenecks on the gas network in the event of new supplies. The Authority has a role in granting consent for this and other significant disposals of NTS assets. We initially consulted on the proposal in 2009 and further work was done to address issues raised in the responses. National Grid has also revised its proposal. This second consultation paper is aligned with the timetable for the CCS demonstration project and highlights the issues, regulatory concerns and benefits associated with the updated proposal. It also includes an initial impact assessment and invites comments and views on the proposal to inform the decision on whether to grant consent for the disposal of these assets.

Contact name and details: Bogdan Kowalewicz, Gas Transmission

Tel: 020 7901 7293

Email: gas.transmissionresponse@ofgem.gov.uk

Team: Gas Transmission

Context

The Department of Energy and Climate Change (DECC) is holding a competition to select projects to demonstrate commercial scale Carbon Capture and Storage (CCS) in the UK. National Grid's involvement in the competition is through offering onshore transportation services to one of the bidders. National Grid has identified the opportunity to participate in the competition by using some of the current National Transmission System (NTS) assets to transport Carbon Dioxide (CO_2) to permanent storage. National Grid previously approached Ofgem with an outline proposal for the disposal and possible alternative use of several NTS pipelines in Scotland for this purpose.

Ofgem's current remit in relation to this proposal is limited to decisions related to the disposal of current NTS assets. Ofgem's remit does not extend to regulatory aspects associated with CO_2 transportation. The actions needed for CCS to be successful will be delivered via the recently established Office of Carbon Capture and Storage (OCCS), which is tasked with facilitating the delivery of CCS in the UK, and helping to promote the rapid deployment of CCS globally. The role of the OCCS extends to working with stakeholders to establish and deliver the wider framework for delivering CCS in the UK, including regulation.

National Grid's revised proposal requires Ofgem's consent to go ahead. If consent for the disposal is granted, then it is proposed that the assets cease to be used for natural gas transportation from 2013 and instead be converted to transport CO_2. This second consultation document and initial impact assessment outlines the updated proposals for the disposal of the relevant NTS assets and seeks views from interested parties. The document also provides further detail on National Grid's current proposal for the commercial terms which would apply to the asset disposal.

Associated Documents

- Proposed disposal of part of National Grid's National Transmission System for Carbon Capture and Storage: Publication of independent studies by Wood Mackenzie and Poyry Energy Consulting (Ref: 7/10), 20 January 2010
- Proposed disposal of part of NTS for Carbon Capture and Storage (Ref:35/09), 8 April 2009
- Competition for a Carbon Dioxide Capture and Storage Demonstration Project: PROJECT INFORMATION MEMORANDUM, November 2007 (BERR)
- Towards Carbon Capture and Storage: A Consultation Document, June 2008 (BERR)
- Energy Act 2008 (HM Government)
- Climate Change Act 2008 (HM Government)
- Additional material can be found via the government websites below: http://interactive.berr.gov.uk/lowcarbon/the-low-carbon-transformation/

  http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/ccs/occs/occs.aspx

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Summary

The Department of Energy and Climate Change (DECC) is holding a competition to demonstrate commercial scale Carbon Capture and Storage (CCS). National Grid's involvement in Carbon Dioxide (CO_2) transportation is through offering onshore transportation services to one of the bidders in the DECC competition. National Grid has identified a possible opportunity to participate in the competition by using some of the current National Transmission System (NTS) assets to provide onshore transportation of CO_2 from a Scottish coal fired power station. National Grid has approached Ofgem with an updated proposal for the disposal and possible alternative use of several NTS pipelines for this purpose. The assets in question are currently used to provide gas network capacity at the St. Fergus entry point.

Ofgem is committed to playing its part in contributing to the achievement of sustainable development. We have an important role in shaping the gas and electricity industries, and place issues such as climate change and security of supply and fairness at the heart of our activities. We consider CCS to be a potentially important technology which may help secure the government's climate change initiatives and deliver security of supply. We will continue to work constructively with Government on its plans to bring forward CCS technology.

National Grid Gas's (NGG's) proposal requires the Authority's consent to go ahead. If consent for the disposal is granted then it is proposed that the assets cease to be used to transport natural gas and instead be used to transport CO_2. NGG is not proposing to change its existing network baseline capacity obligations to shippers following asset disposal.

We described the original proposal in our initial consultation in April 2009. The proposal may have merit because it would help to tackle climate change by allowing faster testing of the feasibility of CCS as a means of abating carbon, and it could benefit customers by finding an alternative (or more valuable) use for network assets, leading to lower transportation bills. However, there may also be downsides if they lead to bottlenecks on the network in the event of new gas supplies. Our initial consultation invited views on these issues and received a total of 28 responses.

Overall, respondents to our original consultation supported the proposal but some of this support was conditional on the impacts on shippers (and ultimately gas consumers) being nil or beneficial; support was also subject to verification that the assets were not required for future use. There was support for additional fuel costs, resulting from the higher loads on compressors, being funded by the CO_2 business. There was also support for independent analysis of NGG's modelling and forecast flows through St. Fergus to be performed before any decisions affecting the proposal were made.

However opinion about the benefits of the proposed disposal for gas consumers was mixed. It was recognised that consumers stood to benefit from the disposal, with part of this benefit derived from the fact that gas consumers would not have to fund the eventual decommissioning of this pipeline. Criticism of the benefits from the proposal was directed at the valuation of the asset as this was not seen to represent

the true cost of carbon transport, and a low transfer value would have a small effect on the RAV (and hence transmission charges).

In order to address comments on forecast flows and network capacity modelling, NGG commissioned independent studies by Wood Mackenzie and Poyry Energy Consulting. The views expressed by these reports support the views reached by NGG with regard to forecast future flows and network capability at St. Fergus.

NGG has considered the views of respondents to the April 2009 consultation and has developed a revised proposal with a simpler structure, which is described in this document. NGG's updated proposal contains the following key elements:

- **Baselines** - current entry capacity baseline at St. Fergus is maintained
- **Buyback** - any incremental buyback costs resulting from the removal of the feeder will be met by NG Carbon
- **Opex** - any increases in operating costs resulting from the removal of the feeder will be met by NG Carbon
- **Valuation** – the assets would be transferred at net book value plus an advance of the expected revenues from the alternative use of the assets
- **Revenue sharing** - NG Carbon will pass to gas consumers a share of incremental revenues (net of costs) from CO_2 transportation
- **Consequential benefits** – there are a number of other benefits arising form implementation of the proposal, primarily in terms of defrayment of future liabilities

This is the second consultation and includes our initial impact assessment on the proposals for potential disposal of NTS assets. We seek views from all interested parties in relation to any of the issues set out in this document in order to inform a potential "minded to" view by the Authority. We propose to make a final decision, when the outcome of the CCS demonstration competition is known.

1. Background

This chapter explains the potential for carbon capture and storage and describes the role of the government's competition which aims to demonstrate commercial scale carbon capture and storage. It also provides a description of how NGG's proposal fits in with this initiative.

Carbon Capture and Storage

1.1. Carbon capture and storage (CCS) is the removal, capture and storage of carbon dioxide (CO_2) from fossil fuels either before they are burnt (pre-combustion CCS) or after they are burnt (post-combustion CCS). Captured CO_2 must then be contained in some kind of long-term, permanent storage such as depleted oil and gas fields. The other element that is required under CCS is a means of transporting the CO_2 that has been captured between the capture plant and the storage location.

1.2. The offshore location of storage sites poses a range of potential transportation issues. It is expected that the captured CO_2 would be transported from source by land-based pipeline. Offshore, transportation by either a pipeline or a ship may be possible. The relevant regulatory and safety regimes have yet to be finalised. The Government argues that the ability of CCS to reduce emissions could help to meet the UK's growing energy needs and maintain the security of the UK's energy supply by making coal a viable option for reducing dependence on gas imports.

1.3. CCS has the potential to reduce emissions from fossil fuel burning power stations by significant amounts. In addition to being included in new power stations, it is hoped that, if successful, CCS could be retrofitted to existing plants. All of the different components of CCS technology have been demonstrated in isolation from each other. The Government is now seeking to demonstrate the full chain of CCS technology working on a commercial scale.

DECC Competition for CCS demonstration project

1.4. The Department of Energy and Climate Change (DECC) is holding a competition to select CCS demonstration projects in the UK. The contract will be awarded to the project which best demonstrates integrated carbon capture, transportation and long term geological storage using post combustion capture from a coal fired power station. The project must be on a commercial scale – that is, using a power station with at least a 300MW electrical output - and located in the UK mainland and extended economic zone (an offshore territorial boundary that extends to 200 nautical miles in some places).

1.5. On 12 March 2010 DECC announced that funding had been awarded to two companies for design and development studies associated with CCS. The funding will

support Front End Engineering Design (FEED) studies which will be completed within twelve months, after which the final competition winner will be selected.

Overview of the proposal

1.1. National Grid's potential involvement in CO_2 transportation is through offering onshore transportation services to one of the bids in the Government's CCS competition. National Grid has identified a possible opportunity to use some current NTS assets, in conjunction with some additional new assets, for providing the onshore transportation of CO_2.

1.2. The proposal involves the re-use of existing gas feeders which are near to or at the end of their regulatory economic life. NGG believes this proposal offers an opportunity for gas consumers to extract some residual value from pipelines which are otherwise expected to be under-utilised.

1.3. NGG is not proposing to change existing baselines (which define NGG's obligation to provide capacity at different points on the system) following a disposal, so NGG's existing obligations and allowed revenues are unaffected.

Physical Asset Disposal

1.4. NGG's proposal is associated with a project which involves the capture of CO_2 at a Scottish power station and the transportation of this CO_2 by pipe to St. Fergus for onward pipeline transportation and sequestration in a North Sea field. NGG is proposing the use of various sections of feeder pipe from its St. Fergus terminal to the Scottish central belt. This pipeline could enable most, if not all, of Scotland's economically recoverable CO_2 to be transported into storage, if the project is successful and developed further in the future. The general locations of the feeders involved are shown in Figure 1. The pipeline sections are all 36" in diameter and equate to a total pipeline length of nearly 300km.

1.5. The NGG proposal for the disposal of certain pipeline assets for re-use in CO_2 transportation is conditional upon a successful outcome in the DECC demonstration competition, although there may be other opportunities for the development of a Scottish CCS supply chain. In order that the assets can be used to transport CO_2 work will need to be undertaken to modify the existing assets. To allow sufficient time for this work, NGG envisages that the relevant sections of the NTS would need to be removed from natural gas service in Q2 2013.

1.6. If National Grid's involvement in a CCS project progresses, NGG will be required to seek the consent of the Authority to dispose of sections of feeder pipelines from the NTS.

1.7. If the Authority consents to the disposal, NGG currently plan to dispose of these assets to a new wholly-owned subsidiary National Grid Carbon (NG Carbon)[1], which will operate them for the purposes of transporting CO_2. It is the intention that all maintenance and operation of these assets, once disposed of by NGG, would be fully funded and managed by NG Carbon; funding and management of the disposed assets will not fall to NGG. NG Carbon would also take on any future decommissioning liabilities for those pipes.

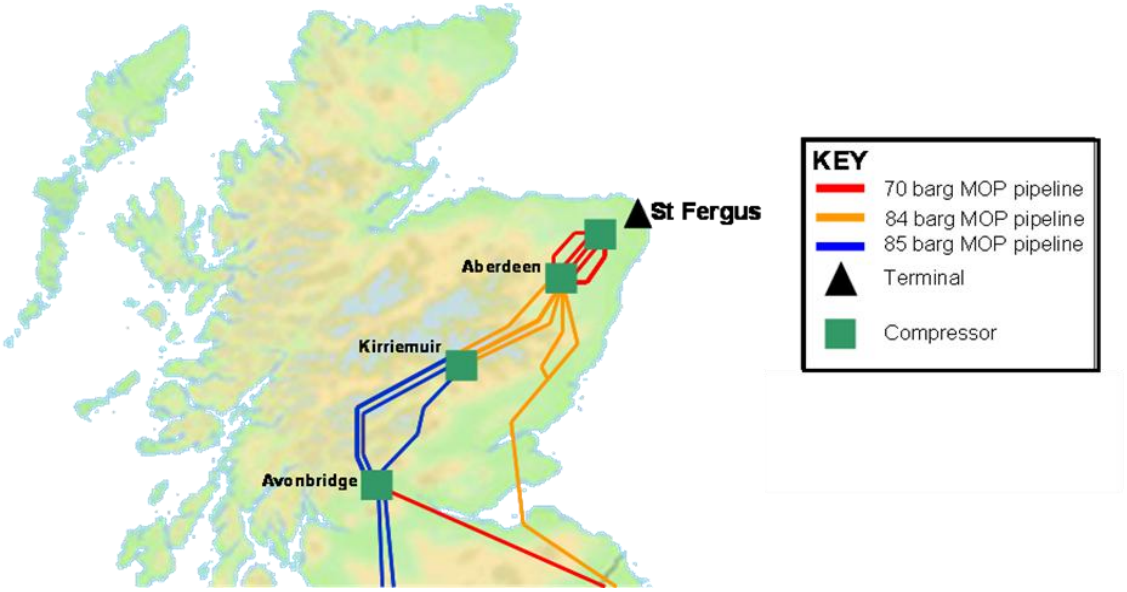

Figure 1: NTS Pipeline feeders

1.8. Summary details of the pipeline sections under consideration for conversion to CO_2 transportation are shown below:

Scottish Feeder	Diameter	Approximate length	Pipeline maximum operating pressure
St. Fergus - Avonbridge	900mm (36”)	~ 300 km	70 – 85 barg

[1] NG Carbon is the subsidiary company of National Grid which has been set up in order to develop the carbon dioxide transportation business.

April 2009 Initial Consultation

1.9. We published our initial consultation on these proposals in April 2009[2]. We received a total of 27 non-confidential responses which we have published on our website. The responses are summarised in Appendix 3, and a description of key points raised and NGG's views on these forms Chapter 3 of this document.

The Office of Carbon Capture and Storage

1.10. At present, regulatory aspects of CCS, including CO_2 transportation fall outside Ofgem's remit. The actions needed for CCS to be successful will be undertaken using a coordinated approach through the Office of Carbon Capture and Storage (OCCS), which is tasked with facilitating the delivery of CCS in the UK, and helping to promote the rapid deployment of CCS globally. The Office will set the strategic path for the use of CCS, facilitate the delivery of the demonstration programme, create the policy and support arrangements to stimulate private sector investment, and work with stakeholders to remove barriers to investment and development in the UK and globally. It will also look to maximise the domestic and global opportunities for UK businesses and the economy to benefit. The OCCS is tasked with facilitating the development of CCS technology, including the UK demonstration programme, innovation, and funding and working with stakeholders to ensure the wider framework for delivering CCS in the UK exists, including regulation and UK skills and capacity.

[2] Proposed disposal of part of NTS for Carbon Capture and Storage (Ref: 35/09), 8 April 2009

2. Regulatory considerations

This chapter explains regulatory considerations which the Authority needs to take into account in reaching a decision about whether to grant consent or not for the proposal, and highlights the legal framework within which any decision must be made.

Consent for disposal

2.1. If the bid in which National Grid is involved is successful, NGG will need to seek the formal consent of the Authority to dispose of part of the NTS, so that it may be re-used to transport CO_2. This is pursuant to Standard Special Condition A27 (Disposal of Assets) of NGG's gas transporter licence in respect of the NTS.

Legal framework

2.2. Standard Special Condition A27 (Disposal of Assets) in NGG's Gas Transporter Licence requires NGG to give the Authority prior written notice of its intention to dispose of or relinquish operational control over any transportation asset. The licensee requires the consent of the Authority to any such disposal. In addition, if the transportation asset comprises a significant part of the gas conveyance system in Great Britain, then NGG also needs to notify the Secretary of State and seek his/her consent to the disposal.

2.3. The last time the forerunner to Standard Special Condition A27 was deployed was in 2003/04 in relation to the sale by Transco of half its distribution assets. This triggered the notification requirements to the Secretary of State. The Authority consented to the disposal of half of the gas distribution network, but imposed a number of conditions on the approval. We believe that a similar notification is required on this occasion, although it is recognised that the proposed disposal of assets by NGG is directly linked to the outcome of the Government's CCS demonstration competition. We believe that if consent were to be given for disposal, it would need to be associated with a number of conditions. A key consideration in deciding whether to grant consent or not, is that there should be no detriment to consumers and any conditions associated with consent should serve to protect the interests of consumers by avoiding the risk of detriment.

Considerations for the Authority in reaching a decision

2.4. The Authority's powers and duties are largely provided for in statute and are summarised in Appendix 5 of this document. 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. 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;
- 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.

2.5. The Energy Act 2008 changed the hierarchy of duties contained in the Acts so that the requirement that the Authority carries out its functions in the manner which it considers is best calculated to contribute to the achievement of sustainable development is of equal importance.

2.6. The Authority's principal objective when carrying out certain of its functions under 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.

2.7. The Energy Act 2008 also makes clear in the text of the Authority's principal objective that it should act in the interests of both existing and future consumers. Whilst the Authority was already required to take into account future consumers, increasing the profile of this requirement was intended as a signal about the significance that should be placed on the interests of future consumers.

2.8. The Energy Act 2010 contains provisions which, once commenced, will modify the principal objective and general duties of the Authority in carrying out its functions under the Gas Act 1986 and the Electricity Act 1989. In particular, the interests of existing and future consumers specified in the principal objective have been clarified as interests taken as a whole including their interests in the reduction of greenhouse gases and in the security of supply to them.

2.9 The changes include moving the competition element of subsection (1) of the principal objective to a new subsection (1B) requiring the Authority to carry out its functions as it considers is best calculated to further the principal objective, wherever appropriate by promoting effective competition. The changes will also mean that, before deciding to carry out functions in a particular manner with a view to promoting effective competition, the Authority must consider to what extent consumers' interest would be protected and whether there is any other manner in which to carry out those functions that would better protect consumers' interests.

2.10 The changes to subsection (2) setting out the matters to which the Authority shall have regard in performing its functions include, in respect of the need to secure that license holders are able to finance the activities which are the subject of specified obligations, an addition to those obligations which now include these additional activities that licence holders may be required to finance - the electricity supply levy, schemes for reducing fuel poverty and adjustment of energy charges to help disadvantaged groups.

2.11 The Energy Act 2010 received Royal Assent on 8 April 2010 but the provisions relevant to amendments of the principal objective and general duties of the Authority do not have legal force until they are commenced 2 months after the Act has been passed.

2.9. During the period between the Energy Act 2010 having received Royal Assent and commencement of the provisions which affect its duties, the Authority must continue to apply the principal objective and its statutory duties, in accordance with the Gas Act 1986 and the Electricity Act 1989 as they currently stand (i.e. prior to the Energy Act 2010 amendments taking effect), although it will be mindful of the changes that are forthcoming.

2.10. Ofgem's environmental and social duties also require us to take account of guidance[3] to the Gas and Electricity Markets Authority from the Secretary of State in this regard. Section 4AB of the Gas Act and section 3B of the Electricity Act 1989 (inserted by sections 10 and 14 of the Utilities Act 2000) provide that the Secretary of State shall give the Authority guidance as to the contribution which they consider the Authority should make towards the attainment of the government's social and environmental policies.

