

Decision on the Australian Energy Market Operator's 2018-19 Ancillary Services Requirements

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Economic Regulation Authority

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Determination

1. The Economic Regulation Authority (ERA) has conducted its audit of the 2018-19 Ancillary Services requirements and plan determined by the Australian Energy Market Operator (AEMO).
2. The ERA's audit has confirmed that AEMO has complied with the Wholesale Electricity Market Rules (Market Rules) when determining the Ancillary Services requirements.
3. In accordance with clause 3.11.6 of the Market Rules, the ERA approves AEMO's 2018-19 Ancillary Services requirements. The approved requirements are set out in Table 1 below.

Table 1: Approved 2018-19 Ancillary Services requirements

Ancillary Service	Requirement
Load Following Services	± 72 MW
Spinning Reserve Services	70% of largest generator or network contingency resulting in loss of generation
Load Rejection Reserve Services	Up to 120 MW
Dispatch Support Service	Contracted Dispatch Support Services to 30 September 2018
System Restart Service	Three Facilities required in diverse network areas

Background

4. Ancillary Services are required to maintain power system security and reliability, facilitate orderly trading in electricity and ensure that electricity supplies are of acceptable quality. These services maintain key technical characteristics of the power system, including frequency and voltage.
5. AEMO is required to publish a report by 1 July each year. The report details Ancillary Services costs and quantities provided in the previous year and AEMO's requirements and plan for the coming year.
6. AEMO's Ancillary Services requirements and plan must be submitted to the ERA for audit and approval by 1 June each year. AEMO submitted its 2018-19 report to the ERA on 31 May 2018.
7. The Market Rules require the ERA to:
 - Audit and approve AEMO's determination of the Ancillary Services requirements, and the ERA may require AEMO to re-determine the requirements (Market Rule 3.11.6).

- Audit AEMO's determination of the Ancillary Services plan to meet the requirements, and the ERA may require AEMO to re-determine the plan (Market Rule 3.11.12). There is no approval requirement for the plan.

Audit Scope

8. The scope of the ERA's audit has been to assess:
- Whether the requirements and plan for 2018-19 comply with the relevant Market Rules and Market Procedures.
 - Whether AEMO addressed the recommendations from the ERA's 2017-18 determination.¹

AEMO's requirements and plan

9. AEMO is required to determine the requirements for each type of Ancillary Service. The 2018-19 requirements are those summarised in Table 1.
10. AEMO is also required to determine the plan to meet the requirements for each Ancillary Service type. Table 2 below summarises the procurement plan.

Table 2: AEMO's Ancillary Services plan for 2018-19

Ancillary Service	Summary of procurement plan for 2018-19
Load Following Services	Procured from LFAS Market
Spinning Reserve Services	42 MW supplied by long term interruptible load contract. 26 MW supplied from short term contracts. Remainder provided by Balancing Portfolio.
Load Rejection Reserve Services	Provided by Balancing Portfolio
Dispatch Support Service	AEMO is in discussions with Synergy, Western Power and the Public Utilities Office on the appropriate approach for maintaining security and reliability in the Kalgoorlie and Geraldton regions after 30 September 2018.
System Restart Service	Currently three contracts in place.

¹ Refer to the ERA's [2017-18 Audit and Approval report](#)

Compliance assessment

12. In carrying out its audit, the ERA has considered:

- (a) Whether AEMO has complied with Market Rule 3.11.4, which requires AEMO to determine the Ancillary Services requirements for all classes of Ancillary Services.
- (b) Whether AEMO has determined the requirements in accordance with the SWIS Operating Standards and the Ancillary Services Standards as required by Market Rule 3.11.1.
- (c) Whether AEMO has determined the requirements based on the facilities and configuration expected for the SWIS in the coming year as required by Market Rule 3.11.2.
- (d) Whether AEMO has determined the requirements in accordance with Market Rule 3.11.4 read in conjunction with Market Rule 3.11.5, which provides AEMO with discretion to determine the requirements according to location, take into account differing load levels, and vary by type of day and/or by time of day and/or vary across the year.
- (e) Whether AEMO has determined the Ancillary Services plan for each class of service as required by Market Rule 3.1.11(c).

