



Electricity spot prices above \$5000/MWh

**Victoria and South Australia
24 January 2019**

26 March 2019

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1 Obligation

The Australian Energy Regulator (AER) regulates energy markets and networks under national legislation and rules in eastern and southern Australia, as well as networks in the Northern Territory. Its functions include:

- monitoring wholesale electricity and gas markets to ensure energy businesses comply with the legislation and rules, and taking enforcement action where necessary;
- setting the amount of revenue that network businesses can recover from customers for using networks (electricity poles and wires, and gas pipelines) that transport energy;
- regulating retail energy markets in Queensland, New South Wales, South Australia, Tasmania (electricity only), and the ACT;
- operating the Energy Made Easy website, which provides a retail price comparator and other information for energy consumers;
- publishing information on energy markets, including the annual State of the energy market report, to assist stakeholders and the wider community.

The AER is required to publish a report whenever the electricity spot price exceeds \$5000/MWh in accordance with clause 3.13.7 (d) of the National Electricity Rules.

The report:

- describes the significant factors contributing to the spot price exceeding \$5000/MWh, including withdrawal of generation capacity and network availability;
- assesses whether rebidding contributed to the spot price exceeding \$5000/MWh;
- identifies the marginal scheduled generating units; and
- identifies all units with offers for the trading interval equal to or greater than \$5000/MWh and compares these dispatch offers to relevant dispatch offers in previous trading intervals.

These reports are designed to examine market events and circumstances that contributed to wholesale market price outcomes and are not an indicator of potential enforcement action.

2 Summary

On 24 January 2019, the spot price for electricity exceeded \$5000/MWh over 11 trading intervals from 4 pm to 9 pm inclusive in Victoria and South Australia. The spot price reached the market price cap (MPC) of \$14 500/MWh in Victoria at 6.30 pm and 7 pm and in South Australia from 5.30 pm to 8.30 pm. Most of these high prices were forecast. Prices were aligned across the two regions for the entire high price period.

On the day, maximum temperatures reached 41 degrees in Melbourne and 48 degrees in Adelaide (a new record temperature), leading to high demand for electricity in both regions.

Of the 14 800 MW of generation usually available in Victoria and South Australia during summer, around 11 300 MW was offered into the market on the day. The difference was due to several generator outages in Victoria (all of which were incorporated into AEMO's forecasts), technical issues affecting generation capacity and low wind output in both regions.

Throughout the day generators rebid further capacity into low price bands such that between 95 and 99 per cent of capacity was priced below \$5000/MWh for the high priced trading intervals. So, rebidding, of itself, into high price bands, did not contribute to the high prices on the day.

Almost all available generation was dispatched in Victoria and South Australia for the high price trading intervals. Generators with high-priced offers were required to meet the high levels of demand across both regions.

In light of the high demand for electricity in Victoria and the generator outages, AEMO activated the Reliability Emergency Reserve Trader (RERT) from 4.05 pm to 10.30 pm with contracted reserves of 155 MW in Victoria and 210 MW in SA. As a result, AEMO invoked special intervention pricing arrangements, called 'what-if' pricing, for the trading intervals from 4.30 pm to 10.30 pm. 'What-if' pricing seeks to preserve the market price signals by setting the price as if the intervention, in this case the activation of RERT contracts, had not occurred.

In light of extreme temperatures that resulted in sustained high demand for electricity, AEMO instructed AusNet Services to shed load to maintain power system security. This was effected by Alcoa (a large industrial load in Victoria) reducing production. As a result, special pricing arrangements were put in place setting the spot price for electricity in Victoria at or near the market price cap for several trading intervals.

3 Analysis

The following sections examine why the high spot prices occurred. AEMO activated the Reliability Emergency Reserve Trader (RERT) at 4.05 pm until 10.30 pm. As a result, “what-if” pricing applied for the trading intervals from 4.30 pm to 10.30 pm. See Box 1 in section 3.4.2.

Prices were aligned across Victoria and South Australia. Therefore, where appropriate, the analysis in this report treats the two regions as a combined region.

3.1 Overview of actual and expected conditions

Across both regions, the spot exceeded \$5000/MWh for 11 consecutive trading intervals from 4 pm to 9 pm. The spot price reached the price cap of \$14 500/MWh in Victoria at 6.30 pm and 7 pm and in South Australia from 5.30 pm to 8.30 pm.

Table 1 shows actual and forecast spot prices for Victoria (as the price was similar in both regions) and demand and local availability for the 4 pm to 9 pm trading intervals for the combined region.

Price, demand and availability tables for the individual regions are included in Appendix D.

Table 1 shows:

- Four and 12 hours ahead, spot prices were expected to exceed \$10 000/MWh for the trading intervals from 4 pm to 8 pm.
- Demand for electricity was up to 319 MW higher than forecast, four hours prior.
- Generator availability was between 96 MW above forecast, and 238 MW below forecast, four hours prior. Lower than forecast availability is primarily attributed to low semi-scheduled wind availability.

Table 1: Actual and forecast spot price, demand and available capacity for the combined region (South Australia and Victoria)

Trading Interval	Price (\$/MWh)			Demand (MW)			Generator Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
4 pm	14 033	14 500	14 204	11 645	11 408	11 067	11 580	11 686	11 516
4.30 pm	14 497	14 500	14 500	11 937	11 664	11 352	11 565	11 688	11 526
5 pm	13 702	14 500	14 500	12 113	11 803	11 585	11 535	11 635	11 488
5.30 pm	13 999	14 500	14 500	12 154	11 924	11 625	11 601	11 581	11 425
6 pm	14 395	14 500	14 500	12 203	11 968	11 685	11 595	11 499	11 357
6.30 pm	14 500	14 500	14 500	12 079	11 972	11 744	11 483	11 432	11 288
7 pm	14 500	14 500	13 891	11 846	11 834	11 613	11 260	11 311	11 542
7.30 pm	14 445	14 500	14 345	11 661	11 629	11 570	11 133	11 214	11 451
8 pm	14 135	10 063	14 484	11 524	11 304	11 297	11 008	11 208	11 277
8.30 pm	14 158	180	13 579	11 364	11 045	11 045	10 995	11 233	11 276
9 pm	11 464	411	331	10 904	10 601	10 490	11 011	11 247	11 394

3.2 Demand

Very high temperatures in Melbourne and Adelaide led to high demand in both regions. The temperature in Melbourne reached a maximum 41 degrees.¹ Meanwhile, the temperature reached a record of 48 degrees in Adelaide following three consecutive days of daily maximum temperatures above 35 degrees.²

Combined demand for electricity reached a maximum of 12 203 MW at 6 pm. Demand for electricity across the combined region was up to 320 MW higher than forecast.

3.3 Supply

This section examines the supply side factors that had an effect on the high price outcomes.

