grid australia
BACKBONE OF THE NEM

25 June 2013

Mr John Pierce
Chairman
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Dear John

Issues Paper on Review of the National Framework for transmission reliability

Grid Australia would like to comment on the late submission lodged by AEMO in relation to the Commission's Issues Paper on a national framework for transmission reliability.

AEMO's submission includes a report from Nuttall Consulting on benchmarking expected unserved energy at each connection point. Based on Nuttall Consulting's report, AEMO proposes that forecasts of expected energy not supplied (EENS) can be used as a form of reliability measure, or reliability standard to be met, to benchmark businesses' network performance[1]. As explained in the discussion below on benchmarking, Grid Australia considers that AEMO's proposal is unlikely to provide meaningful information to stakeholders.

It is important to note at the outset that Grid Australia supports economically efficient outcomes. As explained in its submission to the Commission's Issues Paper, Grid Australia regards the delivery of economically efficient outcomes as the primary goal of a national framework for transmission reliability. On this point, there is no difference of view between Grid Australia's position and AEMO's submission.

At its most basic level, however, AEMO's view is that probabilistic planning alone can be relied upon to calculate the economically efficient level of reliability. Grid Australia does not accept this proposition for the following reasons:

- Sole reliance on probabilistic planning is inconsistent with international practice, as few (if any) countries adopt a purely probabilistic approach to reliability setting, as pointed out in KEMA's 2008 report for the Reliability Panel2.

- The cost-benefit assessment, which is the core of the probabilistic planning approach, is subject to considerable uncertainty, both in terms of estimating the VCR and the probability

[1] AEMO's submission on the AEMC's Issues Paper on Review of the National Framework for transmission reliability, 22 May 2013, page 3.

[2] KEMA, International Review of Transmission Reliability Standards, Additional response regarding probabilistic planning methodologies, 31 July 2008, page 3.

and duration of an outage (which depend on the nature and timing of transmission equipment failures, both of which are inherently uncertain).

- Probabilistic planning inappropriately encourages a mechanistic approach to reliability setting, based on a simplistic assessment of expected costs and benefits. By the same token, it discourages the exercise of engineering judgement, and thereby runs the risk of exposing customers to extreme outage events. Grid Australia is particularly conscious of this risk to consumers, and of the broader economic and social consequences if there is a major, prolonged outage in a capital city or large load centre.

Grid Australia does not accept AEMO's view that the above considerations are 'emotional'[3]. Rather, Grid Australia regards these considerations as important elements in taking a rounded or holistic view of the appropriate reliability standard. In addition, whilst probabilistic assessment is used to inform the economic redundancy standard, the deterministic expression of the standard allows the necessary judgment to be exercised at each connection point, so that potential exposures to extreme events may be considered on a case-by-case basis. Grid Australia considers this approach to be consistent with delivering economically efficient outcomes, rather than adopting a 'one-size fits all' approach to reliability across all transmission networks.

In a broader context, Grid Australia's proposed approach to reliability standards is not unusual. In any complex business decision, executives seldom rely solely on a mechanistic cost-benefit analysis to determine whether an investment should be made. In electricity transmission, which has a very high societal value, it is especially important to consider investment decisions more broadly. This observation helps explain why practically no other jurisdiction applies the approach to reliability standards advocated by AEMO. Grid Australia therefore regards AEMO's position as overly mechanistic and suggestive of a high level of precision that simply does not exist.

In addition to the matters noted above, AEMO makes a number of other points in its submission which are either incorrect or overstated. To assist the Commission, Grid Australia comments briefly on each point below.

1. High impact low probability events

AEMO claims that the probabilistic approach can address high impact low probability events, but its submission provides no explanation of how this would be achieved.

The accompanying report by Nuttall Consulting proposes the use of a measure of forecast reliability based on the statistical expectation of energy not supplied ("EENS"). The Nuttall Consulting report states[4]:

> *"The simulated approach uses contemporary engineering risk and reliability analysis techniques to model the power system, and determine the likelihood and extent of customer interruptions. In this way, various statistics of a reliability measure can be determined (e.g. the mean reliability measure that a customer should receive in any year). Consequently, these simulated measures can be made to inherently allow for low*

[3] AEMO's submission on the AEMC's Issues Paper on Review of the National Framework for transmission reliability, 22 May 2013, page 3.

