AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Non-market ancillary services cost and quantity report 2017-18

September 2018

An Annual Report required by the National Electricity Rules for the National Electricity Market

Important notice

PURPOSE

The purpose of this publication is to provide information about:

- The quantities and costs of system restart ancillary services (SRAS) and network support and control ancillary services (NSCAS) acquired by AEMO in the National Electricity Market (NEM) for the financial year 2017-18.
- The process AEMO followed in 2017-18 to acquire SRAS for subsequent financial years.

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ABBREVIATIONS

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
NEM	National Electricity Market
NLAS	Network Loading Ancillary Service
NMAS	Non Market Ancillary Services
NSCAS	Network Support and Control Ancillary Services
NER or Rules	National Electricity Rules
SRAS	System Restart Ancillary Services
TNSP	Transmission Network Service Provider
TOSAS	Transient and Oscillatory Stability Ancillary Service
VCAS	Voltage Control Ancillary Service

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1. Introduction

Ancillary services are essential to the management of power system security in the National Electricity Market (NEM), to facilitate orderly trading in electricity, and to ensure the supply is of acceptable quality.

AEMO acquires both market and non-market ancillary services.

- Market ancillary services are acquired through central dispatch and the prices are determined using the dispatch algorithm.
- Non-market ancillary services (NMAS) are acquired under bilateral contracts. There are two types of NMAS that AEMO may acquire: System Restart Ancillary Services (SRAS), and Network Support and Control Ancillary Services (NSCAS).

1.1 SRAS

SRAS can help restore electricity supply following a large-scale blackout of part or all of the power system. The Reliability Panel[1] is responsible for determining the system restart standard, which specifies the level of supply restoration for which AEMO is to procure system restart services. AEMO must use its reasonable endeavours to acquire sufficient SRAS for each defined electrical sub-network to meet the requirements of the system restart standard.

For the purposes of the matters covered by this report, two versions of the system restart standard are relevant:

- The system restart standard in place for 2017-18 was determined in August 2013 and remained in effect until 30 June 2018[2].
- The system restart standard applicable from 1 July 2018 was determined in December 2016[3].

1.2 NSCAS

NSCAS may be procured by Transmission Network Service Providers (TNSPs) to maintain power system security and reliability, and to maintain or increase the power transfer capability of the transmission network to maximise net economic benefits[4]. AEMO can also procure NSCAS as a last resort to prevent an adverse impact on power system security and reliability.

1.3 NMAS reporting

AEMO is required, under clauses 3.11.10 and 3.13.5(b) & (c) of the National Electricity Rules (NER), to report annually on specified matters relating to the NMAS it has acquired. This report includes:

- The number of SRAS acquired per NEM region and electrical sub-network in 2017-18 and for 2018-19.
- The total actual annual cost for provision of SRAS in 2017-18, broken down to charges for availability and use, for each electrical sub-network and each NEM region.
- The total estimated annual cost for provision of SRAS in 2018-19, broken down to charges for availability and use, for each electrical sub-network and each NEM region.

[1] The Reliability Panel is established under the National Electricity Law by the Australian Energy Market Commission (AEMC), and comprises representatives from the AEMC, AEMO, registered participants, and consumers. The Panel's responsibilities are specified in section 38 of the National Electricity Law and clause 8.8.1 of the NER.

[2] Available at https://www.aemc.gov.au/sites/default/files/content//System-Restart-Standard-Reliability-Panel.PDF.

[3] Available at https://www.aemc.gov.au/sites/default/files/2018-08/REL0057%20-%20Review%20of%20the%20System%20Restart%20Standard%20-%20Final%20Standard.pdf.

[4] For more information, see http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Ancillary-services/Network-support-and-control-ancillary-services-procedures-and-guidelines.

- Whether SRAS were acquired to a level that meets the system restart standard for each electrical sub-network.
- The process followed by AEMO in 2017-18 to acquire SRAS for 2018-19 onwards.
- The quantities and types of NSCAS covered under existing ancillary services agreements.
- The actual costs and quantities of each facility contracted to provide NSCAS under ancillary services agreements.