Summer generation capacity in Victoria and South Australia is approximately 14 800 MW. At the time of high prices, across both regions between 327 MW and 596 MW (or between 2 and 4 per cent) of semi-scheduled wind generation and around 11 300 MW (or around 76 per cent) of non-wind generation was offered.

3.3.1 Generator offers and availability

Figure 1 shows cumulative combined generator offers for Victoria and South Australia. Also known as closing bids, the figure shows the actual capacity offered by generators in each region, including amendments to their offers throughout the day to match changes to their own economic and/or physical positions (known as “rebidding”). Also

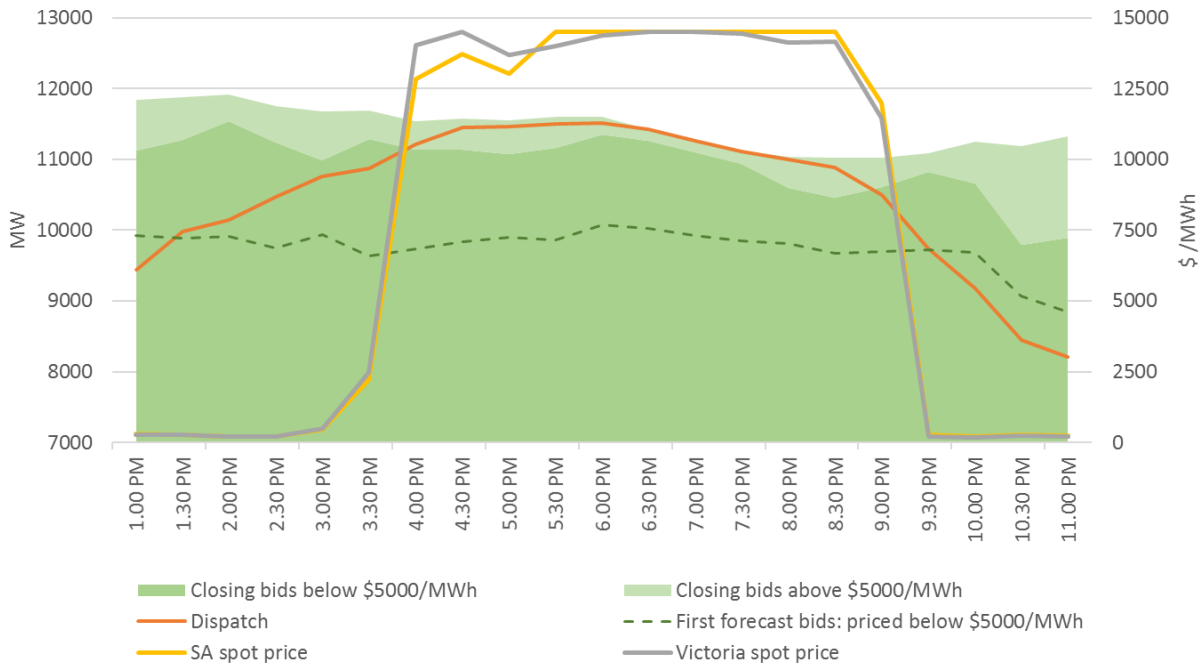
¹ [BOM Melbourne, Victoria 24 January 2019](#)

² [BOM Adelaide, South Australia 24 January 2019](#)

shown on the figure are the initial bids below \$5000/MWh (dotted green line) and actual combined generation output (orange line).

Capacity offered below \$5000/MWh is shown in dark green and capacity offered above \$5000/MWh is shown in light green. The yellow and grey lines show the spot price for electricity in South Australia and Victoria, respectively.

Figure 1: Combined generator bids for Victoria and South Australia



In initial forecasts, generators in Victoria and South Australia were offering between 84 and 88 per cent of their capacity at prices below \$5000/MWh (in aggregate, dotted green line), with the remainder offered above \$5000/MWh.

Throughout the day generators rebid further capacity into low price bands such that between 95 and 99 per cent of capacity was priced below \$5000/MWh for the high priced trading intervals. Rebidding into high price bands did not contribute to the high prices in Victoria and South Australia.

Looking at generator availability in Table 1 and the orange (‘dispatch’) line in Figure 1 we can see that almost all available generation was dispatched in Victoria and South Australia for the high price trading intervals from 4.30 pm to 9 pm. Generators with high-priced offers (represented by the light green shaded area) were required to generate (represented by the orange line in the light green shaded area) to meet the high levels of demand across both regions.

Appendix B details the generators involved in setting the price during the high-price periods, and how that price was determined by the market systems.

The closing bids for all participants in Victoria and South Australia with capacity priced at or above \$5000/MWh for the high-price periods are set out in Appendix C.

3.3.2 Generator outages and reduced capacity

At the time of high prices two generating units in Victoria were unavailable, both for technical reasons. As a result, a total of 885 MW of potential capacity was unavailable. These outages were factored into AEMO's forecasts.

- Energy Australia advised AEMO that it would be taking its 355 MW Yallourn unit 4 out of service for planned maintenance from 19 January for a period of seven days. This maintenance outage lasted longer than anticipated and unit 4 returned to service on 4 February.
- AGL's Loy Yang A unit 3 experienced a tube leak removing a further 530 MW of potential available capacity in Victoria from the afternoon of 22 January to 26 January.

These outages are detailed in Table 2.

Table 2: Generation plant outages

Station	Unit	Unavailable capacity (MW)	Start	End	Reason	Rebid time
Yallourn	YWPS4	355	19-Jan 12.30 am	4-Feb 9 pm	Planned maintenance outage	15-Jan 8.17 am
Loy Yang A	LYA3	530	22-Jan 3.30 pm	26-Jan 6 pm	Plant failure, tube leak	22-Jan 2.30 pm
Total		885				

Also, several units in Victoria were operating at reduced capability, all due to technical reasons. Details are provided in Table 3.

Table 3: Generation with reduced capacity due to technical issues

Station	Unit	Unavailable capacity (MW)	Reason	Rebid time
Yallourn	YWPS1	Up to 15*	Plant issues: "revised mill limits" and "revised fuel oil capabilities"	24-Jan 2.10 pm
Yallourn	YWPS2	Up to 55*	Plant issue: "revised temperature limits" and "revised gas heat temp limit, soot issue"	24-Jan 11.10 am
Yallourn	YWPS3	55	Plant failure: "boiler tube leak"	24-Jan 12.30 pm
Loy Yang A	LYA2	130	Plant failure: "boiler tube leak"	24-Jan 7.23 am
Total		255		

*indicates units with varied availability during the high price trading intervals

3.3.3 Wind availability

During the high price trading intervals, maximum semi-scheduled wind output reached approximately 205 MW in South Australia and 400 MW in Victoria. This compares to total installed capacity of semi-scheduled wind generation of around 1480 MW in South Australia and around 1210 MW in Victoria. Total semi-scheduled wind generation across Victoria and South Australia was between 39 MW and 331 MW lower than forecast four hours ahead.