[4] Nuttall Consulting, Electricity Transmission Reliability Measures - Review of options and concept design: A report to AEMO, 24 May 2013, page 15.

> *frequency / high consequence events, and so, are more suited to capacity planning and cost-benefit analysis."*

In explaining the steps involved in preparing outage probability models for the purpose of calculating EENS, the Nuttall Consulting report states:

> *"The asset outage probabilities and outage durations are essential inputs to calculating the EENS measure. Ideally, these should be based upon historical records of outage events."*

Simply put, the proposition appears to be that:

- reliability standards can be expressed in terms of forecasts of future average connection point reliability;
- these forecasts can be derived probabilistically from historic data sets that include high impact low probability events; and in this way,
- low frequency / high consequence events are taken into account in setting standards.

It is important to note that in the context of this discussion, low frequency / high consequence events (sometimes also called "high impact low probability events" or "HILP events") can refer to:

- more common events involving the outage of one or two transmission system elements, which may or may not result in supply interruption at one or more connection points; and
- much less typical "catastrophic" events involving multiple coincident outages that lead to widespread, and prolonged supply interruptions.

In relation to the first category, historic outage data are available, and so it is possible to calculate estimates of expected EENS in the manner suggested in the Nuttall Consulting report. However, the "average" view of the world conveyed in calculations of expected unserved energy masks the very significant potential exposures faced by consumers in relation to inherently uncertain and unknowable catastrophic events. Moreover, views based on expected unserved energy mask the potentially significant exposure to supply interruption that may be faced by consumers even if a credible contingency occurs. Indeed, this point is partially acknowledged in the Nuttall Consulting report as follows[5]:

> *"Additionally, there may be some concern that reporting EENS on its own - even supported by actual measures – may mask the range of interruption events and their likelihood. Given EENS is a long-term average, the reported annual figure can be much lower than the interrupted energy of the typical outage event that produces it. Therefore, there is a possibility that stakeholders could misunderstand the reliability risks they face with regard to the scale of event that may occur."*

Grid Australia's submission to the AEMC's issues paper noted that under a probabilistic planning approach, high impact low probability events are given a low weighting in the evaluation of expected costs and benefits, reflecting the very low probability of such events occurring. However, the total costs of widespread or prolonged outages are likely to be very high. Grid

[5] Ibid, page 34.

Australia also noted that this issue had been examined in a report to AEMO on VCR, prepared by Oakley Greenwood in 2011, as follows:

> *"By contrast, the value of avoiding cascading outages in a broad area of the power system following a single thermal failure requires consideration of costs that potentially go far beyond the sum of the direct and indirect costs experienced by individual electricity users. These include the social disruption costs that were addressed in part in the 2007 Victorian VCR, but can also include the costs of so-called high impact, low probability (HILP) events, such as the transmission failure that occurred in Auckland in 2006. Incorporation of HILP events within the VCR will therefore require additional analysis. In the first instance, additional effort will be required to assess the actual level of cost experienced in HILP events. In addition, some alteration would need to be made to the VCR calculation method in order to incorporate HILP costs – or these costs would need to be considered separately. This is because the VCR calculation method weights the costs of outage events by their probability of occurrence only. As a result, the contribution of HILP events […] would be reduced to almost zero."*

A point to emphasise is that the "catastrophic" category of HILP events involves very low frequencies of occurrence, and so accurately quantifying probabilities and estimating the costs and consequences of such events based on past data is simply not possible. In any case, as noted by the Oakley Greenwood 2011 report cited above, the probability-weighted value of such events is almost zero.

Having regard to these considerations, Grid Australia's submission to the AEMC's issues paper concluded that[6]:

> *"The determination of transmission reliability standards is likely to involve a consideration of the maximum exposure from a transmission outage, in addition to the expected exposure. These considerations require the exercise of judgment by the independent standard-setter, and cannot be determined through a mechanical or formulaic approach."*

Based on the above discussion, the proposal set out by AEMO and Nuttall Consulting does not, in Grid Australia's view, adequately address the question of how reliability standards should be determined so as to properly address exposures relating to low frequency / high consequence events (whether these arise from relatively more common single transmission element failures, or multiple coincident plant outages with catastrophic consequences).

Grid Australia also disagrees with Nuttall Consulting's view that the Commission's proposed adoption of a deterministically expressed standard does not provide any weight to high impact low probability events[7]. Grid Australia's position - as noted in section 3.2 of its submission to the AEMC's issues paper - is that the establishment of deterministically expressed standards should explicitly consider these events, with appropriate input from consumer groups and other stakeholders.

