Gas Network Extensions in Northern Ireland:

Approach to Comparing High Pressure Licence Applications

A Consultation Paper

6 February 2014



About the Utility Regulator

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We are not a policy-making department of government, but we make sure that the energy and water utility industries in Northern Ireland are regulated and developed within ministerial policy as set out in our statutory duties.

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Our Mission	Value and sustainability in energy and water.
Our Vision	We will make a difference for consumers by listening, innovating and leading.

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Be a best practice regulator: transparent, consistent, proportional, accountable, and targeted.

Be a united team.

Be collaborative and co-operative.

Be professional.

Listen and explain.

Make a difference.

Act with integrity.

Abstract

We are publishing today a consultation on how we will compare applications for a licence to extend the high pressure gas network to the west. Given that we have different high pressure regulatory models in NI we need to prepare for the case where applications are on the basis of different regulatory models and thus different risk profiles.

This consultation sets out initial proposals for adjusting the WACC of applicants with differing regulatory models to allow them to be compared on a consistent basis. We have set out our approach and arrived at a range for the adjustment factor between 0.09% and 0.53% with a medium point of 0.22%.

Audience

Potential applicants for high pressure gas conveyance licence, regulated companies, consumers, other regulatory bodies and other statutory bodies.

Consumer impact

The purpose of the consultation is to facilitate as many parties as possible to apply for the high pressure gas to the west licence. This will allow for the most efficient company to deliver the benefits of natural gas to the consumers in the towns along the gas to the west route.

CONTENTS

1 EXECUTIVE SUMMARY

1.1. The Northern Ireland Executive has approved a subvention of up to £32.5m for extending the gas network to the west. We consulted in April 2013[1] on how we would facilitate the application process for the necessary licences.

1.2. One of the issues was whether we would allow licence applications on the basis of both of the current regulatory models which operate in Northern Ireland in respect of the treatment of operating costs (opex) – being the 'revenue cap' model and the 'operating cost pass through' model.

1.3. In considering the answer to this question, we regarded two principles as being important. First, it should be possible for applicants to be fairly compared against each other when considering the respective value of their applications to consumers in Northern Ireland. Second, nothing should be done which would preclude applications from companies which proposed to operate under one particular model, since in principle both of them are acceptable and appropriate. Instead we should seek to facilitate applications submitted under either model.

1.4. Our original proposal in relation to applications for the high pressure conveyance licence was that they would be required to be based on the 'revenue cap' model, with applicants competing on both operating expenditure and the cost of capital. This would clearly ensure that applications could readily be compared against each other, since they would all be made on the same comparable basis. It would therefore satisfy the first principle.

1.5. However, we were also clear that we did not intend this to have the effect of excluding applicants who wished the 'operating cost pass through' model to be adopted in the final licence as granted. If it could be demonstrated that it better facilitated us in meeting our statutory duties, and that consumers would be better off as a result, we indicated that we would be prepared to grant a licence on this basis, notwithstanding the fact that the applicant had been required to frame its application on the different 'revenue cap' basis. This would ensure that our second principle was also satisfied.

1.6. However, the consequence of this is that any decision to adopt the 'operating cost pass through' model would have required us, at the time of granting the licence, to calculate the difference in terms of value for money for consumers under the two methods of regulation. We would have needed to convert an application made under one model to a licence granted on the other model.

1.7. Having had the opportunity fully to consider the responses to this proposal we have concluded that it would be preferable instead to allow applications to be submitted based on either model. This obviously serves the purpose of facilitating applications from companies wishing to use different models. But it raises the possibility that different applications for the licence could be based on different risk profiles, and we therefore need to take additional steps to ensure that these applications can fairly be compared against each other.

[1] http://www.uregni.gov.uk/uploads/publications/Gas_to_the_West_consultation_paper.pdf

1.8. In order to compare applications based on different regulatory models we will need to make appropriate adjustments. In particular the Weighted Average Cost of Capital (WACC) will require adjustment to take account of the fact that those with a revenue cap would require opex risk to be reflected in their WACC but those with an 'operating cost pass through' model would not.

1.9. However, under our previous proposal a similar process of adjustment would also have had to be carried out before a licence could be granted on the 'operating cost pass through'. We consider that bringing that process forward, clearly stating how it will operate, and consulting in advance on a method for calculating the adjustment factor, will appreciably add to the transparency and robustness of the licence application process while still continuing to ensure that it satisfies both of our principles.

1.10. The specific type of calculation that is required for this purpose does not have a significant amount of regulatory precedent as regulators have not tended to make explicit the various risk elements incorporated into the overall WACC. However, there is a body of regulatory work on the impact of specific cash flow risk on WACC and our proposed approach is consistent with some of the work we did on the Power NI price control and elements of Ofgem's work on the RIIO-T1 and RIIO-GD1 reviews.

1.11. In this paper we have set out the approach we propose to use and the reasoning behind the assumptions we have made. This allows us to provide an indicative range of values for the risk adjustment factor.

1.12. In summary, in order to estimate the adjustment factor for opex risk we need to take a view on the amount of opex that will be required for the gas to the west pipeline and how unpredictable or risky it might be. The level of opex is considered using comparisons with similar pipelines in NI. We regularly review and determine opex costs and therefore have a good understanding of the likely costs.

1.13. In assessing the level of variation we also take into account the actual variation levels of similar projects in NI as well as reviewing other UK regulators views on the level of variation in UK utilities costs. In particular we have referenced Ofgem's work on RIIO T1 which had a significant focus on relative risk assessments and the companies' exposure to cash flow risks. As part of this work Ofgem has considered many of the issues on the variability of utility costs that are raised in this paper.

1.14. Our analysis produces a range of figures ranging from a high estimate to a low estimate. We then use these estimates to work out the impact that this variation would have on the cashflows and equity returns of the licensee. This allows us to judge the likely impact on a licensee's equity beta and ultimately the adjustment factor that should be applied to the WACC.

