AUSTRALIAN ENERGY REGULATOR

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Dr John Tamblyn
Chairman
Australian Energy Market Commission
PO Box A2449
SYDNEY SOUTH NSW 1235

Dear Dr Tamblyn

RE: Regulatory Investment Test for Transmission Draft Rule (AEMC Reference ERC0077)

I refer to recent discussions between AEMC and AER staff on the regulatory investment test for transmission (RIT-T) draft rule.

In these discussions, further comment was invited on the inclusion of a separate class of market benefit in the RIT-T for 'option value' and the drafting of clause 5.6.5B(c)(7). I attach for your consideration a report from Frontier Economics that the AER has commissioned on these issues.

I trust that this information is of use to you in finalising the RIT-T rules.

Yours sincerely

Tom Leuner
General Manager
Markets

Draft RIT-T Rule drafting

ADDITIONAL COMMENTS FOR THE AUSTRALIAN ENERGY REGULATOR

This note provides additional drafting comments on the *Draft National Electricity Amendment (Regulatory Investment Test for Transmission) Rule* 2009 (Draft Rule) published by the AEMC. This note should be read in conjunction with Frontier's original drafting comments provided to the AER and forming part of the AER's submission to the AEMC (original comments).

Appropriateness of real options in the RIT-T

Frontier's original comments suggested that clause 5.6.5B(c)(4)(viii) of the Draft Rule, which refers to the concept of "option value", be deleted in the absence of expert supporting analysis and evidence. Our point was that a real options approach to estimating market benefits is an alternative approach to scenario analysis for dealing with uncertainty, rather than a process that yields a distinct additional type of market benefit not available under a scenario approach.

For example, while:

- A <u>scenario approach</u> would seek to estimate the impacts on market benefits of different (discrete) states of the world (eg high/low load growth, high/low fuel costs, high/low plant build costs, etc);

By contrast:

- A <u>real options approach</u> could use, as inputs, probability distributions for the same variables as those used in the scenario analysis. For example, a real options approach might assume normal probability distributions around variables such as load growth, fuel costs and plant build costs.

This means that a real options approach is simply *a different way* of calculating market benefits rather than a *distinct type* of market benefit that is currently missing from the Regulatory Test (as the RIT-T Rule drafting seems to suggest).

Therefore, one result of employing a real options approach over a scenario approach could be a more precise estimate of the market benefits of an option. However, it can also have several drawbacks:

- It is only as precise as the assumptions used – for example, if the true distribution of future generation fuel costs is skewed rather than normal (as assumed), the calculation of real option values will be similarly compromised and the additional apparent precision will be illusory (ie the results will exhibit 'false precision');
- It is more complicated to apply – most TNSPs and the AER will probably not have internal resources that could undertake or critically assess real option analysis, necessitating specialised advice that will increase the costs of, and delay, project assessment; and
- It is less intuitive and transparent – market stakeholders often tend to have a sense of potential future discrete scenarios but a much poorer sense of probability distributions. For example, while stakeholders might

> be able to appreciate and comment on the estimated market benefits arising from the use of alternative future wholesale gas prices (say, $2/GJ, $4/GJ and $8/GJ), they may not be able to comment on the plausibility of a single market benefit estimate that takes account of the entire probability distribution of potential future gas prices.

By contrast, the New Zealand equivalent of the RIT-T, the Grid Investment Test (GIT), recognises that the use of a real options approach is an <u>alternative</u> to a net present value (NPV) approach. Clause 13 of the GIT reads as follows:

> Either standard net present value analysis or real options analysis must be applied in assessing the **expected net market benefit** of a **proposed investment** or **alternative project**. The type of analysis to be used in applying the **grid investment test** to a particular **grid investment** must be whichever of standard net present value analysis or real options analysis is more appropriate having regard to the likelihood of occurrence of any real options during the economic life of the **proposed investment** or **alternative project**.[1]

Therefore, if a reference to real options analysis is to remain in the RIT-T, we suggest that clause 5.6.5B(c)(4)(viii) be removed and (c)(11) be modified to read as follows:

> Specify that the cost-benefit analysis is to account for uncertainty in accordance with an established methodology, such by considering appropriate sensitivities for key input variables or through the application of a real options framework.