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6 Grid Australia, Review of the National Framework for Transmission Reliability: Submission in response to the AEMC Issues Paper, 3 May 2013, pages 15 - 17.

7 Nuttall Consulting, Electricity Transmission Reliability Measures, Review of options and concept design, A report to AEMO, 24 May 2013, first bullet point, page 30.

As a final observation it is worth noting that power system operating decisions are driven by deterministic standards that reflect international practice and experience with power systems over many decades. For example, the Rules require the system to be able to withstand any given 'credible contingency'. A non-credible contingency is, arguably, a low probability event. The determination of what is, and what is not, a credible contingency has not been made solely on the basis of probabilistic analysis for many of the same reasons that it is not possible to solely rely on this approach when setting planning standards.

2. Benchmarking

2.1 EENS is not an appropriate or meaningful benchmark

As noted above, AEMO proposes that expected energy not served (EENS) may be used as a form of reliability measure, which AEMO argues would provide a tangible indication of the level of reliability customers receive. AEMO sets out its position as follows[8]:

> *"AEMO believes that more focus on benchmarking a reliability measure such as the EENS would improve operation of the network, expenditure on maintenance, and sufficient crew to restore service within an acceptable timeframe. This will reduce the amount of capital expenditure required to meet reliability requirements and encourage investments which benefit the market at the optimal time."*

Grid Australia does not accept AEMO's proposition that the expected energy not served is a tangible way of determining or measuring the level of reliability that customers receive. It is a measure of the expected long term average unserved energy, not the actual level of reliability. In fact, as already noted, Nuttall Consulting recognises that actual reliability measures for transmission networks are volatile, and it is for this reason that Nuttall Consulting considers it is better to model expected reliability[9]:

> *"Actual event data is used to provide measures of the historical reliability that customers have actually received. However, measures determined in any year – or even an average over the medium-term for transmission connection points - could result in a very variable reliability measure that is highly dependent on what events actually occurred (e.g. whether or not a low frequency/high consequence event occurred over that period). Therefore, output reliability measures based upon actual data are generally not suited to capacity planning.*
>
> *The simulated approach uses contemporary engineering risk and reliability analysis techniques to model the power system, and determine the likelihood and extent of customer interruptions. In this way, various statistics of a reliability measure can be determined (e.g. the mean reliability measure that a customer should receive in any year). Consequently, these simulated measures can be made to inherently allow for low frequency / high consequence events, and so, are more suited to capacity planning and cost-benefit analysis."*

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8 AEMO's submission on the AEMC's Issues Paper on Review of the National Framework for transmission reliability, 22 May 2013, page 3.

9 Nuttall Consulting, Electricity Transmission Reliability Measures, Review of options and concept design, A report to AEMO, 24 May 2013, page 15.

Grid Australia agrees with Nuttall Consulting that output based reliability measures for transmission reliability are not appropriate. Grid Australia made this point in its submission to the AEMC's Issues Paper. However, it does not follow that modelling or simulating expected unserved energy is a reasonable method for benchmarking actual reliability.

In Grid Australia's view, it is very difficult to infer meaningful information regarding a TNSP's reliability performance by benchmarking expected unserved energy, for the following reasons:

- A basic tenet of probabilistic planning is that customers must be exposed to some level of expected unserved energy in order for a network or non-network solution to be economically justified. According to the principles of probabilistic planning, expected unserved energy is not undesirable or inefficient – it is simply a decision signal to determine whether action should or should not be taken to reduce the exposure. Therefore, a benchmark which shows that there is greater expected unserved energy at one connection point compared to another (or greater average unserved energy for one TNSP than another) does not imply that reliability levels are 'worse' in the former case, or that the level of reliability is more efficient in the latter case.

- According to probabilistic planning, economically efficient investment arises if the expected benefit from the investment (avoided expected unserved energy multiplied by value of customer reliability) exceeds the expected cost of the investment. Therefore, it is essential to consider both the costs and the benefits of a prospective network investment or non-network solution at a connection point. AEMO's proposed benchmark only examines the expected benefits, not the expected costs. It therefore provides an incomplete and potentially misleading assessment of whether the TNSP is providing an efficient level of reliability.

