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Real Options and Investment Decision Making

SSE and Scotia Gas Networks (SGN) welcome the opportunity to comment on the above Ofgem consultation. In principle we are broadly supportive of the use of real options for investment decision making where appropriate. Our responses to the specific questions raised in the consultation are provided in the attached appendix; with our general observations below.

For energy networks real options analysis may provide an improvement on traditional DCF analysis. However, the RIIO environment needs, above all, flexibility. Any investment decision tool must ensure that network operators are encouraged and rewarded for thinking differently, innovatively and choosing options which provide flexibility. Any such mechanism must provide the flexibility to change approach part way through a price control period and should not leave all the risk with the network operator when new information becomes available.

A real options approach that allows such flexibility may be useful where deferment has additional value, as in Ofgem's example with regard to interruptible contracts versus capital investment in gas. Likewise, it may be useful in situations of anticipatory investment. We have adopted the principles of real options in our approach to assessing large transmission investments e.g. the Western isles. However, the use of real options does add complexity to investment decision making and we believe the example provided in the supplementary annex to the consultation (on gas network interruptible contract auctions) requires further work to refine the assumptions made. We discuss this further in our response to the questions posed in the annex.

Looking to ED1, there is an active work stream to consider future provision of network flexibility and capacity. Real options analysis is likely to have a role, as part of a suite of investment tools, in assessing appropriate, timely investment. Again licenses must clearly support the basis of underlying assumptions.

These examples underline the point that real options analysis is simply one of many tools available for investment decision making. Which tool to be used will depend on the specific investment project being considered; if real options analysis is to be used then Ofgem and the industry need to ensure a robust and well justified methodology is established. Such a methodology needs to be sufficiently flexible to apply across transmission, distribution, electricity & gas.



Finally, it is important to reiterate that whatever investment decision analysis tool is used, the future of the energy sector is unclear and investment 'decisions' made today may well change at some point in the future. What is needed is the ability, and positive incentive, for network operators to be innovative and able to adapt as more information becomes available.

Yours sincerely,

Malcolm J. Burns
Senior Regulation Manager

Appendix: response to consultation questions

CHAPTER: Two (Main Paper)

Question 1: Do you consider that a real options approach is useful (or not useful) in the context of investment appraisal in the energy sector? Please provide reasons.

Real options analysis has the potential to be a useful tool for investment decision making for energy networks in specific circumstances such as where there are commercial v capital options, where there is significant uncertainty or where a 'wait and see' approach is appropriate.

CHAPTER: Three (Main Paper)

Question 1: Do you have any views on the practical applications of real option pricing set out in this paper in relation to: (i) scale and timing of network investment, and (ii) valuing interruptible contracts (see also supporting appendix)?

Real options analysis is a complex tool and, as noted by Ofgem, is only likely to be of practical use where investment is partly irreversible, there is significant uncertainty and where there is the opportunity to respond to new information. Importantly, again as noted by Ofgem, real options analysis is only practical when the investment decision is relatively marginal.

Any investment decision tool needs to allow flexibility and the use of real options must not close of the ability to change decisions in the future e.g. if an interruptible gas contract is not renewed part way through a price control period capital investment may well be required and it is not appropriate that GDN shareholders should not bear that risk.

We discuss the application of real options to gas network interruptible contract auctions in more detail below.

If real options analysis is to be used then Ofgem and the industry need to ensure a robust and well justified methodology is established. Such a methodology needs to be sufficiently flexible to apply across transmission, distribution, electricity & gas.

Question 2: In what other policy areas, if any, do you consider the real options approach could help improve decision making?

Our responses to the Chapter three questions (see above) provide the specific circumstances where a real options approach could be useful.

Appendix 2 – regulatory precedent

We note that Appendix 2 of the consultation paper seeks to provide regulatory precedents for considering the respective approaches in Australia and New Zealand. This includes investment appraisal techniques to meet transmission network constraints including the potential application of real option theory. However, the references included in the New Zealand context are incorrect.

This is because the Electricity Industry Act 2010 disestablished the Electricity Commission. This was replaced by the Electricity Authority, an independent crown entity responsible for regulation the New Zealand electricity market. The Commerce Commission of New Zealand took over responsibility for approving Transpower's (New Zealand electricity transmission company) major grid upgrades from the Electricity Commission on 1 November 2010.

In New Zealand, a Capital Expenditure Input Methodology sets out the requirements Transpower follows when preparing major capital proposals and the criteria the Commerce Commission uses to review and approve a major capital proposal. The Capital Expenditure Input Methodology replaces the former Electricity Governance Rules for approving Transpower's grid upgrade expenditure and integrates all regulation of Transpower's capital spending with Part 4 of the Commerce Act 1986.

A grid upgrade proposal is a proposal for major capital investment in the national grid that Transpower prepared under the Electricity Governance Rules and submitted to the Commerce Commission or the former Electricity Commission for approval. Since 31 January 2012, Transpower submits major capital proposals instead of the grid upgrade proposals.

Supplementary annex

CHAPTER: Four

Question 1: Do you have any views on our approach to estimating the option value associated with interruptible contracts?

CHAPTER Five

Question 1: Do you have any views on how we should apply the estimated option values for interruptible contracts in practice?

Our response below covers both of these questions.

Where deferment of capital expenditure has additional value it would be sensible to use a real options approach. However, whilst the use of a real options approach may allow GDNs to offer a better interruptible price; it will not *per se* allow for the greater use of interruptible contracts. Furthermore, whilst we would expect the capital investment costs to be allowed as the baseline costs, with any savings achieved through the use of interruptible contracts shared between shareholder and customer via the IQI sharing mechanism. We would expect further flexibility to ensure that shareholders are no worse off if any such interruptible contracts are not renewed.

With regard to the Ofgem's approach, we believe that further work is required to refine the assumptions before the calibration of option values can be applied to system reinforcement projects. For example:

- In the high demand case it is not appropriate to assume that the original investment decisions is always still valid; and
- In the low demand case it is not correct to simply assume there will never be any investment.

In addition, the calculation of option value & assumptions around project volatility need further examination as they are key sensitivities in the analysis. We would welcome further industry wide discussion on their derivation e.g. with regard to the high / low case; whether or not volatility is symmetrical; is a default value appropriate etc.