5.6.5B(c)(7)

This clause in the Draft Rule currently reads as follows:

> with respect to the classes of market benefits set out in subparagraphs (4)(ii) and (iii), ensure that, if the *credible option* is a *reliability augmentation*, the quantification assessment required by paragraph (5) will only apply insofar as the market benefit delivered by the *credible option* is above the minimum standard required by a *reliability augmentation*;

Frontier's original comments suggested that this clause ought to be deleted on the basis that its meaning was unclear. The discussion below seeks to explain the problems created by this clause in more detail.

First, we understand that this clause exists to assist the assessment of options aimed at meeting deterministic reliability standards. Such standards are typically couched in terms of certain levels of network redundancy following credible contingency events, such as transmission line or generation plant outages. For example, a deterministic standard might require that the network satisfies an "N-1" criterion, meaning that load will continue to be served even in the event of a single credible contingency. An "N-2" standard requires that load will continue to be served even in the event of two credible contingencies. Although not all deterministic reliability standards can be expressed in this "N-" manner, it is reasonable to suggest that they will relate to some technical aspect of the network rather than to abstract economic concepts such as 'net benefits', 'economic

[1] *Electricity Governance Rules*, 17 July 2008, Schedule F4 – Grid Investment Test, pp.189-190.

benefits' and the like. For present illustrative purposes, we have assumed that the relevant deterministic reliability standard is an N-1 standard applying in western Sydney.

The next step is to consider what is meant by the expression, "the minimum standard [of market benefit] required by a *reliability augmentation*". As noted in our original comments, the need to meet a deterministic standard like N-1 does not imply a particular minimum level of market benefits.

Consider two options for meeting an N-1 standard:

(1) a network augmentation options, which costs $50 million; and

(2) a local generation option, which costs $70 million.

Both options might offer satisfaction of the N-1 standard. But unlike the network augmentation option, the generation option will also provide additional energy and capacity to the market – by contrast, the network option will simply enable power from elsewhere in the NEM to be conveyed to western Sydney. In providing an additional source of energy, the generation option might provide the following types of market benefits:

- Ensuring that load is served in certain (unlikely) states of the world in which credible contingencies occur (this is the market benefit of meeting the N-1 standard) – let us assume that this benefit can be valued at $10 million; and
- Helping to delay the need for new generation elsewhere in the NEM (which avoids the financing costs of investing in new generation capacity earlier) – let us assume that this benefit can be valued at $30 million.

Therefore, we assume that the gross market benefits of the generation option are $40 million.

Now sub-clause (c)(7) says that only the additional market benefits of an option (ie the market benefits delivered above the 'minimum standard') need to be quantified. But what is this minimum standard? The only means of finding this out is to calculate the market benefits of the network augmentation option as well. These market benefits might be solely comprised of ensuring that load is served in certain (unlikely) states of the world in which credible contingencies occur.

However, the precise magnitude of this market benefit might vary from the equivalent type of benefit provided by the generation option. For example, the network option – while satisfying the N-1standard – might only provide market benefits from avoiding unserved energy of $8 million (instead of $10 million). This variation could arise due to the fact that in certain very rare states of the world where, say, two credible contingencies occur, the network option might not avoid as much unserved load as the generation option. In other words, even though both options meet the required N-1 standard, where an N-2 event occurs, the generation option will offer a slightly more reliable supply than the network option. This slight different in reliability can be estimated and valued.

All this means that the net economic cost of the:

- Transmission network option is $42 million (being $50 million - $8 million); and
- Generation option is $30 million ($70 million - $40 million).

So, in this example, the generation option is the better option and should be undertaken.

The point of this example is that it illustrates that it is not possible to calculate the market benefits of an option above the "minimum standard" without actually calculating the *entire* market benefits of all the options. Therefore, there is no purpose in trying to limit the quantification of market benefits only to those above a "minimum standard", since no such thing actually exists. In our view, it is better to simply require all market benefits to be calculated – even when the driver for an investment is a deterministic reliability standard – and choose the option with the highest positive net market benefit or the smallest net economic cost.