13. The audit confirms that AEMO has complied with the non-discretionary requirements at (a), (b), (c) and (e) above.

14. For the discretionary requirement at (d), AEMO's requirements for services such as Spinning Reserve are variable (i.e. 70% of the largest contingency), but for services such as LFAS, a static requirement is set (i.e. +/- 72MW). AEMO's report states that it is monitoring an emerging challenge where it may require additional LFAS to be provided in real time during short-term periods of high variability in non-scheduled generation or rapidly changing levels of output from rooftop photovoltaic systems. In monitoring this challenge, AEMO should consider whether it is possible to develop varying LFAS requirements in future reporting periods.

AEMO's response to the ERA's 2017-18 recommendations

15. Last year the ERA made two recommendations in its determination on AEMO's 2017-18 Ancillary services requirements.² These recommendations together with AEMO's responses are discussed below.

Ancillary Services quantities

16. In the ERA's 2017-18 audit of the requirements it identified that the historical quantities reported for the Ancillary Services were significantly above the approved megawatt requirement for each of these services. AEMO's 2018-19 report also shows similar

² Refer to the ERA's [2017-18 Audit and Approval report](#)

levels of enabled quantities. For example, the 2017-18 requirement for LFAS was 72 MW for raise and lower services, whereas the average quantity enabled was 110 MW raise and 111 MW lower.

17. AEMO is required to report on the adequacy of the approved requirements and the amounts reported as being enabled are not a true indicator of this.
18. This is a concern for LFAS because the requirements determine the level that generators are compensated for this service. The ERA's 2017-18 audit and approval report therefore recommended AEMO investigate options to improve LFAS measurement.
19. AEMO's 2018-19 report provides greater clarity on the measurement issue. There are complexities in calculating what is provided for LFAS due to the way the Synergy Balancing Portfolio is dispatched. The Balancing Portfolio facilities do not receive dispatch instructions so there is no base point to distinguish between energy and Ancillary Services provided by these facilities.
20. Given the circumstances outlined in paragraph 19 above, AEMO can only report the quantities enabled from Balancing Portfolio facilities rather than the actual quantities deployed. These quantities reflect the operating range of two Balancing Portfolio facilities (approximately 78 MW each for LFAS raise and LFAS lower). The actual residual headroom, based on output, is assigned to either Spinning Reserve or Load Rejection Reserve subject to the ramping requirements of the generators. When combined with the typical provision of LFAS from outside the Balancing Portfolio (30 MW), it results in a quantity reported of greater than the 72 MW requirement.
21. Also contributing to the higher reported LFAS enablement quantities, is the relationship between LFAS and Spinning Reserve. LFAS raise quantities contribute to the Spinning Reserve quantities. In circumstances where a Balancing Portfolio facility's LFAS raise quantity has been used up then the amount of available Spinning Reserve may become lower than operationally required. Additional Balancing Portfolio facilities may be brought online to increase the available Spinning Reserve. If these facilities have the capability to provide LFAS then these facilities may also be included in the LFAS calculations.
22. Under individual facility bidding measurement of enablement quantities will no longer be a problem. In the interim, AEMO is currently replacing its energy management system and will explore the opportunity to enhance the enablement quantity calculation process.
23. AEMO engaged a consultant to undertake a study to more accurately estimate the LFAS requirement through modelling and statistical analysis. The modelling premise is that LFAS is a service balancing real-time electricity supply and demand. Imbalances result predominantly from differences between forecast and actual demand, including non-scheduled generation output. The consultant found that for 2017 data, the forecast error in a 10 minute time horizon was less than 78 MW for 99% of the time, consistent with the 72 MW LFAS requirement. Modelling of prior years' yielded similar results.
24. AEMO's 2018-19 report states that an emerging challenge is rapidly changing levels of output from rooftop photovoltaic systems and increases in non-scheduled generation capacity. These changes will need to be considered when estimating future years' requirements.