1.15. Based on the approach and assumptions set out in the paper we estimate a range of risk adjustment factors from 0.09% to 0.53% with a medium estimate of 0.22%. These would be applied to a pre-tax WACC. Our initial view is that the risk adjustment factor should lie towards the medium point estimate. This is based on our initial view that the medium assumptions used in the paper represent the most appropriate values to apply.

1.16. In particular, the high end of the range assumes a level of variability significantly larger than we have seen before in gas transmission and would therefore appear to over-estimate the necessary adjustment. On the other hand, our initial view is that the low end of the range may not adequately reflect the level of uncertainty that is incorporated

into opex risk.

1.17. We view the range that we have arrived at as reasonable and appropriate given the evidence we have identified and set out in the paper. This is consistent with the fact that the level of controllable opex involved in this project is relatively low compared to the size of the capex requirement, the evidence of limited historical variation of controllable opex in NI gas transmission projects and the protection offered by the licence conditions in extreme and unforeseen events.

1.18. We would highlight that our conclusions are project specific and will have limited implications for companies and projects with different risk profiles. Some areas that might drive variation in other regimes e.g. Ofgem's incentive mechanisms, would not apply to this project.

Table 1 Proposed 'risk factor adjustments'.

Component	Low	Medium	High
WACC Adjustment	0.09%	0.22%	0.53%

1.19. This is a consultation and we would be very keen to hear views on the approach and the specific assumptions within the analysis. We have also highlighted more detailed questions throughout the paper but respondents should feel free to respond on any issue.

2 BACKGROUND

Purpose of this consultation

2.1. Our consultation paper 'Gas Network Extensions in Northern Ireland' published 3rd April 2013[2] sought responses on a number of issues relating to the process by which a gas conveyance licence would be granted to extend the Northern Ireland high pressure gas network to the towns in the gas to the west extension area[3]. Amongst other things we sought views as to which regulatory model(s) should be permitted for inclusion within the high pressure conveyance licence and how an application process might be designed which would allow applicants to choose between the permitted options.

2.2. We specifically recognised that currently in Northern Ireland there are two different models as to how deviations between forecast and actual operating expenditure should impact on returns to the licence holder. The 'revenue cap' model applied to BGE (NI) and the 'operating cost pass through' model applied to Premier Transmission and Belfast Gas Transmission. We were clear that we regarded either model as being equally acceptable for the proposed high pressure pipeline system. However it was recognised that permitting applicants to choose between these two models had the potential to make judging between applicants more challenging than might otherwise be the case, because it would make applications less obviously comparable. For clarity the different models only apply to operating expenditure ("opex") and a 'revenue cap model' would apply to capital expenditure in all circumstances.

2.3. We originally proposed that applications for the high pressure conveyance licence should be restricted to the 'revenue cap' model with applicants competing on both operating expenditure and the cost of capital. One of the benefits of this approach was that it could maximise the information revealed by the application process. However we were clear that this should not exclude the 'operating cost pass through' model being adopted in the final licence as granted, if it could be demonstrated to us by an applicant that it better facilitated us in meeting our statutory duties and that consumers would be better off as a consequence of its adoption. However, any decision to adopt the 'operating cost pass through' model would have required us, at the time of granting the licence, to calculate the difference in terms of value for money for consumers under the two methods of regulation.

2.4. Some respondents to this consultation questioned whether it was appropriate to conduct a licence award process on the basis of one proposed set of licence conditions, but then to grant a licence containing a different set of conditions.

2.5. We considered this issue very carefully in the light of the consultation responses, and have concluded that it would be preferable to allow applications to be submitted based on either model. However, this requires us to determine a means by which we can ensure that applications made on different models can be comparable for the purposes of the competition. In practice, this will mean that the analysis and calculations we would have had to perform prior to granting a licence, in order to determine whether and how to change the revenue cap model which was the basis of an application to an

[2] Gas Network Extensions in Northern Ireland

[3] Dungannon / Coalisland, Cookstown / Magherafelt. Enniskillen / Derrylin, Omagh and Strabane

'operating cost pass through' model, will now be performed as part of process in comparing applications.

2.6. We recognise that this does add some complexity to the process and will reduce the level of information that will be revealed by the licence application process as it will no longer be credible to require applicants to reveal information on their required level of opex. However we view this as superior to the alternative of choosing in advance which regulatory model should be contained in the licence and limiting the process to just that model.

2.7. We consider that it enhances the transparency and robustness of the application process to bring forward the stage at which one type of application can be converted into another for the purposes of comparison, to clearly state how it will operate, and to consult in advance on the method by which it will be carried out. It also avoids any potential artificiality of those who do not wish to operate under a revenue cap model from submitting applications on the basis of opex forecasts appropriate to the revenue cap model.

2.8. In order to compare applications with different regulatory models we will need to make appropriate adjustments. In particular the Weighted Average Cost of Capital (WACC) will require adjustment to take account of the variation in the level of risk to which licence holder returns are exposed as between a 'revenue cap' and an 'operating cost pass through' model. This consultation is concerned with the size of the adjustment factor and the method by which it is calculated.

Relationship between this Consultation and the Licence Application Process

2.9. It is our intention to begin the licence application process today, 6th February 2014 with the closing date for applications being 6th May 2014. We will then score the applications in accordance with the Licence Application Regulations and Assessment Criteria published by the Department of Enterprise Trade and Investment (DETI) on 28 November 2013 and publish an initial determination for consultation on which applicant(s) are to be considered as the preferred applicant for the available conveyance licences. The aim would then be to award the final licence to the successful applicant(s) in early autumn 2014.

2.10. This consultation will run in parallel with the licence application process and we will be making a determination on the 'risk adjustment factor' prior to scoring applications for the high pressure conveyance licence. The 'risk adjustment factor' will only be used for the purposes of comparing applications made on different bases. The licence as granted will contain the model chosen by the successful applicant and will not be impacted by the 'risk adjustment factor'.