2.11. The Authority is required to have regard to the guidance when discharging its statutory functions to which its principal objective and general duties apply. The Government therefore expects the Authority to take account of this guidance in its corporate planning process. In this way, the Authority can make a contribution, appropriate to its functions, principal objective and duties, towards the wider social and environmental objectives of the government, without compromising the principle of arm's length regulation.

2.12. The guidance most recently provided by the Secretary of State in January 2010, says that the Government sees two principal long term challenges in energy policy: tackling climate change by reducing carbon dioxide emissions within the UK and abroad; and ensuring secure and affordable energy as the UK becomes increasingly dependent, in its consumption of fossil fuels, on imports. The guidance states that within this context the Government's social and environmental energy goals are to:

[3] Ofgem's Environmental and Social Duties - published on Ofgem's website: www.ofgem.gov.uk

- increase renewable energy levels to 15% of total UK final energy consumption by 2020, as will be required by the proposed directive on the promotion of the use of energy from renewable sources;
- reduce greenhouse gas emissions by at least 80% by 2050 from the 1990 baseline, and to establish and implement carbon budgets for the UK to chart the trajectory necessary for achieving this legally binding target as required by the Climate Change Act 2008;
- to reduce carbon emissions by at least 34% from the 1990 baseline by 2020;
- to meet our share of Europe's 20% reduction in all greenhouse gas emissions by 2020;
- eliminate fuel poverty as far as reasonably practicable among households in England, Scotland and Northern Ireland by 2016 and in Wales by 2018; and
- contribute to a 20% reduction in EU energy consumption by 2020.

2.13. The guidance further states that over the next decade and beyond the UK will need to increase very significantly the proportion of its energy which is derived from renewable, nuclear, or other low carbon sources. The Government considers that the Authority has an important role consistent with its principal objective, general duties and functions, in bringing about an energy system that encourages substantial carbon emission reductions in a timescale consistent with the above targets. The government also notes that the appropriate development of networks is key to achieving the transition to a lower carbon energy system while maintaining security of supply.

3. Issues raised in response to initial consultation

This chapter describes the main issues that were raised in response to our April 2009 consultation and NGG's subsequent reaction to these issues (where appropriate). This includes queries about the details of the proposal, regulatory issues, valuation of assets and commercial options.

3.1. In our April 2009 consultation document, we set out NGG's original proposal to dispose of certain feeder pipes from the St. Fergus entry point, in order that they could be used for CO_2 transportation. In the sections below we provide a brief recap on the specific elements of the proposal being commented on, summarise the issues raised by respondents and provide NGG's reaction to these issues. Subsequent chapters describe how NGG has revised its initial proposal in the light of the responses

3.2. The proposal has the potential to impact on NGG's costs and obligations under its licence. In principle, NGG could have sought to reduce the baseline at St. Fergus, but has chosen not to do so. As a consequence there is a small risk that, under some circumstances, higher buyback costs could occur. We described how an assessment of the capability of the network under various forecast flow scenarios was undertaken by NGG. NGG considered that future supplies at St. Fergus would be below the current level which NGG has an obligation to accommodate.

3.3. In order to assess the potential risk that network capability could be exceeded, NGG undertook scenario analysis which considered the impact of other factors, which could increase flows, exceeding capability and therefore incurring cost. Reflecting the risk that following disposal of the assets, gas flows could exceed capability NGG proposed a range of potential risk/reward sharing options. These were presented and we invited comments on the appropriateness of the methods of valuation and the risk/reward sharing options.

3.4. There were 27 non-confidential responses received to our Initial Consultation. A question-by-question summary of the responses received is included in Appendix 3. Overall, respondents to the last consultation expressed support for NGG's proposal but some of this support was conditional on the impacts on shippers (and ultimately gas consumers) being nil or beneficial. There was mixed opinion of the benefits of the proposed disposal for gas consumers.

3.5. Key issues raised in response to our initial consultation were related to the proposal details, regulatory issues, valuation of assets and commercial options. Some of the main topics were:

- Independent scrutiny of flow forecasts and network modelling
- Valuation of assets
- Commercial options for risk / reward sharing
- Exit capacity and flow flex

- Further issues including security of supply and linepack
- Issues associated with the CO_2 business rather than with gas transportation

These issues are further elaborated on below.

Independent scrutiny

3.6. The initial proposal was based on NGG's forecasts of future supplies at St.Fergus. Similarly the assessment of network capability with a feeder removed was reliant on network analysis carried out by NGG.

3.7. Respondents wanted to verify that the assets in question were not required for future use and a number of respondents insisted that any supporting analysis should be thorough and robust before any decision is made by the Authority. There was strong support for forecast flows through St. Fergus and network capability modelling to be authenticated by an independent party. There was a specific concern that all potential sources, including Norwegian flows, developing fields, UKCS actual decline (versus predicted) and LNG imports were not fully accounted for in the analysis that was presented in the original consultation.

3.8. We asked NGG to commission independent studies to address these concerns and these are reported in chapter 4.

Valuation of assets

3.9. NGG's original proposal suggested several approaches to valuing the relevant assets. These included a value based on MEA (modern equivalent asset) value; the adjusted economic life of the assets; the value implied by the DECC Competition; the value embedded in the original design expectation; a valuation based on the depreciated asset register; a valuation based on the NTS infrastructure value; and a valuation derived from the number of anticipated pipeline years. These approaches resulted in asset valuations in the range £0.2m to £182m. Each approach was described in the consultation and we invited views about these.

3.10. There was some support for the range of valuations proposed by NGG, however it was recognised that the range was wide and there was concern that this range was too wide to develop an appreciation of the commercial value of the assets in question. There were requests for independent valuations to be considered and for these calculations to take account of the perceived uncertainty in future flow forecasts through St. Fergus. NGG were asked to provide a more complete breakdown of their valuation and depreciation calculations.

3.11. In response to questions about depreciation, NGG has indicated that it currently depreciates its gas transmission pipelines over 45 years in its statutory accounts. For its Regulatory accounts, NGG takes the value of its assets as at 31st

March 2002 and depreciates them over 56 years using a 'sum of the digits'[4] depreciation methodology. For any more recent assets (1st April 2002 onwards), it depreciates them over 45 years using a 'straight line' depreciation methodology.

3.12. One of the proposed approaches to valuing the assets involved the use of Modern Equivalent Asset (MEA) based valuations. Respondents generally regarded the use of MEA valuations as inappropriate as they assume the full capacity of the existing pipe is required for CCS. NGG has argued that such an approach did not recognise the value of investment already returned to gas shippers and consumers through the use of these pipelines in the past. There was no general consensus in favour of a MEA approach amongst respondents. Another of the proposed approaches to valuing the assets involved the use of historic cost accounting principles. However, some respondents considered that the book valuation of the asset was not representative of the true cost of carbon transport. One respondent argued that the low value that might be ascribed to the asset would be expected to have only a modest impact on transmission charges. The use of historic cost accounting principles was considered inappropriate by a number of respondents. Ofgem's views on asset valuation are discussed in chapter 5.

3.13. Some respondents suggested that the value of the assets should be determined through a competitive process. Other suggestions on the approach to revaluing the assets included using techniques which assess the opportunity cost of the assets, or recalculation of the asset's depreciation to the end of the competition date. Some respondents considered the sale of the assets to NG Carbon at book value as inappropriate because this was seen as resulting in unnecessarily favourable terms for use in a competitive market. As a consequence some respondents considered it more appropriate to retain the asset under NGG ownership and to make the asset available through a "change of use".

3.14. However, NGG state that the reason why the CO_2 transportation cannot be a business service within NGG is because it would be governed, and limited, by NGG's Gas Transporter Licence. As a result it is NGG's view that developing a CO_2 transportation business within the existing licensed gas transportation business would not be appropriate. The establishment of NG Carbon within the National Grid group of companies allows for greater transparency in the regulation of NGG and its relationships with the CCS business.

3.15. There was concern that the Authority's decision would set a precedent for future disposals. Respondents strongly emphasised the importance of choosing a valuation methodology that, as far as a possible, could be uniformly applied for future disposals. We note the views above and have set out our comments on asset valuation in chapter 5.

3.16. One respondent queried the reason for using a date of 2018 as the date when the assets may be considered surplus to requirements. NGG considers that 2018 is

[4] Sum-of-digits is an accelerated depreciation method which expenses the larger proportion of the cost of the fixed asset over the early years of that asset's life.

the time from which, due to declining UKCS production (even with the inclusion of West of Shetland developments), that supplies to St. Fergus will drop below levels that could cause a constraint, even with the removal of a pipeline. This was highlighted in the April 2009 consultation document (paragraph 3.35).

3.17. NGG's MEA valuation assumed that the economic life of the assets in question is limited by the duration of the DECC CCS competition. Some respondents queried this assumption, given that CCS may continue beyond this date. NGG argue that their analysis is based on the competition timescales, as this is the period over which the asset would be used, and this impacts on the depreciated value of the asset in CO_2 transport. NGG argue that the DECC CCS demonstration projects will operate for a specific number of years and any commercial use of the assets beyond this period could only be speculation at this stage, especially given the demonstrative nature of the competition. NGG also pointed out that this was only one of the options and timescales given in the asset valuations - the asset life for CO_2 transport will be reconsidered after the demonstration period has ended and there is more certainty around the future viability of CCS.

3.18. At a more detailed level, some respondents asked why when NGG calculated the MEA, the first year of use for the pipeline varied between 1975-78, however when calculating the pipeline years adjusted value the year of commissioning is 1970. NGG believe that there is no difference in the treatment. NGG used 1970 as a reference date to illustrate the methodology they propose to use to calculate a pipeline value. The actual calculation proposed by NGG takes each pipeline section and applies the year of commissioning specific to that asset, hence providing a first year of use within the range 1975 – 1978. This is how the 'total network remaining pipeline usage value' of 97,416 was derived, as set out in section 4.17 of our April 2009 initial consultation document.

Commercial options

3.19. The initial consultation set out a number of options for ways in which payment could be made to NGG for the assets upon disposal. NGG considers that the aim of these options was to provide a balanced and flexible set of choices which could allow gas shippers and consumers to participate in both the potential risks and rewards of the CCS project. The April 2009 consultation set out three commercial options which were: a lump sum payment reflecting the value of the physical assets transferred; and two variants based on royalty payments linked to the tonnage of CO_2 transported through the modified assets for the competition – a simple royalty and a participatory royalty.

3.20. There was little desire expressed for risk sharing and the majority of respondents favoured a lump sum payment. It was believed to be simple and more transparent compared to the royalty payments approach ("a clean-break"), and it would benefit consumers quickly. It was also suggested that this approach might be combined with a payment to cover increased opex as a result of buyback or increased compressor running costs.

3.21. The participatory royalty scheme was generally not favoured. There was concern that this scheme would risk exposing gas consumers to uncertain costs if extra buyback costs deviated from predictions, if CCS uptake differed from that predicted, or if there were delays in the development of the CCS business.

3.22. There was a cautious response towards a risk/reward sharing mechanism – it was not clear that consumers should or would want to be exposed to cost risks which depend on the success of the demonstration competition. There was support for NG Carbon to pay for all increased opex costs as a result of buyback or increased compressor running costs. Respondents thought that a mechanism set on an ex-ante basis would be difficult to set and could end up inequitable for one party and consequently distort the results of the demonstration competition.

3.23. Ofgem were asked how they would handle a signal supporting the need for new investment at St. Fergus post disposal. We believe that in such circumstances, additional capacity would need to be triggered via an incremental signal allowing NGG to decide whether to invest to meet the new higher obligation. Ofgem were also asked to include further analysis into the accuracy of forecast flows through St. Fergus, the likelihood that the NTS could be used as a transit route for Norwegian gas, NGG's asset valuations and the impacts on flexibility from the loss in linepack. The comments about forecast flows have been addressed via the independent studies which were carried out and are reported on in chapter 4, we have set our views on asset valuation in chapter 5, and the flexibility and linepack issues are discussed below.

Exit capacity

3.24. NGG's original proposal did not present specific analysis commenting on the potential impacts of a disposal on exit capacity and system flexibility.

3.25. Respondents queried the effect of the proposal on NGG's ability to meet its exit capacity obligations. NGG proposes that its obligation to make capacity available up to the baseline (plus any obligated) in accordance with its Gas Transporter Licence will not be affected by the disposal of the relevant assets. One respondent queried whether disposal could have any impact on the Moffat exit point, including the ability to offer a reverse flow product at Moffat. NGG notes that discussions regarding reverse flow at Moffat are ongoing but in the short term this reverse flow product is likely to be non-physical and on an interruptible basis. If a physical service were to be provided via entry capacity bids being placed then NGG would have to assess the impact on the NTS and, in accordance with the Incremental Entry Capacity Release statement and Exit Substitution Methodology statement, assess how such requests are met. There is not expected to be any change to the arrangements at Moffat, or NGG's ability to deliver them.

3.26. Another respondent questioned whether the proposal would affect the ramp rates or access flow flexibility of Direct Connects (DCs). NGG has confirmed to Ofgem that the flow flexibility provided to DCs via current means and the Notice Periods will

still apply. The flow flex provided to the distribution networks via the Offtake Capacity Statement will remain unchanged. The analysis to date on assured pressures and system flexibility around Scotland has been and continues to be modelled. NGG's analysis has shown that there should not be any detrimental impact to the current level of service experienced by Distribution networks in Scotland in the majority of scenarios. Given that analysis for flat/flex requirements involves the ability to meet assured pressures then the exit capacity service to distribution networks should remain unchanged.

3.27. NGG acknowledges that in some very extreme scenarios, it may not be possible to provide the current levels of service around assured pressures, at certain points in Scotland. NGG has said that NG Carbon will meet any incremental costs arising in the event that an extreme scenario led to the need for mitigating actions required to make sure that the distribution network was not adversely impacted.

3.28. NGG assesses that there is only a very small probability of any negative impacts to DNs arising as a result of the proposal (due to the extreme nature of the relevant associated scenarios) and the availability of commercial tools to address these scenarios. NGG would expect NG Carbon to bear the incremental cost of managing any mitigating actions needed.

3.29. The sections of pipelines proposed for disposal between St. Fergus and Avonbridge have been chosen to minimise the impact on the NTS and DN gas networks and minimise costs. Any costs due to the need to remove / replace offtakes (or any other modifications to the NTS resulting from the disposal of the feeder) would be fully funded by NG Carbon. NGG would not face the costs of any such changes or modifications, which are necessary solely to separate the relevant sections of the feeder which is to be disposed of, from the NTS.

Further issues

3.30. Ofgem was asked to consider the impacts of the proposed disposal on security of supply under different scenarios, including compressor failure or increased flows. Ofgem was also asked to assess the impact on flexibility given the loss of linepack. The interaction with the current (at the time) entry capacity substitution proposals[5] was also queried as were the impacts on trade and transfer, and the commodity price. These concerns are addressed in this document. A variety of other issues were raised and they are summarised below.

3.31. Some felt that Ofgem's decision process should not delay progress on the CCS demonstration project; neither should the project deadlines impact on thorough analysis and consultation supporting the decision process. Our process is intended to be timely and to allow for appropriate analysis and consultation.

[5] NGG's Entry Capacity Substitution methodology was approved by Ofgem in December 2009 and entry capacity substitution has now been implemented.

3.32. There was concern that royalty payments from the CO_2 business to NGG could distort the CCS demonstration competition. We understand that any such payments would be treated in the same way as other costs associated with acquiring or developing a transportation asset by NG Carbon.

3.33. There was support for additional fuel costs arising from working the remaining compressors at a higher loading, and other costs resulting from the higher loads on these compressors to be funded by NG Carbon. NGG were asked if other costs associated with the disposal including potential off-take relocations would be considered in deciding the sale price of the asset. In reply, we understand that NG Carbon would be responsible for any such costs, separate from the disposal valuation.

3.34. The use of long term bookings in producing future forecasts was criticised as it was believed that these were not representative of actual flows experienced through St. Fergus. We understand that the future forecasts were not based solely on long term capacity bookings but on a range of relevant factors. The study undertaken by Wood Mackenzie (set out below), also serves to provide an independent view of forecast future flows.

3.35. The initial consultation was criticised by some respondents for ignoring the benefits that the CCS could provide consumers as a carbon dioxide abatement technology. The CCS project is a demonstration the aim of which is to prove the technology on a commercial scale. We do not believe that it would be appropriate to include such benefits in the analysis until the demonstration was concluded.

3.36. There were concerns that the proposals to reduce the physical capacity of the pipeline were to precede a reduction in baseline capacity in the next price control. The current proposal will not change the current baseline at St. Fergus. However it would not be realistic to express a view about a particular aspect of the overall package of measures which are considered during a future price control review.

3.37. A review process was requested to address issues and assumptions with hindsight once a decision on the proposed disposal has been made. We believe that the present consultation provides all interested parties with adequate opportunities to express their views and to bring forward relevant new information to allow Ofgem to properly reach a decision.

3.38. Respondents queried whether NGG's flow rate assumptions reflected actual flow patterns or whether they were based on an assumed 1/24th flow rate. NGG has stated that its network analysis has been conducted on a steady state basis i.e. assumes a 1/24th flow rate. Network analysis on a transient basis i.e. on profiled flows, has also been conducted to support the steady state analysis. This highlighted no significant operational issues within reasonable national gas demands. The changing dynamics of the system would mean an increased use of the northern compression fleet and this has been accounted for in NG Carbon's costs.

3.39. Some respondents expressed concern that the proposals might increase the risk of compressor failure, or reduce the ability of the NTS to respond in the event of a failure. NGG assert that this is an inherent risk that is managed through the design process and that standby capability should be available at each compressor site. NGG argues that the risk of compressor failure is small because when considering failure frequencies on a site by site basis the failure events become much less frequent because of the availability of standby compressor provision. Failure frequencies experienced by customers are further reduced by the markets (and the operator as a last resort) having the ability to call on gas supplies from alternative sources should that be necessary to maintain security of supply. NGG's belief is that the risks associated with compressor unit failures will continue to be maintained at a low level.

3.40. Respondents queried the impact of the potential loss of linepack. There is a loss of line pack associated with the proposed disposal, but NGG calculates that there is sufficient linepack available to meet the present level of demand. However, the absolute quantity of linepack that is available in the Scottish section of the NTS must reduce if a 300km pipeline is taken out of use. NGG do not believe this will restrict its ability to meet linepack demand. In NGG's view it is expected that gas flows from St. Fergus will decline beyond 2017 which, in turn, should facilitate a provision of greater quantities of network flexibility.

3.41. In NGG's opinion, the retention of capacity baselines, and the belief that NGG can meet future supply forecast requirements, suggests that CCS is unlikely to have a significant impact on entry capacity substitution. Access rights to St. Fergus would not be affected if baselines are maintained. The NGG proposal is structured so as to minimise impact to shippers' access to the system. NGG would still be required to release NTS Entry Capacity at an Aggregated System Entry Point (ASEP) in accordance with its Gas Transporter Licence and Incremental Entry Capacity Release Statement.

