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Dear John

RE: Draft Paper on NSW Distribution Reliability Outcomes and Standards Review

AEMO welcomes the opportunity to provide feedback on the AEMC's Draft Paper on the review of the NSW distribution reliability outcomes and standards review. The Draft Paper considers the trade-off between costs and reliability performance for four different scenarios. We acknowledge that the terms of reference to the AEMC did not appear to allow the consideration of a full probabilistic assessment[1] but consider that it is the most efficient approach.

A probabilistic economic cost-benefit approach to distribution network planning can potentially lead to a $50[2] reduction in the average NSW customer's annual electricity bill in 2015 without any detrimental effect to current reliability levels of the NSW customers.[3]

AEMO believes that any changes to the existing NSW licence conditions must be implemented immediately in order for these benefits to be realised.[4] AEMO acknowledges that there may be some transitional implications on businesses[5] however implementation will

[1] "The timetable for the review does not allow for a fundamental re-design of the way in which distribution reliability standards are expressed"; SCER Terms of Reference to the AEMC, Page 4.
[2] The average customer bill in Ausgrid's distribution network is $2,100. $1,000 relates to network costs. The average bill is even higher in Essential and slightly lower in Endeavour. We understand the Ausgrid augmentation program for 2012-13 and 2013-14 is approximately $1 billion. If they applied a probabilistic approach it is likely that many of these projects will be delayed beyond the start of the next regulatory period. This translates to a reduction in the starting RAB of $1 billion and therefore a reduction in MAR of approximately $100 million. This translates to a $50 reduction for customers in Ausgrid's distribution network area if Ausgrid does not undertake any augmentation capital expenditure in 2012-13 and 2013-14.
[3] We acknowledge that more detailed modelling is required to justify the $50 estimate and assess the potential impact on reliability levels.
[4] Although we note the SCER Terms of Reference states "Any changes to NSW's approach to reliability standards would need to apply from the start of the next NSW regulatory determination period, commencing on 1 July 2014", Page 4.
[5] AEMO engaged in informative and helpful discussions with Ausgrid on potential implications of moving to a probabilistic reliability planning criteria.

ensure that any improvements in the planning standards identified through this review are taken into account by the AER and passed on to NSW consumers.

Proposed amendments to the NSW licence conditions have been included in Attachment 1.

AEMO's detailed views on this review are set out below.