Responding to this consultation

2.11. We have set out a number of questions for respondents to comment on. Respondents should not feel confined to the specific questions proposed and may comment on any other issue they feel relevant to the issues under consideration in the paper. We welcome responses to the issues raised in this paper by **Thursday 20th March 2014 by 5pm.**

Responses should be sent to:

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14 Queens Street

Belfast BT1 6ER graham.craig@uregni.gov.uk

2.12. Our preference would be for responses to be submitted by e-mail.

2.13. Individual respondents may ask for their responses in whole or in part, not to be published, or that their identity should be withheld from public disclosure. Where either of these is the case, we will ask respondents to also supply us with the redacted version of the response that can be published.

2.14. As a public body and non-ministerial government department, we are bound by the Freedom of Information Act (FOIA) which came into full force and effect on 1 January 2005. According to the remit of FOIA, it is possible that certain recorded information contained in consultation responses can be put into the public domain. Hence it is now possible that all responses made to consultations will be discoverable under FOIA – even if respondents ask us to treat responses as confidential. It is therefore important that respondents note these developments and in particular, when marking responses as confidential or asking to treat responses as confidential, should specify why they consider the information in question to be confidential.

2.15. This paper is available in alternative formats such as audio, Braille etc. If an alternative format is required, please contact the office and we will be happy to assist.

3 INTRODUCTION AND APPROACH

Licence Application Process – High Pressure Licence

3.1. The gas conveyance licence for the gas to the west high pressure (above 7 bar) pipeline system will be awarded by means of a competitive licence application process in accordance with the Licence Application Regulations and Published Criteria set out by DETI. Following a public consultation published in April 2013 we have determined the process to award the high pressure licence and this is set out fully in our Application Pack. We have highlighted some the features below:

- Applicants will be able to choose between two models with regard to how deviations in the level of operating expenditure between forecast and actual outcomes will be treated in the licence, either 'revenue cap' or 'operating cost pass through'. If the former option is chosen the licence holder will receive an allowance to cover opex following each periodic[4] price review. Any deviation between actual and forecast expenditure will be at the licence holders own risk. If the latter option is chosen then the licence holder receives an allowance equal to actual opex and the licence holder avoids any opex risk;
- For clarity all applicants will be expected to manage capital expenditure risk and no applicant will be expected to take risk on gas volumes;
- Applicants will be required to reveal their required WACC;
- We will apply a fixed 'risk adjustment factor' to applicants' stated WACC so that all applications will be scored on a common basis irrespective of the model chosen by the applicant.

3.2. This is in contrast to the design of the low pressure licence application process where applicants have no choices available to them as to how costs will be treated in the licence.

The Risk Adjustment Factor

3.3. We believe that the WACC will be different depending on the treatment of operating expenditure in the licence. We would expect that the 'operating cost pass through' model would require a lower WACC than the 'revenue cap' model. In order to score applications on a common basis irrespective of the model chosen by the applicant we will apply a fixed 'risk adjustment factor' to one or other set of applications. This will remove variations between applications due to the choice of model and allow them to be compared on a fair and transparent basis.

Context

3.4. Regulators have been calculating a WACC for regulated companies to reflect their risk levels for many years. There are a variety of risks which regulated companies are

[4] Periodic reviews are likely to be every five years.

faced with. These can include:

- Capex risk - the risk that actual capital expenditure varies from allowed capital expenditure;
- Volume risk – the risk that actual volumes vary from allowed volumes;
- Financing Risk – the risk that actual cost of capital varies from allowed cost of capital;
- Regulatory Risk – this is a more general risk that regulatory action will impact on cash flow;
- Stranding Risk – the risk that the asset will be stranded and there will be no revenues to cover costs.

3.5. In addition there is the risk that actual opex varies from allowed opex – opex risk – and this is the risk which we are focused on for present purposes. If a company does not face this risk then it should have a lower WACC than an otherwise identical company who does. Some companies who apply for the licence will not expect to face this risk while some will. We need to be able to compare the applications and thus we need to be able to identify the additional opex risk.

3.6. We have identified some of the more well known risks above. There could be a temptation to take a high level view of what proportion of each risk makes up the total risk within the WACC. We are not aware of any other regulator who has attempted this and we have not done so here.

3.7. The difficulty is evident when we consider the case of the two current gas transmission companies who have an 'operating cost pass through' model – BGTL and PTL. They also do not have any ongoing capex costs and they have locked in all their necessary financing (through 100% debt). Therefore one might assume they have no opex, capex, financing or volume risk and that they were close to risk free. However it is clear from their credit rating and the yield on their debt that they are not considered risk free. There are many factors which contribute to risk including those which are difficult to quantify in isolation e.g. risk that the regulatory environment changes.

3.8. While many of the elements we cover in this paper are common to regulation we are not aware of any economic regulator who has previously made explicit its calculation of such a specific risk adjustment factor for WACC. Regulators have normally produced a general WACC commensurate with the overall level of risk facing the regulated entity rather than seeking to explicitly identify each individual element of risk which is incorporated into the WACC.

3.9. This points to the difficulty in being precise about individual risk components and we recognise that isolating such risks is not a straight forward exercise. Indeed given that nearly all regulators have often made significant adjustments to regulatory models over the years e.g. changing incentive mechanisms, moving from a price cap to revenue cap, it is noteworthy that there is such a limited body of evidence on individually identifying the impact on WACC of such actions.

3.10. The fact that so many regulators have not felt the need to quantify the value of the direct link between changes to incentives and WACC could indicate that the overall impact is small. However we believe that it is worthwhile for us to calculate an adjustment factor in these circumstances and that a robust estimate can be established using the available evidence.

3.11. We did consider whether there was any robust high level evidence on the systematic/non-systematic risk division between opex, capex and finance. The limited evidence we found on this did not suggest that there was a pre-existing approach that could simply be applied in these circumstances.

