RELIABILITY
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1 June 2020
Mark Feather
General Manager
Policy and Performance
Australian Energy Regulator

By email: AERInquiry@aer.gov.au

Dear Mr Feather,

Widespread and Long Duration Outages – Values of Customer Reliability – submission to consultation paper

The Reliability Panel (the Panel) thanks the Australian Energy Regulator (AER) for the opportunity to provide a submission on the consultation paper for the Widespread and Long Duration Outages (WALDO) - Values of Customer Reliability (VCR) consultation paper.

The Panel has previously expressed its support for the development of a model to estimate VCRs for WALDOs and is appreciative of the AER's efforts. In particular, the Panel commends the AER for its extensive consultation and detailed engagement with industry stakeholders. The Panel also thanks the AER for the opportunity to participate in the sub-committee which advised on the development of the WALDO VCR model. The Panel is particularly interested in the WALDO VCR model, given that it considers that these would be one of the key inputs into its work on reviewing the system restart standard and protected events i.e. those events that are "wide spread and long duration". The comments in this submission should therefore be considered with that in mind.

One of the main strengths of the model is the ability for users to input the characteristics of a particular WALDO, in order to estimate the WALDO VCRs that are specific to a particular set of circumstances. The Panel considers that this strength could be undermined if a set of WALDO VCRs published alongside the model were used as a default estimates by policy makers. This would risk policy decisions being based on only the published WALDO VCRs, which would likely not be appropriate given that economic assumptions will have changed since the WALDO VCRs were first published (e.g. exchange rates, soft and hard commodity prices). It would therefore be helpful if any WALDO VCRs published alongside the model were more "worked examples" to help demonstrate to stakeholders how to use and interpret the model. This would encourage the use of the model itself to estimate WALDO VCRs, with policy makers being made aware of the range of inputs and assumptions that are involved in estimating a VCR for a WALDO. Consequently, policy makers would be aware of the need to treat the worked examples with caution.

The Panel acknowledges that estimating WALDO VCRs is difficult. This is due to the lack of a historical precedent for a model of this nature and the large amounts of data required. As VCR estimates are imprecise by nature the Panel considers that it would be helpful for the AER to define a "margin of uncertainty" for the model's outputs. The Panel is happy to discuss this further with the AER. For example, during the 2016 review of the System Restart Standard, the Panel's economic analysis allowed for a margin of plus or minus 30 per cent to account for uncertainty associated with using the standard VCR values to estimate the costs of unserved energy associated with region-wide black system events. Incorporating a similar approach or including commentary on this may assist in users being more aware of the band of uncertainty around the WALDO VCR estimates.

Aside from incorporating a margin of uncertainty into the model outputs, the Panel also considers the upper limit of 15GWh for WALDOs in this model may be too low. This is because the Panel is interested in using the WALDO VCRs as an input into considering the system restart standard and protected event applications, which in some jurisdictions would involve considering numbers greater than 15GWh. A 15GWh limit on WALDOs excludes those larger-scale, cascading outages that may simultaneously occur across multiple NEM sub-networks. The Panel considers outages featuring cross-regional boundaries to be plausible and notes that they were observed during the 2019/20 summer, and a coincident separation of two regions occurred on 25 August 2018. The Panel suggests that this model should therefore seek to better account for such scenarios.

The Panel considers that increasing the upper limit of WALDOs in this model would make it more useful for the Panel's review of the System Restart Standard and for assessing requests for protected events. The Panel also notes

in this context, that the review of the System Restart Standard must cover entire sub-networks at a time, as required by clause 8.3.3(aa) of the National Electricity Rules.

In order to consider what a revised upper limit should be, the Panel suggests that the AER consider the Economic Assessment of System Restart Ancillary Services in the NEM report by Deloitte, which was commissioned by the Panel in 2016. This report, used in the 2016 review of the System Restart Standard, provides detailed estimates of the levels of unserved energy associated with region-wide black system events. It estimated the USE experienced during a black system event as being greater than 15GWh for New South Wales, Victoria and South Queensland. This suggests the current WALDO VCR model could not be used to evaluate SRAS capacity for these sub-networks, unless some crude assumptions were made i.e. a simple linear extrapolation of a 15GW WALDO, which would likely create inaccurate and not represent the intricacies of the WALDO model. The estimates for these sub-networks have been provided in Attachment 1.

