

25<sup>th</sup> October 2016

Australian Energy Market Commission  
PO Box A2449  
Sydney South NSW 1235

Submission lodged online at: [www.aemc.gov.au](http://www.aemc.gov.au)

Project Number: REL0057

Dear Mr Henderson

### **Review of the System Restart Standard - Draft Determination**

Snowy Hydro appreciates the opportunity to comment on the Draft Determination.

We appreciate that the Reliability Panel has taken on broad feedback from Market Participants to incorporate economic assessment of additional restart sources. However we highlight AEMO's integral involvement in this process has compromised the independence of the analysis and the conclusions reached.

For instance AEMO have provided the AEMC and their economic modellers (Deloitte) with:

- Capacity/generation restoration curves for each electrical sub-network and for each quantity of System Restart Ancillary Service (SRAS); and
- Reliability and Availability assumptions for each SRAS in each sub-network.

All these parameters are critical factors to Deloitte's economic assessment of the optimal number of SRAS for each sub-electrical network. Market Participants have repeatedly stated that having reduced the total quantity of SRAS procured for the NEM by half, AEMO is in a conflicted position to justify its decision in any consultation/assessment which is critical of the economic merits of this significant reduction in SRAS for the NEM. Clearly it was inappropriate to have AEMO provide critical factors in Deloitte's economic assessment of the optimal number of SRAS for each region. Market Participants expected that key inputs outlined above should have been provided by an independent technical expert and/or the Transmission Network Service Providers (TNSP) relevant to each electrical sub network.

Given the recent 28<sup>th</sup> September 2016 South Australian system black event, it remains to be seen whether AEMO's procurement of only two (2) SRAS for the electrical sub network was optimal to minimise the economic cost of the major supply disruption<sup>1</sup>.

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<sup>1</sup> Clause 3.11.4A(a) of the Rules contains the SRAS Objective, which sets out the high level purpose of SRAS as follows:

Snowy Hydro highlights the following key observations from our review of the Draft Determination and Deloitte economic assessment:

1. AEMO had too prominent role in advising the Deloitte economic assessment.
2. For the purpose of AEMO SRAS procurement, the no interconnectors is available assumption to aid in the restoration of an electrical sub network is counter balanced by the very optimistic assumption that all transmission for the electrical sub network would remain intact in a system black event (in the SA 28<sup>th</sup> September black out, “three of the four transmission lines between Adelaide and the north of South Australia and 22 towers across the network were damaged<sup>2</sup>”).
3. Ambiguous use of the terms and definitions of availability and reliability has created confusion in the interpretation and efficacy of the modelling results. For instance for large thermal generation plant such as Bayswater, auxiliaries may be restored but the generator units still require at least 2 hours to be available to synchronise and supply generation into the grid. Is availability measured from the time of auxiliaries being supplied? or is availability measured after the time required to allow the generation unit to be synchronised to the transmission network?
4. From Figure 6.5 of the Draft Determination it can be seen that AEMO has determined that it would take only 30 minutes to bring electricity supply to Murray Switching Station from a single SRAS source in the south of the electrical sub-network. This assumption is unrealistic and ignores that practical reality of re-energising a transmission path from the south to Murray Switching Station would require:
  - a. The south restart resource to be fully ready as a restart service when the system is black. In reality there would be a high degree of confusion immediately after the system black event which would delay the start of the restoration process;
  - b. Stabilising load of approximately 40MW would be required at Mt Beauty. There would be a high degree of uncertainty on where this load is coming from and whether the distribution system connecting this load to Mt Beauty can be re-energised in a timely manner. These factors may introduce a significant time delay in the restoration process;
  - c. Energisation of the 220kV transmission network to Dederang would require the re-energisation of the 330/220kV Dederang transformers. High inrush current during the energisation of the transformers is likely and hence special consideration of generator protection schemes is required to ensure high transformer inrush currents does not result in unintended generator trips which will delay the restoration process.

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“The objective for system restart ancillary services is to minimise the expected economic costs to the market in the long term and in the short term, of a major supply disruption, taking into account the cost of supplying system restart ancillary services, consistent with the national electricity objective (the SRAS objective).”

<sup>2</sup> Adelaide Advertiser, “Why the lights went out across our state”, 30/09/16.

- d. High transformer inrush currents also result in temporary overvoltages due to ferroresonance. These overvoltages may cause issues which delay the restoration process.

Snowy Hydro estimates that it would take at least 90 minutes to bring supply from the south to Murray Switching Station. Snowy Hydro’s key point is the desk top modelling undertaken by AEMO does not adequately cater for the practical operational difficulties associated with re-energising the network following a system black.