For more recent actual (weekly) cost data for non-market ancillary services, see the AEMO website[5].

2. System Restart Ancillary Services

2.1 Meeting the system restart standard

2.1.1 Meeting the system restart standard in 2017-18

The quantity of SRAS procured for 2017-18[6] was determined by AEMO in accordance with the August 2013 system restart standard and the SRAS Guidelines published by AEMO in September 2014. Table 1 shows the number of SRAS per electrical sub-network contracted throughout the 2017-18 financial year.

Table 1 Number of SRAS acquired per region and electrical subnetwork for 2017-18

Region	Electrical sub-network	Number of SRAS
Queensland (QLD)	QLD North	2
	QLD South	1
New South Wales (NSW)	NSW	2
Victoria (VIC)	VIC	2
South Australia (SA)	SA	2
Tasmania (TAS)	TAS	1
Total		10

For the 2017-18 year, AEMO acquired sufficient SRAS to meet the system restart standard for all electrical sub-networks. However, for completeness, AEMO notes that the actual availability of two services, as established by the terms of the relevant contracts, was less than 90%[7]. Although every SRAS has a contractual availability requirement of 90% or more, in 2017-18 that level was not achieved for one SRAS acquired for South Australia, and one for New South Wales.

2.1.2 Meeting the system restart standard in 2018-19

AEMO determined the quantity of SRAS procured for 2018-19 in accordance with the system restart standard applicable from 1 July 2018 published in December 2016 and the SRAS Guidelines[8] published by AEMO in

[5] See the AS Payments Summary file at http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Ancillary-Services/Ancillary-Services-Payments-and-Recovery.

[6] Under contracts with a term from July 2015 to June 2018, with options for two 1-year extensions.

[7] The relevant system restart standard required primary restart services to have a reliability of 90%.

[8] See https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Ancillary-services/System-restart-ancillary-services-guideline.

December 2017. Table 2 shows the number of SRAS per electrical sub-network contracted for the 2017-18 financial year.

Table 2 Number of SRAS acquired per region and electrical subnetwork for 2018-19

Region	Electrical sub-network	Number of SRAS
Queensland (QLD)	QLD North	2
	QLD South	2
New South Wales (NSW)	NSW	2
Victoria (VIC)	VIC	2
South Australia (SA)	SA	2
Tasmania (TAS)	TAS	2
Total		12

Based on the modelling undertaken, AEMO can confirm it has acquired sufficient SRAS to meet the applicable system restart standard for all electrical sub-networks for the financial year 2018-19.

2.2 Costs of SRAS

2.2.1 General

The annual cost of SRAS is based on an aggregation of payments to contracted providers for:

- Availability ($ per 30-minute trading interval).
- Testing (fixed amount per successful test).
- Usage (fixed amount if the service is used in the event of a blackout).

The availability cost may vary, as it is paid only when the service is available. For example, it is not paid when plant used by the SRAS is out of service, or when the SRAS fails a test under the contract. For cost estimation purposes, however, AEMO takes a conservative approach, assuming the plant has full availability for the whole year.

The testing charge is fixed in SRAS contracts. Up to and including 2017-18, each SRAS was required to undertake one annual test, but from 2018-19 more tests may be required[9]. Cost estimates for 2018-19 assume two testing charges will be payable for each SRAS.

Annual SRAS cost estimates also include 5% of the contracted usage charge for each SRAS, based on an assumption of one major supply disruption event every 20 years.

2.2.2 2017-18 SRAS costs

Table 3 shows a comparison of the estimated and actual costs for 2017-18.

The difference between the estimated and actual SRAS costs for 2017-18 is attributable to:

- Four SRAS tests payments were unpaid as of 30 June 2018. These test payments will be paid during the 2018-19 year.
- Services having less than full availability[10] due to outages and unsuccessful or uncompleted tests.
- No usage payments were made.

[9] This is dependent on the number of outages involving SRAS equipment. A post maintenance test is required for outages of seven days or more.

