National Grid House
Warwick Technology Park
Gallows Hill, Warwick
CV34 6DA

James Grayburn
Head of RIIO-GD1
Ofgem
9 Millbank

London
SW1P 3GE

Paul Whittaker
UK Director of Regulation

paul.whittaker2@nationalgrid.com
Direct tel +44 (0)1926 65 3190
Direct fax +44 (0)1926 65 6520
Mobile +44 (0)7776 170735

www.nationalgrid.com

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Dear James

Real Options and Investment Decision Making

Thank you for the opportunity to provide comments both on this consultation and on the Supplementary Annex applying Real Options to gas network interruptible contract auctions. Although the consultation appears to be targeted at the gas distribution networks ("GDNs"), we believe that it is as applicable, if not more so, to transmission. As a result, this non-confidential response is provided on behalf of both National Grid Electricity Transmission plc ("NGET") and National Grid Gas plc ("NGG").

NGET owns and operates the high voltage electricity transmission system in England and Wales and, as National Electricity Transmission System Operator ("NETSO"), operates the Scottish high voltage and offshore transmission systems. NGG both owns and operates the gas National Transmission System ("NTS") in Great Britain and, through its low pressure gas distribution business, distributes gas in the heart of England to approximately eleven million offices, schools and homes.

In the UK, the primary duties of NGET and NGG, under the Electricity and Gas Acts respectively, are to develop and maintain efficient coordinated and economical systems and also to facilitate competition in the generation and supply of electricity and the supply of gas. Our activities include the residual balancing in close to real time of the electricity and gas markets.

Application to Distribution

As highlighted above, we are slightly surprised that this consultation is primarily aimed at GDNs as it would appear to be equally, if not more, relevant to transmission (both NGET and NGG NTS). Furthermore, our general view is that Real Options analysis has limited relevance to the distribution element of NGG's business. Other than when it was driven by customer connections, we have carried out only very limited DN reinforcement for a number of years. The vast majority of our investment is driven by asset health or safety factors with limited viable alternatives and our RIIO-GD1 plan continues this trend. For example, typically we spend less than £5m a year on general DN reinforcement out of total annual investment (including REPEX) of £600m or more (i.e. less than 1%). However, as part of our April RIIO-GD1 resubmission, we provided further information around options

in a number of asset health areas of the capital plan. Although this is not exactly the same approach as that set out in both the consultation and the Supplementary Annex, it may represent a similar method of further improving investment decisions.

Regarding the Supplementary Annex and the application of Real Options to gas network interruptible contracts auctions, the trade-off between investment and non-investment solutions has long been considered in distribution network planning by NGG. One specific point however is that when the paper discusses an example relating to interruptible contracts (paragraphs 3.17 to 3.22) there is a presumption in the paper that the cost of an investment doesn't change if implementation is deferred. This is not necessarily the case as deferring may result in the work having to be completed in a shorter space of time and / or at a time when pressure for resources results in premium rates having to be paid[1].

Application to Transmission

Transmission is slightly different as the very large investments being considered, in relation to both gas and electricity, provide situations where a deferral option, or even flexibility of decision making in general, could have the potential to offer significant value to consumers. However, as part of our transmission investment planning under RIIO-T1, we are already developing procedures to carry out alternative types of analysis on projects where a simple NPV approach fails to sufficiently capture all of the necessary sensitivities or yields a marginal result[2].

It is also important to understand that there are considerations other than purely capital cost that are important when making large investment decisions. This is highlighted, in both gas and electricity transmission, by our use of a decision support tool called the "Whole Life Value Framework" when considering whether or not to invest in our networks. This allows important elements of the decision-making process, which are not necessarily directly related to the upfront capital cost, to be fully considered over the lifetime of the asset. These elements include safety, environmental and operability issues which can each add significant costs when considered over the time periods in question (i.e. 40 to 50 years) and which can therefore influence the initial investment solution adopted.

Electricity Transmission

As part of our RIIO-T1 submission for electricity transmission, we have included a draft Network Development Policy[3]. When finalised, this document will set out how we will make decisions about the choice and timing of wider transmission system reinforcements such that the network continues to be planned in an economic and efficient manner. This involves making use of the available information to balance the risks of investing too early (e.g. the risk of inefficient financing costs and increased stranding risk) with the risks of investing too late (e.g. inefficient congestion costs).

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[1] Naturally, the opposite could also be true and pressure for resources could be lower. However, the point is that there remains a risk of higher costs if project is delayed (i.e. it is not a no-risk approach).

[2] Incidentally, we agree with the consultation that, in cases where the NPV of a proposed investment is either extremely negative or positive, a Real Options approach is unlikely to yield a different investment strategy relative to static NPV or Discounted Cash Flow analysis.