In relation to estimating the social costs of WALDOs, the Panel recognises that there are data limitations. Further it is noted that in order to improve these estimates it is likely that a detailed study of social costs would need to be undertaken and that this may not be compatible with the AER's publication timeline for this model as well as being highly sensitive to the particular social pressures of the time. Nevertheless, the Panel has concerns about basing the social costs of WALDOs on the New York City Blackout of 1977. This is due to the significant change in how society uses technology and the impacts of this on electricity consumption that have occurred since this time. Given modern society's increasing reliance on electricity, it is very likely the social costs of WALDOs have increased since 1977. While noting that there are data limitations, the Panel recommends the AER use more recent case studies for estimating social costs, with the most obvious example being the recent South Australian black system of 2016. Other examples that may be considered include the Alice Springs System Black Incident on 13 October 2019, the Darwin/Katherine black system of 2014, the Melbourne blackout in January 2009, and the Auckland power crisis of 1998.

While we recommend looking at more relevant examples, we also recognise that data from actual events will always be limited. This is because events of this nature are very rare and will hopefully continue to be so into the future. It is also because estimating the social costs of WALDO events cannot be solely based on data from an actual event, no matter how contemporary or relevant. There will always be a need for such estimations to be augmented with analysis and judgement that is relevant to the unique circumstances of the case.

The Panel considers that there are also several unique circumstances to consider when calculating Australia's social costs. The higher ambient temperatures could mean the social costs of blackouts during heatwaves may be more extreme than other nations. In addition, in assessing the costs, the model also needs to take into account the unique make-up of the Australian economy. The economic mix generally has a strong service industry orientation due, in part, to the large proportion of the population living in metropolitan areas. For the model to more accurately estimate costs for the Australian economy, it needs to ensure there is appropriate weighting given to the impacts of WALDO events on the service industry.

The Panel also considers it is important for the model to take into account the current physical structure of the electricity grid in Australia and the fact that it is long and stringy and with potential multiple points of failure. This is relevant to the probability of WALDO events in Australia due to the possibility of less connected sub-regions being more likely to experience prolonged outages.

The Panel appreciates the work that the AER has done to date in developing a WALDO model, and considers it will be a useful input into the Panel's future work, noting the above comments on how the model could be improved. Due to the various challenges in developing a useful WALDO model described above, the Panel also supports the model being reviewed at some point in the future. Any review should incorporate a detailed examination of the societal costs of WALDOs in Australia. The Panel encourages that adequate resources are allocated to future reviews so that model can continue to remain an up-to-date, useful tool that will help to inform policy decisions into the future.

Yours sincerely

Charles Popple
Chair, Reliability Panel
Commissioner, AEMC

ATTACHMENT 1

Economic Assessment of System Restart Ancillary Services in the NEM Report (Deloitte Access Economics)

This report, available here, provides estimates for the level of USE associated with each NEM sub-network for a black system event. Only the estimates for New South Wales, Victoria and South Queensland have been provided as these are the only sub-networks which were estimated to experience levels of USE greater than the limit specified in the WALDO VCR model. Each column refers to a different load restoration path (a different combination of SRAS plants). These tables are available on pages 13, 21 and 35 of the report.

Unserved energy – New South Wales load restoration (MWh)

SRAS Plants	**NSW1**	**NSW1 & 3**	**NSW1, 2 & 4**	**NSW 1,2 & 3**	**NSW1, 2, 3 & 4**	**NSW1, 2, 3, 4, 5**
Number of plants	1	2	3	3	4	5
MWh	50,022	42,455	40,242	42,008	39,796	39,796

Source: Deloitte Access Economics, Economic Assessment of System Restart Ancillary Services in the NEM, November 2016, p. 13.

Unserved energy – Victoria load restoration (MWh)

SRAS Plants	**VIC1**	**VIC1 & 2**	**VIC1 & 3**	**VIC1 & 4**	**VIC1, 2 & 4**	**VIC1, 2, 3 & 4**
Number of plants	1	2	2	2	3	4
MWh	30,902	25,213	28,008	30,030	24,295	22,071

Source: Ibid, p. 21.

Unserved energy – South Queensland load restoration (MWh)

SRAS Plants	**SQ1**	**SQ1 & 2**	**SQ1, 2 & 3**
Number of plants	1	2	3
MWh	17,196	16,092	15,381

Source: Ibid, p. 35.