3.3.4 Network Availability

The NEM regions are connected via high voltage interconnectors, through which electricity can be transferred between regions. Victoria is connected to South Australia via two interconnectors – Heywood and Murraylink, while Victoria is connected to New South Wales via the Victoria – New South Wales (Vic – NSW) interconnector, and to Tasmania via Basslink.

Table 4 shows actual flows, import and export limits into the combined region across the Basslink and Vic – NSW interconnectors. The table shows that the combined region imported up to 700 MW of electricity during the high price period, higher than forecast for all but the 7 pm (when flows were close to forecast).

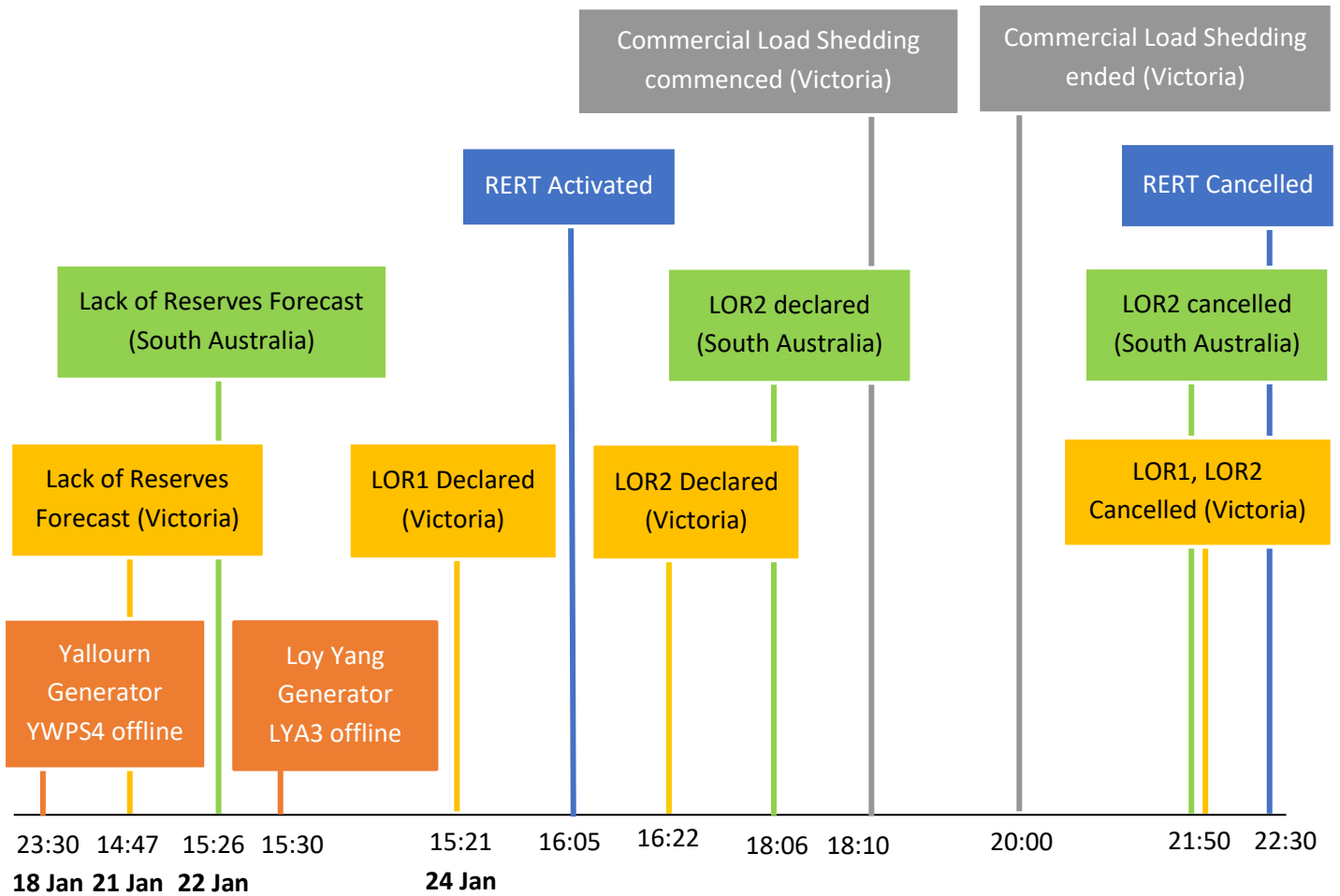
Table 4: Combined net actual and forecast flows and import limits into the combined region (Victoria and South Australia)

Trading Interval	Flows (MW)			Import Limit (MW)			Export Limit (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
4 pm	-443	-111	-585	-501	-118	-634	-179	982	1204
4.30 pm	-503	-68	-516	-542	-68	-561	-66	957	1165
5 pm	-682	-270	-513	-727	-300	-553	297	906	1177
5.30 pm	-669	-454	-504	-673	-464	-542	402	799	1184
6 pm	-721	-580	-509	-749	-626	-547	396	793	1191
6.30 pm	-670	-632	-663	-681	-714	-700	402	857	1150
7 pm	-600	-603	-561	-639	-719	-596	384	796	1222
7.30 pm	-557	-458	-357	-615	-574	-391	360	1166	1472
8 pm	-534	-431	-348	-612	-547	-384	365	1175	1469
8.30 pm	-481	-475	-683	-500	-639	-697	392	1172	1434
9 pm	-427	-122	-476	-470	-432	-476	-150	1237	1451

3.4 Market Intervention

The following sections outline the interventions by AEMO, including the lack of reserves and activation of emergency reserves. Figure 2 outlines the timeline of market intervention and events in the lead up to and during the high prices in Victoria and South Australia on 24 January.

Figure 2: Timeline of events for 24 January across Victoria and South Australia



3.4.1 Lack of Reserves

Against the backdrop of anticipated hot weather and outages at Loy Yang A and Yallourn, AEMO forecast lack of reserve conditions as early as 21 January for Victoria and 22 January for South Australia.

Consequently, AEMO issued several lack of reserve (LOR) notices seeking a market response. Appendix E lists all relevant market notices for the events on 24 January. These reserve notices focus on three thresholds in ascending order of severity: LOR 1, 2 and 3. Each threshold is based on the number of unplanned failures of either transmission or generating equipment (known as credible contingencies) that should they occur, would result in AEMO having to shed load.

At 6.14 pm, AEMO announced an actual LOR3 in Victoria (Market Notice 66670) and instructed AUSNet Services to shed load to maintain power system security in Victoria and South Australia. This was effected by Alcoa (a large industrial load in Victoria)

reducing production for the dispatch intervals from 6.10 pm to 8 pm.³ As a result, special pricing arrangements were put in place setting the spot price for electricity in Victoria at or near the market price cap from the 6.30 pm to 7.30 pm trading intervals inclusive.

