Determination of the Ancillary Service Margin Peak and Margin Off-Peak parameters for 2016/17

Issues Paper

24 December 2015

Economic Regulation Authority
WESTERN AUSTRALIA

This document is available from the Economic Regulation Authority's website at www.erawa.com.au. For further information, contact:

Economic Regulation Authority
Perth, Western Australia
Phone: (08) 6557 7900

Disclaimer

Contents

Introduction

Synergy is currently the default provider of the Spinning Reserve Ancillary Service[1] under the *Wholesale Electricity Market Rules* (**Market Rules**). However, the Market Rules also allow other generators to provide such services through an Ancillary Service Contract, provided it is a less expensive alternative.[2]

The Ancillary Service Margin Peak and Margin Off-Peak parameters (**Margin Values**) are required under the Market Rules.[3] The Margin Values are applied to the Balancing Price to calculate the availability cost to be paid to Synergy for the provision of Spinning Reserve Ancillary Service.

The Market Rules[4] require the Australian Energy Market Operator (**AEMO**)[5] to submit a proposal for the Margin Values to the Economic Regulation Authority (**Authority**) by 30 November of the year prior to the start of the financial year.

AEMO[6] submitted its proposal on the Margin Values for the period from 1 July 2016 to 30 June 2017 on 27 November 2015.[7] AEMO engaged Jacobs Group (Australia) Pty Ltd (**Jacobs**) to assist in deriving the Margin Values and provided the Authority with a confidential report prepared by Jacobs on the key modelling assumptions used in deriving the Margin Values.

AEMO's proposal and Jacobs' public report are available on the Authority's website.[8]

The Market Rules[9] require that the Authority determine the Margin Values by 31 March 2016. The time period to which the determination applies is from 1 July 2016 to 30 June 2017.

In determining the Margin Values, the Authority must take into account the Wholesale Market Objectives and the proposal submitted by AEMO. It is also required to undertake a public consultation process, which must include publishing an issues paper and issuing an invitation for public submissions.[10] The Authority has prepared this issues paper to assist interested parties in making submissions on the proposed Margin Values for the 2016/17 financial year, as submitted by AEMO.

---

1 Spinning reserve is reserve that is synchronised to the system and that can respond almost immediately and provide frequency or voltage support for a short duration.

2 Clause 3.11.8(b) of the Market Rules.

3 Clause 9.9.2.

4 Clause 3.13.3A(a).

5 Market operation functions were transferred from the Independent Market Operator to AEMO on 30 November 2015.

6 The Margin Values proposal was provided by the Independent Market Operator as market operation functions were not transferred from the Independent Market Operator to AEMO until 30 November 2015.

7 Jacobs' 2016/17 Margin Peak and Margin Off-Peak Review confidential final report (23 November 2015) is included as an attachment to AEMO's proposal of the Margin Values.

8 See ERA website, Spinning Reserve (Margin_Peak and Margin_Off-Peak), http://www.erawa.com.au/electricity/wholesale-electricity-market/determinations/ancillary-services-parameters/spinning-reserve-margin_peak-and-margin_off-peak

9 Clause 3.13.3A.

10 Required by clause 3.13.3A(b) of the Market Rules.

Invitation to make submissions

Interested parties are invited to make submissions on the Authority's issues paper by **4:00 pm (WST) Monday, 1 February 2016** via:

Email address: publicsubmissions@erawa.com.au

Postal address: PO Box 8469, PERTH BC WA 6849

Office address: Level 4, Albert Facey House, 469 Wellington Street, Perth WA 6000

Fax: 61 8 6557 7999

CONFIDENTIALITY

In general, all submissions from interested parties will be treated as being in the public domain and placed on the Authority's website. Where an interested party wishes to make a submission in confidence, it should clearly indicate the parts of the submission for which confidentiality is claimed, and specify in reasonable detail the basis for the claim. Any claim of confidentiality will be considered in accordance with the provisions of section 55 of the *Economic Regulation Authority Act 2003*.

The publication of a submission on the Authority's website shall not be taken as indicating that the Authority has knowledge either actual or constructive of the contents of a particular submission and, in particular, whether the submission in whole or part contains information of a confidential nature and no duty of confidence will arise for the Authority.

