

# The Draft System Restart Standard

## 1. Introduction

This System Restart Standard (standard) was determined by the Reliability Panel (Panel) in accordance with clauses 8.8.1(a)(1a) and 8.8.3 of the National Electricity Rules (Rules). The purpose of this standard is to provide guidance and set a benchmark to assist the Australian Energy Market Operator (AEMO) in procuring sufficient system restart ancillary services (SRAS) to meet the requirements of the National Electricity Market (NEM). This standard is effective from 1 July 2018.

## 2. Requirements of the standard

The requirements of the standard are specified in clause 8.8.3(aa) of the Rules, which states that (*italicised terms are defined under the Rules*):

“The system restart standard must:

1. be reviewed and determined by the *Reliability Panel* in accordance with the *SRAS Objective*;
2. identify the maximum amount of time within which *system restart ancillary services* are required to restore *supply* in an *electrical sub-network* to a specified level, under the assumption that *supply* (other than that provided under a *system restart ancillary services* agreement acquired by AEMO for that *electrical sub-network*) is not available from any neighbouring *electrical sub-network*;
3. include the aggregate required reliability of *system restart ancillary services* for each *electrical sub-network*;
4. apply equally across all regions, unless the Reliability Panel varies the system restart standard between electrical sub-networks to the extent necessary:
  - (a) to reflect any technical system limitations or requirements; or
  - (b) to reflect any specific economic circumstances in an *electrical sub-network*, including but not limited to the existence of one or more *sensitive loads*;
5. specify that a *system restart ancillary service* can only be acquired by AEMO under a *system restart ancillary services* agreement for one *electrical sub-network* at any one time;
6. include guidelines to be followed by AEMO in determining *electrical sub-networks*, including the determination of the appropriate number of *electrical sub-networks* and the characteristics required within an *electrical sub-network* (such as the amount of *generation* or *load*, or electrical distance between *generation centres*, within an *electrical sub-network*); and
7. include guidelines specifying the diversity and strategic locations required of *system restart ancillary services*.”

The Panel has detailed the factors that it considers in making its determination of the standard in its decision, “AEMC Reliability Panel 2016, System Restart Standard, Draft Report, 25 August 2016”. This draft determination explains how the Panel has reviewed and determined the standard in accordance with the SRAS objective. The Panel’s decision with respect to the other requirements of the standard in clause 8.8.3(aa) are outlined below.

### **3. Restoration timeframe**

For each electrical sub-network, AEMO shall procure SRAS sufficient to, following a major supply disruption, restore generation and transmission in that electrical sub-network such that supply<sup>1</sup> in that electrical sub-network is restored to the level set out in column 2 of Table 1 within the restoration time set out in column 3 of Table A.1.

The restoration timeframe represents the 'target time-frame' to be used by AEMO in the SRAS procurement process. It is not a specification of any operational requirement that should be achieved in the event of a major supply disruption.

### **4. Aggregate reliability of SRAS**

Aggregate reliability is the probability that the generation and transmission in a sub-network is expected to be restored to the specified level within the specified time. For each electrical sub-network, the required aggregate reliability shall meet or exceed the values shown in column 4 of Table A.1.

The reliability of any individual SRAS will incorporate the expected start-up performance and availability of that service.

The aggregate reliability of the procured SRAS in each electrical sub-network shall be determined by AEMO, considering the combination of the individual reliabilities of the SRAS procured in that electrical sub-network, together with an assessment of the impact of the points of failure set out in the guidelines for diversity in section 8 of the standard.

AEMO will determine the manner in which reliability will be assessed in accordance with the requirements in the Rules.

### **5. Applicability of the standard in electrical sub-networks**

This standard shall apply equally across all regions and electrical sub-networks, except as varied between electrical sub networks in Table 1 and set out below.

In addition, for the New South Wales electrical sub-network AEMO shall procure SRAS sufficient to also:

- re-supply and energise the auxiliaries of at least 500 MW of generation capacity north of Sydney within 1.5 hours of a major supply disruption with an aggregate reliability of at least 75%.

### **6. Use of SRAS in neighbouring electrical sub-networks**

A system restart ancillary service can only be acquired by AEMO under a system restart ancillary services agreement for one electrical sub-network at any one time.

### **7. Guidelines for the determination of electrical sub-networks**

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<sup>1</sup> Supply is defined in chapter 10 of the Rules as “the delivery of electricity”

AEMO shall determine the boundaries for electrical sub-networks without limitation by taking into account the following factors:

- the number and strength of transmission corridors connecting an area to the remainder of the power system;
- the electrical distance (length of transmission lines) between generation centres; and
- an electrical sub-network should be capable of being maintained in a satisfactory operating state to the extent practicable during the restoration process, and in a secure operating state from a stage in the restoration when it is practicable to do so, as determined by AEMO.

#### **8. Guidelines for assessing the diversity of services**

In determining the aggregate reliability of SRAS in an electrical sub-network, AEMO shall consider diversity of the services by taking into account the following guidelines:

- Electrical - diversity in the electrical characteristics shall be considered particularly with respect to whether there would be any single points of electrical or physical failure across the procured SRAS sources for each electrical sub-network;
- Geographical - diversity in geography shall be considered with respect to whether there would be any single points of failure related to the potential impact of geographical events such as natural disasters; and
- Energy Source - diversity in the energy source or fuel utilised by services shall be considered to account for any single points of failure across the procured SRAS sources for each electrical sub-network.

#### **9. Guidelines for the strategic location of services**

AEMO shall determine the strategic location of SRAS based on an assessment of how the geographical and electrical location of those services best facilitates the power system restoration. The locational value of SRAS relates to its ability to energise the transmission network and assist other generating units to restart. A strategic location for an SRAS may be either within or outside the electrical sub-network for which the service is procured.

**Table A.1 Time, Level and Aggregate Reliability by Electrical Sub-Network**

| <b>1. Electrical Sub-Network<sup>2</sup></b> | <b>2. Level of Restoration<br/>(% of Average Operational Demand<sup>3</sup>)</b> | <b>3. Restoration time (hrs)</b> | <b>4. Aggregate Reliability</b> |
|--|--|----------------------------------|---------------------------------|
| <b>North Queensland</b>                      | 45%  | 4.0                              | 90%                             |
| <b>South Queensland</b>                      | 25%  | 3.0                              | 90%                             |
| <b>New South Wales</b>                       | 20%  | 3.0                              | 90%                             |
| <b>Victoria</b>                              | 20%  | 3.0                              | 90%                             |
| <b>South Australia</b>                       | 25%  | 3.0                              | 90%                             |
| <b>Tasmania</b>                              | 30%  | 3.0                              | 90%                             |

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<sup>2</sup> The electrical sub-network boundaries are defined in the AEMOs 2014 SRAS Guideline.

<sup>3</sup> Operational Demand in a region is demand that is met by local scheduled generating units, semi-scheduled generating units, and non-scheduled intermittent generating units of aggregate capacity  $\geq 30$  MW, and by generation imports to the region. It excludes the demand met by non-scheduled non-intermittent generating units, non-scheduled intermittent generating units of aggregate capacity  $< 30$  MW, exempt generation (e.g. rooftop solar, gas tri-generation, very small wind farms, etc), and demand of local scheduled loads.