3.4.2 Reliability Emergency Reserve Trader Activated

AEMO announced its intention to activate the Reliability and Emergency Reserve Trader (RERT) in both Victoria and South Australia from 4.05 pm as demand levels continued to rise throughout the afternoon. The RERT was activated from 4.05 pm to 10.30 pm with contracted reserves of 155 MW in Victoria and 210 MW in South Australia.⁴

RERT is contracted outside of the market and effectively lowers actual demand through contracts that either increase the supply of, or lower the demand for electricity.⁵

When AEMO activates RERT contracts, prices for all regions across the NEM are determined using “what-if” pricing. “What if” pricing is discussed in more detail in Box 1 and Appendix F.

Box 1: “What-if” pricing

The market operator, AEMO, invokes “what-if” pricing when it intervenes in the market, for example by activating RERT contracts. Normally AEMO sets targets for generation and interconnectors and determines wholesale electricity market prices (energy and FCAS) in a single calculation (or “run”) for every five minute dispatch interval. After an intervention these are calculated twice for each dispatch interval, one taking into account the RERT contracts called “Intervention” and one that does not include the direction called “What-if”.

“What-if” attempts to calculate what the price would have been had AEMO not intervened in the market. This effectively removes the effects of the RERT contracts thereby preserving the market price signal. To achieve this, the “what-if” run recalculates, amongst other things, the level of demand and the targets for generation and interconnectors.

Australian Energy Regulator

March 2019

³ <http://energylive.aemo.com.au/News/Victorian-and-South-Australian-energy-update>

⁴ http://www.aemo.com.au/-/media/Files/Electricity/NEM/Emergency_Management/2019/RERT-contracted-for-24-and-25-Jan-2019.pdf

⁵ Under the National Electricity Rules, AEMO is required to publish (on its website) reports detailing the circumstances that gave rise to the need for the activation of RERT contracts, their processes and the costs that occurred (cl. 3.20).

Appendix A: Significant Rebids

The rebidding tables highlight the relevant rebids submitted by generators. It details the time the rebid was submitted and used by the dispatch process, the capacity involved, the change in the price of the capacity was being offered and the rebid reason.

Victoria

Table 5: 4 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$MWh)	Price to (\$MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<180	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
12.02 pm		Energy Australia	Yallourn	-20	-1000	N/A	1200~p~adj avail boiler tube leak, boiler pressure limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl~
3.51 pm	4.00 pm	AGL Energy	Mckay	-56	<279	N/A	1545~p~020 reduction in avail cap~203 plant failure

Table 6: 4.30 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$MWh)	Price to (\$MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~

Table 7: 5 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$MWh)	Price to (\$MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~

Table 8: 5.30 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MWh)	Price to (\$/MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~
4.27 pm		Snowy Hydro	Murray	43	N/A	-1000	16:26:38 p revised m1u1 capability, unit blockloaded to manage vibration. redistribute mw over to lav

Table 9: 6 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MWh)	Price to (\$/MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~
4.16 pm		Energy Australia	Yallourn	20	N/A	-1000	1610~p~adj avail due to fuel oil available sl ~
4.27 pm		Snowy Hydro	Murray	43	N/A	-1000	16:26:38 p revised m1u1 capability, unit blockloaded to manage vibration. redistribute mw over to lav

Table 10: 6.30 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MWh)	Price to (\$/MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~

Table 11: 7 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MWh)	Price to (\$/MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~
4.16 pm		Energy Australia	Yallourn	20	N/A	-1000	1610~p~adj avail due to fuel oil available sl ~
4.27 pm		Snowy Hydro	Murray	43	N/A	-1000	16:26:38 p revised m1u1 capability, unit blockloaded to manage vibration. redistribute mw over to lav
6.41 pm	6.50 pm	Iraak Sun Farm Pty Ltd	Karadoc Solar Farm	90	N/A	<0	19:11 ~ p ~ plant availability ~ sl
6.48 pm	6.55 pm	Energy Australia	Gannawarra Energy Storage System	25	N/A	-986	1845~p~revised commissioning profile sl ~

Table 12: 7.30 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MWh)	Price to (\$/MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~
4.16 pm		Energy Australia	Yallourn	20	N/A	-1000	1610~p~adj avail due to fuel oil available sl ~
4.27 pm		Snowy Hydro	Murray	43	N/A	-1000	16:26:38 p revised m1u1 capability, unit blockloaded to manage vibration. redistribute mw over to lav
6.41 pm		Iraak Sun Farm Pty Ltd	Karadoc Solar Farm	90	N/A	<0	19:11 ~ p ~ plant availability ~ sl

Table 13: 8 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MWh)	Price to (\$/MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	-1000	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	-1000	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	-1000	N/A	1455~p~adj avail due to gas temps sl ~
4.16 pm		Energy Australia	Yallourn	20	N/A	-1000	1610~p~adj avail due to fuel oil available sl ~

Table 14: 8.30 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$MWh)	Price to (\$MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	0	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	0	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	0	N/A	1455~p~adj avail due to gas temps sl ~
8.08 pm	8.15 pm	Energy Australia	Yallourn	30	N/A	0	2005~p~adj avail due to backend temps sl ~

Table 15: 9 pm

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$MWh)	Price to (\$MWh)	Rebid reason
7.25 am		AGL Energy	Loy Yang A	-130	<9	N/A	0723~p~020 reduction in avail cap~203 plant failure
11.10 am		Energy Australia	Yallourn	-10	0	N/A	1110~p~adj avail revised back end temp limit sl~
1.57 pm		Energy Australia	Yallourn	-20	0	N/A	1355~p~adj avail revised gas heat temp limit, soot issue sl~
2.57 pm		Energy Australia	Yallourn	-10	0	N/A	1455~p~adj avail due to gas temps sl ~
8.08 pm		Energy Australia	Yallourn	30	N/A	0	2005~p~adj avail due to backend temps sl ~

South Australia

There were no significant rebids for the trading intervals from 4 pm to 9 pm that are not discussed in the body of the report.

Appendix B: Price setter

The following table identifies for the trading intervals in which the spot price exceeded \$5000/MWh, each five minute dispatch interval price and the generating units involved in setting the energy price. The 30-minute spot price is the average of the six dispatch interval prices.

The prices shown for the trading intervals from 4.30 pm to 9 pm are a result of the “what-if” pricing calculation.

