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Australian Energy Market Operator
Level 22, 530 Collins Street
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Submission by email at: SRAS2018@aemo.com.au

Consultation on SRAS Guideline Electrical Sub-network Boundaries & NSCAS Tender Guidelines

Snowy Hydro Limited is a producer, supplier, trader and retailer of energy in the National Electricity Market ('NEM') and a leading provider of risk management financial hedge contracts.

Snowy Hydro Limited appreciates the opportunity to provide feedback to AEMO's System Restart Ancillary Services (SRAS) Guidelines.

SRAS Description

The System Restart Standard provides that the reliability of any individual SRAS will incorporate the availability of that service, the expected start-up performance and the reliability of the transmission components between the SRAS source and the first transmission substation to which it is connected.

Snowy Hydro submits that the start-up performance of the SRAS source is the most critical element in the assessment of the overall reliability of an individual SRAS.

Snowy Hydro highlights that value of system restart sources decreases exponentially with decreasing start-up reliability. For instance, the following table shows the number of sources required to provide 99% reliability for start-up reliabilities ranging from 0.99% to 0.30%. The table also shows the relative value of each source.

Start-up Reliability of each source	Probability Source won't Start	Number of Sources required for 99% Reliability	Relative value of each source
0.99	0.01	1	100%
0.9	0.1	2	50%

0.8	0.2	2.87	35%
0.7	0.3	3.83	26%
0.6	0.4	5.03	20%
0.5	0.5	6.65	15%
0.4	0.6	9.02	11%
0.3	0.7	12.92	8%

Table 1: How start-up reliability affects that relative value of System Restart Sources

The table above demonstrates that the number of SRAS required to meet a 99% reliability target dramatically increases with decreasing start-up reliability.

In general, large thermal units need to be re-energised shortly after an outage/trip event to minimise the time required to get back on-line. This relationship is non-linear and beyond the first 30 minutes the time required to synchronise the generator plant exponentially increases. Snowy Hydro therefore believes start-up performance is the most important factor in determining the overall reliability of a system restart source because a SRAS plant with high overall availability but poor start-up performance when the restart source is required may adversely impact on the overall restoration program in a black system event. This was clearly evident by the failure of both restart sources in South Australia during its statewide blackout on the 28th September 2016.

This analysis illustrates that AEMO needs to critically consider amongst other considerations the effect of different SRAS start-up performance and its major impact on the individual reliability of a SRAS source in procuring the right amount of restart services to meet the SRAS objective.

SRAS tests

Snowy Hydro agrees with AEMO's assessment that the testing of SRAS capability is central to effective planning for the restoration process and to be effective, testing should simulate real event conditions as far as practicable.

AEMO proposes to conduct at least two SRAS tests in any financial year. This will include:

- One test conducted at a date and time nominated by the SRAS Provider, and agreed by AEMO.
- One test conducted when advised by AEMO on not less than 24 hours' notice, at a reasonable time having regard to market and system conditions.

The test with not less than 24 hours notice would be challenging in the NEM's current market environment with high levels of uncertainty due to variations in demand and increasing levels of intermittent generation. Snowy Hydro submits that while designing an appropriate test with short notice is possible, the opportunity costs associated with running these tests would be higher than tests with longer notice periods. Hence we believe SRAS Providers must be entitled to recover their opportunity costs associated with the 24 hour notice test.

The opportunity cost will vary across different SRAS Providers depending on the characteristics of the restart source, where it is located in the transmission network, and its exposure to financial contracts.

Snowy Hydro advocates that AEMO requests testing regimes which practically demonstrates that a restart source is able to energise an external network bus and/or energise an external load in its testing requirements. This requirement is consistent with the aim that testing should simulate real event conditions as far as practicable.

SRAS Assessment

Snowy Hydro notes the Reliability Panel's recommendations for change in its Final Determination on the System Restart Standard[1]:

> *AEMO explore avenues through which it might be able to increase engagement with key stakeholders, such as network service providers, in relation to its consideration of key elements relevant to its procurement of SRAS.*
>
> > *o The Panel is aware that some stakeholders consider that the current SRAS procured by AEMO may not comply with the current Standard. While AEMO is not obliged to consult with relevant stakeholders in relation to the level of SRAS it is procuring, the Panel considers that there is value in AEMO engaging with network service providers in relation to its assumption on restoration of generation and the transmission networks.*

Snowy Hydro advocates that AEMO implements these recommendations and has genuine engagement with all key stakeholders especially Transmission Network Service Providers who have intimate knowledge of the practicalities of switching transmission and distribution network elements.

Electrical Sub-Network Boundaries

[1] Reliability Panel, Final Determination - Review of the System Restart Standard, 15 December 2016, page vii.

Snowy Hydro notes that the System Restart Standard requires for New South Wales that there is an additional requirement for SRAS to be capable of restoring 500 MW of generation capacity (north of Sydney) within four hours of a major supply disruption with 75% reliability.

We understand the Reliability Panel made this recommendation in its review of the System Restart Standard because it did not have the remit to determine a new electrical sub-network boundary north of Sydney.

Snowy Hydro encourages AEMO to critically assess whether it is more appropriate for NSW to have two electrical sub-networks instead of relying on the additional requirement for a SRAS capable of restoring 500MW of generation capacity north of Sydney.

Snowy Hydro appreciates the opportunity to comment on the SRAS guidelines. For enquiries on this submission I can be contacted on kevin.ly@snowyhydro.com.au

Yours sincerely

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