3.42. Respondents to the initial consultation queried whether there were any precedents from previous disposals, such as DN sales. A feature of the proposed disposal of the feeder is that it is an existing transportation asset for which an alternative use (non-natural gas transportation) is being proposed. Although there have been other cases of asset disposals, including the sale of NGG's Distribution Networks and the transfer of the Isle of Grain LNG storage site, there is no obvious precedent to a disposal for alternate use. In the case of the sale of a number of NGG's Distribution Networks this was undertaken on the basis of existing licensed activities being transferred to new owners who would be similarly licensed; the DN businesses were being sold as 'going concerns' and would continue to use the existing assets for their existing purpose.

3.43. Likewise, the transfer of the Isle of Grain LNG storage site to National Grid Grain LNG for subsequent development into an LNG importation terminal relates to an asset that was not a gas transportation asset being sold to a legally separate entity.

Issues associated with the CO_2 transportation business

3.44. Several potential issues related to the new CO_2 business were highlighted by respondents to the consultation.

Regulation of CCS

3.45. Issues raised during consultation included third party access, capacity hoarding, potential "use it or lose it" (UIoLI) arrangements and the development of the CO_2 network by identifying further gas assets that could offer value to this industry. The OCCS will be facilitating a wider framework for the development of CCS technology. It is not currently in Ofgem's powers and duties to exercise any condition that could be regarded as regulating this industry.

Health, Safety and the Environment

3.46. The assets in question were designed to carry natural gas at high pressure; the assets would need to be assessed for material suitability, risk of leakage, and an action plan would need to be developed in case of leakage. Again, these points are noted, but are outside of Ofgem's remit.

4. Future flows at St. Fergus and pipeline capability

This chapter describes the independent studies that were undertaken by Wood Mackenzie and Poyry Energy Consulting, focusing on flow forecasts at St. Fergus and on conducting an audit of National Grid's network analysis.

Question 1: What is your view of the conclusions drawn about future flows and capability based on the consultants' reports?

Future network requirements

4.1. NGG sought to assess the impact of its original proposal by forecasting the ability of the network to accommodate the level of supplies expected via St. Fergus. A common feature of all of NGG's forecasts is that future supplies at St. Fergus are expected to be below the current baseline level, even if new supplies appear. The highest peak day level is for the year 2015/16 when flows of around 136mcm/d could be expected under the high range scenario. This compares with a predicted capability of 130-133 mcm/d if one of the existing feeders were to be removed. NGG's 2008 Ten Year Statement base case forecast does not predict peak flows above 115mcm/d[6] over the same period. Comparison of the initial analysis with NGG's latest 2009 Ten Year Statement shows slightly lower forecast peak flows for the same period, 2013/14 – 2018/19.

4.2. As detailed in the previous Chapter, several respondents requested independent verification of the forecast flows and network capability modelling performed by NGG. We asked National Grid to commission independent studies by Wood Mackenzie and Poyry Energy Consulting, assessing flow forecasts at St. Fergus and auditing NGG's network analysis, respectively. We published a non-confidential summary of the Wood Mackenzie study on our website[7] and the Poyry Energy Consulting report in full, in January 2010, and invited comments on both reports from all interested parties.

Wood Mackenzie report

4.3. Wood Mackenzie was appointed as gas market consultant to prepare an independent report, intended to provide sufficient information to assess the future potential gas flows coming into St. Fergus for the period 2013/2014 to 2017/2018 as well as to consider potential flow upsides. Gas supplies flowing to St. Fergus comprise a mixture of indigenous UK gas and imports from Norwegian gas production.

[6] This is a flow measure: million cubic metres per day.
[7] Proposed disposal of part of National Grid's National Transmission System for Carbon Capture and Storage: Publication of independent studies by Wood Mackenzie and Poyry Energy Consulting (Ref: 7/10), 20 January 2010

4.4. Wood Mackenzie forecast the contribution to future UK gas production from the remaining UK reserves, which are characterised by declining production volumes, but with considerable potential upside to the extraction of the remaining reserves. The study commented on the likelihood of further gas discoveries through future exploration drilling and the contribution from North Sea Norwegian gas production.

4.5. The Wood Mackenzie report concluded that estimated overall gas flows to St. Fergus would be flat around the current level for the next three to four years - production decline is expected to be overcome to some extent by additional production coming from technical (remaining) reserves and, to a lesser extent, from Norway. Flows are expected to peak in the year 2014/2015 when the new production from West of Shetlands will be available, but flows are expected to decline thereafter.

4.6. The conclusions drawn by NGG about forecast future flows at St. Fergus, which we reported in our April 2009 consultation document, appear to be consistent with the views expressed by Wood Mackenzie.

Poyry Energy Consulting Report

4.7. Poyry Energy Consulting was appointed to examine the network analysis models used by NGG to assess pipeline capability from the St. Fergus entry point with one of the feeders removed. The purpose of this audit was to provide an independent view to Ofgem and to industry about the network analysis undertaken by NGG and to indicate whether the St.Fergus capability values, which we published in our April 2009 initial consultation document, are reasonably representative of the physical network.

4.8. Poyry Energy Consulting's study reported that both the approach and the assumptions used by NGG in the analysis were reasonable and, where relevant, consistent with normal network analysis. The audit also established the extent to which flow capability generally remains above 130mcm/d, for the period under consideration.

4.9. In particular, Poyry Energy Consulting concludes that:

- the St. Fergus capability has not been overstated;
- NGG's network analysis models contain appropriate technical and commercial constraints;
- underlying supply and demand assumptions used in the models are derived from data sources which are consistent with those used for the Ten Year Statements;

- the network models had not been created subsequent to the publication of the April 2009 document; and

- NGG adopted a conservative approach to the analyses such that the impacts to network capability of the proposed asset disposal are not underestimated.

Responses to the consultants' reports

4.10. We invited responses to the consultants' reports when they were published, and we received a total of 5 non-confidential responses which are published on Ofgem's website. Four of the respondents welcomed the reports. Of these three respondents expressed positive views about the assurance that these studies provided about the robustness of the analysis, which indicated that there would be minimal likelihood of the proposed asset disposal resulting in any adverse impact on the system.

4.11. Other issues, not directly related to the consultants' reports were also raised. One respondent queried the impact of the disposal on assured pressures[8] and system flexibility for users. (These comments are addressed in chapter 3.) One respondent commented that the reports indicate that shippers should not be exposed to higher system operator costs. (This is addressed in chapter 5.) This respondent also raised queries about the regulatory treatment which could be applied to the CO_2 regime and queried the technical and safety aspects of CO_2 transportation. (Ofgem's role in this regard has been explained earlier).

Ofgem view

4.12. Both National Grid and Wood Mackenzie forecasts show future expected flows from West of Shetland and Norway, including growth, and both anticipate actual flows will be short of the existing baseline at St. Fergus and in line with the projected reduced capability of network. Respondents who commented on the published Wood Mackenzie and Poyry Energy Consulting reports welcomed them and expressed positive views about the conclusions. Based on the evidence presented and the views of the consultants, we consider that the projected flows will be compatible with the physical capability of the reduced network without additional compression being added. We would welcome any further views on the conclusions drawn about forecast flows at St. Fergus and the assessment of network capability.

[8] The Assured Offtake Pressure is the requirement that gas made available at the point of offtake is in accordance with the Offtake Pressure Statement, issued each year by NGG for each DN user and NTS/LDZ offtake.

5. NGG's revised proposal

This chapter describes the revised proposal from NGG and how this reflects the comments received in response to the April 2009 consultation document. It also provides Ofgem's views on elements of the revised proposal, where appropriate.

Question 1: What is your view of the structure of the revised proposal overall?

Question 2: What is your view of the treatment of incremental buyback, opex, Compressor Fuel Use and other costs identified?

Question 3: What is your view of the suggested approaches to asset valuation?

Question 4: What is your view of the proposal for sharing the benefits of increased CO_2 throughput?

Question 5: What is your view of the suggested mechanism for returning value to gas consumers?

Question 6: Are there any other considerations which have not been taken into account?

Allocation of risks

5.1. In response to the April 2009 consultation on the proposed asset disposal, most of the respondents who expressed a view made it clear that they had concerns about consumers being exposed to risk and uncertainty as a result of the CCS project.

5.2. NGG's original proposal envisaged that the amount of remuneration received by consumers for the disposal of the assets should be adjusted to take account of the additional buyback and incremental CFU[9] costs that will be borne by NG Carbon.

5.3. If consumers take no risk of buyback or incremental CFU costs, NGG argues that they should equally receive only limited benefit if these costs are lower than expected. However, other consultees noted the uncertainty over revenues and costs that will be borne by NG Carbon. National Grid's view is that given these uncertainties, and shippers' preferences, it is critical that a robust framework is developed around benefit sharing that prevents:

a) on the one hand the potential for exceptional gains for NG Carbon; while

[9] CFU is compressor fuel usage used to drive the compressors on the network. Incremental CFU is the additional compressor fuel which may be necessary to transport gas through the remaining pipelines because a feeder is removed.

b) on the other hand satisfying Ofgem's objective of ensuring "no net harm to gas consumers" and recognising that there is a risk to NG Carbon that buyback and CFU costs could exceed the conservative P90 forecast.

Overview of NGG's Revised Proposal

5.4. NGG's original proposal has been revised to take on board the comments and views received from those parties that responded to the April 2009 initial consultation document, as well as comments and thoughts expressed in subsequent discussions between NGG and Ofgem. NGG believes there are a number of risks associated with the proposal but the two risks that stand out as difficult to quantify and forecast are the risks that NGG may be required to buyback entry capacity at St. Fergus and in relation to the level of incremental opex. These are driven by wider market factors over which NGG has limited influence or control[10] and over which there is considerable uncertainty regarding the impact and likelihood of events.

5.5. Ofgem's current view is that consumers should not be subject to either the buyback risk or the opex risk. It does not appear to be appropriate for gas consumers to bear risks associated with the NG Carbon CO_2 transportation business which are unrelated to providing and operating the NTS. This view was echoed in responses to the April 2009 consultation. NGG's revised proposal is structured to reflect this view.

5.6. The disposal of NTS assets could potentially impact on NGG's commercial obligations, as expressed through the entry capacity baselines and buyback. NGG's revised proposal seeks to ensure that users of the gas transmission system are not adversely impacted by the disposal of the assets, while providing for potential upside. NGG's updated proposal contains the following key elements which are further discussed below:

- **Baselines** - current entry capacity baseline at St. Fergus is maintained, with the option of constructing additional compressors if necessary
- **Buyback** - any incremental buyback costs resulting from the removal of the feeder will be met by NG Carbon
- **Opex** - any increases in operating costs resulting from the removal of the feeder will be met by NG Carbon
- **Valuation** – transfer at net book value plus an advance of the expected revenues from the alternative use of the assets
- **Revenue sharing** - NG Carbon will pass to gas consumers a share of incremental revenues (net of costs) from CO_2 transportation

[10] NGG has control in the way it operates and maintains its NTS network, it also has obligations under its licence to operate efficiently and economically. Minimising system buyback costs would be consistent with this.

NGG also notes that there are a number of **consequential benefits** that arise from implementation of the proposal, primarily in terms of defrayment of future liabilities

Baselines

5.7. NGG is not proposing to change existing baselines (which define NGG's obligation to provide capacity at different points on the system) following a disposal, so NGG's existing obligations and allowed revenues are unaffected.

5.8. It is noteworthy that under the current regime, any unsold baseline capacity can be moved to other entry points where it might be valued more using the capacity trade and transfer mechanism. Additionally capacity substitution allows for the permanent move of baseline capacity from one entry point to another entry point. Such a permanent reduction in baseline at St. Fergus would reduce the obligation with respect to capacity release for NGG and would reduce the buyback exposure as a result.

Security of Supply Considerations

5.9. NGG propose to preserve the current natural gas capability of this section of the NTS as far as possible. As described above, NGG propose to construct additional compressors should this prove necessary in order to meet their entry capacity obligations. By retaining current baseline levels at St. Fergus, NGG believes there is no reduction in the flexibility offered to potential new supplies such as those that may materialise from West of Shetland or Norway.

Buyback

5.10. NGG's analysis which compares NTS capability to future forecast flows, indicates a low probability of flows approaching the current baseline level. The analysis also indicates that the likelihood of the reduced capability being reached or exceeded, is greatest over the period 2014 - 2018. NGG has said that the cost of adding additional compression, which is estimated at approximately £80m, needs to be considered against the limited risk over the interim period, and has suggested that the uncertainty over this period is managed via buyback.

5.11. In our initial consultation we highlighted that whereas baselines were to remain unchanged and uncertainty remained about future supplies arriving at St. Fergus, it needed to be borne in mind that the removal of a feeder could create additional risk because of the increased reliance on compression to move gas away from the terminal. There was a small risk that, under some circumstances, higher buyback costs could occur and we asked NGG to undertake analysis on the buyback[11]

[11] Buyback is the process of compensating users if NGG is unable to deliver entry capacity, which is sold on a financially firm basis, and users wish to flow gas against the capacity holding.

exposure (constraint volumes and values, as well as probabilities) that could occur in the event that flows exceeded capability, with one feeder removed.

5.12. NGG has indicated that any such incremental buyback costs resulting from the removal of a feeder would be borne by NG Carbon. An agreed methodology will need to be developed and consulted on to provide assurance that proper account has been taken of any such costs which arise so as to keep consumers whole.

5.13. NGG has estimated the order of magnitude of likely buyback costs out as far as 2020. The latest analysis estimates a range between P10 and P90[12] values of £0m and £65.8m with a P50 estimate of £20.8m and an average expected buyback of £23.2m.

Opex

5.14. If the proposal goes ahead and one feeder is removed then gas from St. Fergus will be transported through fewer pipes which may result in increased use of compressors. This would have associated with it higher compressor fuel use (CFU) and higher associated opex. NGG has indicated that any such incremental opex costs resulting from the removal of a feeder would be borne by NG Carbon. In the same way as incremental buyback indicated above, an agreed methodology will need to be developed and consulted on to provide assurance that proper account has been taken of any such costs which arise so as to keep consumers whole. NGG has estimated incremental opex (mainly CFU) could range from £4m - £7m per annum with a P50 value of £5.5m per annum.

Valuation

5.15. An important consideration in any asset disposal is the value that should be ascribed to the assets in question. This is an input to the decision on the extent to which customers should benefit from the disposal of the asset. As described above, in our April 2009 document, we consulted on several alternative approaches to the valuation of NTS assets. Whereas a wide range of views were expressed, no compelling arguments were put forward by respondents to suggest that a particular methodology should be adopted.

5.16. There is an argument that taking assets outside the regulatory ring fence (which would be the case in this instance as the disposal is to another NG group company) should reflect their value to consumers. Since gas consumers have funded and carried the risk of NGG investing in and developing these assets, then they should capture most of the upside if these assets are removed from the RAV. Consumers should benefit from the market value of the assets through a mixture of reductions from the RAV and some form of additional reduction in transmission

[12] P10 and P90 refer to the probability of certain outcomes. The outcome will be below the P10 value in only 10% of possible scenarios, similarly it will not exceed the P90 value in 90% of possible scenarios.

charges. In its revised proposal NGG considered three approaches to valuing the assets, which are further explored below:

Value of Retaining the Feeder in Gas Use

5.17. One approach proposed by NGG involves determining the value that might be obtained from a disposal process with reference to the value that gas consumers could be expected to derive from retaining the feeder in gas service. Given the current and forecast future levels of gas entry at St. Fergus, it is NGG's view that the feeder has a very limited and declining value in gas service and that its disposal for use in CO_2 transportation will offer the best value to gas consumers. NGG considers that:

i) retention of the feeder provides some "optionality" in the event of certain scenarios (unexpectedly high volumes of gas entry at St. Fergus, a major failure of one of the other Scottish feeders[13] etc). However the scenarios that identify the feeder as having significant value are considered by NGG and the consultants to be highly unlikely: the NGG and Wood Mackenzie views do not support large new volumes of entry at St. Fergus (given declining UKCS production) and the Pöyry report supports NGG's view of the remaining NTS network capability. The level of redundancy in this part of the NTS network would remain above that of other parts of the network given the reliability and degree of resilience already offered by the NTS due to the multiple feeders that would remain.

ii) shippers are not currently indicating that high volumes of gas will be landed at St. Fergus through entry capacity bookings. This may, however, be a feature of the capacity regime rather than signalling that the "optionality" offered through securing entry capacity rights is of low value. The entry capacity substitution methodology with its retention arrangements (which have been the subject of significant effort and industry consultation to ensure that they provide NGG with appropriate signals) may provide some indication of how the market views the value of retaining the optionality provided by retaining the feeder in service. At the recent Capacity Retainer Window in January 2010 no capacity was retained at St. Fergus. Recent flows from St. Fergus seem consistent with prior long term auction sales.

iii) the retention of the feeder could provide additional line-pack which might have some operational value to NGG as System Operator. However the location of the feeder is not compatible with the provision of Operating Margins in competition with e.g. Glenmavis, and NGG do not see this as attractive or being material;

iv) the re-use of the feeder might defer its decommissioning and hence defer the associated costs. NGG has never decommissioned a pipeline of this length before and the level of the associated costs and issues is

[13] It is worth noting that no such failure has ever occurred on the NTS.

currently uncertain. These costs could be significant, particularly if sections of the feeder must be removed from the ground, or if filling with grout is necessary.

v) operational costs (including rates, insurance, easements, operating & maintenance costs) would continue to be incurred by NGG if the feeder were to be retained in service. It would also be necessary to determine whether such costs could continue to be regarded as efficiently incurred if the need for the feeder had declined; and

vi) the operation of high pressure pipelines carries a degree of risk and demands compliance with all relevant legislation by NGG.

Value from Disposal of the Feeder through an Open Market Process

5.18. If there is more than one party who has an alternative use for the feeder, the most efficient solution to determining its value might be to offer it for sale with a consequent reduction in baseline. Interested parties would then value it based on the revenues an alternative use of that asset could generate for them.

5.19. Several respondents to the April 2009 consultation document commented on "alternative uses" and commented that the process of finding an alternative use for the feeder, and valuing it might involve an auction on the open market, or an invitation for interested parties to indicate some expression of interest, or similar approach. There are several direct references to an open market valuation approach in the responses; however none of these parties (nor any other) has since made any approach to either NGG or Ofgem regarding acquisition of the feeder.

5.20. Interested parties (if there are any) will have been aware since April 2009 that NGG's view is that the feeder has limited future value as an NTS asset and that NGG was examining the possibility of disposal (as set out in the Ofgem April consultation) based on:

a. the NTS baseline entry capacity being maintained;
b. the buyer meeting:
    i. incremental operating costs (e.g. CFU) costs ;
    ii. incremental capacity buyback costs;
    iii. all future operational costs (rates, insurance, pipeline maintenance, etc); and
    iv. the decommissioning costs at the end of the pipeline's life.