- 5. From Figure 6.5 for the NSW1 and the NSW1 + NSW3 curves, it can be seen that AEMO believes approximately 2100MW of Snowy Hydro generation can be available to generate after 100 minutes. This assumption is incorrect. According to TransGrid<sup>3</sup>, “The capability of the restart system to supply load north of Snowy is **limited to 1700 MW** until a major thermal generating unit is in service. To achieve this, two Kangaroo Valley units must be generating or operating in synchronous condenser mode, and at least one Bendeela unit must be in service”.
- 6. Figure 6.5 is reproduced below from the Draft Report to highlight the following key observation. Using the NSW1 + NSW3 generation restoration curve which represents the current AEMO procured number of SRAS for NSW, AEMO’s desktop modelling and associated assumptions concluded that two sources of SRAS can meet the current standard of 40% of peak load in 4 hours. It is therefore very worrying and puzzling to understand why the draft standard has been set at a level significantly below what AEMO believes is achievable. If you believe that AEMO’s modelling is credible then the draft standard must be set at 26% of peak demand = 3800MW in 3hrs. Anything less stringent than this would be **eroding** what is currently already a controversial and highly inadequate number of SRAS services for NSW.

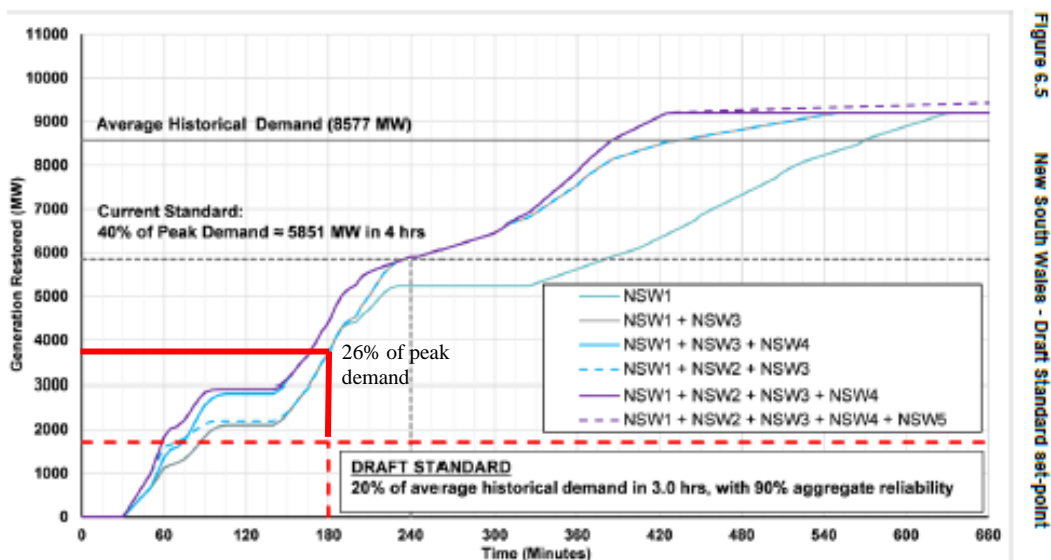


Figure 6.5, NSW – Draft Standard set-point.

<sup>3</sup> TransGrid, Grid Operating Manual – OM 666, Restart of New South Wales System, 26/08/2014, page 38.

7. The Draft Standard seems to have been retrofitted to what restart sources is assumed to be available for each electrical sub network. For instance the Reliability Panel states that<sup>4</sup>:

*This is necessary because the values of Gmin and Tmin are based on the current mix of generation and transmission assets in the relevant electrical sub-network.*

The number of restart sources is not static as price signals and the terms associated with restart contracts may encourage new entrants or other existing plant to retrofit their facilities to provide restart services.

We believe that is a fundamental flaw of the draft standard as the key parameters of Gmin and Tmin are based on what restart sources are currently available for each electrical sub-network. This ignores the fact that the market is dynamic and therefore price signals plays an important role in eliciting new and/or retrofitted sources of system restart capability.

Instead, the standard should be set at a level (time and percentage of generation capability) which would achieve the SRAS Objective of minimising the economic cost of a major supply disruption.

8. Snowy Hydro is also concerned with a deterioration of the current standard by setting the draft standard as a percentage (20%) of average operational demand instead of 40% peak demand. The economic consequences of a major supply disruption are immense. For example, at a Value of Customer Reliability of \$40,000/MWh, and the NSW demand at 10,000MW, the economic cost of a black system event is \$400 million per hour. The social impact also would be immense with potential loss of life.
9. From Figure 6.5, as it stands AEMO claims it can meet the standard with 2 SRAS for NSW. As already highlighted in our submission this claim is being challenged by Market Participants. To allow for uncertainty in a total system black event which in all likelihood would be chaotic, some level of redundancy from additional SRAS is required to increase overall confidence that the restoration of the system can be done in a way that minimises the total economic cost of a market supply disruption.
10. Clause 3.11.7(b) of the Rules states:

