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Ms Sara O'Connor
Economic Regulation Authority
PO Box 8469
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Dear Ms O'Connor

SPINNING RESERVE, LOAD REJECTION RESERVE, AND SYSTEM RESTART ANCILLARY SERVICE (MARGIN VALUES AND COST_LR PARAMETERS) SETTLEMENT VALUES 2022/23

Synergy welcomes the opportunity to comment on the proposed margin values and Cost_LR ancillary services parameters for 2022/23 (**Issues Paper**).

Financial year 2021/22 sees continued and unprecedented changes to the Wholesale Electricity Market (**WEM**) largely brought about by the impacts from the COVID-19 pandemic, increasing penetration of rooftop distributed solar photovoltaic (**DPV**) systems and ongoing regulatory reforms (**WEM Reform**) led by the Energy Transformation Strategy (**ETS**).

The market rules require the ERA to set the margin values and cost_LR parameters to compensate Synergy for the difference between the financial position Synergy would have been in but for providing ancillary services and Synergy's actual financial position after providing the ancillary services.

Synergy's fundamental concern is that the ERA modelling of the battery is divorced from what is achievable for the portfolio by Synergy's agent AEMO prior to New Market Start, the commencement of facility bidding and the receipt of individual dispatch instructions by Synergy facilities. That is, the actual operation of the portfolio is assumed away in the ERA model.

Synergy's secondary concerns relate to model configuration. The ERA model at times allocates the battery with services which, given its state of charge it is unable to provide. Further, the ERA model allocates the battery with services it is theoretically only just able to provide rather than what the battery would provide, having allowed for real time consumption of Essential System Services (**ESS**) and gate closure. It is Synergy's belief that AEMO will not, and should not, allocate the provision of upward services when the battery is at a very low state of charge and or downward services when the battery is approaching a full state of charge.

While Synergy understands (and contends) the ERA modelling, Synergy does not understand the model outputs.

Despite the highest Spinning Reserve (**SR**) availability cost in the last five determinations, when assessed collectively the proposed margin values are the lowest. Given the low

projected balancing prices and high availability costs, Synergy would expect high margins relative to previous determinations.

Synergy continues to hold concerns regarding the accuracy of the ERA modelling and its ability to appropriately reflect the cost of, and payment for, SR and Load Rejection Reserve (**LRR**).

Comparison to previously approved values

Synergy believes it is helpful to compare the proposed settlement values for 2022/23 and 2023/24 to past determinations, and the values for 2018/19 to 2023/24 summarised in the table below.

Summary of proposed and approved values 2018/19 to 2023/24						
Essential System Service	**2018/19 Approved**	**2019/20 Approved**	**2020/21 Approved**	**2021/22 Approved**	**2022/23 Proposed**	**2023/24 Proposed**
Margin Peak %	25%	17.32%	25.46%	12.6%	**13.6%**	-
Margin Off Peak %	50%	12.92%	21.42%	23.4%	**5.8%**	-
SR Availability Cost Total ($m)	13.06	10.34	8.40	6.53	**14.83**	-
SR Availability Cost Peak ($m)	7.97	6.91	5.04	3.04	11.84	-
SR Availability Cost Off Peak ($m)	5.09	3.43	3.35	3.49	2.98	-
SR MW Peak	224.1	235.40	252	240	235	-
SR MW Off Peak	189.0	236.40	240	241	176	-
Peak $/MWh	54.44	56.48	40.47	25.07	23.12	-
Off Peak $/MWh	39.52	46.08	37.36	20.51	34.23	-
LRR Availability Cost Total ($m)	1.4	1.4	1.167	7.386	**4.74**	1.12*
LRR Availability Cost Peak ($m)	-	-	0.274	4.331	2.77	0.57*
LRR Availability Cost Off Peak ($m)	-	-	0.893	3.054	1.96	0.54*
Total ($m)	**14.46**	**11.74**	**9.56**	**13.916**	**19.57**	**n/a**

* July, August and September 2023 only

Availability payments for SR are recovered via multipliers (the margin values for peak and off-peak) that are applied to the balancing market price and the quantity of SR modelled for the period. The collective proposed margin values for 2022/23 are the lowest despite the highest SR availability cost in the last five determinations.

In the discussion paper, the ERA highlights the new AEMO practice of allocating ~10% of DPV solar generation to the SR contingency on the basis that this volume will likely disconnect from the network following a contingency event. Despite this new and large component of the SR requirement, Synergy notes that the peak SR quantity has reduced by 2% from 240 MW approved in 2021/22 to 235.48 MW proposed in 2022/23. Synergy expects that the growing solar contingency is a key driver of the peak availability cost increasing by 389% from $3.04m approved in 2021/22 to $11.84m proposed in 2022/23.