Frequency performance

25. Last year the ERA identified that AEMO's performance in managing system frequency was in excess of the standards. AEMO's 2018-19 report again shows frequency performance above the standards. The Technical Rules require frequency to be maintained in the normal range of 49.8 Hz to 50.2 Hz for 99% of the time. For the current 2017-18 reporting period, frequency remained in the normal range for 99.996% of the time.
26. Frequency performance above the standards combined with the higher enabled quantities could lead to the conclusion that more services are being enabled than are necessary to meet the standards. The ERA's 2017-18 determination report recommended AEMO investigate the drivers of this performance.
27. AEMO's report explains that the Technical Rule requirements for generators require settings that result in these generators responding to variations in frequency within the normal operating band. LFAS services are needed to return the frequency to 50 Hz. The Technical Rule generator settings work together with LFAS, significantly contributing to the frequency performance being above the standard.

Dispatch Support Services

28. AEMO's 2018-19 report states that the West Kalgoorlie and Mungarra generators the subject of the current Dispatch Support Services contract will be retired on 30 September 2018.
29. The ERA noted in its 2017-18 WEM Report,³ that at the time of writing AEMO and Western Power were investigating options for maintaining security and reliability in the Kalgoorlie and Geraldton regions. However, this remains unresolved as AEMO's 2018-19 report states that it is currently in discussions with Synergy, Western Power and the Public Utilities Office on the appropriate approach for maintaining power system security and reliability in these regions after 30 September 2018.
30. The approach for the Kalgoorlie and Geraldton regions will need to be resolved swiftly to ensure security and reliability in these regions is maintained after 30 September 2018. Any new Dispatch Support Services contract will require approval from the ERA.

Ancillary Services Costs

31. The total cost of Ancillary Services for 2017-18 is \$21 million more than 2016-17. Contributing to this increase is a \$15.6 million rise in LFAS costs and a \$5.2 million rise in Spinning Reserve costs.
32. For LFAS, the quantities have remained the same across the two years and the increase in costs is therefore driven by the prices offered by participants in the LFAS market.

³ Refer to [2016-17 WEM Report](#)

33. Spinning Reserve costs are derived from the margin values process.⁴ Margin values are applied to the balancing price and the volume of Spinning Reserve assumed in the margin values process.
34. Margin values increased from 24% and 35% in 2016-17 (peak and off-peak respectively) to 36% and 64% in 2017-18. For 2018-19, the margin values are 25% (peak) and 50% (off-peak), with the modelled quantities not materially different from previous years. The effect of the lower 2018-19 margin values on Spinning Reserve costs will be dependent on balancing prices for the period.

Conclusion

35. The ERA approves AEMO's 2018-19 Ancillary Service requirements as set out in Table 1. In making its determination the ERA considered:
- AEMO's historical performance in maintaining power system security and reliability.
 - That the requirements have been determined in accordance with the Market Rules and are consistent with previously approved levels.
 - That while AEMO has noted it will monitor emerging challenges such as rooftop photovoltaic systems, it has not forecasted any material changes taking place to the power system or the market in 2018-19 requiring a change to the Ancillary Services requirements.
 - That should there be a shortfall of any services, AEMO will need to reassess its requirements and seek the ERA's approval in compliance with Market Rule 3.11.6.
36. Following the emerging challenges noted in AEMO's report, the ERA recommends that AEMO consider future changes in demand from roof-top photovoltaic systems, and also increases in non-scheduled generation capacity when determining future year's requirements.
37. The ERA also recommends that AEMO keep it informed of its progress with replacing its energy management system and investigating the opportunity to improve the enablement quantity calculation process.

⁴ Refer to ERA determinations at https://www.erawa.com.au/electricity/wholesale-electricity-market/ancillary-services-parameters/spinning-reserve-margin_peak-and-margin_off-peak