5.21. Implicitly, the new owner of the asset may also need to be of sufficient financial strength that Ofgem could be confident that a new owner having removed the feeder from gas service would not then fail financially leaving consumers exposed to some of the above liabilities. NGG's view is that given the above liabilities, it is unsurprising that it has received no proposals from third parties regarding acquiring the feeder for some alternative use.

5.22. NGG believes an open market process could produce an irrational result. In NGG's view, if those with potential alternative use were to bid in an auction (and assuming that the alternative uses has less scope to generate sufficient revenue to cover the liabilities, operating costs etc. than NG Carbon's CO_2 transport project) then NG Carbon would simply need to bid marginally more than the next best option. In the absence of any other participants in the sale process then NGG considers that NG Carbon could acquire the feeder for a very low value and without gas consumers having the prospect of additional value in the event that CCS is a success. There could also be a risk that a third party might seek to out bid NG Carbon and then "ransom" the use of the feeder. NGG does not consider that an open sale process would necessarily deliver good value to gas consumers.

5.23. We do not believe that this is a credible argument however. Whilst these outcomes are possible we do not believe that they are plausible since this would not be rational behaviour for any investor. It is unlikely that potential investors, subject as they are to competitive pressures, would act in a manner which resulted in the outcomes described above. The arguments advanced by NGG above need to be balanced by the possibility that someone may have a better value proposition for the feeder (than NG Carbon, for instance) which would only be revealed by a market valuation exercise.

Valuation as a CO_2 Pipeline

5.24. As noted above, NGG's proposed approach to the valuation of the feeder is based against a background of:

a) the current entry capacity baseline at St. Fergus will be maintained[14]: any incremental buyback costs[15] (resulting from the removal of the feeder) will be funded by NG Carbon;
b) any net increases in the operational costs of the NTS[16] (e.g. CFU and electricity) resulting from the removal of the feeder will be met by NG Carbon

5.25. In negotiating a tariff with the user of the CO_2 pipeline, NG Carbon will also need to consider:

a) the capex costs incurred in disconnecting the feeder from the NTS and converting it to use as a CO_2 pipeline;
b) the opex costs transferred from NGG to NG Carbon (rates, insurance, easements, pipeline operation and maintenance etc.); and
c) the residual value of the feeder at the end of the CCS demonstration including future decommissioning liabilities.

[14] Subject to capacity adjustments occurring as a result of substitution or baseline review by Ofgem.
[15] Determined using an agreed methodology.
[16] Determined using an agreed methodology.

5.26. NGG believes that the above elements are not relevant to a valuation of the feeder because they will be assessed by DECC as part of the CCS demonstration project. This exercise will be used by DECC to satisfy themselves that the CCS project elements have been appropriately assessed and good value is being obtained by (electricity) consumers funding the projects through the CCS consumer levy.

5.27. The design of NGG's proposal is intended to have the effect of protecting gas consumers from potential adverse impacts arising from disposal of the feeder. However, it also has the effect of making a valuation difficult because of the uncertainty over whether, and in what volumes, incremental entry capacity buyback will be needed, and the extent of increased operational costs.

5.28. If a situation arose that led to the need for NGG to undertake entry capacity buybacks at St. Fergus, the cost of these actions is likely to be very high[17.] However the probability of such an event (based on the analysis undertaken and referred to above) is currently seen as low. The ability to forecast these costs is largely guided by understanding shippers' investment plans, and industry participants were urged to share with Ofgem (confidentially if preferred) their indications of future plans so that this risk could be properly assessed. We are not aware of any information received that would help to inform this further.

5.29. In the Ofgem April 2009 consultation, the majority of stakeholders expressed the view that they did not wish to bear these risks through the "participatory royalty" type arrangements suggested by NGG. However NGG considers that it would not be in the interests of consumers for it to sell the feeder for a fixed sum and run the risk that NG Carbon might make an excessive profit as a result of, for example, the level of capacity buyback being substantially less than the level forecast. In the April 2009 consultation we explored potential mechanisms that would enable gas consumers to share the upside through some form of sharing mechanism in the event that the re-use of the feeder as a CO_2 pipeline was successful in addition to the downside protection being offered in the event it was not. Such benefit sharing is similar to the way the System Operator incentive arrangements are structured: the industry is familiar with this type of arrangement.

5.30. NGG proposes that the transfer of the feeder to NG Carbon should be based on the written down historic cost accounting (HCA) book value of the asset (c. £250,000). This is on the basis that this is the only valuation for which NGG believes it is able to provide any evidence based on the actual cost of the assets, and is a product of the calculation that determines NGG's regulated asset return. It is also in their view, consistent with the approach used by Ofgem in relation to the transfer of Grain LNG storage facility to National Grid Grain for future development as an LNG importation terminal.

5.31. Under this proposal a payment that represents an advance of anticipated CCS revenues (an advance payment) of £10m (£9.4m in NPV terms) would also be made

[17] In 2006 buyback costs reached 10p/kWh at St. Fergus and the constraint management costs came to around £30m, There has been no buyback of capacity at St. Fergus since 2006.

by NG Carbon to NGG as part of the transaction. NGG would pass 50% of this directly on to consumers: this represents an early return to consumers resulting from the re-use of the asset. It also rewards NGG for developing alternative uses for its assets in situations where there is the potential for this to offer greater value to gas consumers than the current use.

5.32. NGG believes that there needs to be an incentive to innovate if new uses for assets are to be explored to benefit gas consumers. Whereas we agree with this view, we do not believe that NGG should expect to receive payments under an incentive scheme, such as the Innovation Funding Incentive (IFI), for researching innovative uses for assets no longer needed for gas transportation, as well as receiving monies from the innovative use the assets are subsequently put to.

Ofgem initial view

5.33. We believe that a starting point for valuing the assets is to consider how NGG and shareholders have been remunerated for the assets. Where assets are fully or largely depreciated it may be considered that the shareholders have already been fully remunerated for their investment and, as such, any benefits which are derived from ownership of the assets should fall to consumers.

5.34. Any benefit to consumers should be based on the market value of those assets i.e. the price that would be agreed between a seller and a buyer on an arms-length commercial basis.

5.35. However we also recognise that transferring all the market value to consumers provides no incentive for a network operator to find another use for assets it no longer needs, as in this instance. Any estimate of market value therefore needs to take into consideration a suitable reward for the network operator in developing the new use of the assets.

5.36. In this particular case the estimation of the market value is difficult to determine as the market for CO_2 transportation has not been developed and there does not appear to be a long list of interested parties willing to bid for these assets. If the Authority was minded to consent to the proposed disposal, it might be possible to invite non-binding expressions of interest for the potential sale of the assets on the open market to see if such an approach was feasible. However, we are concerned that such a process might delay the DECC CCS trial. We would welcome views on the merit of allowing interested parties to bid for the assets.

5.37. Given the uncertain nature of the market for CO_2 transportation there would appear to be three generic options for the transfer value:-

a) A one-off transfer value based on the best estimate today of the market value

b) A one-off transfer value plus a share of future revenues (as per NGG's proposal)

c) No transfer value but a share of future revenues

5.38. The greater the proportion of transfer value that is attached to the initial payment the lower the risk to consumers. NGG argues that the higher the asset valuation, the less economically viable it becomes to re-use these assets for CO_2 transportation, and the less likelihood of a CCS supply chain wishing to use pipeline transportation in preference to alternatives, such as ship-borne transportation; in the extreme scenario this might result in the failure of the consortium to secure a place in the CCS trial and the potential that there would be no value returned to consumers. We believe that such an argument needs to be balanced against Ofgem's primary duty to protect consumers and the need to ensure that any valuation represents fair value for consumers and reflects the value of the assets in alternative use.

5.39. Given the above discussion option a) above would appear to bear the risk that consumers may fail to recover a fair value if CO_2 transportation develops into a successful business. Option c) on the other hand could result in consumers failing to recover any value if CO_2 transportation does not develop as a viable business. Option b) therefore seems, at this stage to be the most sensible option

5.40. NGG have proposed that the initial transfer value should be based on the written down historic cost accounting (HCA) book value of the assets plus an advance payment of future revenues and future net revenue sharing. Ofgem's initial view is that the appropriate asset value to use is a reasonable estimate of the RAV value rather than the HCA book value. To deduct a value less than this would result in gas consumers continuing to pay for these assets even though NG Carbon was developing these assets for commercial exploitation. This would not seem appropriate. We have not obtained from NGG a reasonable estimate of this value as yet.

Sharing the Benefits of Increased CO_2 Throughput

5.41. If CCS is successful then there is the possibility that other users will seek to utilise the CO_2 pipeline. The DECC CCS project provides for 2Mt/yr but we understand that the feeder has a capacity to transport up to 10Mt/yr of CO_2. However flows in excess of 6Mt/yr of CO_2 will require significant additional capital investment in the form of additional compression to increase capacity to 10Mt/yr. At this stage, the structure of the tariff which the consortium will be able to secure during the DECC programme and the way in which this will vary as a result of additional customers using the feeder to transport CO_2 is unclear. NGG believes that it is appropriate that gas consumers share the benefits in the event CCS is a success.

5.42. This growth in the use of the feeder is, of course, largely dependent on the future economics of CCS, government policy and power generators' investment plans

along with those of other CO_2 emitters. NGG states that spare capacity would be made available to third parties and it hopes that the presence of the CO_2 pipeline and the fact that it has spare capacity will attract further CCS projects once the initial demonstration project has proved the concept and technology.

5.43. The potential and timescales for additional revenue, are highly uncertain (it should be noted that the pipeline longevity and storage facility capacity will also influence whether additional loads will wish to use the pipe). Nevertheless, NGG's proposal will ensure that in the event that revenues are increased (either as a result of additional revenues being available, additional flows being realised or due to lower than forecast buyback cost), a share of the benefits will be passed on to gas consumers. NGG has developed a number of scenarios based on different growth rates to illustrate the impact of incremental net revenues on the value returned to gas consumers.

5.44. Given the uncertainties regarding the scale and rate of CCS growth, the remaining useful operational life for the feeder, the future economics of CCS and the cost of the necessary compression it is NGG's view that it does not appear to be prudent to make commitments regarding levels of benefit that should flow to gas consumers at levels of flow in excess of 6Mt/yr. As a result NGG's proposal is based on benefits to gas consumers arising from increased CO_2 flows being capped at 6Mt/yr (based principally on NGG's view that this is the point at which major additional investment would be required). Gas consumers would therefore see no benefit from CO_2 flows above 6Mt/yr.

5.45. NGG proposes that that for flows of CO_2 between 2Mt/yr and 6Mt/yr, the incremental revenues (adjusted for any necessary capital expenditure needed to permit the higher transfers) should be shared between NG Carbon and gas consumers. NGG propose that:

a) Incremental annual flows above 2Mt/yr should be shared 50% to consumers and 50% to NG Carbon; and
b) Incremental annual flows above 4Mt/yr and less than 6Mt/yr should be shared 75% to consumers and 25% to NG Carbon.

5.46. Our initial consultation set out various scenarios indicating the impact of additional throughput for a given set of assumptions. NGG's analysis shows that (assuming incremental CO_2 throughput generates additional revenue equivalent to £1/tonne) the "medium growth" and "high growth" scenarios generate an additional £5.6m to £15m in NPV terms for gas consumers over the life of the project. If the incremental revenue is more than £1/tonne then this range would be scaled proportionately. National Grid cannot be specific about the exact mechanism for this until the details of the tariff structure are clear from the DECC CCS Demonstration project process. However because of the sharing factors National Grid considers that the above approach should provide NG Carbon with an appropriate incentive to seek to increase CO_2 volumes transported and ensures that gas consumers benefit as a result. For the reasons set out above, NGG's proposal is based on the sharing of incremental revenues for increased flows being capped at 6Mt/yr.

5.47. The upside for gas consumers in relation to these additional benefits as a result of different growth scenarios is summarised in Table 1.

Table 1: Summary of Consumer benefits from various growth / incremental buyback scenarios[18]

Consumer benefit NPV £m (includes the advance payment)	Base Volume	Limited Growth	Strong Growth
Low buybacks outturn (P10)	23	28.6	38
Expected buybacks outturn (P50)	15.1	20.7	30.1
High buybacks outturn (P90)	4.7	10.3	19.7

(Figures above assume that Compressor Fuel Use outturns as expected, P50)

5.48. It should be noted that the level of the initial advance payment, the throughput thresholds at which different sharing factors are triggered and the levels of those sharing factors are inter-related. A higher advance payment rewards gas consumers more and earlier, but places more risk with NG Carbon in relation to buyback and incremental opex costs. A lower initial payment would imply less risk for NG Carbon and so gas consumers should take a greater share of the upside in the event that buyback etc., turn out lower than forecast.

5.49. A detailed methodology will be needed to determine the manner in which the level of incremental buyback and CFU are assessed. In addition, consideration will need to be given to the timing to be applied when "dividends" to consumers are assessed and shared (for example, a decision would be required on whether this is assessed after 15 years at the end of the project, or annually, or at say 5 yearly intervals) and the extent to which benefits paid out in early years (due to low buyback costs) could be recovered if buyback costs are higher in subsequent years.

Consequential Benefits

Opex savings

5.50. If the disposal goes ahead, gas consumers would see the benefit of reduced NGG operational costs (rates, easements, insurance, operating and maintenance costs etc.) and these would be reflected via the normal price control process. NGG has estimated that routine maintenance element of the operational costs equates to approximately £0.25m/yr. This equates to £2.5m in NPV terms (in 2013/14) over the estimated remaining useful life of the asset.

18 All figures are expressed in NPV terms (2013/14) and represent the potential benefit from buyback/CFU over/under recovery to gas consumers (i.e. they incorporate the sharing factors and assumptions outlined above.

Decommissioning Costs

5.51. The decommissioning costs of the feeder are currently uncertain. NGG understands that part of the CCS Demonstration programme is intended to address eventual decommissioning needs and costs of the CCS demonstration projects. If the consortium is successful in proceeding to the next stage in the competition then funding for Front End Engineering and Design (FEED) studies will be provided and NG Carbon would expect to clarify the decommissioning cost as part of this work.

5.52. If the decommissioning liability were to be returned to NGG at the end of the feeder's life as a CO_2 pipeline then from the gas consumer perspective, they are likely to be no worse off compared to the status quo since the feeder would always have needed to be decommissioned at some point in time. In this case NG Carbon benefits from not bearing the decommissioning liability and should be willing to pay more for the feeder free of the decommissioning liability, so the question of the decommissioning cost still requires resolution.

5.53. NGG proposes that an initial estimate of £20m[19] (£7.6m in NPV terms) should be used for decommissioning costs in assessing its proposal to dispose of the feeder. This is based on NGG's understanding of industry standard approaches to decommissioning this type of asset (which generally involves the cost of cutting and grouting the feeder at road, rail, and river crossings, sealing the remaining sections and filling them with nitrogen – monitoring this and topping up as necessary, and fitting and maintaining cathodic protection in service to protect the integrity of the pipe).

Summary of cost and benefits of NGG's revised proposal

5.54. NGG believes that its revised proposal will protect the interests of existing and future gas consumers by maintaining the entry capacity baseline at St. Fergus while returning value to consumers without them having to bear the costs of capacity buybacks or increased opex costs. NGG believes that this will be achieved in the following manner:

a) entry capacity baselines at St. Fergus will be preserved at the current levels. In the event that National Gird Gas needs to buy back entry capacity it has sold at St. Fergus as a result of the removal of the feeder, the costs of these buybacks will be met by the CO_2 transporter (NG Carbon) and not by NTS users or gas consumers;

b) network capability of the relevant parts of the NTS will exceed the present forecast requirements for capacity. NGG's internal analysis has been independently assessed by Pöyry Energy Consulting who has concurred with NGG's findings. The forecast gas supply levels to St. Fergus have also been

[19] The cost is made up of project management costs, site facilities, purge and retest of pipe, recalibration values etc and filling with Natural Gas/Nitrogen and/or grout where required. The £20m estimated cost has a +/-50% tolerance.

subject to external validation and found to be consistent with NGG's earlier analysis;

c) NTS users and gas consumers will be protected from any net increases in CFU or other Opex costs that arise as a result of removal of the feeder;

d) the disposal of the feeder will return value to consumers for the re-use of this asset. In the absence of the disposal, no such "refund" would occur and consumers would in due course be required to fund the decommissioning of the asset. The "refund" will comprise an initial sum and an additional payment arrangement. The latter element will return additional value to consumers proportionate to the success of the CCS project (and therefore the "real" outturn value of the feeder) which reflects the amount by which buyback and other costs encountered are lower than currently assumed. This reflects the level of uncertainty over both the costs and revenues at this stage of the demonstration project, but offers a robust framework that ensures that gas consumers benefit in the event these costs are lower and/or the revenues are higher than expected and are designed to ensure that the CO_2 transporter will not receive an excessive gain from the acquisition of the feeder: rather, shippers and therefore consumers will gain a fair share in the success of the project; and

e) while the removal of the feeder from gas use may lead to some increases in operating costs for NGG (for example increased compressor costs which will be borne by NG Carbon), the removal of the feeder will also lead to a reduction in the operating costs of the disposed of section such as operation and maintenance costs.

Potential payments from a disposal

5.55. NG Carbon will pass to gas consumers a share of incremental revenues it derives from CO_2 transportation resulting from:

a) Incremental entry capacity buyback costs and opex[20] (e.g. compressor fuel use (CFU) and other opex) turning out to be below the forecast levels (shared 50/50 between NG Carbon and gas consumers); and

b) Revenues for CO_2 capacity sold in excess of the 2Mt/yr provided for in the DECC CCS Demonstration project (net of incremental costs) should be shared on the basis of 50% retained by NG Carbon and 50% to consumers; and

c) Revenues for CO_2 capacity sold in excess of 4Mt/yr (net of incremental costs) up to 6Mt/yr should be shared on the basis of 25% retained by NG Carbon and 75% to consumers.

[20] If consent for the disposal were granted, then a methodology would need to be agreed to identify these incremental costs.

5.56. To the extent that incremental buyback costs are higher than forecast (and exceed the CO_2 transport tariff), this risk will be carried by NG Carbon, backed by its parent - National Grid Holdings One plc. At present, and based on responses from stakeholders to the April 2009 consultation, it is not proposed that NG Carbon would seek any indemnity from consumers for high incremental buyback costs.

5.57. NGG's view of the expected benefits to gas consumers of the proposal are summarised in Table 2 below, expressed in NPV terms (2013/14) over the life of the project (15 years). NG Carbon's underwriting of incremental entry capacity buyback and incremental opex is not included, as consumers are to be held whole in relation to these incremental costs.