3.12. We also considered if there was any evidence in the debt markets that could assist us in our analysis. We note that credit rating agencies do recognise that an 'operating cost pass through' model is likely to be less risky than a revenue cap model and this would be one factor that could affect credit ratings. We can also observe the different yields between bonds with different credit ratings. For example, the difference in the yield on the A and BBB iBoxx Non Financial index over the last 15 years averages to about 0.45%[5]. However given the many factors that can influence bond yields and credit ratings we do not consider this provides a robust basis for identifying the risk adjustment factor.

Our Proposed Approach

3.13. There is a significant body of work on the methodologies that regulators use in assessing risk and WACC for regulated utilities. In calculating the 'risk adjustment factor' we can draw upon these well established methodologies. In this consultation paper potential values for the various components of the calculations are suggested in order to establish a credible range of 'risk adjustment factor' values. We anticipate that the chosen value for the risk adjustment factor will be within the proposed range.

3.14. Having considered above some of the risks that will exist for regulated entities it is clear that these different components of risk could vary from project to project. In corporate finance theory the WACC is strictly a concept that applies to individual projects, not to companies as such (companies are simply bundles of projects). That means that in the case of a major project such as a pipeline, it is entirely appropriate to take account of its particular risk characteristics and consider how these affect the WACC to be applied.

3.15. As a starting point, if a project has a very small amount of opex relative to total cashflows this would point to a small level of opex risk within the overall WACC. Conversely if a large proportion of cashflow relates to opex, this would suggest that opex risk is much more material. Therefore we need to ensure our analysis takes into account the size of the operating costs for this project and the potential impact of opex fluctuations on total cashflows.

3.16. Furthermore we can observe that the inherent unpredictability of the opex in any project will have an important bearing on opex risk. Where a project's opex is highly uncertain and difficult to predict the licensee will expect to rewarded for significant opex risk. Conversely where the opex is highly predictable opex risk will be lower. Therefore we also need to consider the potential variability of opex for the gas to the west project in determining an adjustment factor.

3.17. In carrying out our analysis we have referenced to work of other regulators in these areas. For its RIIO T1 work Ofgem produced a significant amount of work in assessing the relative risk of the companies and their exposure to cash flow risk. As part of this

[5] iBoxx rating of A and BBB covers around three notches or gradations of potential credit ratings. So for example between the midpoint of the A and BBB classes there are sub grades A- and BBB+ (Fitch / S&P).

they modelled the relative risks of the cash flows using Monte Carlo simulation. The modelling included a number of assumptions in relation to the variability of costs and the distribution of the variability. We have referenced these in section 4 below.

3.18. Furthermore Ofgem also asked ECA/Imrecon[6] to consider the impact that these variations in expenditure would have on cashflow and the implications for equity returns and ultimately WACC. The overall result of Ofgem's work on RIIO was to determine different equity betas for different companies on the basis of the different cash flow risks that they faced.

3.19. A similar approach of reviewing the impact of variability on equity return has been used in our recent work on retail margins[7] and by similar work in Australia[8] . While this approach is relatively recent and does require a number of assumptions to be made we consider it can provide useful insights into the relationship between risk and the WACC.

3.20. The next section sets out a more detailed methodology where we take the size and variability of opex for this project and make an estimate for the risk adjustment factor. The methodology is based on the Capital Asset Pricing Model (CAPM) methodology and focuses on the relationship between opex risk and the cost of equity. We conclude by using the analysis to produce a range for the risk adjustment factor.

Q1: Do respondents have views on the proposed approach or views on an alternative approach?

[6] RIIO Review Financeability Study November 2012

[7] http://www.uregni.gov.uk/uploads/publications/Power_NI_Price_Control_Consultation.pdf

[8] 'Estimation of the regulated profit margin for electricity retailers in New South Wales', SFG, April 2013

4 CALCULATING THE 'RISK ADJUSTMENT FACTOR'

Theoretical Background

4.1. Returns to investors, in particular returns to shareholders, are uncertain. Some of those uncertainties will correlate with uncertainties present in the generality of stock market investments while others are specific to a particular investment. CAPM estimates the returns to equity required for investment in any particular business by measuring the relationship between stock market returns and the particular investment in response to the correlated uncertainties. This relationship is measured by an equity beta.

4.2. We consider that there is a measurable difference in the variation in equity returns a shareholder can expect to receive as a result of common uncertainties depending on whether a 'revenue cap' or an 'operating cost pass through' model of handling deviations between the forecast and actual level of operating expenditure is included in the licence. This difference will be reflected in the equity beta which can then be used to calculate the 'risk adjustment factor'.

4.3. One methodology for quantifying this difference would be to observe the actual differences in betas amongst individual utility stocks quoted on the London Stock Market. However over the years the number of such stocks has dwindled to a level where such observations are no longer a valid source of evidence. While there remain a few stocks subject to a 'revenue cap' we are unaware of any operating under an 'operating cost pass through' mechanism. We do not therefore propose to pursue this alternative methodology.

Proposed Methodology

4.4. Our proposed approach starts from the following assumptions.

4.5. At the start of the price control period the licence holder will receive a revenue allowance to fund licensed activities. However actual expenditure levels may deviate from the forecast allowance. Such variation in opex may result in variations in the equity returns received by shareholders, depending on whether the 'revenue cap' or 'operating cost pass-through' model is in place. (It may be assumed that debt repayments are maintained at a constant level.) This deviation in equity returns can then be compared with the contemporaneous variation in returns in the stock market.

4.6. We propose to estimate the incremental difference in equity beta between the two models by measuring the incremental variability of equity returns over a price control period under the 'revenue cap' model and comparing it with the expected variability of such returns on the stock market over an equivalent period. This is used to calculate the likely impact on beta and the 'risk adjustment factor'.