For the reasons set out above, Grid Australia considers that AEMO's benchmarking proposal is unlikely to provide any useful information to stakeholders, and is more likely to confuse and misinform.

2.2 EENS "benchmarking" cannot be used to drive TNSP performance improvement, or to compare DNSP and TNSP performance

AEMO suggests that its proposed benchmark will drive improvements in network operations and maintenance. However, in order for a benchmark to provide a commercial incentive to drive changes in performance, it would need to affect a TNSP's revenue. Under the current arrangements, the service target performance incentive scheme (STPIS) is the mechanism that links a TNSP's service performance with its revenue allowance.

Clause 6A.7.4(a) of the National Electricity Rules states that the AER must, in accordance with the transmission consultation procedures, develop and publish an incentive scheme or schemes (service target performance incentive scheme) that comply with the principles in paragraph (b). The AER has appropriately developed separate performance incentive schemes for transmission and distribution, which reflect the different characteristics of each network.

Grid Australia is not aware of a proposal from any stakeholder that the same performance incentive scheme should apply to transmission and distribution networks. However, this appears

to be the logical extension of Nuttall Consulting's suggestion that its proposed benchmarking of reliability would allow comparisons between transmission and distribution networks[10]:

> *"Although this review is focused on transmission, it would be preferable if reported reliability measures were consistent between transmission and distribution. This would reduce the effort of stakeholders to understand the measures, and make comparisons between sectors."*

Grid Australia strongly disagrees with this proposition because it ignores the very significant differences between transmission and distribution networks, which are reflected in the current designs of their respective STPIS schemes. Any attempt to benchmark transmission reliability against distribution reliability is likely to create considerable confusion, and is fundamentally flawed. It is also worth noting that the current reliability measures used in the STPIS scheme are more statistically stable than EENS and, therefore, provide a useful time series representation of changing levels of transmission reliability for a given system. However, more work is required before these measures could be used for comparative benchmarking purposes because of the inherent differences in cost benefit trade-offs that exist between one transmission system and another.

2.3 Proposed uses of EENS benchmarks in other regulatory processes is misguided

Nuttall Consulting's report offers the following additional suggestions for how the proposed EENS benchmarking may be used in other regulatory processes[11]:

> *"The AER or other stakeholders often need to assess the expenditure and investment needs of TNSPs in various regulatory documents, including revenue proposals, pass-through and contingent project applications, and annual planning reports. This assessment often involves the consideration of the factors driving changes to reliability. Therefore, the measures would add value to these processes if they provided some visibility of the network components and issues affecting reliability."*

Grid Australia does not understand how the proposed benchmarking of expected unserved energy would have any bearing on the matters listed by Nuttall Consulting.

In any event, there are separate provisions already in place to ensure that fit for purpose information is available and applied in these regulatory processes. Grid Australia is not aware of any particular issues in these processes that need to be addressed, and Grid Australia considers it highly unlikely that AEMO's proposed reliability benchmark could provide any improvement.

In summary, Grid Australia is not opposed to benchmarking providing that it furthers the achievement of the national electricity objective (NEO). However, Grid Australia cannot support the reliability benchmark proposed by AEMO and Nuttall Consulting because the measure is unlikely to provide meaningful information; it would not provide a reasonable basis for affecting a TNSP's revenue; and there is no regulatory or commercial purpose for the proposed benchmark.

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[10] Ibid, page 12.

[11] Ibid, page 12.

3. Transparency, compliance and accountability

AEMO expresses a number of concerns regarding the Commission's application of its proposed principles to the different planning approaches. AEMO is particularly concerned with the Commission's definition of transparency, which is reproduced below for ease of reference[12]:

> *"The process for setting standards and the standards themselves should be transparent, and stakeholders should have the opportunity to provide input on proposed changes to the standards. The process and reasons for setting transmission reliability standards should be clearly explained."*

AEMO proposes a different definition of transparency[13]:

> *"Transparency, under a stricter definition, relates only to the level of objectivity or lack of judgement that needs to be used to apply the framework."*

Grid Australia does not share AEMO's concerns regarding the definition of 'transparency' or the Commission's application of this principle in its Issues Paper. AEMO appears to believe that transparency requires a reliability setting approach in which no judgment is exercised in applying the framework. On this view, AEMO's position is that a mechanistic approach is inherently more transparent than an approach that requires the exercise of judgment.