[3] http://www.nationalgrid.com/NR/rdonlyres/AF9704E0-9CAA-4C52-90F1-8C8BD5680E7C/52173/2012_NGET_NetDevPol_redactedsecure.pdf

Given the uncertainty in the energy sector noted in the consultation document, we propose to consult with stakeholders annually on generation and demand data, including a number of self-consistent demand and generation scenarios. This data will then be used to identify any capacity shortfalls on the transmission system and for associated wider transmission system solutions. It is essential that this range of solutions is sufficiently wide and includes, for example, operational solutions and small-scale investment solutions with short lead-times as well as the larger-scale alternative investment solutions which are likely to have longer lead-times.

All possible solutions will then be compared on the present value of build costs, congestion costs and transmission losses. As the sums that are likely to be invested are very large, lead-times are long and the benefits of some of the investments are necessarily uncertain, the dimensions of risk and timing are crucial. We will not therefore make decisions based on conventional cost-benefit analysis and, instead, will use a framework that allows us to take account of the optimal timing and risk-adjusted values of any investments made.

The fundamental trade-off is between the risk of undertaking an investment that turns out to have been too early or unnecessary, and the risk of high congestion costs because network assets that turn out to have been needed are not yet available. Consequently, the question of timing is crucial. By waiting, information will be revealed (for example, from the management of the connection application process) that might confirm the need case for a given piece of infrastructure thus increasing the expected value of that investment and reducing (or eliminating) the risk of asset stranding. On the other hand, because of the long lead-times of investments, waiting too long could significantly increase the risk of very high congestion costs arising in some future scenarios.

The optimum combination of transmission solutions for each of the demand and generation scenarios will be established, and we will then develop the set of feasible investment strategies based on agreed decision rules. It should be noted that the preferred strategy may include transmission solutions which are not included in the optimum combinations for any of the individual demand and generation scenarios; for example, incremental solutions that delay commitment decisions for large reinforcements.

In our draft Network Development Policy, we note that a number of decision rules that could be used to choose a preferred investment strategy, including least (expected present value) cost, minimal possible regret and risk and cost trade-offs are available. We are currently developing our framework for the identification of feasible investment strategies and discussing the associated decision rules with Ofgem as part of the RIIO-T1 process. Our intention is that preferred decision rules can be agreed, such that we would only move to a different approach in response to feedback from stakeholders.

Gas Transmission

As with electricity transmission the decision as to whether or not to invest, and therefore regarding commercial alternatives, is essentially a cost-risk trade-off. The current gas transmission regime requires us to make such trade-offs on every incremental investment through the revenue driver processes underpinning the entry and exit capacity incentives. This often materialises in practice as an SO-TO question as, in most cases, the decision is one of investment in physical assets (TO element) versus contracting solutions or taking on an element of operational risk (SO element).

This in turn means that the cost-risk issue must be considered in relation to our wider security of supply obligations and the gas safety case, most notably in regard to exit capacity and our 1-in-20 obligation. The 1-in-20 obligation requires us to consider the commercial arrangements in place and our contractual rights to curtail demand at the time of making exit capacity-driven investment decisions rather than 'closer to real time' gas flows. The 1-in-20 obligation does not apply to entry[4] and hence there is more scope to consider how commercial options might allow deferral or avoidance of investment.

There are potentially cases whereby National Grid could avoid investment by putting in place commercial services. In order to fully assess the cost-risk trade off we need to evaluate the risk side of the equation whilst taking account of both the probability of the service being available in the event we need it, and the longevity of the service. For physical assets this longevity and probability of availability is very high, but arguably this is less so for commercial services. As part of our RIIO-T1 submission, we have proposed that for our Incremental Entry & Exit, Network Flexibility, Asset Health, IED and GB & EU market facilitation uncertainty mechanisms, we will consider the optimal trade off between investment, contractual solutions and/or operational risk. We would envisage that this would require consideration of wider benefits beyond a simple NPV calculation, and in some cases, this would include consideration of enhanced system agility/response capability or of the 1-in-20 obligation driver.

Conclusion

We welcome this consultation and support in general the principles it raises in terms of attempting to capture the benefits of flexibility in investment decisions. However, we consider that there doesn't always have to be a 'one size fits all' solution to this issue and that instead there are benefits in adopting the choice of investment decision making tool on a case by case basis. As highlighted above in the electricity transmission section of the response, we are currently exploring a number of techniques similar to the Real Options analysis set out in the consultation and look forward to discussing the decision rules to be used in formulating investment strategies with Ofgem, and our wider stakeholders, in the future.

If you have any questions on any of the comments made in this response, please contact Alex Haffner in the first instance on 01926 655838 or at alex.haffner@nationalgrid.com.

Yours sincerely,

[by email]

Paul Whittaker
UK Director of Regulation

[4] NB – The 1-in-20 obligation is sometimes considered to be the gas equivalent of the Security & Quality of Supply Standards (SQSS) employed in the electricity industry. However, this is not the case as the 1-in-20 obligation applies only to Exit Capacity (as opposed to Entry Capacity) and is not controlled via industry governance in the same way as the SQSS is.