4.7. For the purpose of this analysis we will only consider those risks which are different as

a consequence of the choice made by the applicant as to how they wish opex to be treated. The aim is not to calculate total risk in the business but rather to calculate the difference in risk between the options open to the applicant. Therefore it is not necessary to consider those risks related to capital expenditure, volumes, policy / regulatory decisions, general economic performance etc.

4.8. The WACC in a business is usually made up of two components, debt and equity with the gearing ratio reflecting the proportion of debt to equity in the total capital stock. Theory suggests that, within reasonable limits, WACC is unaffected by the relative proportion of debt and equity in the business as long as the ratio between them efficiently reflects the nature of risk inherent in the business. Whether the business is mostly debt or mostly equity funded or any combination in between the WACC should remain the same. Our analysis will therefore focus on a typical capital structure for a high pressure pipeline business. However we will also check the analysis assuming a capital structure based on 100% equity capital.

Variability in Equity Returns

4.9. As discussed above for the purposes of this analysis we propose to focus only on variation in equity returns as a consequence of deviations in opex between allowances and actual out-turn. In addition we propose that equity returns will only vary under the 'revenue cap' option. Under 'operating cost pass through' allowances are equal to actual costs and as a result equity returns are stable.

4.10. In order to calculate the adjustment to the equity component of the WACC it is necessary to estimate the likely variation in equity returns under the 'revenue cap' option. In doing this we propose to use, as a modelling assumption only, data relating to the WACC, taken from the Ofgem RIIO T1 price control review. In particular we use the Ofgem WACC for gas transmission. We also take into account the assumptions Ofgem made on variability of opex and capex.

Calculating Expected Equity Returns

4.11. The Department of Enterprise, Trade and Investment estimate the capital cost of the new high pressure network to be in the region of £96.67m, October 2013 prices, with the subvention available from the Northern Ireland Executive having a maximum value of £32.5m, the opening asset value of the network at commencement of operations is assumed to be £64.17m. However this value will decline over time as the asset depreciates and is assumed to be zero at the end of the assets economic life. This is in contrast to opex which we assume will not diminish significantly over time. The average asset value over the economic life of the asset is (£64.17m / 2) £32.085m.

4.12. As already discussed we propose to make our initial calculation assuming a typical capital structure including both debt and equity sources of funding before considering a situation with either only debt or equity funding. In their most recent price control for the Great Britain gas transmission network, Ofgem[9] proposed a gearing ratio of 62.5%, as being the appropriate estimate of an efficient mix of funding sources. Applying this ratio results in an 'average equity holding' over the life of the project of

[9] Table 4.4 Ofgem Final Proposals NGGT

£32.085m * 37.5% = £12.032m.

4.13. To calculate the return required by equity investors we propose adopting the Ofgem estimate of the market rate for equity of 6.8%. This does not pre-judge the WACC that applicants might wish to submit as part of the application. We use this number as a modelling assumption only to make comparison of opex risk to equity returns tractable. When we apply this figure to the Average Equity Holding the expected equity return per annum is £0.818m

Table 2: Calculation of Expected Equity Returns

Parameter	Value
Capital Expenditure	£96.67m
Subvention	£32.5m
Opening Asset Value	£64.17m
Average Asset Value	£32.085
Gearing	62.5%
Average Equity Holding	£12.032m
Indicative Return on Equity	6.8%
Expected Equity Return (annual average)	£0.818m

Estimating the Operating Costs of the Gas to the West Pipeline

4.14. As we are only interested in the variations in controllable opex which will result in variations in equity returns, it is proposed that only these costs will be considered further.

4.15. To achieve this we will first need an estimate of the annual controllable opex for this project. We propose two approaches to estimating the likely level of future controllable opex - a top down estimate and a bottom up estimate.

4.16. The top down approach takes the controllable opex for comparable assets as a percentage of the opening asset value of that asset and applies that percentage to the gas to the west opening asset value. We view the most relevant comparators as the three existing gas high pressure licence holders in Northern Ireland. Their annual operating costs as a percentage of their opening asset value are[10]:

[10] Actual controllable operating costs are as per BGE (NI), Premier Transmission Limited and Belfast Gas Transmission uplifted to October 2013 prices. Opening asset value for Premier Transmission and Belfast Gas Transmission equal value of bonds issued to purchase these pipelines. Operating costs include non routine costs such as Common Arrangements for Gas.

- BGE (NI) 1.51%
- Premier Transmission 3.05%
- Belfast Gas Transmission 0.85%

4.17. We would propose that the BGE (NI) figure would be most representative of likely future costs for the new high pressure pipeline. As with the gas to the west pipeline the BGE NI network is mainly routed through a rural environment linking a number of NI towns. One significant difference is that the gas to the west pipeline will not include any entry/exit points with other jurisdictions. This will mean that it will not require costs associated with cross border flows which can be significant e.g. regulatory and IT costs.

4.18. The Premier Transmission asset is sub-sea and so will have a radically different operating cost base from an onland pipeline. The Belfast Gas Transmission pipeline also has subsea elements and has an opening asset value of £4.140m per km which is much higher than equivalent figures for BGE (NI) £0.77m per km and the new pipeline £0.57m per km. We would propose an indicative figure of 1.51% giving an estimate of annual controllable operating expenditure of (£96.67m * 1.51%) = £1.46m[11].

4.19. A more bottom up approach would attempt to estimate each major controllable operating cost line for the gas to the west pipeline before aggregating these to estimate total cost. Again we propose to use the BGE(NI) actual controllable opex for the period 2012-2017 as the most appropriate comparator. We are not aware of any reason why the structure of the costs of the gas to the west pipeline would be materially different from those of another on land high pressure gas pipeline in NI. The gas to the west pipeline will be 58% of the length of the current BGE NI network.