Table 2: NGG View of Summary of Stakeholder costs/benefits expressed in NPV for 2013/14[21]

	Item	National Grid Carbon (£m)	National Grid Gas (£m)	Consumers (£m)	Comments
Actual Payments	Disposal Value	-0.25		0.25	Consumers should benefit through downward effect on transportation charges
	Initial Payment	-9.4	4.7	4.7	Payment split 50/50 made through new licence term.
	Buyback and CFU over/under recovery	0 to -24.4*	0.0	0.0 to +24.4*	NGC will price a certain level of risk for CFU and buybacks into tariff
Savings	Opex saving			2.5	Assumed £0.25m a year from 2013/14 to 2028/29 for savings on routine maintenance. This does not include rates, insurance and non-routine maintenance, which would be incurred by NG Carbon
	Decommissioning			7.6	Currently estimated at £20m with a tolerance of +/- 50%.
INITIAL TOTAL	Expected Benefit CO_2 transport (0 - 2Mt/yr)		4.7	15.1 to 39.5*	Initial payment + Savings through lower transportation charges = £15.05m. Upside up to £39.45m if buybacks <P75 level and/or CFU<P50
Growth	CO_2 transport (2-4Mt/yr)	50%		50%	Further benefits paid through new licence term if utilisation of the feeder falls in this category – 50% share of revenues after incremental cost and return on investment covered
	CO_2 transport (4-6Mt/yr)	25%		75%	Further benefits paid through new licence term if utilisation of the feeder falls in this category – 75% share of revenues after incremental cost and return on investment covered
	Potential Benefit			15.1 to 54.2*	Assume £1/tonne growth share)

[21] All figures are expressed in NPV terms for 2013/14 (commissioning year for CCS use) using a discount factor of 6.25%.

Further considerations

5.58. There are several costs associated with the disposal which are necessary to facilitate disposal of the feeder. In addition to the discussion about incremental buyback opex above, NG Carbon would bear the following costs:

a) the costs of separating the feeder from the NTS and the modification works for its use as a CO_2 pipeline;

b) the capex costs needed to connect it to the power station and to the offshore pipeline at St. Fergus;

c) the capex costs for compression needed to change the CO_2 from gaseous to dense phase ready for offshore injection; and

d) the cost of decommissioning the feeder when this becomes necessary.

5.59. NG Carbon would earn revenues from making the feeder available for the transportation of CO_2.

Mechanism for Returning Value to Consumers

5.60. The insertion of a new term into Special Condition C8B of NGG's gas transporter licence in respect of the NTS is considered by NGG a possible appropriate mechanism to return value to consumers. NGG suggests that Special Condition C8B could be modified by the addition of a new term or terms within the calculation of the NTS owner cost pass through adjustment factor TOF_t to address:

a) adjustments in respect of the initial consumer dividend;
b) adjustments in respect of low outturn levels of buyback and incremental opex; and
c) adjustments in respect of incremental revenues derived from transporting increased volumes of CO_2.

5.61. Other elements of the proposal would be expected to flow through via the normal price control process (reduced opex costs, eventual decommissioning costs).

5.62. There remain questions regarding the timing of the adjustments in relation to (b) and (c) above. NGG proposes these be 5 yearly, or at the end of life (15 years) of the project and that payments should be on a rolling basis. NGG proposes that:

a) the disposal value be payable by NG Carbon in the year following the disposal;

b) the initial consumer dividend be payable by NG Carbon and from NGG to gas consumers commencing in the year following the commissioning of the CCS project and that it should be spread over 5 years;
c) adjustments to NGG's allowed revenue in respect of items (b) and (c) will feed through to gas consumers as a "consumer dividend":
    1) they will reflect the difference between the element of the CO_2 tariff revenue earmarked to cover these items and the outturn position for those elements. In any given year this could be a surplus or a deficit;
    2) the surplus / deficit in respect of a year should be spread over the following 5 years;
    3) in a given year the adjustment will be based on the sum of the annual surplus/ deficits for the relevant previous years subject to a floor of zero (e.g. where there is a surplus then an adjustment is made passing a share of the benefits to gas consumers. However in other years a high buyback cost could result in a deficit; and
    4) deficits would be carried forward and netted off against surpluses in future years.

5.63. The structure of the above proposal is designed to provide some smoothing of the consumer "dividends" so that (given that the method of disbursing the consumer "dividend" is through the pass through term in NGG's revenue restriction) excessive volatility in this element is avoided along with the attendant impact on network charges.

Appendices

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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.

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 4 June 2010 and should be sent to:

Bogdan Kowalewicz
Senior Manager, Gas Transmission Policy
Ofgem
9 Millbank
London SW1P 3GE

E-mail 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 issue a further consultation. Any questions on this document should, in the first instance, be directed to:

Bogdan Kowalewicz
Senior Manager, Gas Transmission Policy
Ofgem
9 Millbank
London, SW1P 3GE
Tel: 020 7901 7293
gas.transmissionresponse@ofgem.gov.uk

CHAPTER 4: Future flows at St. Fergus and pipeline capability

Question 1: What is your view of the conclusions drawn about future flows and capability based on the consultants' reports?

CHAPTER 5: NGG's revised proposal

Question 1: What is your view of the structure of the revised proposal overall?

Question 2: What is your view of the treatment of incremental buyback, opex, CFU and other costs identified?

Question 3: What is your view of the suggested approaches to asset valuation?

Question 4: What is your view of the proposal for sharing the benefits of increased CO_2 throughput?

Question 5: What is your view of the suggested mechanism for returning value to gas consumers?

Question 6: Are there any other considerations which have not been taken into account?

Appendix 2: Initial Impact Assessment

Question 1: Do you agree with our initial assessment of the impacts of the proposal for the disposal of assets?

Question 2: Are there any quantitative benefits or costs that have not been included in our assessment?

Question 3: Are there any qualitative benefits or costs that have not been included in our assessment?

Question 4: Are there any other considerations that have not been included in our assessment?

Appendix 2 – Initial impact assessment

This appendix sets out and seeks views on our assessment of the impact of the proposed disposal of assets, including our qualitative and quantitative analysis.

Question 1: Do you agree with our initial assessment of the impacts of the proposal for the disposal of assets?

Question 2: Are there any quantitative benefits or costs that have not been included in our assessment?

Question 3: Are there any qualitative benefits or costs that have not been included in our assessment?

Question 4: Are there any other considerations that have not been included in our assessment?

Key issues and objectives

1.1. The issues arising out of the potential disposal of the assets in question have been discussed in the earlier chapters and also in the April 2009 consultation document. This appendix sets out our assessment of the impact of the proposed disposal of assets, including our qualitative and quantitative analysis.

Quantitative benefits

1.2. The primary benefit arises from the transfer value of the assets and the returns associated with this which would benefit the gas transportation business and ultimately consumers. Further benefits arise as a result of avoided opex and maintenance costs for the feeder and additionally from the removal of the liability associated with decommissioning costs once the pipelines reach the end of their useful life as gas transportation assets.

1.3. NGG estimates that these feeder sections would otherwise be decommissioned around 2020 given their expected life, forecast decline in UKCS, and the ultimate decline in Norwegian supplies. The costs associated with decommissioning would normally be borne by NGG and thus gas shippers and consumers, however if sold for re-use, decommissioning costs would be borne by the CCS project. Gas consumers will benefit directly from the removal of the need to continue supporting maintenance of the depreciated assets, as well as by avoiding these decommissioning costs.

1.4. Our assessment of the quantitative benefits of the proposal incorporates the following elements:

- Transfer value
- Revenue sharing potential
- Reduced operating and maintenance costs
- Transfer of decommissioning liabilities

Transfer Value

1.5. NGG proposes that the transfer of the feeder to NG Carbon should be based on the written down historic cost accounting (HCA) book value of the asset (c. £250,000). A payment that represents an advance of anticipated CCS revenues (an advance payment) of £10m (£9.4m in NPV terms) should also be made by NG Carbon to NGG as part of the transaction. NGG would pass 50% of this directly on to consumers: this represents an early return to consumers resulting from the re-use of the asset.

Revenue sharing potential

1.6. NGG's proposal will ensure that in the event that revenues are increased (either as a result of additional revenues being available, additional flows being realised or due to lower than forecast buyback cost), a share of the benefits will be passed on to gas consumers. Given the uncertainties regarding the scale and rate of CCS growth, the remaining useful operational life for the feeder, the future economics of CCS and the cost of the necessary compression it is NGG's view that it does not appear to be prudent to make commitments regarding levels of benefit that should flow to gas consumers at levels of flow in excess of 6Mt/yr. As a result NGG's proposal is based on benefits to gas consumers arising from increased CO_2 flows being capped at 6Mt/yr (based principally on this being the point at which major additional investment would be required). Gas consumers would therefore see no benefit from CO_2 flows above 6Mt/yr.

Opex and maintenance

1.7. If the feeder is decommissioned and taken out of gas service then NGG will no longer face the operating costs (routine maintenance and inspection) for this section of the NTS. It is estimated that savings of around £250,000 a year may be realised as a result of this.

Decommissioning costs

1.8. This proposal also has a benefit resulting from the removal of decommissioning costs for the natural gas pipelines which would be borne by gas shippers and consumers were the assets left in service allowed to depreciate further following the decline of UKCS.

1.9. The full extent of works necessary to decommission a pipeline of such length is difficult to estimate and few precedents exist for such an exercise on this scale. NGG has therefore developed an initial estimate of £20m (£7.6m in NPV terms) for decommissioning costs in assessing its proposal to dispose of the feeder. This is based on NGG's understanding of industry standard approaches to this that generally involve the cost of cutting and grouting the feeder at road, rail, and river crossings, sealing the remaining sections and filling them with nitrogen – monitoring this and topping up as necessary, and fitting and maintaining cathodic protection in service to protect the integrity of the pipe.

1.10. The award of government funding to parties bidding in the DECC CCS demonstration competition was recently announced and NG Carbon would expect to clarify the decommissioning cost as part of Front End Engineering and Design (FEED) studies, which have been triggered by this.

1.11. The benefits are summarised in the table below.

Table A1: Summary of benefits and costs expressed in NPV for 2013/14[22]

		Proposed £	Comments
Benefits	Disposal value	£0.25m	
	Initial payment	£4.7m	50:50 split with NGG; i.e. £4.7m passes to consumers
	Opex savings	£2.5m	Based on £250,000 p.a.
	Decommissioning costs	£7.6m	
Totals		**£15.1(net total for consumers)**	£19.75 (Gross, including £4.7m (50% of £9.4m) which would pass to NGG, in addition to payment to consumers)
Growth potential		£15.1m to £54.2m	Dependant on growth of CO_2 transportation business

[22] All figures are expressed in NPV terms for 2013/14 (commissioning year for CCS use) using a discount factor of 6.25%.

1.12. We have calculated the potential benefits which may be realised in comparison to the present situation where all feeders are in place. Consequently we have not included any potential additional benefits that may arise resulting from incremental buyback and CFU costs being less than forecast, in the event that a feeder is removed. These are costs not faced by consumers at present and any such benefit is only realised as a result of the sharing factors proposed in the proposal. We do not believe that it would be appropriate to include these in the calculation of the overall benefits for these reasons.

1.13. The upper limit on benefits would be defined by the future growth of CCS and the volumes of CO_2 transported through the feeders. It should be noted that the level of initial advance payment, the throughput thresholds at which different sharing factors are triggered and the levels of those sharing factors are inter-related. A higher advance payment better rewards gas consumers earlier, but places more risk with NG Carbon in relation to buyback and incremental opex costs. A lower initial payment would imply less risk for NG Carbon and so gas consumers should take a greater share of the upside in the event that buyback and CFU out-turn lower than forecast although the structure of the proposal means that consumers only receive limited benefits in the early phase of the CO_2 project and must wait until the CO_2 business is developed to realise these higher potential benefits.

Qualitative benefits

Potentially lower gas transportation charges

1.14. Consumers would benefit directly through the return of value to them as a result of NG Carbon purchasing the fourth feeder from NGG. The proceeds from the disposal of the feeder (the valuation and initial payment being proposed) will contribute towards NGG's allowed revenues. As a result it is anticipated that this would lead to reduced charges to shippers, who may choose to reduce their charges.

Potential benefits for electricity consumers

1.15. Another benefit is indirect and will apply to gas consumers only to the extent that they are also electricity consumers. The Government and DECC have proposed that the CCS demonstration projects will be funded via a levy on electricity consumers. To the extent that re-use of a feeder for CO_2 transportation represents a lower cost option as part of a demonstration project for DECC to pursue (and subject to being a winning bid in the competition), then electricity consumers may benefit as this could mean that they would face a lower levy to fund this, in comparison with the cost of building a new pipeline for CO_2 transportation for instance. If CCS is successfully demonstrated then this should support increased future diversity and security of supply due to electricity generation using coal (with CCS) for longer than would otherwise be the case.

Quantitative costs

Buyback

1.16. By removing a pipeline from the gas network in Scotland this increases the chance of a constraint on the gas network, particularly if St Fergus flows are high. If a constraint does occur, NGG has a number of tools available to it to alleviate the constraint, one of which is to buyback capacity rights from the shippers at the constraint ASEP. This can become very expensive and so NGG is financially incentivised to minimise these costs as well as to conduct operations economically and efficiently.

1.17. As a result of this potential increase in buyback costs NG Carbon must be prepared to either pay up front to cover the expected incremental buyback exposure faced by NGG for the future or pay for the incremental buybacks as they happen. These incremental buyback costs were discussed in the April 2009 consultation document and indicated a range of potential costs between £0 and £77.2m in total for the period 2013/14 to 2017/18. Following specific questions raised in the first consultation and new information, further analysis by NGG, up to 2020, has identified that a more likely range of possible buyback is in the range £0 - £65.8m.

Increased compressor fuel use

1.18. Increased compressor fuel use as result of having to transport similar volumes of gas through fewer pipes may arise, if the assets are disposed of. The additional costs attributed to this will be borne by NG Carbon and calculated in accordance with an approved methodology. In this way NGG will not be exposed to additional costs. However the fact that these costs may arise needs to be highlighted along with the difficulty in predicting what they may be since they largely are dependent on the total flows which will come through St. Fergus in future.

1.19. The above are both potential costs to NG Carbon, not to gas consumers, since NG carbon will underwrite these increased costs should they occur. However they do impact on the potential benefit to consumers, since these costs may affect the level of revenue sharing that could occur.

Qualitative costs

NTS Linepack

1.20. This proposal, if executed in full, may have a limited effect on NGG's provision of flow flexibility services and the amount of linepack NGG holds, although NGG does not anticipate that these will have significant cost or operational implications. It should be noted there is a cost benefit resulting from this proposal as the value of the linepack contained with the disposed feeder sections which will be displaced onto

the NTS. NGG estimate the value of this at around £2m, which is a one-off benefit to shippers.

1.21. Several respondents to our April 2009 consultation commented on the potential effects on flexibility which may arise as a result of the removal of these pipelines and the resulting reduction in linepack provision in Scotland. It is expected that the current flow flex arrangements will remain unchanged. The changes in linepack will need to be considered alongside the forecast decline in flows via St. Fergus over time. The dynamics of the system will change as a result of feeder removal and changing supply patterns which forecast continuing decline at St. Fergus.

1.22. The lower St. Fergus flows may provide greater flexibility to Scottish DNs than currently present even with the feeder removed due to the expected lower St Fergus flows. However NGG acknowledge that in some extreme scenarios it may not be possible to encounter the levels of flexibility currently achieved. The risks of any deterioration of service to DNs have been identified as having a very small probability of occurring (due to the extreme nature of the relevant associated scenarios) and commercial tools exist to allow NGG to address them, should they occur.

Impacts on consumers

1.23. The proposal, if it goes ahead, is likely to benefit existing and future consumers in the ways described above, through the return of value to the gas business. These additional revenues will result in lower transportation charges overall as a result, and we would expect competitive pressures between shippers and between suppliers to see these lower transportation charges being reflected in lower bills to consumers.

Impacts on competition (including effects on small businesses)

1.24. The proposal is likely to have very little or no impact for competition because NGG's existing commercial obligations are preserved unchanged. As NGG does not intend to change the gas entry capacity baselines at St. Fergus, if the proposal were to go ahead, then we believe that competition will be unaffected.

1.25. Whereas there is a permanent reduction in capability as a result of operating one feeder less, this is matched by the existing and continuing forecast decline in UKCS production and overall in lower total volumes being delivered to St. Fergus under a variety of scenarios. We believe therefore that this will not inhibit the operation of St. Fergus entry point and the existing balance of competition between entry points will be preserved.

1.26. NGG has considered both the long-term requirement for capacity at St Fergus and the capability of the system after the Feeder has been removed from gas use. NGG's analysis indicates that the remaining capability of the network will be sufficient to manage all reasonable demands for network entry capacity at St Fergus

in the medium to long-term. On this basis, it is difficult to see how there would be any detriment to competition if the disposal were to go ahead,

1.27. We do not expect the proposal for the disposal of these assets to have any direct impact on small businesses.

Impacts on sustainable development

1.28. We believe that the proposal will have minimal impact on sustainable development when considered from the point of view of the gas transmission network. Disposal of these assets is not forecast to impact the ability of the NTS to transport gas from St. Fergus, although it is recognised that there may be period when compressor usage may increase because the gas volumes are being transported through fewer pipes.

1.29. However there is a potential major benefit which the assets may help to deliver by facilitating the implementation of carbon capture and storage and extending the lives of coal fired power stations, whilst reducing their carbon emissions. This benefit is realised because of the potential alternative use for these pipelines in transporting CO_2, once they are taken out of natural gas service and converted for this alternative use.

1.30. The proposal will facilitate the demonstration of CCS technology under the DECC CCS demonstration programme , if successful, by means which have a lower environmental and financial impact than the construction of a new purpose built CO2 pipeline. By facilitating the delivery an operational facility by 2014, this could help to position the UK at the global forefront of CCS development, with the associated benefits that may bring in terms of early delivery of low carbon generation as part of a diverse and secure energy supply.

Impacts on health and safety

1.31. We do not believe that there are significant impacts on health and safety which arise as a result of the proposal for disposal of these assets. We recognise that there may be a marginal benefit attributable to the fact that the high pressure gas transmission network will reduce by approximately 300km in length. The associated reduction in both the maintenance requirement and potential hazard of operating high pressure gas transmission pipelines is beneficial form a health and safety perspective. Because these pipelines will no longer carry high pressure natural gas there will be a small but positive impact on safety risk – related issues. Whereas these are benefits for the gas transmission system they are offset in part by the slight increase in duty for the remaining pipelines in this sector of the network.

1.32. We consider that the proposal may have a potential positive impact on health and safety, if the bid which includes NG Carbon using the feeders for CO_2 transportation is successful in the DECC CCS demonstration competition. This is

because it is likely to result in less construction of CO_2 pipelines which is likely to reduce the health and safety risks which are associated with this type of activity.

1.33. There is however a new series of potential health and safety risks which will need to be assessed by the relevant bodies, as a result of the new duty envisaged for these pipelines in transporting CO_2 instead. We are unable to comment further on this new use, which sits outside Ofgem's current remit, but acknowledge that the safety and health concerns of operating CO_2 pipelines are significant issues that will need to be addressed appropriately.

Risks and unintended consequences

1.34. The principal risks associated with the disposal are associated with the future flows which arrive at the St. Fergus entry point and the capability of the network (with one feeder removed) in being able to transport these volumes. These have been explained elsewhere in the document. An assessment of the capability of the network under various forecast flow scenarios was undertaken by NGG and NGG's forecast is that future supplies at St. Fergus would be below the current level which NGG has an obligation to accommodate, even if new supplies appear.