Despite the almost four-fold increase in the peak availability cost, Synergy notes that the margin peak has increased by just 8% from 12.6% approved in 2021/22 to 13.6% proposed in 2022/23. The proposed margin peak is the second lowest over the last five ERA determinations. Given that the peak SR availability cost is the highest in the last five determinations, Synergy is deeply concerned that it will be under remunerated relative to its actual costs.

Further, while off peak SR costs have reduced by 15% from $3.49m approved in 2021/22 to $2.98m proposed in 2022/23, the margin off peak has decreased by 75% from 23.4% approved in 2021/22 to 5.8% proposed in 2022/23. Indeed, the margin off peak is more than 50% lower than any approved value in the last five determinations. Given the significant reduction in the margin off peak, Synergy is deeply concerned that it will be under remunerated relative to its actual costs.

Synergy also notes that LRR costs have fallen by 36% from $7.386m approved in 2021/22 to $4.74m proposed in 2022/23. While it can be assumed that a major contributor to the apparent decline in LRR costs relates to the ERA modelling of the battery (Synergy's concerns with ERA modelling of the battery are discussed under question 1), the ERA paper does not confirm the drivers of this cost reduction.

Government system security transition payment

On page 25 of the issues paper the following statement is made:

"The State Budget has allocated operating subsidies to Synergy. If Synergy is undercompensated, the Government's system security transition payment, will cover the shortfall." [1]

Synergy confirms it receives a government system security transition payment. However, this payment is for specific costs and cannot be used by Synergy to 'top-up' any shortfall in ESS operating costs. Synergy's remuneration for SR and LRR relies solely on the ERA determined settlement parameters.

Synergy's recommendation

Synergy continues to hold concerns regarding the accuracy of the ERA modelling and its ability to appropriately reflect the cost of, and payment for, SR and LRR.

In line with Synergy's response to Question 1, Synergy suggests that revised modelling is undertaken with the battery heavily constrained to operate toward the centre of its chargeable range.

Should new modelling not be able to be undertaken in the allowable timeframe, Synergy recommends that the previous margins are adopted as a more reasonable estimate of Synergy's costs.

Question 1:

What are any alternative views on how the output from the battery can be valued?

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1. The operation of a battery within the Synergy Portfolio prior to New Market commencement

Portfolio bidding

The final investment decision for the battery expected operation to commence roughly in line with the New Market Start Date and facility bidding for the Synergy portfolio. The deferral of the New Market Start posed the dilemma of whether to register the battery facility outside of the Synergy portfolio. Synergy notes that the Market Rules, as they currently stand, do not accommodate a battery which is a generator, a load, and a provider of ESS. As such, and in consultation with AEMO, Synergy determined that the most feasible path was to include the

[1] ERA issues paper, p 25.

battery in the portfolio. Until the New Market commences, the battery will be subject to portfolio bidding.

Portfolio bidding is complex; compromises exist, and Synergy's facilities are interdependent. Price formation adheres to strict ex-ante optimisation, while in real time AEMO endeavour to balance and rebalance the portfolio in accordance with Dispatch Guidelines provided by Synergy. Where circumstances require, AEMO can create a compliant movement of the portfolio by moving any facility within the portfolio, regardless of cost. Rebalancing of Synergy's facilities (and especially its low-cost coal facilities) is often manual and undertaken after AEMO identify a trend.

Currently, and for the duration of the determination period, Synergy facilities do not receive automated nor individual dispatch instructions but rely on intra-interval AEMO manual rebalancing and portfolio frequency response. The requirement for manual portfolio rebalancing does not and cannot allow the battery to operate as dynamically modelled by the ERA.

Lack of a setpoint

AEMO often start Synergy gas turbines in real time to maintain ESS in a manner which is not contemplated in Synergy's bids. Synergy gas turbines which are enabled for Load Following Ancillary Services (**LFAS**) do not have a setpoint, around which LFAS provision may be set and enforced. Rather, once enabled for LFAS, Synergy's gas turbines will follow frequency from the bottom to the top of their operating range providing the market with a service which is disproportionate to Synergy's cleared LFAS volumes. Like Synergy's gas turbines, the battery will not have a market driven setpoint but will rely on manual AEMO operation and associated manual rebalancing of other portfolio facilities to achieve net outcomes.

Consumption of ESS services and interdependence with other portfolio facilities

In the ERA modelling SR, LRR and LFAS are made available, but never consumed. However, these services are consumed and, with respect to LFAS, are consumed in every Trading Interval (**TI**). While the consumption of LFAS may be assumed to be normally distributed, there will be consecutive TIs of consumption of LFAS in one direction for periods of time. The battery is energy and storage limited. Consistent consumption of LFAS in one direction for a period may exhaust battery energy or storage capacity and transfer the provision of LFAS, SR and LRR services onto other Synergy facilities.