General Enquiries
Holly Medrana
Economic Regulation Authority
Ph: 08 6557 7900
records@erawa.com.au

Media Enquiries
Tracy Wealleans
Economic Regulation Authority
Ph: 08 6557 7900
records@erawa.com.au

Proposed Margin Values

Under the Market Rules, Synergy is the default provider of Spinning Reserve Ancillary Services. The Margin Values[11] determined by the Authority are used to calculate the total payment to Market Participants for providing Spinning Reserve Service in a Trading Interval.[12]

The Market Rules require the Margin Values to take account of:

- the margin Synergy could reasonably have been expected to earn on energy sales forgone due to the supply of spinning reserve service; and
- the loss in efficiency of Synergy's scheduled generators that System Management has scheduled to provide spinning reserve service that could reasonably be expected due to the scheduling of those reserves.

In making its determination, the Authority is required to take into account the Wholesale Market Objectives and the proposal submitted by AEMO.

Table 1 below shows AEMO's proposed Margin Values for 2016/17, compared with the approved Margin Values for 2015/16. The table also shows other parameters used in deriving the Margin Values.

The Margin Values and other parameters used in deriving the Margin Values are estimates from Jacobs' modelling, which is discussed further below.

Table 1 Margin Values and other parameters used in deriving the Margin Values

Margin Values	Proposed 2016/17	Current 2015/16
Margin Off-Peak (%)	35	51
Margin Peak (%)	24	36
Average Annual Spinning Reserve Capacity_Off-Peak (MW)[13]	191.9	178.4
Average Annual Spinning Reserve Capacity_Peak (MW)[14]	218.1	208.8
Estimated Annual Availability Cost ($M)	10.55	8.32
System Marginal Price_Off-Peak ($/MWh)	36.17	32.98
System Marginal Price_Peak ($/MWh)	52.97	47.23

[11] Expressed as a percentage.

[12] Clause 9.9.2(f) provides the total payment to all Market Participants for Spinning Reserve Service in Trading Interval(t) is calculated as: SR_Availability_Payment(t) = 0.5 x Margin(t) x Balancing_Price(t) x max(0, SR_Capacity(t) – LF_Up_Capacity(t) – Sum(c e CAS_SR,ASP_SRQ(c,t))) + Sum(c e CAS_SR,ASP_SRPayment(c,m) / TITM))

[13] The Average Annual Spinning Reserve Capacity refers to the Spinning Reserve Capacity requirement, which is dynamic in each Trading Interval and is set by the dispatch profile in Jacobs' model.

[14] The Average Annual Spinning Reserve Capacity refers to the Spinning Reserve Capacity requirement, which is dynamic in each Trading Interval and is set by the dispatch profile in Jacobs' model.

The proposed Margin Values[15] for 2016/17 are lower than those approved for 2015/16.[16] Margin Peak has decreased from 36 percent to 24 per cent, and Margin Off-Peak has decreased from 51 per cent to 35 per cent.

This change is driven by a higher modelled average Balancing Price and a greater contribution to Spinning Reserve provided by Load Following Ancillary Service. However, the estimated total availability cost to be paid to Synergy is higher in 2016/17, reflecting an increase in the quantity of Spinning Reserve expected to be obtained from Synergy.

Jacobs' report notes the key factors contributing to the proposed Margin Values, as set out below.[17]

Greater contribution to Spinning Reserve through Load Following raise

It has been assumed NewGen Kwinana combined cycle gas turbine (**CCGT**) will contribute to Spinning Reserve indirectly through the Load Following raise in 2016/17, which was not the case in 2015/16. Jacobs notes this is a relatively cheap source of Spinning Reserve that displaces Spinning Reserve that would otherwise have to be provided by Synergy at a greater unit cost. NewGen Kwinana CCGT was not included in 2015/16 as its frequency response functionality had been turned off. Its owner has advised its intention to activate the frequency response functionality of the CCGT by 1 July 2016, and therefore the unit will be capable of providing Spinning Reserve indirectly through its provision of Load Following Ancillary Service in 2016/17.

Higher Balancing Price

The Worsley cogeneration unit is expected to retire in 2016/17, which has led to a general increase in the forecast Balancing Price due to more expensive generation being dispatched. This increase in Balancing Price results in an increase in the 'foregone profit' component of Synergy's availability cost. However, a higher Balancing Price flows through to a lower Margin Value needed to produce the required Availability Payment for a given quantity of Spinning Reserve.