Victoria

Table 16: 4.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
3.35 PM	\$14 189.81	Ecogen Energy	NPS	Energy	\$14 189.81	1.00	\$14 189.81
3.40 PM	\$14 500.00	Snowy Hydro	LNGS1	Energy	\$14 500.00	0.27	\$3915.00
		Snowy Hydro	LNGS2	Energy	\$14 500.00	0.27	\$3915.00
		Snowy Hydro	VPGS1	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS2	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS3	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS4	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS5	Energy	\$14 500.00	0.09	\$1305.00
		3.45 PM	\$13 671.85	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00
Stanwell	STAN-2			Energy	\$144.63	-0.59	-\$85.33
Stanwell	STAN-3			Energy	\$144.63	-0.59	-\$85.33
Snowy Hydro	MURRAY			Energy	-\$1000.00	1.00	-\$1000.00
3.50 PM	\$13 673.08	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	1.05	\$14 908.95
		Stanwell	STAN-2	Energy	\$144.63	-0.59	-\$85.33
		Stanwell	STAN-3	Energy	\$144.63	-0.59	-\$85.33
		Snowy Hydro	MURRAY	Energy	-\$1000.00	1.00	-\$1000.00
3.55 PM	\$13 674.33	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	1.05	\$14 908.95
		Stanwell	STAN-2	Energy	\$144.63	-0.58	-\$83.89
		Stanwell	STAN-3	Energy	\$144.63	-0.58	-\$83.89

		Snowy Hydro	MURRAY	Energy	-\$1000.00	1.00	-\$1000.00
4.00 PM	\$14 489.89	Ecogen Energy	JLA01	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.25	\$3622.47

Spot Price \$14 033/MWh

Table 17: 4.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
4.05 PM	\$14 489.89	Ecogen Energy	JLA01	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.25	\$3622.47
4.10 PM	\$14 500.00	Energy Australia	BALBG1	Energy	\$14 500.00	1.00	\$14 500.00
4.15 PM	\$14 489.89	Ecogen Energy	JLA01	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.25	\$3622.47
4.20 PM	\$14 500.00	Origin Energy	URANQ11	Energy	\$14 500.00	0.47	\$6815.00
		Origin Energy	URANQ12	Energy	\$14 500.00	0.47	\$6815.00
		Origin Energy	URANQ13	Energy	\$14 500.00	0.47	\$6815.00
		Origin Energy	URANQ14	Energy	\$14 500.00	0.47	\$6815.00
		ERM Power	OKEY2	Energy	\$118.69	-0.78	-\$92.58
4.25 PM	\$14 500.00	Origin Energy	URANQ11	Energy	\$14 500.00	0.47	\$6815.00
		Origin Energy	URANQ12	Energy	\$14 500.00	0.47	\$6815.00
		Origin Energy	URANQ13	Energy	\$14 500.00	0.47	\$6815.00
		Origin Energy	URANQ14	Energy	\$14 500.00	0.47	\$6815.00
		Stanwell	STAN-1	Energy	\$144.63	-0.11	-\$15.91
		Stanwell	STAN-2	Energy	\$144.63	-0.36	-\$52.07
		Stanwell	STAN-3	Energy	\$144.63	-0.32	-\$46.28

4.30 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	2.03	\$28 823.97
		Origin Energy	ER01	Energy	\$32.65	-0.42	-\$13.71
		Origin Energy	ER02	Energy	\$32.65	-0.42	-\$13.71
		CS Energy	W/HOE#2	Raise 5 min	\$22.73	-0.84	-\$19.09
		Origin Energy	ER01	Raise 5 min	\$2.79	0.42	\$1.17
		Origin Energy	ER02	Raise 5 min	\$2.79	0.42	\$1.17
		CS Energy	GSTONE6	Raise 60 sec	\$29.87	-0.84	-\$25.09
		Origin Energy	ER01	Raise 60 sec	\$2.80	0.42	\$1.18
		Origin Energy	ER02	Raise 60 sec	\$2.80	0.42	\$1.18
		EnergyAustralia	YWPS2	Raise 6 sec	\$20.70	-0.84	-\$17.39
		Origin Energy	ER01	Raise 6 sec	\$1.74	0.42	\$0.73
		Origin Energy	ER02	Raise 6 sec	\$1.74	0.42	\$0.73

Spot Price \$14 497/MWh

Table 18: 5.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
4.35 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	6.08	\$86323.84
		CS Energy	GSTONE1	Energy	\$104.73	-1.00	-\$104.73
		CS Energy	GSTONE3	Energy	\$104.73	-1.00	-\$104.73
		CS Energy	GSTONE4	Energy	\$104.73	-1.00	-\$104.73
		CS Energy	GSTONE6	Energy	\$104.73	-1.00	-\$104.73
		AGL Energy	BW01	Lower reg	\$14.00	4.00	\$56.00
		CS Energy	GSTONE1	Lower reg	\$8.73	-1.00	-\$8.73
		CS Energy	GSTONE3	Lower reg	\$8.73	-1.00	-\$8.73
		CS Energy	GSTONE4	Lower reg	\$8.73	-1.00	-\$8.73
		CS Energy	GSTONE6	Lower reg	\$8.73	-1.00	-\$8.73
4.40 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
4.45 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	7.09	\$10 0663.82
		ERM Power	OKEY2	Energy	\$118.69	-4.57	-\$542.41
4.50 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	4.64	\$65 883.36
		Stanwell	STAN-1	Energy	\$105.63	-0.98	-\$103.52
		Stanwell	STAN-4	Energy	\$105.63	-0.98	-\$103.52

4.55 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5.00 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00

Spot Price \$13 702/MWh

Table 19: 5.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
5:05 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:10 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:15 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:20 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:25 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:30 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00

Spot Price \$13 999/MWh

Table 20: 6.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
5:35 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:40 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:45 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:50 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:55 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:00 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00

Spot Price \$14 395/MWh

Table 21: 6.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
6:05 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:10 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:15 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:20 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:25 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:30 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00

Spot Price \$14 500/MWh

Table 22: 7.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution	
6:35 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
6:40 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
6:45 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
6:50 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
6:55 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
7:00 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
Spot Price		\$14 500/MWh						

Table 23: 7.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution	
7:05 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
7:10 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
7:15 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.26	\$46 285.48	
		Stanwell	STAN-1	Energy	\$105.63	-0.48	-\$50.70	
		Stanwell	STAN-2	Energy	\$105.63	-0.60	-\$63.38	
		Stanwell	STAN-3	Energy	\$105.63	-0.48	-\$50.70	
		Stanwell	STAN-4	Energy	\$105.63	-0.48	-\$50.70	
7:20 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	1.00	\$2 175 000.00
7:25 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	0.95	\$2 066 250.00
7:30 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	0.94	\$2 044 500.00
Spot Price		\$14 445/MWh						

Table 24: 8.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution	
7:35 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	0.95	\$2 066 250.00
7:40 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	0.92	\$2 001 000.00
7:45 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.27	\$46 427.46	
		Stanwell	STAN-1	Energy	\$105.63	-0.61	-\$64.43	
		Stanwell	STAN-2	Energy	\$105.63	-0.77	-\$81.34	
		Stanwell	STAN-4	Energy	\$105.63	-0.61	-\$64.43	
7:50 PM	\$14 500.00	Generation deficit constraint				\$2 175 000.00	0.91	\$1 979 250.00
7:55 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.25	\$46 143.50	
		Origin Energy	ER01	Energy	\$48.99	-0.69	-\$33.80	