1.35. The conclusions drawn by NGG about forecast future flows at St. Fergus, which we reported in our April 2009 consultation document, appear to be consistent with the views expressed by Wood Mackenzie. Similarly the Poyry Energy Consulting report supports the views reached by NGG with regard to network capability at St. Fergus, and concludes that the impacts to network capability of the proposed asset disposal are not underestimated.

1.36. Therefore, on the basis of the evidence presented and on the views of consultants, we believe that the probability of future flows, above those considered, being delivered to St. Fergus is very low. However it needs to be recognised that a very small residual risk will remain that additional new supplies could arrive which would exceed the capability level. In such circumstances NGG would be faced with the possibility of needing to invest (in an additional compressor) to increase capability. On the evidence of the analysis presented to us we believe that this is very unlikely to occur.

Other impacts

Security of supply

1.37. By retaining current baseline levels at St. Fergus, NGG believes there is no reduction in the flexibility offered to potential new supplies such as those that may materialise from West of Shetland or Norway. Both National Grid and Wood Mackenzie forecasts show future expected flows from West of Shetland and Norway, including growth, and both anticipate actual flows will be well short of the existing baseline at St. Fergus.

1.38. NGG has demonstrated that NGG can meet the obligations set by the entry capacity baselines at St Fergus (through the use of additional compression if necessary). This work has been independently reviewed by Pöyry Energy Consulting who has confirmed that the level of remaining network capability is higher than 130mcm/d, as NGG's earlier analysis indicated. It is possible that an increase in current baseline entry capacity might require additional investment, but the current capacity bookings at St. Fergus are significantly below the current baseline (around 40% in winter 2012 declining to around 12% in winter 2017/18) and show a declining trend that indicates that market participants do not plan to land such levels of gas in the near or foreseeable future at this entry point. Recent flows from St. Fergus seem consistent with prior long term auction sales.

1.39. The introduction of entry capacity substitution includes the provision for network users to indicate their future requirements, if they are not in a position to book long term capacity, and so prevent remaining unsold entry capacity from being substituted away to another entry point. At the recent Capacity Retainer Window in January 2010, no capacity was retained at St. Fergus.

1.40. New importation capacity has been delivered around the system indicating that market participants are investing on the basis of bringing future gas supplies to the UK at entry points other than St Fergus. On this basis, it does not appear that the transfer of the feeder will have any impact on NGG's ability to ensure that all reasonable demands for gas are met in the medium or long term and as such there will not be any material effect on security of supply.

1.41. From the wider standpoint of the security of UK energy supplies, if NG Carbon can provide CO_2 transportation services and thus help to develop CCS, this should help secure the long-term future of Scottish power generation. In addition, once CCS is proven and developed in both scale and economics, it will allow the UK to use coal reserves at other power stations with minimal carbon emissions and thus provide security of supply whilst facilitating government emissions reductions.

Entry capacity substitution

1.42. NGG has a licence obligation to implement entry capacity substitution. Entry capacity substitution is the process by which unsold non-incremental obligated baseline entry capacity is moved from one or more NTS entry points to meet the demand for incremental obligated entry capacity at another NTS entry point. St. Fergus is a potential donor entry point for substitution, because of the level of unsold baseline capacity and declining UKCS production.

1.43. Whereas new supply sources may connect to St. Fergus, both the Wood Mackenzie and NGG forecast flow projections suggests that even if high range estimates for these new supplies are adopted, the current baseline would still be above the maximum forecast flow level. The potential for capacity to be substituted away from St. Fergus remains.

1.44. The potential disposal of assets could therefore impact on substitution at St. Fergus. If capacity remains unsold at St. Fergus and can be substituted away to another entry point (in accordance with NGG's methodology) then this may reduce the need for additional compression to be installed in order to restore capability back to current levels. Since substitution is intended to be a permanent reduction of baseline at the donor entry point, capability above the revised (lower) baseline level could only be provided in response to a signal for incremental entry capacity triggered at an auction.

NGG's Gas Safety Case

1.45. NGG believes that the removal of specific feeder sections will not cause any failure to comply with, or fully satisfy, its safety case obligations. NGG contends that sufficient linepack contingency will remain available in Scotland such that NGG does not consider this proposal to present any additional or undue risk to the gas network through weakened physical resilience.

Appendix 3 – Summary of responses to initial consultation

1.1. This appendix provides a summary of the responses received to our initial consultation. It follows the same structure as the questions asked in each chapter of the document. The initial consultation was published on 8 April 2009. We received 27 non-confidential responses and these have all been published on Ofgem's website.

CHAPTER 1: Background

1.2. There were no questions asked in this chapter.

CHAPTER 2: Proposal to dispose of assets for CO_2 transportation

Question 1: Do you think this proposal is a good idea in principle?

1.3. 19 respondents were supportive of the idea in principle, although 12 of these responses were conditional upon the following:

- Four respondents were supportive of the idea in principle on the premise that the impacts on consumers and users of the NTS were thoroughly assessed and found to be nil or beneficial overall. A further three respondents asked for it to be verified that the NTS could stand the withdrawal before a decision was made. One respondent was concerned for the impact on capacity, valuation, the CO_2 regulatory framework and safety.
- One respondent supported the idea in principle but questioned the value of the asset and suggested that it is auctioned to present its true market value. It outlined that arrangements have to be transparent with demonstrable benefits to consumers.
- One respondent was supportive of the idea in principle but suggested that the action be regarded as "change of use" not "asset disposal". The respondent recommended that regulation of the CO_2 business should be Ofgem's responsibility.
- A further respondent stated that they could be supportive but were concerned that future gas flow expectations were understated. The respondent expressed further concern that the disposal of the pipeline asset would cause within day balancing constraints, and remove ability for linepack flexibility.
- A respondent in support of CCS urged the Authority to consider the importance of its decision, and warned that considering this proposal in isolation could cause high costs to consumers in the future, and potentially undermine CCS development.

1.4. One respondent did not agree with the manner suggested for the proposed disposal.

1.5. Four respondents did not state their preference, but raised the following issues:

- One respondent stated that a decision should not be made until market participants are assured that the unknowns and imponderables have been satisfactorily resolved, full independently audited data are made available, and the risks to security of supply have been fully assessed.
- A further respondent expressed concern that forecasts of indigenous gas flows through St. Fergus were understated and that future potential flows could end up stranded. The respondent said this had implications for security of supply and loss to producers and shippers.
- It was suggested by one respondent that there should be no cross subsidies between gas and CO_2 so that the CO_2 price signal is the primary driver in stimulating investments in low carbon and carbon free investments.
- The last of these four respondents did not think that using the end of the regulatory life was the correct way to measure these assets, and was concerned by the effects of transferring this asset to another wholly owned NG subsidiary.

1.6. One respondent was opposed to the principle of asset disposal in the manner set out in the initial consultation document.

Question 2: In the event that a feeder section is removed, existing compressors may be required to work harder to transport the same volumes of gas through fewer pipes. It is proposed to capture these additional compressor fuel costs and to introduce a capped volume for these additional fuel costs, based on pre-disposal levels, over which the new CO_2 transportation business would bear the costs and make payment to NGG. What is your view of this proposed treatment of these additional compressor fuel costs?

1.7. Fifteen respondents wanted to ensure that these costs should not be passed on to NGG and hence users of the NTS. These respondents also offered the following comments:

- Five of these respondents stated that the CO_2 business should be accountable for all incurred cost increases from compressor costs. One respondent was in favour of the CO_2 business paying for a capped volume.
- One respondent also suggested an audit of compressor costs after the disposal of the asset to ensure that the NTS did not incur any extra costs.
- The setting of a cap based on pre-disposal levels was queried by two respondents as they believed this was susceptible to change. One respondent called for further analysis.
- One respondent said that NGG need to determine how extra compressor maintenance and possible repair would be funded.

1.8. Two respondents believed that no special treatment of fuel costs would be necessary: one of these suggested that the transfer price should account for potential risks in addition to the current risk value assessment of the asset.

1.9. One respondent stated that the CO_2 network should not be exposed to uncertain costs it cannot control, and that the sale price should fully compensate NGG for the risk of needing to operate compressors more. The respondent said that by calculating this total price, NTS system users should not face any additional costs.

CHAPTER 3: Regulatory issues

Question 1: Do you agree with our view of the regulatory issues of the proposed asset disposal?

1.10. Five respondents agreed with the regulatory issues initially identified with the proposed asset disposal. Three further respondents broadly agreed with the issues put forward and also identified the following potential regulatory issues:

- The potential sale of the assets to a third party;
- Other potential uses of the asset within NGG (such as a linepack buffer);
- Authentication of forecast flow data before decision;
- CO_2 transportation would have to be developed in line with HSE requirements;

1.11. Respondents also highlighted regulatory issues outside of Ofgem's decision considerations. These issues concerned the regulation of CO_2 transport itself.

1.12. Seven respondents neither stated whether they agreed or disagreed with Ofgem's view of the regulatory issues of the proposed asset disposal. One of these wanted to see more information on the valuation of the assets and the impact on the allowed revenue that the different scenarios put forward could have.

1.13. Four respondents raised issues relating to the regulation of CO_2 transport in the future, i.e. issues currently outside of Ofgem's consideration in forming a decision for disposal of a pipeline from the NTS for natural gas transport. These included:

- One respondent asked for consideration of arrangements to prevent "hoarding" of capacity, the material suitability of the asset for CO_2 transport, and the development of any "use it or lose it" (UIOLI) arrangements.
- One respondent stated that CO_2 transportation should be within Ofgem's regulatory control as energy consumers will be affected by its costs.
- A further respondent proposed that the regulatory structure of CO_2 transport should be reviewed, and suggested that this proposal would be a good starting point.
- One respondent suggested that the powers and duties that the Authority relies upon when considering this proposal should be applied within the wider

context of the plant and CCS in general, but expressed concern that the decisions made in relation to this proposal could hamper the development of a regulatory framework in the future.

Question 2: Do you agree with the projected forecast flows at St. Fergus?

1.14. Three responses were in agreement with the projected forec$_a$st flows at St. Fergus, although two of these called for verification of the modelling to be certain. One of these respondents was concerned about potential Norwegian flow increases.

1.15. Five respondents disagreed with the projected forecast flows at St. Fergus. Four of these respondents were dissatisfied by the level of uncertainty in forecast flows from new indigenous fields and Norway and asked for NGG to undertake a more detailed flow forecast; one respondent suggested that this could comprise up to 30mcm additional gas available to the UK during the forecast period. This respondent expressed concern that entry capacity substitution proposals (which were in development at the time of consultation) and long – term capacity charges created uncertainty and discouraged commitment, thus the booked capacities at St. Fergus cannot be assumed to be a true reflection of future requirements. The respondent warned that buyback as a strategy would not satisfy the capacity requirements of new or developing projects.

1.16. Nine respondents neither agreed nor disagreed with the projected forecast flows, however four of these respondents highlighted the need to carefully consider the forecast Norwegian imports, developing fields and potential LNG flowing through St. Fergus. Four further respondents felt that they weren't in a position to validate NGG's forecasts, but welcomed independent analysis for verification.

1.17. Two of the ten respondents, who were neither in agreement or disagreement with the projected forecast flows, pointed out NGG's discretion in these forecasts and so recommended that the forecast is independently audited.

Question 3: Are there other flow forecasts or scenarios which should be taken into account?

1.18. Eight respondents were concerned that NGG's forecasts hadn't taken into account all future flows including the development of gas fields west of Shetland, UKCS and Norwegian flows. One of these respondents urged NGG to consider beach gas flow forecasts at Teesside, whilst another recommended that a scenario be considered whereby a new pipeline from Norway to St. Fergus is constructed for analysis and consultation. One of these respondents suggested using the winter of 2008/9 to conduct modelling to determine how the system would have coped if the asset proposed for disposal was removed but with no additional system pressure.

1.19. One respondent also suggested comparing the expected UK Continental Shelf (UKCS) rate of decline in production with the actual rate in producing future forecasts.

1.20. Two respondents did not think there were any other forecasts or scenarios to be taken into account.

1.21. Six respondents supported a case for independent work to assess the flow forecasts.

Question 4: What is your view of the indicated capability at St. Fergus with the feeder removed, with and without additional compression?

1.22. Ten responses asked for independent scrutiny of the modelling of indicated capability of St. Fergus with the feeder pipe removed. Six of these respondents stated that they were not in a position to be able to verify the data.

1.23. Four respondents were reassured by NGG's assessment that it was able to provide the baseline capacity after asset disposal, although one of these respondents asked for an independent audit to reassure NTS users that this was the case. One of these respondents felt that the indicated capability was correct, although they felt that the addition of gas compression would not be economic and efficient without sufficient user-commitment backing.

1.24. One respondent commented that the physical loss in capacity resulting from asset disposal was much greater than the loss in quoted arbitrary baseline capacity. The respondent deduced that the actual reduction in capacity would be much higher than stated and asked for independent analysis into this issue.

Question 5: What is your view of the projected buyback costs which have been identified?

1.25. Three responses were supportive of the projected buyback costs on the basis of the data presented. Two did not think that there was a requirement for additional compression. Another response thought that these costs were a reasonable estimate given that the forecast flows and buyback costs were based upon best available historic and forecast data.

1.26. One respondent recalled the extensive buyback costs incurred recently[23] when maintenance overran, asking if this had been taken into account when calculating these buyback costs.

1.27. Three responses asked for an independent view of these buyback costs. One of these respondents commented that buyback costs could increase with the introduction of entry capacity substitution, simultaneously requesting an impact assessment for the proposed asset disposal. A further respondent commented that the buyback costs stated were not overly conservative but added that they had no

[23] This refers to buybacks which occurred in 2006. NGG has not incurred any buyback costs since then.

way of judging the adequacy of NGG's base/high case buyback volumes. The respondent urged that the CO_2 business is exposed to full costs of buyback resulting from the removal of a feeder from St. Fergus and did not believe that capping these costs at the cost of a new compressor was an appropriate strategy.

1.28. One response disagreed with the projected buyback costs and stated that these will increase for consumers unless NGG changes the baseline capacity at St. Fergus. Another response disagreed with the reliance on buyback as a strategy to provide shippers with the confidence that the required flows will be achievable.

1.29. Two respondents questioned the need to assess buyback cost risk if NGG was able to hold baselines steady at St. Fergus.

1.30. One respondent believed that the removal of a pipeline from the system would remove a degree of optionality when the system was experiencing stress and that this could increase the cost of system operation to be borne by consumers and shippers.

Question 6: Are there any other issues that you believe are relevant?

1.31. There was a wide range of other views expressed. These opinions are grouped and summarised under the following headings:

Impact Assessment

1.32. One respondent called for a full impact assessment to be made alongside an audit of NGG's modelling. Two further respondents requested that Ofgem includes an assessment of the impacts of trade and transfer and on the implications for commodity price.

Impact on baselines and effect on TPCR5

1.33. Seven respondents raised the potential impacts of the proposed disposal on baseline capacity in the next price control. One of these commented that implementation is not planned until 2013 in the new price control period. Another two respondents sought assurance about the baseline capacity after the introduction of entry capacity substitution and the new price control review to be implemented in 2013. Three respondents voiced concern towards any changes in the baseline capacity as a result of the disposal going ahead and asked for assurance that this would not be lowered.

1.34. One respondent believed that the data presented proved that the current infrastructure could give NGG the means to provide a higher baseline capacity in the future. The respondent thought that NGG's proposals to provide increased

compression or buyback to maintain already existing levels of baseline capacity were insufficient.

Impact on flexibility

1.35. Eight respondents commented on the impact that the disposal will have on NTS flexibility and its linepack facility. Five of these urged for further analysis to be undertaken. Two respondents asked if there could be any adverse effects of reduced flexibility in the Scottish region for DNs and directly connected consumers. Another respondent said that they would be extremely concerned if the proposal resulted in or brought forward within-day balancing constraints or flexibility tools to manage within day balancing.

Security of supply

1.36. Five respondents raised the issue of security of supply. Three of these respondents believed that security of supply should not be compromised as a result of the disposal. One respondent urged the need to understand system performance under stress tests such as a compressor failure with the pipeline disposed from the NTS. Two of these respondents advised that the European Security of Gas Supply Directive would apply more stringent standards for security of supply which would need to be considered if this proposal were to go ahead.

Interaction with entry capacity substitution

Four respondents focused on the interaction of the proposed asset disposal with the proposals (at the time of consultation) for entry capacity substitution. All four respondents felt that the proposed asset disposal and entry capacity substitution could not be treated in isolation. One respondent recommended that Ofgem undertake an impact assessment covering the interaction between the two. Another respondent proposed that the decision on asset disposal is delayed until there was an agreed solution to substitution.

Services at Moffat

1.37. One respondent asked whether the proposal had any effect on exit capacity, reverse flow or the services which NG currently provides to the market at Moffat.

Timing

1.38. Two respondents highlighted timing of the decision as an issue. One of these emphasised that the CCS competition was a time limited opportunity and thus an indication of decision is needed. The other respondent argued for the decision to be delayed until after the implementation of the substitution regime and a subsequent QSEC auction. The respondent reasoned that this process could result in an increase

in capacity bookings and a movement in baselines which could change the volume of the capacity available at St. Fergus and therefore affect the economics of the project.

Independent opinion

1.39. Four respondents urged for independent analysis to cover an audit of NGG's forecast costs and activities, a review of UK entry capacity, forecast flows and the increased costs from operating NTS compressors at a higher load during the period. One respondent did not think that the disposal should constrain the system at all and warned that rebuilding a gas pipeline in the future to cater for new signals at St. Fergus would be inefficient after this disposal.

1.40. A further respondent requested independent analysis into the cost of ship-borne CO_2 transportation to justify the decision to transport CO_2 via pipeline.

Remuneration issues

1.41. Five respondents raised issues related to the remuneration of the disposed asset by the CO_2 business. One respondent opposed any royalty arrangements as they believed that this could distort or erode current market competition. Another respondent called for further clarity on the principles applied in valuing the asset for disposal and a further respondent asked when the sale value would be removed from NGG's NTS RAV.

Flow rate assumptions

1.42. Three respondents questioned the flow rate assumptions further. One questioned whether the statement reflected actual flow patterns at St. Fergus or the UNC expectation of a constant $1/24^{th}$ flow rate.

1.43. One respondent did not think that buyback risk would increase as they believed the existing physical capacity is not required for expected future usage.

1.44. Two respondents were concerned with the analysis of long term capacity bookings. One did not think that these bookings should be used solely to decide on the removal of the pipeline; the other emphasised that there is no incentive for shippers to book long term at St. Fergus as long term capacity is more expensive at this entry point than elsewhere, and highlighted that this may distort the actual utilisation of St. Fergus as an entry point in the future. Another respondent expanded by stating that data gathering needs to be more comprehensive because not all operators are asked to provide Transporting Britain's Energy (TBE) data in NGG's annual exercise.

Disposal related costs

1.45. One respondent urged the consideration of other costs arising from the proposed asset disposal, including: potential offtake removal and relocation; the asset choice process and condition of assets retained as part of the NTS; the higher loading, modifications required and faster aging for the remaining compressors; and a report on the condition and repairs made to all pipelines in the area before asset disposal commences.