4.20. The bulk of BGE NI costs are made up of maintenance and agricultural liaison costs. While we could expect that there could be some economies of scale in maintaining an additional pipeline in NI we think it is reasonable to assume that these costs will have a linear relationship to pipeline length. These costs are therefore estimated as being equal to 58% of the BGE (NI) allowance.

4.21. While the operational regime of the gas to the west pipeline has yet to be determined we think it is sensible to assume an element of costs associated with system operation. This covers the costs of a control room, IT system and a regulatory team. The current high pressure licensees are currently working on a project to introduce a single IT system, control room, code and regulatory team for NI. This will also apply to the gas to the west pipeline and we therefore expect any costs associated with system operation to be marginal and propose that they equal 25% of the BGE (NI) allowance.

4.22. In addition an annualised figure should be added for non-routine project costs e.g. compliance with EU Directives. Assuming one such project every ten years at a cost of £1.0m per project this gives an annualized cost of £0.1m. Again we would note that costs driven by EU Directives relating to cross border issues would not apply to this project. We would propose a figure for annual controllable operating expenditure based on this methodology of £1.5m.

[11] The BGE NI figure of 1.51% is calculated on the opening asset value before grant and so this calculation is consistent with that approach.

Table 3: Controllable Operating Expenditure Estimate

Component	BGE (NI)	%	New Pipeline
Maintenance	£1.744m	58%	£1.012m
Agricultural Liaisons	£0.167m	58%	£0.097m
System Operation	£0.433m	25%	£0.108m
Other	£0.752m	25%	£0.188m
Non Routine			£0.1m
Total	£3.096m		£1.505m

All figures are at October 2013 prices

4.23. Taking these two estimates together we propose a central case for controllable opex of £1.5m. We also propose a high and low estimate for controllable opex of £1.8m and £1.2m respectively which gives a spread of +/- 20% of the central case.

Estimating the Variability of Operating Costs

4.24. As set out above we have a good understanding on the likely size and makeup of the operating costs and so should be able to take a view on the variability of these costs. At a high level the bulk of the costs made up by maintenance and agricultural liaison officers are predictable and based on regular tenders. Similarly the system operation and regulatory management costs would be expected to be relatively flat and predictable. There may be more unpredictability with project costs which could include significant IT costs although we would expect that the new IT system to implement IME3 European compliance would be in place before the pipeline is operational.

4.25. One source of empirical evidence is the performance history of similar licence holders. We compared BGE (NI) actual controllable opex against allowances for the five year period 2007-12 which resulted in a figure of 95.9%

4.26. This would suggest a variation of 4% although this data is drawn from a limited time period.

4.27. An additional source of information is the variation of these costs for GB regulatory assets. This is something which has been considered by ECA/ Imrecon and Ofgem during its recent work on gas and electricity transmission price controls. Ofgem estimate a likely variation between total operating and capital (totex) allowed and actual costs of +/- 10% for transmission licence holders[12]. This total expenditure figure includes capital expenditure and controllable opex.

4.28. There is no suggestion that opex variability should be treated as higher than capex variability although the ECA/Imrecon work does raise the question of whether large capex projects should have additional risk. We do note that in its Monte Carlo work

[12] RIIO Review Financeability Study November 2012 . This assumes a confidence interval of 90%.

Ofgem included a 'price shock' simulation which assumed the shock for capex would be 20% but opex would only be 5%. Also in reviewing the Moody's rating methodology it is clear that there is a larger focus on the risks associated with a complex capex programme and no suggestion that opex would be expected to be riskier.

4.29. We recognise that the variability identified by Ofgem also reflects a number of incentive regimes which Ofgem apply in gas transmission. These regimes do not exist in the NI regime and we are not proposing they will be included in the gas to the west licence. On the other hand there is no sharing mechanism around opex in the gas to the west project while is a sharing mechanism within RIIO-T1 for opex.

4.30. Overall we take the view that the Ofgem approach represents an appropriate estimate for variation that can be applied in the case of the gas to the west pipeline. We have therefore applied a 10% variation as our medium case.

4.31. It is important to note that the licence will include conditions for a re-opener of the price control determination if actual operating expenditure deviates from allowances by more than 15 percent[13]. This re-opener applies to total opex and would equate to about 20% of controllable opex. In addition the licence will also provide some protection against unforeseen opex[14]. Therefore while it could be possible to consider some extreme scenarios where operating costs vary significantly from forecast the licence conditions provide protection to the licensees to limit this variability. This could be regarded as providing an upper boundary to the possible deviations between allowances and actual costs.

4.32. In our work on the Power NI retail price control we used the methodology outlined here to assist us in determining the margin. However a number of methodologies were used to calculate the final margin and the goal was not to isolate just opex risk.

4.33. The level of variance of annual costs identified was about 10% based on historic company information. In addition Power NI actual costs showed much higher variance than we have evidence for in gas pipeline costs with a lot of this been driven by bad debt issues which would not pertain to the gas to the west licence.

4.34. Based on this analysis we propose that the upper bound estimate of the variation is set at 20% with the lower boundary at 5% and a midway point of 10% in line with the Ofgem estimate of variation. By applying these estimated variations to our estimate of controllable operating expenditure the value of variations in expected costs is derived. This value can then be used to adjust expected equity returns to derive the variation in the rate of return on equity that would result from variations in controllable opex.

Distribution of Opex Variation

4.35. Any discussion of risk and variation of outcomes around a mean raises the issue as to how such variations are distributed and in particular whether this variation is symmetrical or asymmetric.

4.36. This is something which Ofgem considered in its RIIO T1 proposals[15] in carrying out Monte Carlo simulations on the variability of totex. While it did not consider all costs to follow a normal distribution it tended to conclude that opex costs followed a normal distribution and the ones which did not tended to be those linked to the uncertainty

[13] Consistent with BGE (UK) Gas Conveyance Licence Condition 2.2.4 (i).
[14] Consistent with BGE (UK) Gas Conveyance Licence Condition 2.2.4 (j).
[15] https://www.ofgem.gov.uk/ofgem-publications/53602/4riiot1fpfinancedec12.pdf

mechanisms. Given that we do not propose to apply such uncertainty mechanisms we view a normal distribution as a reasonable assumption in this analysis. The results of the Monte Carlo work are presented in the Ofgem paper in figure 3.2 and we note the variability of NG gas transmission is quite narrow.