Increased availability cost

- The dispatch model underlying the proposed Margin Values, shows the Kemerton unit is required to reduce generation in peak periods to provide Spinning Reserve, particularly when energy prices are high, and therefore foregoing higher profits as a result.

- In contrast, the dispatch model shows the Pinjar C&D units are required to increase generation in the peak periods, incurring higher generation costs, and also increase generation in the off-peak periods, incurring more start-up costs and increased generation costs.

[15] Margin Peak and Off-Peak in percentages.

[16] See ERA website, Jacobs' *2016/17 Margin Peak and Margin Off-Peak Review* public final report (26 November 2015), http://www.erawa.com.au/electricity/wholesale-electricity-market/determinations/ancillary-services-parameters/spinning-reserve-margin_peak-and-margin_off-peak

[17] Jacobs' 2016/17 Margin Peak and Margin Off-Peak Review public final report (26 November 2015) p. 30.

- The Interaction Cost[18] has increased from $1 million in the simulations for 2015/16, to $1.7 million in the simulations for 2016/17, which has led to an increase in availability cost. The increase has occurred due to changes in the supply-demand balance in the system, with the removal of the Worsley cogeneration unit, and to a lesser extent, the Geraldton GT unit, which has been decommissioned for 2016/17.[19]

Increased Spinning Reserve requirement

The average Spinning Reserve requirement has increased in both peak and off-peak periods because Collie is running at a higher overall capacity factor to partly fill the gap left by the Worsley cogeneration unit.[20] When Collie (which has the highest output in the system) turns up, the Spinning Reserve requirement increases in that interval.[21]

Expiry of Spinning Reserve contracts

AEMO has advised that expiry of the 13MW Bluewaters Spinning Reserve contract and 13MW SIMCOA interruptible load contract on 30 June 2016 have led to an increase in the quantity of Spinning Reserve provided by Synergy in 2016/17.

The Authority invites public submissions from interested parties on the proposed Margin Values for the 2016/17 financial year.

Modelling of the Margin Values

To determine the appropriate Margin Values, AEMO commissioned Jacobs to firstly calculate the availability cost that could reasonably be expected to be incurred by Synergy for providing Spinning Reserve.[22] In order to estimate the availability cost, Jacobs undertook market simulations that compare the revenue and generation cost outcomes with and without the provision of Spinning Reserve, and also with and without provision of Load Rejection Reserve.

Jacobs also took into account the impact of Load Rejection Reserve[23] in its calculation, to ensure that only the cost of Spinning Reserve was being included in calculating the Margin

[18] The Interaction Cost is the difference in cost between providing both Spinning Reserve and Load Rejection Reserve and providing each reserve separately.

[19] The requirement for Synergy to provide Load Rejection Reserve given the removal of the Worsley Cogeneration and Geraldton GT units further constrains the operation of Synergy's plants and increases the availability cost.

[20] The Worsley cogeneration unit is expected to retire in 2016/17 and has been removed from Jacobs' modelling.

[21] Clause 3.10.2 of the Market Rules specify the standard for Spinning Reserve Service must be at a level sufficient to cover the greater of 70% of the total output, including Parasitic Load, of the generation unit synchronised to the SWIS with the highest total output at that time; and the maximum load ramp expected over a period of 15 minutes.

[22] Compared to the 2015/16 review of the Margin Values, inputs assumptions related to demand have been updated to reflect the expected values for the 2016/17 financial year.

[23] Load Rejection Reserve is the service of holding capacity associated with a Scheduled Generator or Dispatchable Load in reserve so that the Scheduled Generator can reduce output rapidly or the Dispatachable Load can increase consumption rapidly in response to a sudden decrease in SWIS load.

Values. Jacobs considers that there is an interaction between the cost of providing Spinning Reserve and the cost of providing Load Rejection Reserve, with the cost of providing both forms of reserve being higher (or lower) than the sum of providing each reserve separately. Jacobs labelled the difference between these two quantities as the Interaction Cost.