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
		Origin Energy	ER02	Energy	\$48.99	-0.69	-\$33.80
		Origin Energy	ER04	Energy	\$48.99	-0.69	-\$33.80
		CS Energy	W/HOE#2	Raise 5 min	\$22.73	-2.07	-\$47.05
		Origin Energy	ER01	Raise 5 min	\$2.79	0.69	\$1.93
		Origin Energy	ER02	Raise 5 min	\$2.79	1.38	\$3.85
		Origin Energy	ER02	Raise reg	\$44.20	-0.69	-\$30.50
		Origin Energy	ER04	Raise reg	\$44.20	0.69	\$30.50
		CS Energy	GSTONE6	Raise 60 sec	\$29.87	-2.07	-\$61.83
		Origin Energy	ER01	Raise 60 sec	\$2.80	0.69	\$1.93
		Origin Energy	ER02	Raise 60 sec	\$2.80	1.38	\$3.86
		AGL Energy	BW02	Raise 6 sec	\$20.80	-2.07	-\$43.06
		Origin Energy	ER01	Raise 6 sec	\$1.74	0.69	\$1.20
		Origin Energy	ER02	Raise 6 sec	\$1.74	1.38	\$2.40
8:00 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	0.91	\$1 979 250.00
Spot Price		\$14 135/MWh					

Table 25: 8.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
8:05 PM	\$14 500.00	Ecogen Energy	JLA01	Energy	\$14 489.89	0.33	\$4781.66
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.33	\$4781.66
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.33	\$4781.66
8:10 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	2.03	\$28 823.97
		ERMPower and Arrow	BRAEMAR5	Energy	\$144.00	0.54	\$77.76
		ERMPower and Arrow	BRAEMAR6	Energy	\$144.00	0.62	\$89.28
		Delta Electricity	VP5	Energy	\$94.80	-1.02	-\$96.70
		Delta Electricity	VP6	Energy	\$94.80	-1.02	-\$96.70
		Delta Electricity	VP5	Raise reg	\$300.00	1.02	\$306.00
		Delta Electricity	VP6	Raise reg	\$300.00	1.02	\$306.00
		Snowy Hydro	UPPTUMUT	Raise reg	\$0.00	-2.03	\$0.00
8:15 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.26	\$46 285.48
		Stanwell	TARONG#1	Energy	\$83.50	-0.67	-\$55.95
		Stanwell	TARONG#2	Energy	\$83.50	-0.67	-\$55.95
		Stanwell	TARONG#4	Energy	\$83.50	-0.67	-\$55.95
8:20 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	2.01	\$28 539.99
		Braemar Power Projects	BRAEMAR2	Energy	\$100.99	-0.85	-\$85.84
8:25 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	2.01	\$28 539.99
		Braemar Power Projects	BRAEMAR3	Energy	\$128.88	-0.86	-\$110.84
8:30 PM	\$14 489.89	Ecogen Energy	JLA01	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.25	\$3622.47
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.25	\$3622.47

Spot Price \$14 158/MWh

Table 26: 9.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
8:35 PM	\$14 489.89	Ecogen Energy	JLA04	Energy	\$14 489.89	1.00	\$14 489.89
8:40 PM	\$14 448.53	Ecogen Energy	JLB01	Energy	\$14 448.53	0.33	\$4768.01
		Ecogen Energy	JLB02	Energy	\$14 448.53	0.33	\$4768.01
		Ecogen Energy	JLB03	Energy	\$14 448.53	0.33	\$4768.01
8:45 PM	\$13 712.89	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	1.05	\$14 908.95

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
		Origin Energy	ER01	Energy	\$48.99	-0.35	-\$17.15
		Origin Energy	ER02	Energy	\$48.99	-0.35	-\$17.15
		Origin Energy	ER04	Energy	\$48.99	-0.35	-\$17.15
		Snowy Hydro	MURRAY	Energy	-\$1000.00	1.00	-\$1000.00
		Hornsedale Power Reserve	HPRG1	Raise 5 min	\$10.00	-1.05	-\$10.50
		Origin Energy	ER04	Raise 5 min	\$2.79	1.05	\$2.93
		Origin Energy	ER01	Raise reg	\$23.98	0.35	\$8.39
		Origin Energy	ER02	Raise reg	\$23.98	0.35	\$8.39
		Origin Energy	ER04	Raise reg	\$23.98	-0.70	-\$16.79
		EnergyAustralia	YWPS1	Raise 60 sec	\$52.00	-1.05	-\$54.60
		Origin Energy	ER04	Raise 60 sec	\$2.80	1.05	\$2.94
		AGL Energy	BW01	Raise 6 sec	\$20.80	-1.05	-\$21.84
		Origin Energy	ER04	Raise 6 sec	\$1.74	1.05	\$1.83
8.50 PM	\$13 712.89	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	1.05	\$14 908.95
		Origin Energy	ER04	Energy	\$48.99	-1.05	-\$51.44
		Snowy Hydro	MURRAY	Energy	-\$1000.00	1.00	-\$1000.00
		Hornsedale Power Reserve	HPRG1	Raise 5 min	\$10.00	-1.05	-\$10.50
		Origin Energy	ER04	Raise 5 min	\$2.79	1.05	\$2.93
		EnergyAustralia	YWPS1	Raise 60 sec	\$52.00	-1.05	-\$54.60
		Origin Energy	ER04	Raise 60 sec	\$2.80	1.05	\$2.94
		AGL Energy	BW01	Raise 6 sec	\$20.80	-1.05	-\$21.84
		Origin Energy	ER04	Raise 6 sec	\$1.74	1.05	\$1.83
8.55 PM	\$12 914.91	EnergyAustralia	AGLHAL	Energy	\$13 998.99	0.92	\$12 879.07
9.00 PM	\$0.00	EnergyAustralia	YWPS2	Energy	\$0.00	1.00	\$0.00