[10] Contract availability payments for 2017-18 have not yet been finalised.

Table 3 Comparison of 2017-18 estimated and actual SRAS costs

Sub-network	Number of SRAS	Estimated total cost	Actual total cost
QLD North	2	$3,377,893	$3,330,788
QLD South	1	$931,717	$681,353
NSW	2	$7,976,878	$6,353,899
VIC	2	$5,547,990	$5,472,280
SA	2	$1,926,882	$1,658,422
TAS	1	$3,443,107	$3,442,597
Total	10	$23,204,466	$20,939,339

2.2.3 2018-19 estimates and comparisons

Table 4 shows an estimated cost breakdown for the forthcoming year 2018-19.

Table 4 Estimated cost of SRAS for 2018-19 (new contracts)

Sub-network	Number of SRAS	Estimated availability[A] cost	Estimated testing cost	Estimated usage cost[B]	Total estimated cost
QLD North	2	$866,539	$966,000	$29,950	$1,862,489
QLD South	2	$3,854,225	$1,283,000	$314,975	$5,452,200
NSW	2	$10,161,600	$549,160	$15,900	$10,726,660
VIC	2	$6,832,450	$225,000	$29,800	$7,087,250
SA	2	$5,823,648	$165,258	$12,560	$6,001,466
TAS	2	$5,596,589	$433,200	$1,000	$6,030,789
Total	12	$33,135,050	$3,621,618	$404,185	$37,160,854

A. Assumes 100% availability for each service (this is conservative – likely to be less due to outages).
B. Usage charges are only incurred if the SRAS is required to provide black start capability following a major supply disruption. This estimated usage assumes of one event every 20 years (1/20th of the contracted usage charges).

2.2.4 Historical comparison of SRAS cost

Table 5 shows an historical comparison of SRAS cost for the period 2013-14 to 2018-19.

The difference between the 2017-18 actual costs and 2018-19 estimated costs is attributable to:

- Changes in the system restart standard, requiring additional or alternative services to be procured in some sub-networks to meet revised aggregate reliability levels and target restoration timeframes.
- Commercial outcomes of the SRAS procurement process undertaken by AEMO for 2018-19 onwards.
- An increase in testing costs reflecting the requirement for additional SRAS tests under the revised SRAS Guideline.
- Actual payments in 2017-18 being lower than estimated due to reduced availability, testing, and usage payments, as noted above.

Also, the actual costs for 2016-17 have been amended from the NMAS Cost and Quantities Report published in September 2017. The changes are attributable to:

- SRAS tests payments were unpaid as of 30 June 2017. These test payments were paid during the 2017-18 year.
- Availability adjustments due to unsuccessful tests.

Table 5 Comparison of SRAS costs from 2013-14 through to estimated costs for 2018-19

Sub-network	Actual costs 2013-14	Actual costs 2014-15	Actual costs 2015-16	Actual costs 2016-17	Actual costs 2017-18	Estimated costs 2018-19
QLD North	$1,353,428	$0	$3,054,940	$3,240,209	$3,330,788	$1,862,489
QLD Central	$2,670,050	$2,505,494	Qld North and Central regions merged			
QLD South	$2,417,756	$2,508,566	$888,240	$898,008	$681,353	$5,452,200
NSW North	$12,019,875	$11,848,415	New South Wales regions merged			
NSW South	$7,364,417	$7,580,205				
NSW			$7,303,799	$6,894,906	$6,353,899	$10,726,660
VIC North	$7,489,905	$8,215,237	Victorian regions merged			
VIC Latrobe Valley	$6,600,562	$6,771,223				
VIC			$5,320,851	$5,392,461	$5,472,280	$7,087,250
SA	$3,233,916	$3,470,570	$2,173,957	$1,589,134	$1,658,422	$6,001,466
TAS North	$7,025,706	$7,232,666	Tasmanian regions merged			
TAS South	$3,358,736	$3,468,402				
TAS			$3,336,148	$3,370,867	$3,442,597	$6,030,789
Totals	$53,534,351	$53,600,778	$22,077,936	$21,385, 585	$20,939,339	$37,160,854

2.3 The process for acquiring SRAS

Over the 2017-18 year, AEMO undertook a procurement process to acquire SRAS from 1 July 2018. The initial term of all SRAS contracts current in 2017-18 expired on 30 June 2018. While there was a contractual extension option, AEMO determined that in most cases the existing combination of SRAS would not be sufficient to meet the revised system restart standard. Only one existing contract was extended, for a service that was essential to meet the standard for the relevant sub-network.