4.37. Furthermore in its critique of the Ofgem analysis ECA / Imrecon concluded after much consideration that the pattern of variation in equity returns would be symmetrical about the central case, given that the risks considered in this analysis are restricted to operating expenditure we see no reason to diverge from this assumption. ECA / Imrecon estimated that a variation of +/- 10% captured 90% of possible outcomes (i.e.) a 90% confidence interval which equates to 1.65 standard deviations assuming a normal distribution of variance around the mean. We propose to apply the same 90% confidence interval across the calculations and this is applied in section 4.42 below.

Calculating the Variation in Equity Returns

4.38. The table below calculates the variation in equity returns driven by opex variation using the assumptions set out above. For example, taking our medium estimate, operating expenditure is £1.5m with an expected variation of +/- 10% equal to £0.15m. If this variation is applied to expected equity returns of £0.818m this gives a variations in equity returns between a minimum value £0.668m (returns are below expectations due to increased opex) and a maximum value £0.968m (returns are above expectations due to reduced opex). Dividing this maximum and minimum by the average equity holding of £12.032m we calculate the likely spread in equity returns as (£0.668m / £12.032m = 5.6%) and (£0.968m / £12.032m = 8.0%). The spread in equity returns is therefore estimated at 2.5% = (8.0% - 5.6%)[16].

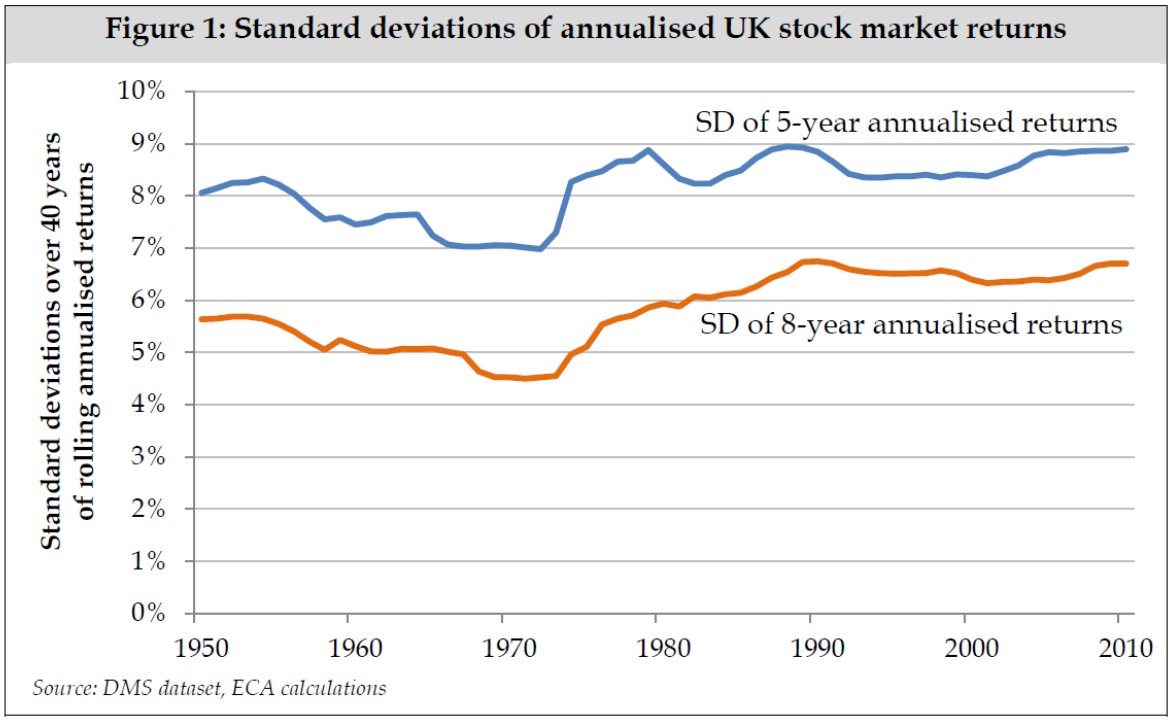
[16] These figures are rounded.

Table 4: Variations in Returns to Equity

Component	Low	Medium	High
Controllable Operating Expenditure	£1.200m	£1.50m	£1.800m
Variation +/-	5%	10.0%	20%
Variation Value	£0.060m	£0.150m	£0.360m
Expected Equity Return	£0.818	£0.818	£0.818
Minimum Equity Return	£0.758m	£0.668m	£0.458m
Maximum Equity Return	£0.878m	£.968m	£1.178m
Rate of Return on Equity (min)	6.3%	5.6%	3.8%
Rate of Return on Equity (max)	7.3%	8.0%	9.8%
Spread in Rate of Return on Equity	1.0%	2.5%	6.0%

Standard Deviation of Market Returns

4.39. Over the past 100 years or so, the standard deviation of annual returns on the United Kingdom stock market has been in the region of 20 per cent. Annualised returns over periods longer than a year will tend to smooth out some of this variability. The standard deviations of these returns over 5 and 8 year periods have been in the region of 8.5 per cent and 6.5 per cent respectively, as shown in Figure 1 below.



Source ECA Imrecon / Ofgem

Calculating the Equity Beta

4.40. As set out in section 4.37 above we propose to apply a 90% confidence interval which equates to 1.65 standard deviations assuming a normal distribution of variance around the mean.

4.41. One standard deviation can therefore be calculated by dividing the spread on rate of return on equity (as calculated in Table 4 above) by the number of standard deviations equating to the confidence interval identified. Then to calculate the equity beta this standard deviation is divided by the standard deviation of five year average market equity returns (8.5%), identified in section 4.39 above.