Grid Australia does not accept that a transparent approach demands a mechanistic approach to setting reliability standards. For example, the Commission adopts a transparent approach in assessing a Rule change proposal, but the Commission's assessment could not be regarded as mechanistic or not requiring the exercise of reasonable judgment.

As already noted, setting reliability standards on an economically efficient basis will require judgments to be exercised. There is no reason why this judgment cannot be exercised in a transparent manner, with input from consumer groups.

Grid Australia acknowledges that both the probabilistic and economic redundancy planning methods rely on complex input assumptions and calculations, and either approach may lack transparency if it is conducted in a 'black box' environment, in which uncertainties and assumptions are not tested with stakeholders. However, Grid Australia's proposed economic redundancy approach has the following advantages:

- Once the probabilistically determined standard is expressed deterministically, the TNSP's performance against that standard is readily auditable; and
- Under Grid Australia's proposal, triggers for re-examination of the reliability standard during the revenue control period are also readily auditable.

As explained in Grid Australia's submission to the Issues Paper, it is important that the reliability standard should be expressed in a manner that facilitates transparency, compliance and accountability. AEMO's proposal to benchmark modelled expected unserved energy does not

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[12] AEMC, Issues Paper, Review of the national framework for transmission reliability, 28 March 2013, page 14.

[13] AEMO's submission on the AEMC's Issues Paper on Review of the National Framework for transmission reliability, 22 May 2013, page 5.

satisfy any of these requirements. Grid Australia considers that the economic redundancy approach provides a much better method for verifying compliance with the reliability standard for the reasons set out in our submission to the Commission's Issues Paper.

Grid Australia therefore maintains the view expressed in its submission that a deterministically expressed reliability standard provides greater certainty and transparency for all stakeholders regarding the level of reliability a TNSP is expected to deliver. It also provides a means of ensuring that TNSPs are held accountable for meeting the standard. This is an important advantage compared to the probabilistic planning approach and – most importantly – it does not preclude economic considerations from being applied in setting the reliability standard.

4. Efficiency and 'fit for purpose'

AEMO claims that the economic redundancy approach is less efficient than the economic cost-benefit planning approach. According to AEMO, "it locks in high cost assets for no discernible reliability improvement and is incapable of responding to the changing and dynamic nature of the market". It also comments that[14]:

> *"AEMO's analysis suggests that the requirement to maintain the same level of reliability excludes the opportunity to consider non-network support which would be a viable option due to changes in recent demand forecasts. Therefore, the economic-redundancy approach still drives inefficient investment as a connection point's original level of reliability is required to be maintained regardless of current or future economic factors. Unless the AEMC expresses the economic-redundancy approach as an output measure, it will continue to lock in high cost inefficient investments.*
>
> *Further, this assessment is conducted prior to the regulatory reset of the asset owner. As a result, it requires assumptions to be made on the demand and augmentation option up to seven years in advance of the likely augmentations to address an emerging constraint. This means the AER must set the business's revenue on the basis of this standard and option that meets the standard at that time. This results in a windfall gain to the business, as identified in ESCOSA's Draft Decision on ElectraNet's proposed amendments to the ETC, unless all augmentation projects are excluded from the ex-ante revenue assessment and included as a contingent project."*

Grid Australia's submission to the Issues Paper has addressed these concerns by setting out a detailed framework in section 3.1 which allows changes in market conditions to be taken into account. For the avoidance of doubt, Grid Australia also proposes that in setting and satisfying the reliability standard, network and non-network options will be considered in accordance with the requirements of the RIT-T. Grid Australia also expects that deterministically expressed standards would be specified in such a way that does not preclude non-network options.

As noted in Grid Australia's submission on the Issues Paper, the current basic 'menu' of reliability standards could be given greater granularity if the standard-setting body sets conditions for the standard at each connection point. This may involve the reliability standard being specified with reference to a maximum load at risk, maximum hours for load loss exposure, or a time dimension. In this way, the standard could accommodate some trade-off between transmission cost and reliability. For example, the reliability standard could specify an N-1 reliability standard with no

[14] Ibid, page 7.

more than 300 MWh of energy supply being at risk of interruption by a credible contingency event. The expression of deterministic standards in this manner would address the concern expressed by AEMO in relation to the application in the Dalrymple PSCR of the current standards prescribed in the South Australian Electricity Transmission Code.