This is particularly important given the perfect optimisation of the battery to both extremes of charge in the ERA modelling. When battery-provided ESS is consumed, the battery will likely be required to charge during high price periods and discharge during low price periods to enable the continued provision of ESS services. If battery energy or storage capacity is exhausted, this will require that other in-service portfolio facilities absorb the burden, or out of service gas turbines commit to ensure the continued provision of services.

Synergy notes that during periods where the portfolio clearing volumes are low, and should the battery exhaust its energy or storage capacity in real time, Synergy may not have sufficient cleared portfolio volumes to accommodate the commitment of an additional gas turbines to maintain reserves which were expected to be provided by the battery. As Synergy is the default provider of ESS, operating the battery to the extremes of its chargeable limits will be accompanied by compliance risks for Synergy where those services are consumed in real time.

Gate closure

Gate closure will preclude Synergy from utilising the full operating range of the battery as ESS are consumed in real time. Gate closure for LFAS occurs between 3.5 and 7.5 hours in advance of the TI in which the service is provided. For Synergy, balancing market gate closure occurs 2.5 hours prior to a TI. Specifically, Synergy will not be able to ex-ante bid the battery to the extremes of its chargeable range for energy arbitrage purposes, while maintaining reliable continued provision of ESS services. Such services rely on the battery not exceeding charge or headroom limits.

2. ERA modelling of the battery

Synergy notes that it has relied upon further material provided by the ERA for responses in this section. Synergy wishes to thank the ERA for their transparent and candid approach to sharing information relating to the modelling of Synergy's generators and the requirement and provision of ESS by Synergy facilities.

Nonetheless Synergy would like to specifically address the below aspects of the ERA modelling.

The provision of ESS by a battery

Setting out Synergy's understanding of the ESS services in relation to a battery, which appear consistent with ERA descriptions in the issues paper and with WEM rule requirements:

a) LFAS up

The battery must be capable to provide LFAS up in one direction for an entire TI at minimum. Providing 30 MW of LFAS up in a TI for example requires:

i. If the battery does not have a dispatch instruction, a minimum state of charge of 15 MWh. A state of charge below 15 MWh would preclude the battery from providing its credited level of LFAS up for the whole TI.

ii. If the battery is at a state of charge less than 15 MWh and has a dispatch instruction to charge, the charge instruction must be sufficient such that the battery would be at 15 MWh at the end of the TI. Thus, the battery could reduce its rate of charge to zero and still not exhaust its available MWh. Otherwise, the battery would be unable to provide its credited level of LFAS up for the whole TI.

iii. If the battery is at a state of charge above 15 MWh it must not have a dispatch instruction to discharge to a level below 15 MWh otherwise it cannot meet both its discharge dispatch instruction and provide the required level of LFAS up for the whole TI.

b) Spinning reserve

The provision of SR adheres to the same principles as LFAS up except that SR must be sustained at minimum for 15 minutes and not for the whole TI. For battery SR provision of 30 MW, the minimum level of battery charge is halved relative to LFAS up.

c) LFAS down

The battery must be capable to provide LFAS down in one direction for an TI at minimum. Providing 30 MW of LFAS down in a TI for example requires:

i. If the battery does not have a dispatch instruction, a maximum state of charge of 185 MWh (minimum headroom available to charge of 15 MWh). Headroom below 15 MWh would preclude the battery from providing its credited level of LFAS down for the whole TI.

ii. If the battery is at a state of charge more than 185 MWh and has a dispatch instruction to discharge, the discharge instruction must be sufficient such that the battery would be at, or less than, 185 MWh at the end of the TI. Thus, the battery could reduce its rate of discharge to zero and still not exhaust its available headroom. Otherwise, the battery would be unable to provide its credited level of LFAS down for the whole TI.

iii. If the battery is at a state of charge below 185 MWh it must not have a dispatch instruction to charge to a level above 185 MWh otherwise it cannot meet both its charge dispatch instruction and provide the required level of LFAS down for the whole TI.

d) Load rejection reserve

The provision of LRR adheres to the same principles as LFAS down except that LRR must be sustained at minimum for 60 minutes and not for a single TI. For battery LRR of 30 MW in a TI, the minimum level of headroom is doubled relative to LFAS down.

ERA model credits the battery with services it is unable to provide

While the ERA model has the benefit of perfect hindsight and perfect foresight, Synergy notes that underlying model summary information provided to Synergy by the ERA during the consultation period indicates that the battery is not strictly adhering to the above limitations of a battery providing ESS. That is, the battery is sometimes credited with services that it is unable to provide.

Minor violations were found with the provision of LFAS up and LFAS down by the battery but appear to be acceptable modelling noise. Moderate violations were found in the provision of LRR during the ramp to evening peak. Significant violations were found in battery provided SR from 8pm to 11pm. These violations are summarised separately in the Excel file (Data_Request_Base Model_Synergy - Margin Values and Cost_LR parameters for 2022-23) which accompanies this written submission. As the data in the excel file relates solely to the provision of services by Synergy facilities, Synergy requests that it is treated as CONFIDENTIAL between Synergy and the ERA.