4.42. Taking our medium estimate of the spread in equity returns of 2.5% which we assume covers 90% of possible outcomes i.e. nine years in ten the return to shareholders will be between 5.6% and 8.0%. We have assumed that equity returns follow a symmetrical / normal distribution of possible outcomes and as a consequence we can say that a 90% confidence interval is equivalent to 1.65 standard deviations in the level of equity returns either side of the central estimate of equity returns. One standard deviation is therefore calculated as (2.5% / 1.65 * 2) = 0.76%.

4.43. We can then calculate the equity beta associated with opex variability by dividing the standard deviation of the rate of return on equity by the standard deviation of the market return on equity calculated as (0.76% / 8.5%) = 0.09.

Table 5: Calculation of Equity Beta

Component	Low	Medium	High
Spread in Rate of Return on Equity	1%	2.5%	6.0%
Confidence Interval	90.0%	90.0%	90.0%
Number of Standard Deviations	1.65	1.65	1.65
Standard Deviation of Rate of Return on Equity	0.30%	0.76%	1.81%
Standard Deviation of Market Return on Equity (SD)	8.5%	8.5%	8.5%
Equity Beta	0.04	0.09	0.21

Adjustment to WACC

4.44. The beta value we have calculated above, when applied to the 'equity risk premium', derives a figure which indicates the difference in equity returns required by investors in a 'revenue cap' treatment of opex compared to an 'operating cost pass through' treatment. We will use the Ofgem RIIO T1 price control estimated equity risk premium being equal to 5.25%.

4.45. However equity only makes up a proportion of total capital and so to calculate the impact of choosing one treatment of operating costs over the other the impact on equity has to be adjusted by the gearing ratio. This produces an adjustment to WACC ranging from 0.07% to 0.42%

Table 6: Impact of Equity Beta on Equity Returns and WACC

Component	Low	Medium	High
Equity Risk Premium	5.3%	5.3%	5.3%
Equity Beta	0.04	0.09	0.21
Equity Component Adjustment	0.19%	0.47%	1.12%
Gearing	62.5%	62.5%	62.5%
WACC Adjustment	**0.07%**	**0.18%**	**0.42%**

Treatment of Tax and Application of Adjustment

4.46. The discussion so far has focussed on calculating a 'risk adjustment factor' which could be applied to a vanilla WACC i.e. one in which the equity component is post tax. This is in line with common regulatory practice where a vanilla WACC is established before the addition of an adjustment to cover tax costs.

4.47. We propose that during the licence application process applicants will be required to reveal their cost of capital on a pre tax basis. This means that the 'risk adjustment factor' which we finally determine as being appropriate will need to be adjusted upwards to take account of tax. Thus the range in Table 6 above would be calculated on a pre-tax basis as applied in the table below.

Table 7: Proposed 'risk factor adjustments'.

Component	Low	Medium	High
WACC Adjustment	0.09%	0.22%	0.53%

4.48. We would propose to apply the risk adjustment factor by adding it to the pre-tax WACC of those applicants proposing an 'operating cost pass through' model. We will do this in the workbook submitted as part of the application and this is set out in the workbook notes.

Impact of Gearing Ratio

4.49. The above analysis was repeated under a range of gearing ratio scenarios from 100% equity to 10% equity. In each case the WACC Adjustment figure remained the same despite variations in the Equity Component Adjustment figure. This result is not surprising. As the amount of equity return to absorb the movements in operating cost increases the spread in possible equity returns decreases resulting in a lower beta and

lower Equity Component Adjustment. However equity is now a larger proportion of total capital and so the impact it has on returns to all sources of capital increases. The table 8 below looks at the effect of different gearing ratio's on the central case set out above where controllable operating costs vary by +/-10%.

Table 8: Impact of Gearing Ratio

Gearing	0%	62.5%	90.0%
Average Equity Holding	£32.085m	£12.032m	£3.209m
Expected Equity Return (annual average)	£2.182m	£0.818m	£0.218m
Opex Variation +- 10%	£0.150m	£0.150m	£0.150m
Rate of Return on Equity (spread)	0.9%	2.5%	9.4%
Confidence Interval	90.0%	90.0%	90.0%
Rate of Return on Equity (SD)	0.28%	0.76%	2.83%
Equity Beta	0.03	0.09	0.33
Equity Risk Premium	5.3%	5.3%	5.3%
Equity Component Adjustment	0.18%	0.47%	1.75%
Gearing	0%	62.5%	90.0%
WACC Adjustment	0.18%	0.18%	0.18%

Questions for Consultation

Q2: Do respondents have views on the methodology of calculating the 'risk adjustment factor' from variations in equity returns?

Q3: Do respondents have any comments on the calculation of the various parameters to which the methodology has been applied?

Q4: Do respondents have views on the application of the 'risk adjustment factor'?

5 CONCLUSION

5.1. The paper has set out the approach and assumptions we have used in proposing a range of **0.09% to 0.53%** for the risk adjustment factor. We view this range as being reasonable and appropriate given the evidence we have identified and set out in the paper.

5.2. Our initial view is that the low end of the range is likely to be too low to fully reflect opex risk. We consider some of the assumptions used to arrive at the high end of the range to be conservative. On balance they may be overly conservative and could over estimate the risk adjustment factor.

5.3. Therefore our initial view is that the risk adjustment factor is more likely to lie towards the medium point estimate of the range.

5.4. We would be very keen to hear from all parties with any comments on the approach to the calculation, the assumptions proposed and anything else they may wish to comment on in relation to the paper.

Questions for Consultation

Q5: Do respondents consider that the proposed range of possible values for the 'risk adjustment factor' is reasonable?

Q6: Do respondents consider that the final 'risk adjustment figure should fall anywhere other than the medium point on the proposed range?