For all remaining requirements, AEMO procured SRAS for the period commencing 1 July 2018-19, in accordance with the SRAS Guideline published in December 2017. A competitive tender process was followed for all electrical sub-networks other than Tasmania. As there is only one possible SRAS provider for Tasmania, AEMO directly requested offers from that provider.

The following is a summary of the procurement process undertaken after publication of the SRAS Guideline in December 2017:

- On 18 December 2017, AEMO issued invitations to tender (ITT) for the provision of SRAS from 19 generation facilities with established or potential black start capability. These included all known facilities in the mainland NEM that AEMO considered could contribute to meeting the system restart standard, and preferred facilities in Tasmania.
- Details of the tender were also published on AEMO's website.
- In response, AEMO received offers for 16 services.
- AEMO undertook power system modelling and other capability assessments of the proposed services together with related transmission network elements, in accordance with the SRAS Guideline.
- The modelling and capability assessments enabled AEMO to identify the combinations of offered services that it determined would be capable of meeting the system restart standard for each electrical sub-network.
- From those identified combinations, AEMO used the tendered SRAS prices to select the services that would meet the system restart standard at the lowest cost (consistent with the SRAS Procurement Objective in NER clause 3.11.7) and notified relevant providers in mid-April 2018.

- Following contract negotiations and AEMO Board approval, final contracts were executed with successful providers by 30 June 2018.

All new contracts are for a three-year duration, with options to extend by up to one year at AEMO's discretion, and up to a further year by agreement.

3. Network Support and Control Ancillary Services

3.1 Types, quantity, and cost of Network Support and Control Ancillary Services (NSCAS)

AEMO's NSCAS Description[11] contemplates three types of NSCAS:

1. Network Loading Ancillary Services (NLAS).
2. Transient and Oscillatory Stability Ancillary Services (TOSAS).
3. Voltage Control Ancillary Services (VCAS).

AEMO acquired VCAS under two existing contracts for the financial year 2017-18.

Table 6 summarises the quantities and costs of the services over the past six financial years.

Table 6 Quantities and cost of NSCAS over the period 2012-13 to 2017-18

Facility	Benefitting region	NSCAS service	Quantity	Cost 2012-13	Cost 2013-14	Cost 2014-15	Cost 2015-16	Cost 2016-17	Cost 2017-18
Combined Murray and Yass substations	NSW	VCAS	800 MVar[A]	Not procured	$3,195,62	$9,896,698	$10,055,572	$10,159,498	$10,375,519
Combined Murray and Tumut power stations	NSW	VCAS	1,650 MVAr[B]	$23,772,200	$41,301,706	$134,494	$171,797	$147,088	$3,842,236
Totals				$23,772,200	$44,497,327	$10,031,191	$10,227,368	$10,306,586	$14,217,755

A. The maximum capacity available from this service.
B. The maximum capacity used at any one time over the five years shown. Over the most recent year, 2016-17, the maximum was 105 MVAr.

The VCAS at Murray and Yass substations is based on a fixed quantity and cost per month.

The VCAS from Murray and Tumut Power Stations is based on an enabling charge per generating unit, which is payable for each trading interval when the service is enabled. The reason for the increase in the VCAS payment to the Murray Tumut Power Stations in 2017/18 is due to an increased number of network outages.

AEMO did not acquire any NLAS or TOSAS in 2017-18.

[11] Available at http://www.aemo.com.au/-/media/Files/PDF/0160-0102-pdf.pdf.