Jacobs consulted with AEMO and determined that the availability cost of providing Spinning Reserve should be the base availability cost[24] plus the Interaction Cost of providing both Spinning Reserve and Load Rejection Reserve, allocated proportionally to the average level of Spinning Reserve[25] required relative to the sum of the Spinning Reserve and Load Rejection Reserve requirements. Jacobs calculated the availability cost for providing Spinning Reserve using the following equation.

Availability cost for providing SR =

Base availability cost for providing SR[26] + (Interaction Cost[27] * SR Proportion[28])

Jacobs' report states that the availability cost is calculated in its model by simulating the power system as it currently operates (i.e. with Spinning Reserve being provided) and comparing those outcomes to a counterfactual case (i.e. where Spinning Reserve is not provided). The difference in Synergy's generation costs between the two cases addresses Synergy's loss in efficiency. Synergy's loss of revenue is calculated as the difference in Synergy's generation multiplied by the price from the simulation including reserve provision. The price is the market price, with Spinning Reserve requirements being met and energy demand being satisfied.

In order to assess the availability cost that could reasonably be expected to be incurred by Synergy, Jacobs compared revenue and generation cost outcomes from four market simulations, with and without provision of Spinning Reserve, and also with and without provision of Load Rejection Reserve. The following equation is used in Jacob's modelling for the base availability cost for providing Spinning Reserve.

The cost for Load Rejection is determined by the Authority every three years and the determined cost has been nil since market commencement. The cost for Load Rejection for the review period 2016/17 to 2018/19 will be determined by the Authority in March 2016.

[24] Base availability cost is the availability cost of providing Spinning Reserve only, with no provision of Load Rejection Reserve.

[25] Jacobs' model determines a Spinning Reserve requirement for every interval. As Jacobs is apportioning a 'total cost' it is apportioned using the average of the Spinning Reserve requirement over all relevant intervals.

[26] Base availability cost is the availability cost of providing Spinning Reserve only, with no provision of Load Rejection Reserve.

[27] Interaction Cost = Availability cost (Spinning Reserve given Load Rejection Reserve) – Availability cost (Spinning Reserve only) - Availability cost (Load Rejection Reserve only)

[28] SR Proportion = Average Spinning Reserve provision / (Average Spinning Reserve provision + Average Load Rejection Reserve provision)

Base availability cost for providing SR =

Synergy's total generation costs, with reserve provision for the set of reserve service(s)

– Synergy's total generation costs, without any reserve provision for the set of reserve service(s) apart from Load Following

\+ (Synergy's total generation volume, without any reserve provision for the set of reserve services apart from Load Following

– Synergy's total generation volume with reserve provision for the set of reserve service(s))

* System marginal price with reserve provision for the set of reserve service(s)

Having determined the availability cost for providing Spinning Reserve, average annual spinning reserve capacity amount for peak and off-peak periods, and the system marginal price for peak and off-peak periods through market simulations, Jacobs re-arranged the equation in clause 9.9.2(f)[29] of the Market Rules to derive the Margin Values.[30]

This method is described in Jacob's 2016/17 Margin Peak and Margin Off-Peak Review – public final report, which is published on the Authority's website.[31]

As part of the Margin Values determination for the 2016/17 financial year, the Authority intends to examine Jacobs' modelling approach in deriving the Margin Values to ensure Jacobs' approach is appropriate and the modelled Margin Values reflect the requirements under the Market Rules.

The Authority invites public submissions from interested parties on the methodology used by Jacobs in its modelling to derive the Margin Values for the 2016/17 financial year.

[29] Clause 9.9.2(f) provides the settlement equation to be used in calculating spinning reserve payment to be paid to Synergy.

[30] Margin(t) = (SR_Availability_Payment(t) – Sum(c e CAS_SR,ASP_SRPayment(c,m) / TITM)) / (0.5 x Bal_Price(t) x max(0, SR_Capacity(t) – LF_Up_Capacity(t) – Sum(c e CAS_SR,ASP_SRQ(c,t))))

[31] See ERA website, Jacobs' *2016/17 Margin Peak and Margin Off-Peak Review* public final report (26 November 2015), http://www.erawa.com.au/electricity/wholesale-electricity-market/determinations/ancillary-services-parameters/spinning-reserve-margin_peak-and-margin_off-peak