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Our Ref:
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Dear James

Northern Powergrid response to Ofgem's RIIO-GD1 "Real Options and Investment Decision Making" consultation

Thank you for giving us the opportunity to comment on Ofgem's views on Real Options and Investment Decision Making. We have taken a straightforward approach, dealing with each of the questions in turn. Given our background, our comments are based around the possible future application of real options to electricity networks and network investment in general rather than specifically for gas networks, although we believe the comments are equally valid in the gas area.

Our only general comment is that overall we believe there is value in taking real options into account in investment appraisal, particularly in the face of uncertainty. We are therefore currently working to do this as part of our own business planning process for RIIO-ED1 and, while the exact approach may differ from that set out in the consultation due to differences between sectors, we believe the general principle that real options should be taken into account holds.

Chapter 2, Question1 – Do you consider that a real options approach is useful (or not useful) in the context of policy and investment appraisal in the energy sector? Please provide reasons.

We believe the approach is useful because:

- It will help reduce (though not completely avoid) the chance that significant investment is undertaken which subsequently becomes stranded i.e. it helps avoids white elephants.
- The real option value of 'flexible' approaches tends to be higher when there is uncertainty, and the growing uncertainty in the energy sector makes taking real options into account more important.

Real options is a useful tool provided it is applied with common sense. For instance, the value assigned to the flexibility will have a material effect in assessing the optimum course of action. Likewise, the number of scenarios analysed can quickly make the exercise extremely complex.

We can see several valid areas where a real options approach could be applied in our own sector; we note both smartgrids and network investment decisions over wide areas in answer to Ch3, Question2.

Chapter 3, Question1 – Do you have any views on the practical applications of real option analysis set out in this paper in relation to (i) scale and timing of network investment, and (ii) valuing interruptible contracts (see also supporting appendix)?

(i) As we note in our answer to Chapter 3, Question2, we can see practical applications of real options analysis with regard to timing and scale of network investment, and if this were to be subject to real options analysis the application would be similar to that shown in chapter 3.

(ii) We acknowledge there would be value in interruptible contracts and a number of organisations in the electricity distribution sector, including ourselves, are examining interruptible contracts (either via aggregators or through the connection agreement).

Chapter 3, Question2 – In what other policy areas, if any, do you consider the real options approach could help decision making?

As noted in response to Chapter 2, Question1, real options analysis appears to lend itself to areas where there is a general trend about which there is a lack of certainty.

Reinforcement and response to climate change, where in both cases there is an uncertain trend which will expose itself over time, appear to be the most likely areas.

Areas where we see a more limited role for real option analysis are:

- Asset renewal, which does not have the uncertainty element that real options might better model than other approaches (although once asset renewal is required, real options analysis could be valuable in appraising replacement options, which might include abandonment).
- Electricity quality of supply, which has a high degree of uncertainty but this is generally a short-term randomness around a reasonably certain baseline.

Specific policy areas (or practical examples of application) in the electricity distribution sector where we can see a potential role for real options in decision making include:

- **Smartgrids** - In the electricity sector a top-down smartgrid solution, proposed as one of the options in SGF WS2/WS3, may potentially offer the cheapest overall solution in the scenarios where there is high low-carbon development activity, but commits DNOs significant expenditure building the communications and IT infrastructure long before the development materialises; and if it does not materialise offers little option to change course without writing off the costs of that infrastructure. A real options approach which valued the flexibility of the business as usual or incremental options, rather than just the costs, could play an important part in informing the judgement.
- **Network investments over wide areas** - We tend to consider flexible options in our investment documentation when we assess large reinforcement investments across wider areas of our network, and although we do not use a formal real options approach it is an area where it might be of benefit. We have recently for example considered flexible incremental options when appraising reinforcement options in the Newcastle area. It is worth noting that Ofgem's consultation mentions the scale and timing of network investment, but the location can also be an important factor in determining the impact that investment has on network flexibility.

Chapter 4, Question1 – Do you have any views on our approach to estimating the option value associated with interruptible contracts?

The approach to estimating the option value associated with interruptible contracts seems broadly sensible.

As we note above, the complexity of real options analysis and the number of input assumptions mean that applying the results with common sense will be important to realise the benefits. In

particular, clear decision rules based on well justified analysis are helpful, coupled with flexibility to undertake more detailed analysis to test they hold in particular cases.

Chapter 5, Question1 – Do you have any views on how we should apply the estimated option values for interruptible contracts in practice?

Once a valid practical approach to real options analysis is in place, it can be applied by network operators both in developing their well justified business plans for submission as part of the price control review process, and also on an on-going basis as companies continually re-evaluate their plans within the price control review period in light of new information. The requirement on network operators to develop an efficient and co-ordinated network obliges network operators to take into account relevant information that real options can provide.

Of course, a valid practical approach to applying real options is required to do this. Real options analysis can be complex and the results are highly dependent on the underlying assumptions. The use of a simplifying assumptions for actual investment appraisals like the one suggested in the consultation (i.e. assume the real option is 30% of the annuity value) are therefore tempting. We have three suggestions for the specific approach suggested:

In terms of the approach developed in the current consultation, we have three comments.

- Rather than setting an 'assumed' real option value, companies could be required to work out 'what would need to be believed' in terms of the option value for it to be worthwhile putting in place an interruptible contract at its market cost (taking into account any costs of making an interruption), since this better reflects the investment appraisal exercise being conducted.
- Rather than setting a single threshold with further analysis in marginal cases, a range could be used e.g. 20% to 40%, where below the range there is a presumption that it is believable the option is worth enough to justify keeping it open, and above the range a presumption that the option is not worth enough. Within the range it would be inappropriate to make a presumption in either direction without further supporting analysis.
- This simple rule may not necessarily give the correct answer, since valid analysis could still demonstrate that the true option value differs from the presumed level. This should be recognised in the application of the approach. Valid evidence could still be taken into account to support the use of an approach that keeps options open, even if simplistic decision rules did not support it. This is more likely to be the worthwhile on decisions over major investment projects. Equally, in the case of major projects, there may also be value in undertaking detailed analysis even assuming any simple decision rule is met.

We would also note that the decision rule Ofgem stipulates in the consultation (at paragraph 5.2), while intuitive, lacks a formal definition which would help clarify any ambiguities for practitioners and other stakeholders alike. For instance, a formal definition could help clarify for some stakeholders the distinction between the cost of keeping an option open and the value to network companies of keeping that option open, which are likely to differ.

If expanding on any of these points would be of use then we would be delighted to assist. I would be the best first contact point.

Yours sincerely,

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