Regulation of CO_2 transport

1.46. Seven respondents raised issues relating to regulation of the CO_2 business. One respondent said that the development was being proposed against a background of no formal economic regulation of CCS activities and no competitive process from which to drive true price discovery. Another asked if CO_2 transportation should be regulated if NG's intentions are to transport CO_2 from multiple sources to multiple sinks – a further respondent requested more information on how the new CO_2 pipeline will be operated, maintained and leased out to the market.

1.47. One respondent queried why the CO_2 transportation business was not put forward as a service within NGG.

1.48. Three respondents raised the issue of third party access to the CO_2 transportation network. One of these stated that there may be other parties interested in the acquisition of the asset, and said that it is unclear why NG Carbon should necessarily be the party acquiring the asset. This was supported by another of the respondents, who believed that a third party should be able to secure terms which are fair and equitable. The third respondent wanted clarity as to how interested parties could seek access to CO_2 capacity and how "hoarding" of capacity would be prevented.

Supporting the CO_2 transportation industry

1.49. One respondent felt that the framing of the initial consultation document was incorrect. The respondent said that in that document the disposal was presumed to be a short term revenue generating opportunity presenting a supply and price risk to gas consumers. The respondent disagreed and stated that minimising costs of developing and maintaining CO_2 infrastructure was in the interests of consumers and that the importance of establishing this route should be considered. The respondent urged that emphasis be placed on how any value available in the GB NTS can support the development of a CO_2 transport network.

1.50. A further respondent asked whether decisions made now set a precedent for future disposals.

CO_2 technology considerations

1.51. One respondent asked for clarity regarding how a leak from the pipeline and possible risk of accumulation of CO_2 would be addressed and resolved. The respondent also pointed out the corrosion hazards associated with CO_2 transport and asked whether NGG will be imposing quality requirements on CO_2 transportation.

Review of decision

One respondent wanted to ensure there was a process to review arrangements to address issues and assumptions with hindsight in the future.

Question 7: What is your view of the proposed disposal of these assets?

1.52. 11 respondents were supportive of the proposed disposal of the assets. Two of these respondents praised the objectives of the proposed disposal. One of these said that this was a first step towards creating a common user CO_2 network. The other respondent commented that the proposal allowed users of the system to receive more residual value from assets that were expected to have declining utilisation and decommissioning costs in the future.

1.53. Other respondents in support of the proposed disposal of the assets had the following recommendations to add in their responses:

- One respondent expressed the opinion that decommissioning costs should be borne by the CO_2 business; another respondent was supportive as long as there were no cross subsidies between gas and CO_2;
- One response recommended that benefits from the disposal mainly benefit consumers, and that these arrangements should be transparent and demonstrable throughout. The response also suggested that the market value of the asset for disposal is considered instead of the book value. A further respondent did not feel that they could comment on the valuation of the asset at this time.
- Two responses were supportive if analysis was robust – one stated that it must be beyond doubt that there was no need for the existing capacity before disposal could be approved. The other respondent emphasised the need for consumers and NTS users to be considered and consulted at all stages of the decision process.
- One respondent was supportive of the proposed disposal but argued that a disposal from NGG and Ofgem's regulation would not be in the best interest of consumers. The respondent recommended that the asset undergo a "change of use" and that it remains under Ofgem's regulation.

1.54. There were five respondents who did not state their position regarding the proposed disposal but raised the following issues:

- One respondent urged for arrangements surrounding the disposal to ensure that operating costs arising from increased buyback and increased pipeline compression were borne by the CO_2 business.
- The remaining four respondents raised concern about the analysis presented in the initial consultation document. One of these stated that there was insufficient detail in the document to address the issues raised. Another

response was concerned by the robustness of the analysis presented. A further respondent asked for more analysis to be conducted to ensure that consumers were receiving fair value for money from the proposal and that shippers would not suffer any detrimental effects. The last of these four respondents said that Ofgem should hire an external expert to conduct an independent assessment of the proposals to fully identify the impact of disposal on NTS capacity and on security of supply.

CHAPTER 4: Valuation of assets

Question 1: Do you agree with the possible ranges of valuations for the assets which have been identified?

1.55. Five respondents agreed with the possible ranges of valuations for assets which have been identified. Two of these respondents remarked on the wide range of valuations, a further respondent expanded by stating that these ranges were too wide to develop an appreciation of the commercial value of the asset. Another of these respondents commented that MEA based values were inappropriate for use as they don't recognise the value of the investment already returned to gas consumers through use of NTS over the last few years. This respondent continued to stress that any increase in valuation over the residual value should be in the interests of consumers, suggesting that the following factors are considered alongside the residual value: potential market worth, buyback risk on gas operations, the extra gas compression required and the minimum level of investment needed before any revenue from the CO_2 business can be returned.

1.56. One respondent disagreed with the range of values displayed in the Chapter 4. The respondent argued that while relevant for transfer between regulated businesses, this range of values was not appropriate for the valuing of assets for transfer from a regulated business to an unregulated business, or where the assets would have significant market value in a competitive market compared to a regulated market. The respondent stated that this range of valuations was based upon historic cost accounting principles and did not consider the opportunity cost or replacement cost of the asset. This respondent continued to express concern for the demonstration plant competition as it felt that NG Carbon could favour one bidder for carriage of CO_2 and hence distort the competition.

1.57. Two respondents were not able to offer a view; one of these commented that the wide range emphasised the difficulty in setting an accurate value for these assets.

1.58. The remaining 11 respondents did not state whether they were in agreement/disagreement but offered the following critique of the valuation range:

- Two respondents suggested that asset ownership is opened up to a competitive bidding process instead to establish its true value and determine the scope for other potential bidders.

- Two respondents recommended that Ofgem seeks independent analysis/opinion into the valuation of these assets. One of these stated that this was because the pipeline still has 20 – 30 years of service life, and so its value will be above book value. This respondent believed there was current uncertainty from industry regarding future flow forecasts through St. Fergus and that this could have implications on the valuation when using the economic life adjusted methodology; the respondent believed this could value the asset below the true market value.
- Two respondents were critical of the MEA based approach to valuation: one respondent said that such a methodology was likely to deter the alternative use opportunity; the other respondent identified two problems with the MEA valuation in that they believed "time used" is arbitrary and that MEA would have to assume that the full capacity of the pipeline is required for CCS.
- Two respondents remarked on NGG's breakdown of calculations: one asked to see the breakdown in more detail so to assure that the asset hasn't been undervalued; the other respondent could not offer analysis of the valuations without detailed breakdowns, but emphasised that the cost to construct a new pipeline would be higher than the lower values shown, suggesting that this be taken into account when the asset is transferred to the NG Carbon.

Question 2: Do you agree with the assumptions which underpin the asset valuations?

1.59. Five responses agreed with the assumptions underpinning the valuations shown. One of these supported the assumptions as they were derived from NGG's balance sheet. The respondent argued that some methodologies, if applied to the rest of the NTS, would result in a valuation of existing assets far in excess of the current RAB. Another of the respondents in agreement with the assumptions questioned DECC's 16 year asset life when the asset in question has practically been fully depreciated.

1.60. One respondent disagreed with the assumptions underpinning the asset valuations. It called for assessment of useful remaining life from inspection data, and the ability to use existing wayleave agreements to be accounted for in determining a valuation for the asset. The respondent said that current time assumptions were arbitrary and were unrelated to the physical condition of the asset.

1.61. A further respondent did not disagree with the assumptions but argued that the valuations by principle were irrelevant as they derived valuations from historic cost accounting principles.

1.62. Two respondents did not feel that they were able to comment on the assumptions underpinning the asset valuations.

1.63. One respondent stated that industry uncertainty around the future flow assumptions at St. Fergus meant that the pipeline value could be underestimated against its true market value when using the economic life adjusted valuation methodology.

1.64. One respondent questioned why the MEA method of valuation assumed a surplus asset date of 2018; the respondent reasoned that the CO_2 price could reach a level to develop CCS past the end date of the DECC competition; they said that it was reasonably clear that NGG expect this pipe to be available for use once the competition period expires so the respondent called for the stated 50 year asset life to be justified. The respondent also asked why there was a difference between the year of commissioning (1970) for calculating the adjusted value of the pipeline and its first year of use (1975-8). The respondent finished by asking for clarification of NGG's depreciation methodology when calculating its depreciated balance sheet value.

1.65. One respondent did not comment on the assumptions underlying the valuations but maintained the view that the process should be opened up to a bidding process as scope exists for other potential bidders.

Question 3: Is there an alternative method of asset valuation which should be considered?

1.66. Ten responses were in favour of an alternative method of asset valuation.

1.67. Eight of the responses in favour of an alternative method suggested a competitive means of valuation, either through competitive tender or auction-style in an open market. One of these respondents suggested that the surplus value generated by a competitive method would be more proportionate to the actual costs of this business so not to distort competition. The respondent said that the transfer of this money to consumers also needs to be considered.

1.68. One of the respondents in favour of a competitive approach also suggested using the opportunity cost of constructing a new pipeline as a means of valuation. Another respondent suggested using a depreciated cost methodology by depreciating the cost of construction to the end of the competition date instead. A further respondent in favour of a competitive approach said that the valuation of the asset was largely dependent on the structure of the CO_2 business operating it, and that if the asset were to stay under NGG ownership, any over/under valuation could be redeemed through the tariff setting in the future (assuming that tariffs are subject to regulation).

1.69. A different correspondent urged for the valuations to consider adding NTS capex costs incurred as a result of the disposal to the final value of the disposed asset. The respondent also suggested that the cost of constructing an equivalent asset should be used as a cap.

1.70. Two respondents asked for examples of alternative methods used from previous distribution network sales. The final respondent said that they were open to suggestions of alternative methodologies.

Question 4: Do you agree with the assessment of benefits associated with asset disposal and alternative use?

1.71. Three responses agreed with the assessment of benefits associated with asset disposal and alternative use. One of these respondents added that they agreed that NGG should be incentivised to find alternative uses for its depreciated assets and that a disposal from the system should result in lower overall transportation costs.

1.72. Four respondents disagreed with the assessment of benefits associated with asset disposal and alternative use. One emphasised that the market value of the asset should be returned to consumers and not the book value to represent the true cost of implementing CCS. The respondent recognised that the final valuation of the asset could advantage or disadvantage the buyer. They advised that if the valuation were too low, the buyer would be at an advantage and should be regulated; if the valuation were too high, government assistance would be required with appropriate regulation.

1.73. Another respondent argued that NGG's shareholders would have been remunerated for the pipeline through the revenue allowance so any remaining value should be returned to the consumer. The respondent continued to add that they did not believe that NG Carbon should be allowed to receive the pipeline at little or no cost and that the transaction should not incur any costs to gas consumers.

1.74. A further respondent in disagreement did not recognise any benefits to users of the NTS apart from a small reduction in transmission charges, the respondent recognised that some values being placed on the asset were negligible to the RAB, but emphasised that these small benefits need to be considered against the potential risk to shippers that asset disposal from the NTS could have. Another respondent felt that it was inappropriate for an unregulated subsidiary of NGG to acquire the asset on favourable terms for use in a competitive market environment and that this would not be in the interest of NTS users or UK taxpayers.

1.75. One respondent had a mixed view of the assessment of the benefits associated with the disposal and alternative use in that they agreed that a benefit existed to users of the NTS by removing the costs of decommissioning, but they did not believe there was a clear case as to whether consumers should receive further benefits from an asset once its value has been fully appreciated.

1.76. The remaining respondent urged that the decision process should not be rushed or the asset value understated in order to hit the CCS competition deadlines.

Question 5: Are there any other considerations that should be taken into account?

1.77. One respondent highlighted the importance of the valuation of the asset as they believed that this CCS project would set a precedent for future projects to

come. The respondent recommended that a range of asset disposals are considered to set a common methodology for similar proposals in the future.

1.78. Another respondent warned that a reduction in the capability of the NTS could reduce the competitiveness of the GB system as a route for Norwegian gas. This respondent also stated that the perception of a shortage in capacity at St. Fergus could push the price of entry capacity up, and that this could make the development of new gas fields in the region uneconomic.

1.79. One respondent suggested retaining the asset under the ownership of NGG, but subjecting them to "change of use" instead of the proposed disposal. The respondent believed that this would avoid a situation where NG Carbon benefits at the expense of consumers by acquiring the asset at too low a valuation, or conversely would avoid a situation where the valuation is too high and risks stalling the momentum of CCS development.

1.80. One respondent commented that competitive tendering for purchase of the asset would identify further risks/opportunities associated with the development of CCS.

CHAPTER 5: Commercial options

Question 1: Do you consider that the opportunity to potentially share in the benefits of CCS using ex NTS assets represents an appropriate balance of risk and reward?

1.81. Nine respondents disagreed that the opportunity to share in the benefits of CCS represented an appropriate balance of risk and reward. Two of these respondents urged for a one-off payment or clean break from NGG as they thought the benefits of CCS would be hard to prove in the early days of the projects, and that the payments between NGG businesses could distort the results of the competition.

1.82. Two of the respondents in disagreement stated that shippers should not be exposed to any of the risk incurred from the disposal of an asset from the NTS. An additional respondent in disagreement expressed concern that a proper balance of risk/reward between network users and NG Carbon will be difficult to set and runs the risk of being inequitable between the parties. This respondent also thought that the risk/reward mechanism would not avoid the risk of distorting the government competition.

1.83. A further respondent said that CCS is a waste disposal process and as a result the value of the process is not as high as the hydrocarbon gas transportation process. The respondent was concerned that one-off capital payments or fees/tonne paid to NGG could inhibit the development of CCS as a technology. The respondent urged a "change of use" (asset retained under NGG ownership) to be considered over asset disposal.

1.84. One respondent did not feel that a sufficient case had been made that gas consumers wish to be exposed to the risk of increased costs through the gas buy-back arrangements. The respondent continued to suggest that it could become sensible to expose consumers to a risk/reward sharing mechanism only once the project has been implemented and its success proven.

1.85. One respondent did not feel that the NG Carbon should be offered a low cost entry into CO_2 transportation without due reward to those consumers who have paid for the infrastructure in question. The respondent suggested that alternative third parties are considered for ownership and that an independent assessment of the proposal is undertaken.

1.86. One respondent argued that the CO_2 business should face all incurred buyback and increased compressor costs to which NGG should have no exposure.

1.87. Three respondents agreed that the opportunity to potentially share in the benefits of CCS as an appropriate balance of risk and reward, although two of these respondents disagreed with a book valuation of the asset: one suggested that the valuation is performed on an open market basis; the other respondent argued that National Grid will not be exposed to any risk if NG Carbon pays book value for the asset.

1.88. One of the respondents in agreement also stated that consumers would find it hard to recognise any clear benefits from a risk and reward mechanism as it is largely dependent on future events (buyback costs and the development of CCS as a technology).

1.89. Four respondents did not state exactly whether they believed the sharing mechanism offered an appropriate balance of risk/reward, but offered the following opinions:

- One respondent said that it would be unwise to rule out the option of royalties, but stated that it was not immediately obvious why shippers and consumers would want to be exposed to the risk and uncertainty of the CCS business. Another respondent recognised the potential benefit of the sharing mechanism but called for further analysis to support this.
- One respondent stressed that long-term safeguards against risk are implemented before potential benefits are collected from CCS technology (which could be short term).
- The final respondent believed that royalties have the potential to turn into cross-subsidies unless set at an appropriate level. The respondent argued that NG's shareholders should be exposed to the risk of failure/success of the CCS project.

Question 2: What is your view of a lump sum payment, in the event that consent is granted for disposal?

1.90. Ten respondents believed that the lump sum payment would be suitable for the purchase of the disposed asset from NGG. Five of these reasoned that the lump sum payment was simple or conventional in design – one commented that the lump sum was transparent and rewarded consumers. Another respondent suggested using the lump sum payment with a simple royalty payment from the CO_2 business. A further respondent queried how a cash sum would relate to a reduction in RAV for NGG.

1.91. Three of the respondents agreeing with the lump sum payment recognised the difficulty in deciding a fair value; one of these respondents called for further scrutiny of the valuation options. Another of these respondents feared that the difficulty in producing a fair value might mean that the lump sum payment would not produce an accurate figure for compensation. One respondent believed that the value should be reached through open auction.

1.92. One respondent disagreed with the lump sum payment as it believed that any significant payment would inhibit the development of the CCS technology.

1.93. Two respondents instead stated that a combined lump sum/royalty approach should be utilised. One believed that the lump sum should cover the RAV of the asset, and that the royalty should cover the increased opex through compressor costs, and costs incurred through extra buyback. The other respondent believed that the royalty payment should also cover increased opex and buyback costs, but these should be determined ex-post by after sale condition as costs may not actually be incurred to the extent forecast.

Question 3: What is your view of a participatory royalty arrangement, in the event that consent is granted for disposal?

1.94. Six respondents were not in favour of the participatory royalty arrangement. Two of these respondents stated that they favoured a lump sum payment or "clean break" instead, although one suggested that auctioning the level of royalty payment to NGG for utilising its infrastructure for CO_2 transport would be more favourable than the asset valuation basis of any of the historic cost ranges in the initial consultation document.

1.95. A further two respondents not in favour of the participatory royalty arrangement explained that they did not think that consumers should be exposed to the risk of extra buyback costs. One of these respondents was in favour of the simple royalty arrangement as it did not expose consumers to the risk of variation in buyback costs. The respondent continued to state that gas consumers would be exposed to a significant amount of risk if the cost of buybacks deviated from that predicted; the respondent also considered the potential effects of the CO_2 transport business experiencing delays in commissioning – they thought that consumers would experience buyback costs with no means of royalties to offset them. The respondent recommended that a participatory royalty arrangement should only be considered once the CCS project is stable and producing a demonstrable profit.

One respondent did not favour the participatory royalty arrangement as it believed that the CO_2 business could not bear any additional costs.

1.96. Three respondents were in favour of the participatory royalty arrangement. Two believed that it was more cost reflective method of remuneration although one of these raised the issue of the effect of uncertainty over payments. The other respondent said that it was unclear why this royalty had to be proportional to the amount of CO_2 transported and not simply an annual payment.
The third respondent in favour said that the method aligns the value returned to consumers and shippers with the commercial benefit derived from the CO_2 business. This respondent also welcomed suggestions of alternative structures for comparison.

1.97. There were four respondents who offered the following comments for development of remuneration proposals:

- One respondent felt that there could be merits in this approach as long as stability in transportation charges is not undermined.
- Another respondent stated that the participatory royalty arrangement was their least preferred option for remuneration, but remained open minded to the approach. The respondent said that factors exposing this arrangement to doubt included the ability to accurately quantify and manage risks, and a pull away from the core business of gas transportation.
- One respondent highlighted the uncertainty in the participatory royalty arrangement fees as they were largely dependent on the amount of CO_2 gas transported during the period, and this will be subject to the project's success.
- The final respondent focused on the proposed annual capacity cap of the pipeline (6m tonnes CO_2 a year). The respondent asked for compression to be considered to increase this cap to 10m tonnes to produce better yields for the consumer.