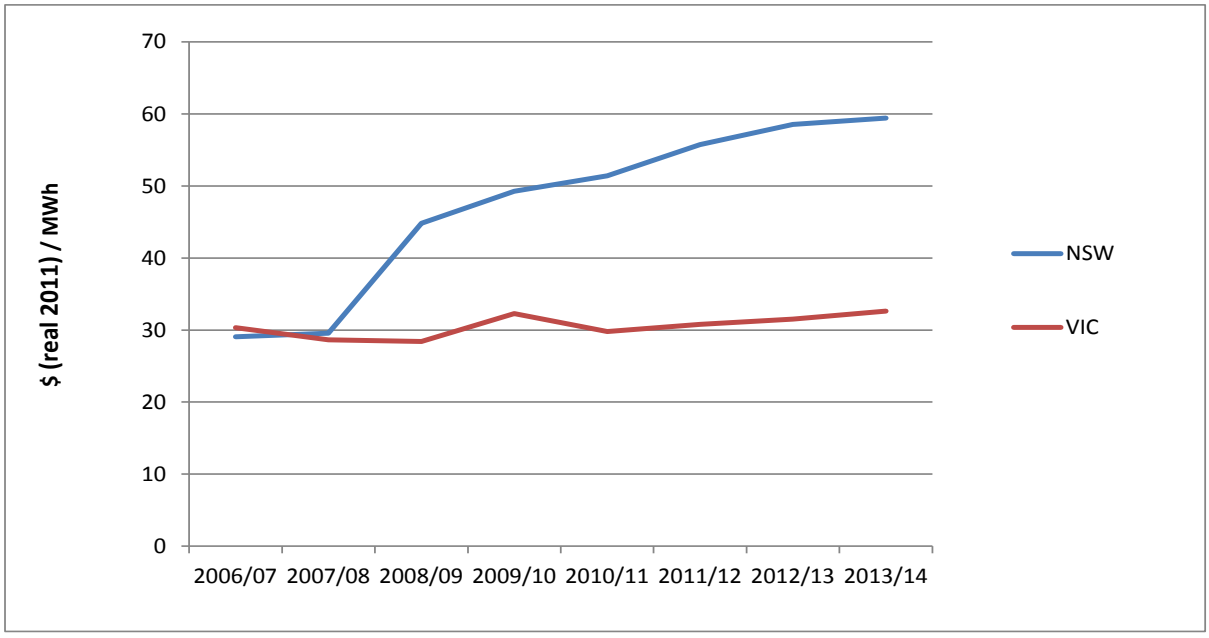
Background

The AEMC's approach to this review involved assessing the trade-off for consumers between the cost of meeting the required level of reliability and the reliability performance experienced by consumers[6]. AEMO acknowledges that studies undertaken as part of the AEMC's review indicated that up to $2.5 billion of net benefits can be achieved by applying a form of cost-benefit analysis which incorporates a lower distribution reliability level. However, we believe that there is the potential for greater savings.

AEMO believes electricity network price rises have been driven by the strict redundancy planning standards currently in place. If the current approach to meet forecast demand in NSW remains unchanged, prices will continue to increase.

Figure 1 below compares the historic and current regulatory period distribution network prices between NSW and Victoria. It shows that prices between the two regions were similar just five years ago. However since 2007, following amendments to the NSW licence conditions, real network prices have increased dramatically compared with Victoria's, which continued to operate under a probabilistic planning standard.

Figure 1 – Distribution electricity network prices



[6] AEMC Draft Report – NSW Work stream

In order to ensure network businesses provide reliable and secure electricity to customers cost-effectively, the AEMC should recommend an economic approach to reliability planning which addresses the price-service balance. This approach must also be coupled with an efficient level of SAIDI and SAIFI measures to achieve the optimal outcome for consumers.

Further reductions to electricity prices will also result from applying an economic cost-benefit approach on the transmission network in NSW. This will also allow for more effective joint planning between the distribution and transmission networks and will ensure a consistent approach to the overall planning framework is achieved.

Approach to distribution reliability planning

AEMO believes that the approach to distribution reliability planning should consider the benefits of providing reliable service to the end use customer and therefore focusing more on services rather than assets. The current framework does not provide sufficient opportunity for non-network service providers to deliver services for customers on a NEM-wide basis, further contributing to asset-focused outcomes.

The costs of any investment with the benefits of providing reliability to customers is most-effectively balanced through an economic approach as it explicitly assesses the value of the energy at risk through the application of a VCR and the likelihood of events occurring. This economic approach, if applied to both distribution and transmission networks will lower total network costs.

The probabilistic approach takes into account the probabilities of a wide range of contingencies occurring (e.g. transformer failure rates), with probabilities assigned on a range of possible operating conditions including demand levels and network topologies. It therefore assesses the probability that events likely to cause constraints and load shedding in the transmission system will occur during the planning horizon. The approach also better matches the option or augmentation required to the value of the constraint. An example of the probabilistic approach is shown in Attachment 2.

Assuming that the current trend of under-expenditure on the forecast levels continues, there is likely to be a number projects that would fit into this category[7]. This approach should also be applied to projects which may be considered committed, but would need to consider any contractual commitments.

Over the next two years Ausgrid have proposed a $1.1 billion augmentation capex. Applying a probabilistic approach to these projects now would reassess their augmentation need date and potentially defer these augmentations to the next regulatory period. This would result in a lower starting regulated asset base (RAB) for the next regulatory period, that is, from 2014 onwards. This lower starting RAB for the next regulatory period can result in a cost saving of a customer's average annual electricity bill of around $50 from 2014 since expenditure would

[7] In the AER's 2009-10 performance report Ausgrid's forecast capex was $1.143 billion compared with actual expenditure of $1.057 billion.

not be incurred over the next two years in the current regulatory period due to deferment of augmentations. There would also be a related reduction in operational expenditure requirements, which would make this cost saving even larger. Additionally, should a probabilistic approach be applied to the need for augmentations from the start of subsequent regulatory periods, rather than part-way through a regulatory period as has been applied in Ausgrid's case, further savings to a customer's bill could result due to these deferments. AEMO are happy to undertake further analysis to justify this argument.