While Synergy is concerned that the ERA model is crediting the battery with services that it is unable to provide, Synergy believes it is a moot point. Synergy's primary concern is that prior to New Market commencement and facility bidding, the battery cannot operate with the flexibility afforded it in the ERA modelling.

3. ERA generator cost curves

ERA derived generator offer curves are not reflective of participant behaviour at the upper extremes.

"Generator offer curves are derived from the information collected from market participants. The offer curves were refined to account for observed practice in bidding at the market floor or otherwise below the expected offer curve." [2]

The ERA model each facility as a single offer curve which, unlike actuals, does not vary by SWIS load level or shape, day type, time of day or season of the year. The SWIS is undergoing significant change driven by the impact of DPV and past offer formation is unlikely to be reflective of future outcomes given expected lower loads and rapidly changing load shapes.

It is Synergy's understanding that adjustments to generator behaviour at the lower end of the offer curve are made to reflect observed market behaviour. This may include participants bidding specific quantities at the price floor. However, no such adjustments were made to the upper end of the offer curves to reflect participants bidding quantities at the cap.

Synergy expects that the ERA's reluctance to model actual market participant bidding behaviour at the upper end of offer curves is the key driver of price variance in the model back-casting for the 2020/21 financial year[3] and that similar outcomes may be expected for financial year 2022/23 and beyond.

The ERA may wish to reflect actual past market participant behaviour at the cap and likely responses to changing SWIS load levels and shape for future modelling exercises.

4. Battery start date and rest period requirement

The ERA has adopted a start date the battery of September 2022. Synergy advises a revised expected practical completion date of 14 October 2022.

Further a rest period (1 TI or 30 minutes) is recommended between charging and discharging, per manufacturer specifications. The battery is capable to move from charging to discharging almost immediately, however the battery is expected to degrade at a faster rate.

5. Conclusion

Until the commencement of the New Market, Synergy expects that the battery will primarily be used for the provision of ESS services (LFAS, SR and LRR). To maintain compliant provision of ESS from the battery, the battery will consistently operate toward the centre of its chargeable range and that executable time shifting of energy (a key feature of the ERA modelling) will be rare.

By way of illustration, Synergy notes that there is a 41% decline in the peak balancing price in the no battery case. Should the battery focus on the provision of ESS and not be able to time shift energy, Synergy believes that this is representative of the balancing price outcome and the margin peak value would need to rise accordingly.

The perfect and dynamic ERA modelling of the battery to both extremes of its chargeable range lifts balancing prices. This is likely to be misaligned with actual outcomes and detrimental to Synergy's fair compensation for SR and LRR. Synergy notes that a primary

[2] ERA report, p 15.
[3] ERA Report, figure 10 and figure 11, p 62.

driver of low margin values is a higher balancing price due to the battery time shifting energy while maintaining a modelled (but unachievable) provision of ESS.

While the battery remains in the portfolio, Synergy currently understands that it will only be able to execute one of these opportunities. That is, after accounting for portfolio bidding, gate closure and the potential for real time consumption of ESS, it will either be able to execute a full range energy arbitrage strategy (which will preclude the battery providing ESS with certainty outside the battery's centre state of charge), or it will be able to provide ESS. In providing ESS, the battery would operate towards the centre of its chargeable range and not execute energy arbitrage.

Considering the above, and the requirement for intra-interval manual rebalancing of multiple Synergy facilities, Synergy's dispatch agent AEMO will be able to achieve one or the other, but not both for Synergy.

Synergy submits that the ERA modelling of the battery is divorced from what is achievable by Synergy's agent AEMO prior to New Market Start, the commencement of facility bidding and the receipt of individual dispatch instructions by Synergy facilities.

For the reasons above, Synergy recommends that revised modelling is undertaken with the battery heavily constrained to operate toward the centre of its chargeable range.

Should new modelling not be able to be undertaken in the allowable timeframe, Synergy recommends that the previous margins are adopted as a more reasonable estimate of Synergy's costs.

Question 2:

The ERA will not have an oversight role the next time restart contract procurement will be undertaken. The ERA is interested in methods available to AEMO to improve the supply of restart capable providers and putting downward pressure on supply cost.

What procurement strategies, methods and approaches can reduce the cost of system restart services to the market?

Synergy supports the ERA's interest in improving the supply of system restart providers to ensure it is provided at a fair and efficient cost. Synergy agrees that undue burden should not be placed on consumers and welcomes any suggestions to reduce system restart costs for consumers.

Should you require any further information regarding this submission, please contact Genevieve Teo at genevieve.teo@synergy.net.au.

Yours sincerely

[redacted]

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