Question 4: Are there other risks / benefits which should be taken into account?

1.98. One respondent expressed surprise that there would not be any implications on meeting the baseline obligation at St. Fergus with this stretch of pipeline disposed of, and questioned the accuracy of other baselines and whether these too have headroom that could be utilised instead of constructing new infrastructure.

1.99. One respondent asked Ofgem to clarify how it would respond in a situation whereby the assets are disposed of from the NTS followed by St. Fergus receiving an incremental signal which could have been facilitated through the use of the disposed assets. The respondent asked how any necessary investment costs would be treated in this case.

1.100. Another respondent considered the technical risk of using an ex-NTS asset for the transport of CO_2. The respondent asked Ofgem to consider the risk of leakage from the pipe and corrosion to the pipe to ensure that there was no risk to industry and local consumers.

1.101. A further respondent requested that future documents included Ofgem/independent analysis of NGG's predictions for flows into St. Fergus; the likelihood that the GB grid could be used as a transit route for Norwegian gas; NGG's asset valuations; and the consequences associated with a 25% reduction in linepack availability within the St. Fergus to Avonbridge feeder system.

1.102. One respondent asked for Ofgem to publish and explain any licence changes they expect to make to NGG's revenue allowance well in advance of any sale.

1.103. The final respondent suggested exploring the benefits of using a different commercial structure where the asset would remain under NGG ownership and revenues received from the transportation of third party gas (i.e. CO_2) feed into NGG's income stream rather than an unregulated external NG subsidiary.

Appendix 4 – Forecast Flow Data

1.1. We asked NGG to carry out analysis and provide data about the current capability of the feeders transporting gas south from St. Fergus and to compare this with the situation that would prevail following any asset disposal. In particular, we asked NGG to consider: the current capability and the capability with the pipeline feeder assets removed; the comparison between this capability and forecast flows at St. Fergus; and the comparison with historic flows at St. Fergus. We reported the results in the April 2009 consultation document.

1.2. The results of the analysis are shown in Table A2 below:

	St Fergus Capability	
	With current infrastructure	**With feeder removed**
310mcm demand day	154mcm/d (stop at baseline)	132mcm/d
400mcm demand day	154mcm/d (stop at baseline)	132mcm/d
590mcm demand day	154mcm/d (stop at baseline)	138mcm/d

Table A2: St. Fergus capability

1.3. A demand level of 310mcm was chosen as this is the approximate level at which historically NGG starts to see flows in excess of 100mcm at St. Fergus. A 400 mcm/d demand level is representative of a reasonably high demand day, whereas the 590 mcm/d demand level corresponds to a 1 in 20 peak day demand level (2007 Ten Year Statement).

1.4. The results show little or no variation between the 310 mcm/d and 400 mcm/d demand levels whilst as expected, capability increases when demand levels are high, for example at 590 mcm/d as in the 1 in 20 demand case. This is because the increased demand makes it easier to move more gas south from St. Fergus.

1.5. The results indicate a capability of around 132mcm/d which is equivalent to 1467 GWh/d, using a CV[24] of 40MJ/m^3.

1.6. We noted that under various scenarios and even with varying demand levels (between 310 - 400 mcm/d) the capability remains at around 130-133 mcm/d. This is some 21-24 mcm/d below the current baseline. Without any compression, this indicates an overall loss in capability of nearly 15%, in comparison to the current level with all feeders available.

[24] Calorific value (CV) is a measure of heating power and is dependent upon the composition of the gas. Gas passing through the NTS has a CV between 37.5 MJ/m3 to 43.0 MJ/m3. An average value of 40 MJ/m3 is used with a conversion factor of 10.833 to convert volumes of gas transported, measured in mcm/d to energy transported, measured in GWh/d.

1.7. If additional compression is installed the deficit is reduced, but capability is not restored to the original level of 154 mcm/d. NGG's analysis indicates that at peak demand under 1 in 20 conditions the capability would only increase to 149mcm/d. This is a net shortfall of 5 mcm/d (just over 3%) compared to the current baseline.

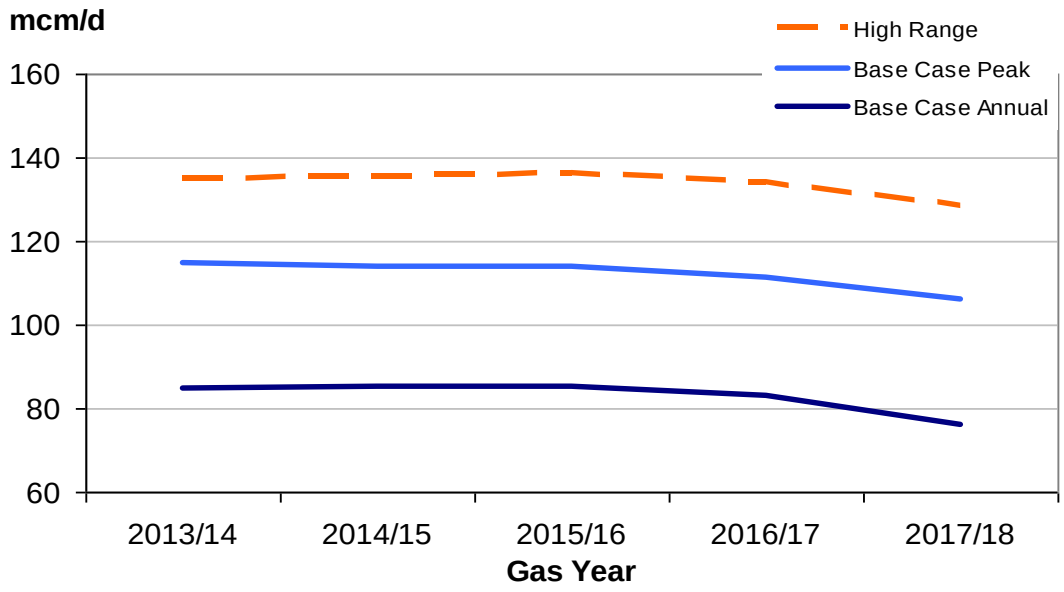

Figure A1: Forecast flows at St. Fergus (from initial consultation)

1.8. Using the figures from its 2008 Ten Year Statement base case, NGG's analysis indicates that system capability will be able to meet requirements, although it may come close to the revised capability with the feeder removed. In 2009, NGG sought advice from Wood Mackenzie to validate its figures given the difficulty in forecasting supply patterns against global influences and commercial drivers. Figure [6] shows the NGG and Wood Mackenzie (WM) views of future supplies against a capability level rounded to 130mcm/d.

1.9. The availability of assets for carbon dioxide transportation is only possible in light of the forecast change in supply patterns over the coming decade. NGG's Ten Year Statement base case forecast for the years 2013/14 - 2017/18 shows that flows are highly unlikely to reach 130mcm/d, with less than 10% probability of flows higher than 113mcm/d between these years.

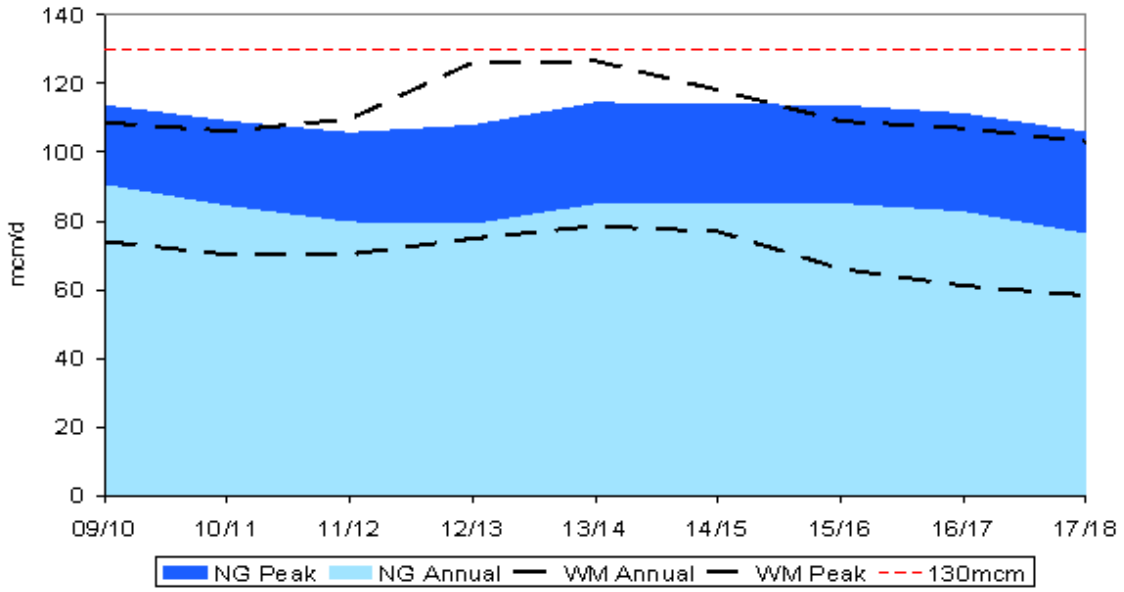

Figure A2: Capability and forecast flows (from initial consultation)

(Source: NGG and Wood Mackenzie[25])

1.10. A common feature of all the NGG forecasts is that future supplies at St. Fergus will be below the current baseline level, even if new supplies appear. The highest peak day level is for the year 2015/16 when flows of around 136mcm/d could be expected under the high range scenario. However NGG's 2008 Ten Year Statement base case forecast does not predict peak flows above 115mcm/d over the same period. This compares with a predicted capability of 130-133 mcm/d if one of the existing feeders were to be removed.

1.11. We note that NGG believes that beyond 2018, the continuing decline in existing UKCS production is such that it will not result in forecast flows reaching a level which could not be accommodated within the capability of the network with the feeder sections removed. The main area of uncertainty is about whether potential new supplies will connect to St. Fergus and if they do, whether the expected flows will be in the high range of those which are forecast.

[25] The data used here was taken from a report commissioned by NG and produced by Wood Mackenzie, entitled "UK Natural Gas Supply/Demand Outlook")

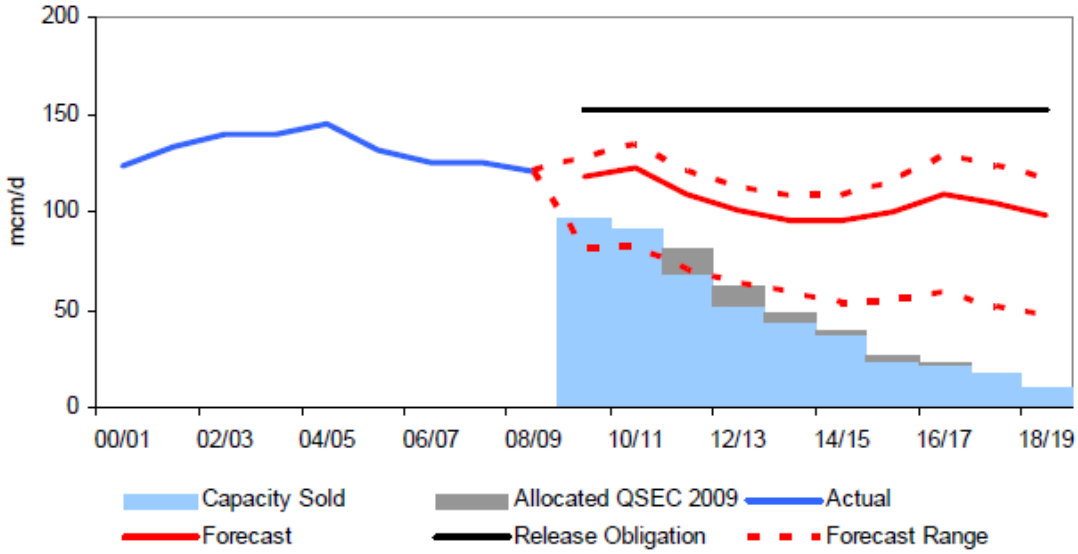

Figure A3: Peak St. Fergus Forecast
(Source: NGG 2009 Ten Year Statement)

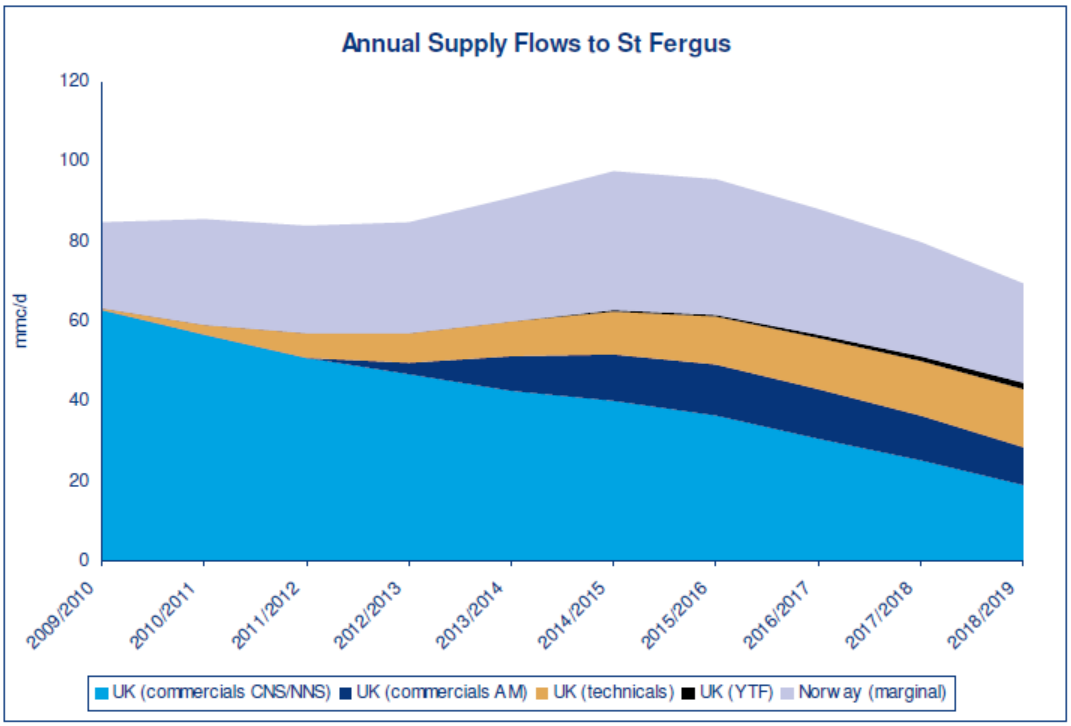

Figure A4 : UK and Norwegian forecasted annual flows to St. Fergus - by supply source (mcm/d)
(Source: Wood Mackenzie, September 2009)

Appendix 5 – 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.[26]

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[27].

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 consumers, present and future, 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[28];
- 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.[29]

[26] entitled "Gas Supply" and "Electricity Supply" respectively.
[27] 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.
[28] 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.
[29] The Authority may have regard to other descriptions of consumers.

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[30] 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 Regulation[31] 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.

[30] or persons authorised by exemptions to carry on any activity.
[31] Council Regulation (EC) 1/2003

Appendix 6 - Glossary

A

Aggregate System Entry Point (ASEP)

A point where gas can enter the NTS.

Annual Monthly System Entry Capacity (AMSEC) auction

An auction, held annually, for the sale of monthly rights to enter capacity on to the NTS at the various entry points for up to two years in advance.

The Authority (Ofgem)

Ofgem is the Office of Gas and Electricity Markets, which supports the Gas and Electricity Markets Authority (GEMA), 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 capacity that the transmission licensee is obligated to release. Baselines also determine the levels above which incremental capacity is defined.

Buy-back

The process of compensating users if NGG is unable to honour entry capacity holdings, which have been sold on a financially firm basis and users wish to flow against them.

C

Capital Expenditure (Capex)

Expenditure on investment in long-lived transmission assets, such as gas pipelines or electricity overhead lines.

CCS

Carbon capture and storage

Calorific Value (CV)

The ratio of energy to volume measured in Megajoules per cubic meter (MJ/m3) which for a gas is measured and expressed under standard conditions of temperature and pressure.

Compressor Fuel Use (CFU)

Fuel used to power compressors which pressurise the NTS. Some compressors are powered by gas, some by electricity.

D

DECC

Department of Energy and Climate Change. The Department brings together much of the Climate Change Group, previously housed within the Department for Environment, Food and Rural Affairs (Defra), with the Energy Group from the Department for Business, Enterprise and Regulatory Reform (BERR).

Direct Connect

A direct connect is a user who requires access to a high pressure connection such as some large scale industrial users (e.g. power stations) and are connected directly to the NTS.

Distribution Network (DN)

DNs transport gas from the NTS to final consumers via a network of pipes and lower pressure mains. They are sometimes also referred to as GDNs (Gas Distribution Networks)

F

Free increment

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

I

Incremental Entry Capacity

Entry capacity in addition to the baseline which NGG releases for allocation. Obligated Incremental Entry Capacity is capacity which has been signalled to be released as a result of QSEC auction.

L

Linepack

The volume of gas within the National or Local Transmission System at any time.

M

Modern Equivalent Asset (MEA)

The modern equivalent asset value is what it would cost to replace an old asset with a technically up-to-date new asset with the same service capability.

N

National Grid Gas (NGG)

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

NG Carbon

NG Carbon is the subsidiary company of National Grid which has been set up in order to develop the carbon dioxide transportation business.

National Transmission System (NTS)

The high pressure gas transmission system in Great Britain.

O

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.

Office of Carbon Capture and Storage OCCS

The Office of Carbon Capture and Storage is tasked with facilitating the delivery of CCS in the UK, and helping to promote its rapid deployment globally. The Office will set the strategic path for the use of CCS, facilitate the delivery of the demonstration programme, create the policy and support arrangements to stimulate private sector investment, and work with stakeholders to remove barriers to investment and development in the UK and globally.

Q

Quarterly System Entry Capacity (QSEC)

Firm 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 forward via QSEC Auctions which offer capacity at each aggregate system entry point between two and sixteen years in advance.

S

Substitution of Entry Capacity

As part of the TPCR 2007-2012 package, 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 has responsibility to construct, maintain and operate the NTS and associated equipment in an economic, efficient and co-ordinated manner. In its role as SO, NGG NTS 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 NGG NTS to annually publish a ten-year forecast of 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.

Transfer and Trade of Entry Capacity

As part of the TPCR 2007-2012 package NGG is obliged to facilitate the temporary transfer of unsold capacity (and trade of previously sold capacity) at an entry point to another entry point on the NTS where there is demand for this capacity.

Transmission Owners (TO)

Companies which hold transmission owner licences. NGG NTS is the gas TO.

Transmission Price Control Review (TPCR)

The TPCR 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, NGET, SPTL, SHETL and to the licensed gas transporter responsible for the gas transmission system, NGG NTS

U

Uniform Network Code (UNC)

As of 1 May 2005, the UNC replaced NGG NTS's network code as the contractual framework for the NTS, GDNs and system users.

Appendix 7 - 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:

Andrew MacFaul
Consultation Co-ordinator
Ofgem
9 Millbank
London
SW1P 3GE
andrew.macfaul@ofgem.gov.uk