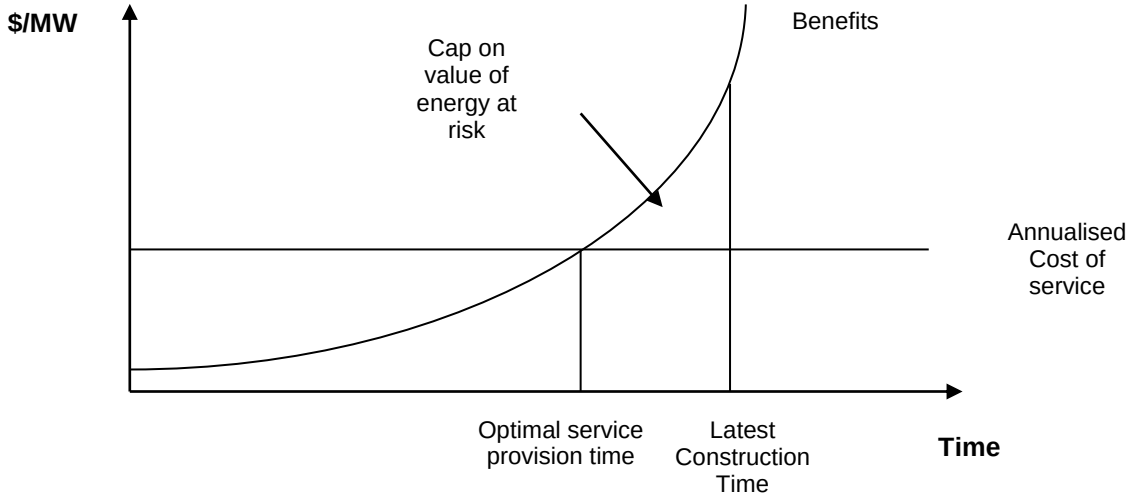
AEMO acknowledges that distribution prices have been approved for 2012/13 however the business's expenditure programmes have not been approved. Therefore applying a probabilistic planning approach to determine when augmentations are required can still be implemented. [8]

AEMO recognises that there may be concerns associated with moving to a probabilistic planning approach. One way to address those concerns is to cap the value of energy at risk at connection points. The cap would need to be determined and expressed as a $/MWh value, rather than as an redundancy requirement, and could differ at different points in the network depending on the type of customers supplied and the value they place on unserved energy. To obtain the maximum benefit of this method, the caps would need to be monitored by the AER and accompanied by penalties for non-compliance. This ex-ante approach could work in concert with existing ex-post reliability targets such as SAIDI and SAIFI.

This approach is outlined in Figure 2 below. Typically when augmenting to meet reliability requirements the benefits associated with any augmentations are initially low. Over time as peak demand and energy at risk increases the benefits will also increase, as depicted by the curved line. The optimal time to construct the augmentation will occur when the customer benefits exceed the annualised cost of the augmentation, as depicted by the horizontal line. As delaying the investment beyond this point would be attractive to the network business who would have received revenue based on its forecast of the optimal timing, the cap on the value of energy at risk will determine the latest construction timeframe. This will ensure that the business does not place considerable reliability at risk.

[8] AEMO, with the assistance of Ausgrid, has applied a probabilistic approach as an example to an Ausgrid's past regulatory test project in Attachment 2.

Figure 2 – Capping energy at risk



Source: AEMO

Using the VCR methodology

AEMO supports the AEMC's proposal of using a value of customer reliability (VCR) in distribution reliability planning. AEMO feels this methodology promotes a service-focussed approach as it considers the value customers place on having an uninterrupted supply of electricity. AEMO also believes that this approach provides opportunity for a more rigorous cost-benefit analysis to be undertaken for investment planning to lower network costs.

AEMO acknowledges the outcomes of Oakley Greenwood's VCR survey as part of the AEMC's NSW review. The Oakley Greenwood report highlighted that the much higher VCR obtained for the small business sector in NSW when compared with the 2007 Victorian value requires additional surveying. AEMO also believes that further investigation on the large difference is required to confidently apply the VCR in NSW.

AEMO undertook a review of the existing estimates of the VCR from a survey performed in 2007. AEMO's intention to establish consistent national VCRs began in the 2010 NTNDP consultation paper where Oakley Greenwood was commissioned to use existing Victorian survey data to demonstrate the calculation of re-weighted VCRs for the four non-Victorian NEM regions. Results from this review are published on AEMO's website[9].