Spot Price \$11 464/MWh

South Australia

Table 27: 4.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
3:35 pm	\$12 974.06	Ecogen Energy	NPS	Energy	\$14 189.81	0.91	\$12 912.73
3:40 pm	\$13 481.47	Snowy Hydro	LNGS1	Energy	\$14 500.00	0.25	\$3625.00
		Snowy Hydro	LNGS2	Energy	\$14 500.00	0.25	\$3625.00
		Snowy Hydro	VPGS1	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS2	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS3	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS4	Energy	\$14 500.00	0.09	\$1305.00
		Snowy Hydro	VPGS5	Energy	\$14 500.00	0.09	\$1305.00
3:45 pm	\$12 349.11	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	0.94	\$13 347.06
		Stanwell	STAN-2	Energy	\$144.63	-0.53	-\$76.65
		Stanwell	STAN-3	Energy	\$144.63	-0.53	-\$76.65
		Snowy Hydro	MURRAY	Energy	-\$1000.00	0.90	-\$900.00
3:50 pm	\$12 495.48	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	0.96	\$13 631.04
		Stanwell	STAN-2	Energy	\$144.63	-0.54	-\$78.10
		Stanwell	STAN-3	Energy	\$144.63	-0.54	-\$78.10
		Snowy Hydro	MURRAY	Energy	-\$1000.00	0.91	-\$910.00
3:55 pm	\$12 418.75	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	0.95	\$13 489.05
		Stanwell	STAN-2	Energy	\$144.63	-0.53	-\$76.65
		Stanwell	STAN-3	Energy	\$144.63	-0.53	-\$76.65
		Snowy Hydro	MURRAY	Energy	-\$1000.00	0.91	-\$910.00
4:00 pm	\$13 343.26	Ecogen Energy	JLA01	Energy	\$14 489.89	0.23	\$3332.67
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.23	\$3332.67
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.23	\$3332.67
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.23	\$3332.67

Spot Price \$12 844/MWh

Table 28: 4.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
4:05 PM	\$13 371.48	Ecogen Energy	JLA01	Energy	\$14 489.89	0.23	\$3332.67
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.23	\$3332.67
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.23	\$3332.67
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.23	\$3332.67

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
4:10 PM	\$13 685.54	EnergyAustralia	BALBG1	Energy	\$14 500.00	0.94	\$13 630.00
4:15 PM	\$13 664.42	Ecogen Energy	JLA01	Energy	\$14 489.89	0.24	\$3477.57
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.24	\$3477.57
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.24	\$3477.57
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.24	\$3477.57
4:20 PM	\$14 500.00	Origin Energy	URANQ11	Energy	\$14 500.00	0.44	\$6380.00
		Origin Energy	URANQ12	Energy	\$14 500.00	0.44	\$6380.00
		Origin Energy	URANQ13	Energy	\$14 500.00	0.44	\$6380.00
		Origin Energy	URANQ14	Energy	\$14 500.00	0.44	\$6380.00
		ERM Power	OAKY2	Energy	\$118.69	-0.74	-\$87.83
4:25 PM	\$14 500.00	Origin Energy	URANQ11	Energy	\$14 500.00	0.44	\$6380.00
		Origin Energy	URANQ12	Energy	\$14 500.00	0.44	\$6380.00
		Origin Energy	URANQ13	Energy	\$14 500.00	0.44	\$6380.00
		Origin Energy	URANQ14	Energy	\$14 500.00	0.44	\$6380.00
		Stanwell	STAN-1	Energy	\$144.63	-0.10	-\$14.46
		Stanwell	STAN-2	Energy	\$144.63	-0.34	-\$49.17
		Stanwell	STAN-3	Energy	\$144.63	-0.30	-\$43.39
4:30 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	1.92	\$27 262.08
		Origin Energy	ER01	Energy	\$32.65	-0.40	-\$13.06
		Origin Energy	ER02	Energy	\$32.65	-0.40	-\$13.06
		CS Energy	W/HOE#2	Raise 5 min	\$22.73	-0.80	-\$18.18
		Origin Energy	ER01	Raise 5 min	\$2.79	0.40	\$1.12
		Origin Energy	ER02	Raise 5 min	\$2.79	0.40	\$1.12
		CS Energy	GSTONE6	Raise 60 sec	\$29.87	-0.80	-\$23.90
		Origin Energy	ER01	Raise 60 sec	\$2.80	0.40	\$1.12
		Origin Energy	ER02	Raise 60 sec	\$2.80	0.40	\$1.12
		EnergyAustralia	YWPS2	Raise 6 sec	\$20.70	-0.80	-\$16.56
		Origin Energy	ER01	Raise 6 sec	\$1.74	0.40	\$0.70
		Origin Energy	ER02	Raise 6 sec	\$1.74	0.40	\$0.70

Spot Price \$13 711/MWh

Table 29: 5.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
4:35 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	5.57	\$79 082.86
		CS Energy	GSTONE1	Energy	\$104.73	-0.92	-\$96.35

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
		CS Energy	GSTONE3	Energy	\$104.73	-0.92	-\$96.35
		CS Energy	GSTONE4	Energy	\$104.73	-0.92	-\$96.35
		CS Energy	GSTONE6	Energy	\$104.73	-0.92	-\$96.35
		AGL Energy	BW01	Lower reg	\$14.00	3.67	\$51.38
		CS Energy	GSTONE1	Lower reg	\$8.73	-0.92	-\$8.03
		CS Energy	GSTONE3	Lower reg	\$8.73	-0.92	-\$8.03
		CS Energy	GSTONE4	Lower reg	\$8.73	-0.92	-\$8.03
		CS Energy	GSTONE6	Lower reg	\$8.73	-0.92	-\$8.03
4:40 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	0.94	\$2 044 500.00
4:45 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14198.00	6.57	\$93 280.86
		ERM Power	OAKEY2	Energy	\$118.69	-4.23	-\$502.06
4:50 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14199.00	4.25	\$60345.75
		Stanwell	STAN-1	Energy	\$105.63	-0.90	-\$95.07
		Stanwell	STAN-4	Energy	\$105.63	-0.90	-\$95.07
4:55 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	0.93	\$2 022 750.00
5:00 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	0.93	\$2 022 750.00
Spot Price		\$13 025/MWh					

Table 30: 5.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
5:05 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:10 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:15 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:20 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:25 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:30 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
Spot Price		\$14 500/MWh					

Table 31: 6.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
5:35 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:40 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:45 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
5:50 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
5:55 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:00 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
Spot Price		\$14 500/MWh					

Table 32: 6.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
6:05 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:10 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:15 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:20 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:25 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:30 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
Spot Price		\$14 500/MWh					

Table 33: 7.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
6:35 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:40 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:45 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:50 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
6:55 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
7:00 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
Spot Price		\$14 500/MWh					

Table 34: 7.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
7:05 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
7:10 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
7:15 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.45	\$48 983.10
		Stanwell	STAN-1	Energy	\$105.63	-0.51	-\$53.87
		Stanwell	STAN-2	Energy	\$105.63	-0.63	-\$66.55
		Stanwell	STAN-3	Energy	\$105.63	-0.51	-\$53.87
		Stanwell	STAN-4	Energy	\$105.63	-0.51	-\$53.87

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
7:20 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
7:25 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00
7:30 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00

