Addendum to the margin values and cost_LR 2021/22 issues paper

12 March 2021

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Invitation to make submissions

Submissions are due by 4:00 pm WST, Tuesday 23 March 2021

The ERA invites comment on this paper and encourages all interested parties to provide comment on the matters discussed in this paper and any other issues or concerns not already raised in this paper.

We would prefer to receive your comments via our online submission form https://www.erawa.com.au/consultation

You can also send comments through:

Email: publicsubmissions@erawa.com.au
Post: PO Box 8469, PERTH BC WA 6849

Please note that submissions provided electronically do not need to be provided separately in hard copy.

All submissions will be made available on our website unless arrangements are made in advance between the author and the ERA. This is because it is preferable that all submissions be publicly available to facilitate an informed and transparent consultative process. Parties wishing to submit confidential information are requested to contact us at info@erawa.com.au.

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1. Introduction

On 9 February 2021, the Economic Regulation Authority published the margin values and Cost_LR 2021/22 issues paper, as part of its annual process to determine the value of some system support services for the Wholesale Electricity Market.[1]

Since publishing the issues paper, the ERA has received additional information indicating that the market is changing more quickly and more markedly than the ERA had expected. This has increased the forecast cost of spinning reserve from the level indicated in the issues paper. Forecast spinning reserve costs for 2021/22 are $6.5 million, up from a forecast of $80,000 in the issues paper. Forecast load rejection reserve costs for 2021/22 are $7.3 million, $1.3 million lower than the $8.6 million forecast in the issues paper. The combined spinning reserve and load rejection reserve forecast cost for 2021/22 is $13.9 million, compared to $9.6 million in 2020/21.[2] The market dynamics driving the changes in forecast costs are outlined in this paper.

The ERA is publishing this addendum to the issues paper to allow for further consultation before the ERA determines ancillary service parameters on 31 March 2021.

1.1 Background

Ancillary service parameters approved by the ERA are used to compensate Synergy for providing spinning reserve and load rejection ancillary services, and for any generators that provide system restart services. Spinning reserve and load rejection reserve are complementary but opposite ancillary services used to maintain system frequency when there is a sudden loss of supply or demand. This can happen when generators fail, or parts of the electricity network become disconnected. The system restart service is needed when the electricity system or parts of the system are subject to widespread blackout.

The issues paper outlined how changing market outcomes were influencing the cost of the spinning reserve and load rejection reserve ancillary services.

The installation of rooftop solar is reducing demand for electricity from the network during the middle of the day. In response, Synergy's larger coal generators reduce their output, which limits how much further the generators can lower output to provide a load rejection service without dropping below their minimum stable level of generation. In the issues paper, the ERA identified that in 2021/22, AEMO will need to schedule more gas generators to provide the load rejection service. Gas generators generally have a higher operating cost than Synergy's coal generators, so using more gas drives up the forecast cost of load rejection.

In the issues paper, the ERA forecast spinning reserve costs that were lower than previous determinations. During the middle of the day when Synergy's larger generators lower their output this can also reduce the quantity of spinning reserve required. In addition, the cost of spinning reserve was forecast to be lower than in previous years because generators providing load following and load rejection reserve services could also provide some spinning reserve service. Therefore, fewer generators needed to be scheduled out of merit to provide spinning reserve, lowering spinning reserve costs.

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1 ERA, 2021, *Ancillary service costs – Spinning reserve, load rejection reserve and system restart (Margin values and Cost_LR) for 2021/22 issues paper*, (online)

2 The ERA approves margin values, the share of the balancing price paid to Synergy to compensate for the margin Synergy could reasonably have expected to earn on energy sales were it not providing spinning reserve, spinning reserve quantities and load rejection reserve costs.

2. Market dynamics

An important consideration in determining the quantity of ancillary services required in the South West Interconnected System is the availability of renewable generators such as solar and wind farms. When, and how much, renewable energy is available has a substantial effect on electricity market outcomes.

The presence of low-cost renewable electricity in the market and the reduction in demand for electricity from the network during the middle of the day is helping to lower average balancing prices when compared to previous years.[3] However, the weather-dependent and variable output from renewable generators requires additional ancillary services to be available to maintain power system security.