*“AEMO must consult with the relevant Network Service Provider to identify and resolve issues in relation to the capability of any system restart ancillary service proposed to be provided by an SRAS Provider in an electrical sub-network to meet the system restart standard.”*

As highlighted by the Reliability Panel<sup>5</sup>: “This requires AEMO to consult with the relevant network service provider to resolve any issues in relation to the capability of the individual SRAS sources”. It is obvious that AEMO has only superficially consulted with the TNSPs with respect to the capability of SRAS to meet the system restart standard. This is evidenced by a presentation made by TransGrid at the 27<sup>th</sup> April 2016 Public Forum that showed that with the post 1<sup>st</sup> July 2015 SRAS procured

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<sup>4</sup> Review of System Restart Standard, Draft Determination, page 50

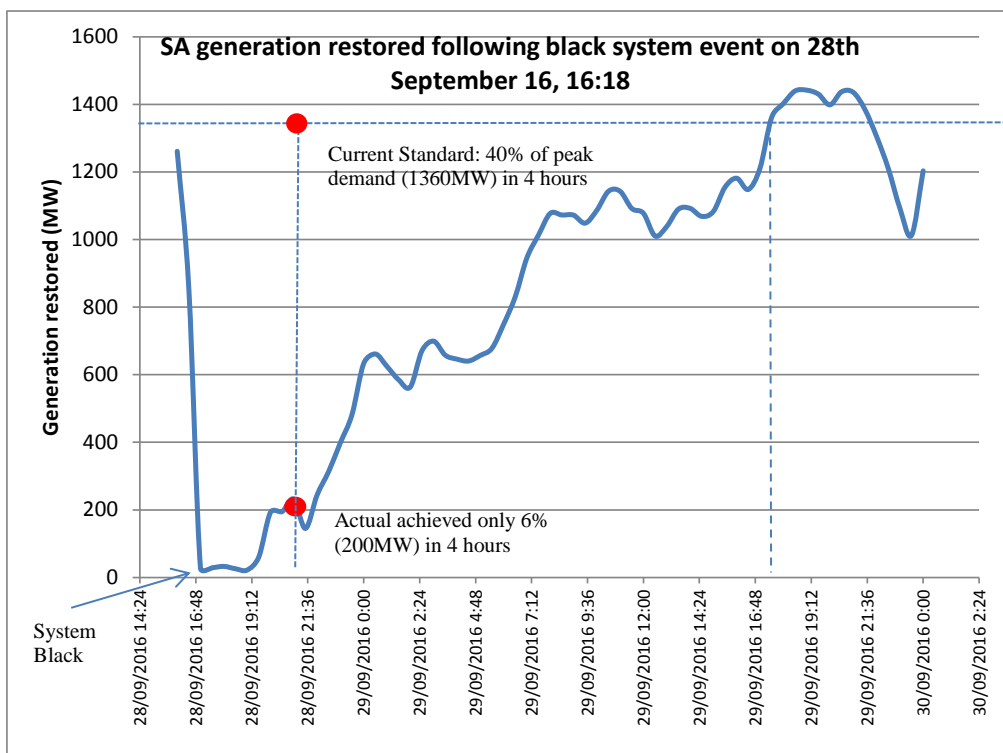
<sup>5</sup> Review of System Restart Standard, Draft Determination, page 81

for the NSW electrical sub-network, 40% of peak load could be met in around 7 hours and not 4 hours as claimed by AEMO.

We understand TransGrid’s latest stimulation results for the time period up to 4 hours after a NSW system black event only produces approximately 2800MW of restored on-line generation capacity. This is **over 3000 MW short** of the current standard of 40% of peak demand (5851MW) in 4 hours. If TransGrid’s modelling/stimulations are more accurate than those of AEMO’s stimulations, it would appear that AEMO is failing to meet the System Restart Standard for NSW.

The TNSPs have a thorough understanding of their transmission system and the operations that would be required to re-energise the system in the event of a system black. It is therefore worrying that AEMO has ignored the advice of this key group of Stakeholders.

11. It is clear that NSW should be two electrical sub networks instead of being the one (1) network with an additional requirement to source system restart from the north of Sydney.
12. Using the 28<sup>th</sup> September 2016 South Australian black system event as an illustrative proxy for the adequacy of AEMO’s restart procurement for South Australia, the figure below shows the generation restored for the region. The system restart standard is set at 40% of peak demand (1360MW) in 4 hours. From the figure, 40% of peak demand (1360MW) was restored in over 24 hours. This is a clearly an indication that the number of AEMO procured restart services (2 for South Australia) was grossly inadequate to meet the system restart standard.



Snowy Hydro appreciates the opportunity to respond to this Draft Determination. Should you have any enquires to this submission contact me on [kevin.ly@snowyhydro.com.au](mailto:kevin.ly@snowyhydro.com.au) or on 0407224439.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'K Ly', with a horizontal line underneath.

Kevin Ly  
Head of Wholesale Regulation