Grid Australia therefore considers AEMO's concerns to be unfounded, as are AEMO's comments that the economic redundancy approach locks in high cost assets up to seven years prior to the investment occurring[15]. Grid Australia's proposed framework addresses the issues of flexibility in revisiting the reliability standards, and avoiding windfall gains and losses. Grid Australia's submission also noted that the AER has significant powers to ensure that a TNSP's capital expenditure allowance satisfies the Rules requirements. There is no reason to suppose – as AEMO appears to – that the AER will systematically over-estimate demand and therefore "lock in" an inefficient investment path.

It is also worth noting that AEMO's submission argues that a probabilistic approach to setting reliability standards is better equipped to identify the benefits of non-network options[16]:

> *"The economic approach more readily and inherently allows non-network options to be assessed at any time, because any non-network option can be assessed with regard to its merits for improving reliability as it does not necessary need to wait for a network need."*

Grid Australia does not understand how a non-network option could be economically efficient if it does not address a network need. As already noted, Grid Australia's proposed framework would consider non-network options in its assessment of how best to satisfy the reliability standard, in accordance with the requirements of the RIT-T.

5. Setting the ex-ante revenue allowance

AEMO's submission argues that the economic redundancy approach is not significantly less complex to apply than the probabilistic planning approach because:

- For a redundancy standard, an investment will be required if the margin of loading above some threshold that is defined through the standards.
- For the probabilistic approach, the measure is the expected energy not served to customers, which is also largely a function of the level of loading above defined thresholds.

AEMO then comments that[17]:

> *"Although there are more steps in the economic approach (when compared to a redundancy standard) to the calculations process for the TNSP in forecasting EENS over the regulatory control period, this does not necessarily translate to more effort on the part of the assessor."*

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[15] AEMO's submission on the AEMC's Issues Paper on Review of the National Framework for transmission reliability 22 May 2013, page 7.

[16] Ibid, page 7.

[17] AEMO's submission on the AEMC's Issues Paper on Review of the National Framework for transmission reliability, 22 May 2013, page 9.

Grid Australia notes that it is difficult to sustain a position which posits that more steps are required, but this can be achieved without additional effort. In fact, the Nuttall Consulting report explains the analysis that would be required to apply its proposal as follows[18]:

> *"Preparing the EENS measure in the format discussed in Section 5 will require the following matters to be specified within the national framework:*
> - *the outage events to be modelled*
> - *the preparation of outage probability models*
> - *the applicable network ratings*
> - *assigning EENS to connection points*
> - *customer demand assumptions*
> - *generation dispatch assumptions*
> - *network and generation development assumptions*
> - *load transfers and restoration assumptions*
> - *circumstances where the standard methodology and assumption can be changed for preparing the measures."*

In setting out its summary and conclusions on its EENS measurement proposal, the Nuttall Consulting report states[19]:

> *"This process is largely an extension of the methodology already applied annually by AEMO to prepare the national transmission network development plan (NTNDP). It also makes use of many of the systems and tasks that TNSPs and AEMO already have to perform to undertake their normal planning and operating tasks.*
>
> *Preparing the measure by this process will require additional effort on the part of TNSPs or AEMO however."*

Grid Australia considers that the discussion in the Nuttall Consulting report illustrates very clearly the likely additional effort that will be required to implement AEMO's proposal for the use of EENS forecasts as a form of reliability measure, or reliability standard to be met. Furthermore, as already explained in relation to benchmarking, Grid Australia considers that AEMO's proposal will not provide a clear indication of whether the TNSP is delivering efficient levels of reliability. Instead, it provides a partial and potentially misleading assessment of reliability performance by focusing on expected unserved energy alone.

More broadly, the economic redundancy approach proposed by Grid Australia has the important benefit of engaging with customers immediately prior to the revenue setting process on the level of reliability that should be provided at each connection point. In terms of stakeholder engagement, this approach is significantly superior to a narrow application of the probabilistic approach, which discourages meaningful discussions regarding trade-offs between improved reliability, reduced risk of high impact events, and the costs of additional investment.

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[18] Nuttall Consulting, Electricity Transmission Reliability Measures, Review of options and concept design, A report to AEMO, 24 May 2013, page 37.

[19] Ibid, page 45.

Grid Australia would be pleased to provide more detailed comments on AEMO's proposal, or to address any queries you may have in relation to these comments.

Please do not hesitate to contact me on (08) 8404 7983 if you wish to discuss any aspect of this submission.

Yours sincerely

Rainer Korte
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