Since publishing the issues paper, the ERA has:

- Considered the effect of AEMO's increase in spinning reserve quantity and proposed increase in load following ancillary service (LFAS) quantities on the forecast costs of spinning reserve.
- Investigated how the introduction of the Generator Interim Access (GIA) arrangement constrains the output of wind farms and affects forecast ancillary service quantities and costs.
- Used updated market and generator data to forecast spinning reserve and load rejection reserve costs.

Revised spinning reserve and load rejection reserve cost forecasts are provided in section 3. The ERA asks stakeholders to consider the information in this addendum along with the issues paper when preparing submissions.

2.1 Increased ancillary service requirements

2.1.1 Spinning reserve quantity

In January 2021, AEMO advised that it has increased the quantity of spinning reserve in some intervals by an additional 70 MW to 130 MW.[4] AEMO's analysis of the power system following the loss of a generator or transmission line identified that additional spinning reserve is required when the 330kV transmission line running north of Perth fails, disconnecting the Badgingarra, Yandin, Beros Road and Warradarge wind farms and the scheduled generators on the same line. AEMO advised the ERA that network faults on this line create changes to the power quality (either the frequency, the rate of change in frequency, or voltage deviations) in the network that induce some of the rooftop solar fleet to disconnect. The momentary loss of rooftop solar increases demand for electricity from the network. AEMO must have sufficient spinning reserve available so that the generators providing the spinning reserve service can increase their output to meet the additional demand.

3 ERA, 2020, *Report on the Effectiveness of the Wholesale Electricity Market*, PP 55-62, (online)

4 For 2020/21 the modelling outcomes the ERA used for determining margin values forecast average spinning reserve quantities of 252 MW for peak periods and 240 MW for off-peak periods so the additional spinning reserve requirement identified by AEMO in January 2021 is an increase in the maximum spinning reserve requirement in some intervals of between 30 per cent and 50 per cent.

AEMO also provided a submission in response to the issues paper that explained the reasons for the increase in the spinning reserve requirement in more detail.[5]

The additional spinning reserve contingency caused by rooftop solar disconnecting increases the overall requirement for spinning reserve at the time the market is at its least flexible. This happens in the middle of the day when rooftop solar generation output is at its highest and demand for electricity from the network is lowest, and balancing market prices are at a minimum. In the middle of the day, the output from large generators such as Collie or Muja is expected to be low as these plants will reduce output as demand falls.

Large coal generators are unable to quickly increase output to provide spinning reserve, and AEMO needs to schedule additional generators to cover the higher spinning reserve contingency; generally these are gas plant and, to a lesser degree, coal facilities. During these periods, the out-of-merit costs for spinning reserve are at their maximum. This is because when balancing prices are low, the difference between the cleared balancing market price and the marginal cost of out-of-merit generation scheduled on, will be higher.

Compared to the issues paper forecasts, the spinning reserve forecast quantity and the forecast cost have increased as explained above. However, forecast load rejection reserve costs may also increase. As additional gas-fired generation is brought online to provide spinning reserve, those generators can only provide load rejection reserve to the level of their minimum safe generation. Therefore, more out-of-merit generation maybe required to provide both the spinning reserve and load rejection reserve requirements.

2.1.2 Load following ancillary service quantity

Each year, AEMO proposes and the ERA approves the quantities of ancillary services for the next financial year.[6] In late January 2021, AEMO staff informally advised the ERA that AEMO may increase LFAS quantities to a range of 106 MW to 120 MW for daytime periods as part of the ancillary service requirements proposed for 2021/22.[7] AEMO suggested the increase was linked to variability in the output of rooftop solar and advised that it will conduct additional analysis before finalising its LFAS proposal.

The ERA has included the revised LFAS requirement in the modelling underlying the determination of ancillary service costs because the higher LFAS requirement covers the same period as the spinning reserve and load rejection reserve forecast.

The higher 'upwards LFAS' and lower quantities during daylight periods offsets some of the increased cost resulting from the additional spinning reserve requirement. However, the additional 23 MW of 'upwards LFAS' does not fully offset the additional (up to) 130MW of spinning reserve needed to cover the rooftop solar contingency.