A comparison between the 2012 NSW VCR for small businesses with AEMO's 2010 re-weighted NSW VCR shows that there is a large difference between the two values. AEMO will be commencing its National VCR project in late 2012 following notice from the Standing Council on Energy and Resources (SCER) to undertake the work. This project will update the re-weighted figures in order to accurately reflect more regional-specific values that customer's place on an uninterrupted supply of electricity. Given the timing of the AEMC's

[9] http://www.aemo.com.au/en/Electricity/Planning/Related-Information/Policies-and-Procedures/National-Value-of-Customer-Reliability-VCR

national work stream review and AEMO's national VCR project, we would be happy to assist with the AEMC's survey and analysis. Additionally, outcomes from AEMO's national study will need to be considered by the AEMC for application in future reliability planning.

If you have any questions please do not hesitate to contact Louis Tirpcou on (03) 9609 8415.

Yours sincerely

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Executive General Manager
Corporate Development

Attachments: Amendments to NSW Distribution Licence Conditions & Probabilistic Planning Examples

Attachment 1 – Amendments to NSW Distribution Licence Conditions

The implementation of a probabilistic planning approach in NSW would require the replacement of condition 14 and Schedule 1 of the distribution licence conditions, and appropriate amendments to other conditions and definitions referring to the design planning criteria.

It is envisaged that condition 14 would:

- define probabilistic planning as an approach that provides for the delivery of an optimal level of system reliability and security using a cost-benefit assessment that considers a value of customer reliability (VCR) against the costs and benefits provided by each investment option,
- include probabilistic design planning criteria that:
    - specify the principles or objectives to be applied by the licence holder in its cost-benefit assessment;
    - take into account the probabilities of occurrence of a range of network contingencies and system-wide conditions or assumptions, including demand forecasts and generation availability (may be specified in Schedule 1 or determined by reference to specified principles);
    - provide for a mechanism to set the VCR to be applied by the licence holder (may be specified in Schedule 1 or determined by reference to specified principles);
    - incorporate a cap on the potential exposure of the value of energy at risk determined and expressed as a $/MWh value, (may be specified in Schedule 1 or determined by reference to specified principles);
- require the licence holder to apply probabilistic design planning criteria to its planning for the construction of all new network elements from the commencement of the revised conditions; and
- require the licence holder to apply probabilistic design planning criteria to its planning for the upgrade of all existing network elements from the commencement of the revised conditions.

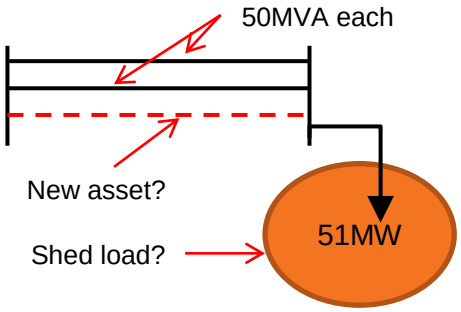
[Appropriate incentives for the licence holder to comply with the design planning criteria should established through revenue regulation.]

Attachment 2 – Probabilistic Planning Examples

Assume load of 50 MW is to be supplied by two lines rated at 50 MVA each. Assuming the forecast load is expected to increase to 51 MW.

The probabilistic approach will consider the value of unserved energy (USE), that is the value of load that might be shed taking into account the probability of losing one of the lines and its duration:

Value of USE (per annum) =
USE x Pr (loss of a 50MVA circuit) x VCR x duration



If the cost of the new asset ≤ value of the USE (over the life of the asset),
then the construction of the asset can proceed, otherwise it can be accepted that load shedding is a credible alternative if alternative network/non-network option is also uneconomic.

Ausgrid Examples

AEMO, with the assistance of Ausgrid, has undertaken a high level cost-benefit analysis on two of Ausgrid's past regulatory test projects to compare results this approach provides with the N-1 approach applied.

Both projects considered require the construction of a new 132/11 kV zone substations; one at Charlestown with a project cost of $40 million and the other at Warringah with a project cost of $25 million. Both areas breach the N-1 criteria in 2010-11. Using a strict deterministic N-1 approach and the same augmentation option proposed by Ausgrid, results suggest that the benefits required to justify the augmentations requires consumers to value their electricity at just under $1 million/MWh, which is 10 times the NSW value calculated as part of this review. Applying the review's VCR of approximately $100,000/MWh showed that the augmentation at Charlestown is not cost-effective for another 10 years, while the augmentation at Warringah is not cost-effective for another five years[10].

[10] AEMO notes however that due to additional operational complexities of the network in the Warringah area, the augmentation may be required earlier than the results that the cost-benefit approach suggests.