2.2 Wind availability

When the ERA published the issues paper, there was limited information available on constraints affecting the output of wind farms connected under the generator interim access

5 AEMO, 2021, *Submission on issues paper: Ancillary service costs – spinning reserve, load rejection reserve and system restart (margin values and Cost_LR) for 2021/22*, (online)

6 ERA, 2020, *Approval of revised 2020/21 LFAS Ancillary Service Requirement*, (online)

7 AEMO did not consider it would need additional LFAS overnight.

arrangement (GIA).[8] Subsequent discussions with Western Power and AEMO on the application of the GIA tool identified the times and conditions when the wind farms connected to the 330kV transmission line north of Perth were most likely to be constrained. Wind farms can be constrained when the scheduled generators connected to the same area of the network are generating. The scheduled generators are peaking generators and tend to generate in the afternoon ramp period and not necessarily overnight when the combined output of the wind farms is at a maximum.

The greater output from wind farms overnight means more demand can be met by this low-cost renewable generation, depressing balancing prices. There is less demand to be met by large coal generators that reduce their output in response. Consequently, the large coal generators have less room to further reduce output and provide load rejection reserve. Again, generation needs to be scheduled out-of-merit to maintain the load rejection reserve requirement. When there is a large difference between the low overnight balancing price and the high marginal cost of a generator scheduled out of merit, the cost is allocated to ancillary services and compensated through the ancillary service parameters determined by the ERA.

2.3 Updated generation information

The ERA asked generators to provide information to inform the modelling the ERA undertakes as part of the determination on forecast spinning reserve and load rejection reserve costs.

In mid-January, Alinta provided updated fuel costs to inform the ERA's modelling. In late February, Synergy provided revised physical generation parameters such as plant efficiency (heat rates), operation costs and maintenance costs for most of its facilities. The data from both generators arrived after the ERA had conducted the modelling underlying the issues paper.

Collectively, these generators comprise a substantial share of market generation. The modelling informing the forecast ancillary service costs in the addendum includes this updated information.

[8] Western Power has allowed generators to connect to its network under generator interim constrained access arrangement (GIA) in advance of the transition to a fully constrained access arrangement. Generators connecting through this mechanism are able to forego the deep connection costs needed to upgrade the network to manage the unconstrained output of a generator. The consequence is generators connect on the understanding that at certain times and under some conditions, the output of the generator will be constrained.

3. Revised forecast costs for spinning reserve and load rejection reserve in 2021/22

The margin values and cost_LR 2021/22 issues paper described how market dynamics were influencing the forecast cost of spinning reserve and load rejection reserve costs. The addendum suggests market dynamics are changing ancillary service quantities and costs faster and to an even greater degree than the ERA anticipated in the issues paper.

The availability of large quantities of renewable generation, rooftop solar in the middle of the day and wind from midnight to dawn is lowering balancing prices at these times. In response, the large coal plants are reducing their output, which gives them less room to provide some ancillary services. To maintain the ancillary service requirements AEMO needs to schedule generation out of the balancing merit order. With low balancing prices and higher marginal cost plant providing ancillary services out of merit order, the greater the cost that needs to be met through ancillary service payments.

Table 1: Revised modelled ancillary service values

Parameter		AEMO proposed values for 2021/22[9]	ERA issues paper forecasts for 2021/22[10]	Addendum forecasts for 2021/22
Balancing market price ($/MWh)	Peak	40.47	18.33	20.51
	Off-peak	37.36	25.25	25.07
Availability cost of spinning reserve ($'000s)	Peak	5,042	33	3,040
	Off peak	3,353	47	3,494
	Total	8,395	80	6,534
Spinning reserve requirement (MW)	Peak	252	172	240
	Off peak	240	164	241
Availability cost of load rejection reserve ($'000s)	Peak	274	6,076	4,331
	Off peak	893	2,541	3,055
	Total	1,167	8,617	7,386
Combined total availability cost for spinning reserve and load rejection reserve	Total	9,562	8,697	13,920

Source: ERA and AEMO modelling

Note: ERA issues paper forecasts assumed third party participation in the provision of spinning reserve.

9 AEMO, 2020, *Margin values and Cost_LR parameters for the 2021/22 financial year*, P. 3, (online). These values are the same as the values used in the ERA's determination of margin values and load rejection reserve in 2020/21.

10 ERA, 2021, *Ancillary service costs – Spinning reserve, load rejection reserve and system restart (Margin values and Cost_LR) for 2021/22 issues paper*, P. 29, (online)

The forecast spinning reserve and load rejection reserve costs in the addendum are based on the latest available market and generator data. The ERA is yet to decide how to determine margin values that are consistent with the spinning reserve availability cost forecast.