Spot Price \$14 500/MWh

Table 35: 8.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
7:35 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2175000.00
7:40 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2175000.00
7:45 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.62	\$51396.76
		Stanwell	STAN-1	Energy	\$105.63	-0.68	-\$71.83
		Stanwell	STAN-2	Energy	\$105.63	-0.85	-\$89.79
		Stanwell	STAN-4	Energy	\$105.63	-0.68	-\$71.83
7:50 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2175000.00
7:55 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.63	\$51 538.74
		Origin Energy	ER01	Energy	\$48.99	-0.77	-\$37.72
		Origin Energy	ER02	Energy	\$48.99	-0.77	-\$37.72
		Origin Energy	ER04	Energy	\$48.99	-0.77	-\$37.72
		Origin Energy	ER02	Raise reg	\$44.20	-0.77	-\$34.03
		Origin Energy	ER04	Raise reg	\$44.20	0.77	\$34.03
		CS Energy	GSTONE6	Raise 60 sec	\$29.87	-2.32	-\$69.30
		CS Energy	W/HOE#2	Raise 5 min	\$22.73	-2.32	-\$52.73
		AGL Energy	BW02	Raise 6 sec	\$20.80	-2.32	-\$48.26
		Origin Energy	ER01	Raise 60 sec	\$2.80	0.77	\$2.16
		Origin Energy	ER02	Raise 60 sec	\$2.80	1.54	\$4.31
		Origin Energy	ER01	Raise 5 min	\$2.79	0.77	\$2.15
		Origin Energy	ER02	Raise 5 min	\$2.79	1.54	\$4.30
		Origin Energy	ER01	Raise 6 sec	\$1.74	0.77	\$1.34
		Origin Energy	ER02	Raise 6 sec	\$1.74	1.54	\$2.68

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
8:00 PM	\$14 500.00	Generation deficit constraint			\$2 175 000.00	1.00	\$2 175 000.00

Spot Price \$14 500/MWh

Table 36: 8.30 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
8:05 PM	\$14 500.00	Ecogen Energy	JLA01	Energy	\$14 489.89	0.36	\$5216.36
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.36	\$5216.36
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.36	\$5216.36
8:10 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	2.21	\$31 379.79
		Delta Electricity	VP5	Raise reg	\$300.00	1.11	\$333.00
		Delta Electricity	VP6	Raise reg	\$300.00	1.11	\$333.00
		ERMPower and Arrow	BRAEMAR5	Energy	\$144.00	0.59	\$84.96
		ERMPower and Arrow	BRAEMAR6	Energy	\$144.00	0.68	\$97.92
		Delta Electricity	VP5	Energy	\$94.80	-1.11	-\$105.23
		Delta Electricity	VP6	Energy	\$94.80	-1.11	-\$105.23
		Snowy Hydro	UPPTUMUT	Raise reg	\$0.00	-2.21	\$0.00
8:15 PM	\$14 500.00	Snowy Hydro	TUMUT3	Energy	\$14 198.00	3.54	\$50 260.92
		Stanwell	TARONG#1	Energy	\$83.50	-0.73	-\$60.96
		Stanwell	TARONG#2	Energy	\$83.50	-0.73	-\$60.96
		Stanwell	TARONG#4	Energy	\$83.50	-0.73	-\$60.96
8:20 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	2.19	\$31 095.81
		Braemar Power Projects	BRAEMAR2	Energy	\$100.99	-0.92	-\$92.91
8:25 PM	\$14 500.00	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	2.21	\$31 379.79
		Braemar Power Projects	BRAEMAR3	Energy	\$128.88	-0.95	-\$122.44
8:30 PM	\$14 500.00	Ecogen Energy	JLA01	Energy	\$14 489.89	0.27	\$3912.27
		Ecogen Energy	JLA02	Energy	\$14 489.89	0.27	\$3912.27
		Ecogen Energy	JLA03	Energy	\$14 489.89	0.27	\$3912.27
		Ecogen Energy	JLA04	Energy	\$14 489.89	0.27	\$3912.27

Spot Price \$14 500/MWh

Table 37: 9.00 pm

DI	Dispatch Price (\$/MWh)	Participant	Unit	Service	Offer price (\$/MWh)	Marginal change	Contribution
8:35 PM	\$14 500.00	Ecogen Energy	JLA04	Energy	\$14 489.89	1.08	\$15 649.08
8:40 PM	\$14 500.00	Ecogen Energy	JLB01	Energy	\$14 448.53	0.36	\$5201.47
		Ecogen Energy	JLB02	Energy	\$14 448.53	0.36	\$5201.47
		Ecogen Energy	JLB03	Energy	\$14 448.53	0.36	\$5201.47
8:45 PM	\$14 787.47	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	1.13	\$16 044.87
		Origin Energy	ER01	Energy	\$48.99	-0.38	-\$18.62
		Origin Energy	ER02	Energy	\$48.99	-0.38	-\$18.62
		Origin Energy	ER04	Energy	\$48.99	-0.38	-\$18.62
		Snowy Hydro	MURRAY	Energy	-\$1000.00	1.08	-\$1080.00
		Hornsedale Power Reserve	HPRG1	Raise 5 min	\$10.00	-1.13	-\$11.30
		Origin Energy	ER04	Raise 5 min	\$2.79	1.13	\$3.15
		Origin Energy	ER01	Raise reg	\$23.98	0.38	\$9.11
		Origin Energy	ER02	Raise reg	\$23.98	0.38	\$9.11
		Origin Energy	ER04	Raise reg	\$23.98	-0.75	-\$17.99
		EnergyAustralia	YWPS1	Raise 60 sec	\$52.00	-1.13	-\$58.76
		Origin Energy	ER04	Raise 60 sec	\$2.80	1.13	\$3.16
		AGL Energy	BW01	Raise 6 sec	\$20.80	-1.13	-\$23.50
		Origin Energy	ER04	Raise 6 sec	\$1.74	1.13	\$1.97
8:50 PM	\$14 707.86	Snowy Hydro	UPPTUMUT	Energy	\$14 199.00	1.12	\$15 902.88
		Origin Energy	ER04	Energy	\$48.99	-1.12	-\$54.87
		Snowy Hydro	MURRAY	Energy	-\$1000.00	1.07	-\$1070.00
		Hornsedale Power Reserve	HPRG1	Raise 5 min	\$10.00	-1.12	-\$11.20
		Origin Energy	ER04	Raise 5 min	\$2.79	1.12	\$3.12
		EnergyAustralia	YWPS1	Raise 60 sec	\$52.00	-1.12	-\$58.24
		Origin Energy	ER04	Raise 60 sec	\$2.80	1.12	\$3.14
		AGL Energy	BW01	Raise 6 sec	\$20.80	-1.12	-\$23.30
8:55 PM	\$13 998.99	EnergyAustralia	AGLHAL	Energy	\$13 998.99	1.00	\$13 998.99
9:00 PM	\$0.00	EnergyAustralia	YWPS2	Energy	\$0.00	1.08	\$0.00

Spot Price \$12 000/MWh

Appendix C: Closing bids

Figure 3 to Figure 8 highlight the half hour closing bids for participants in Victoria and South Australia with significant capacity priced at or above \$5000/MWh during the periods in which the spot price exceeded \$5000/MWh. They also show generation output and the spot price.

Victoria

Figure 3: AGL Energy

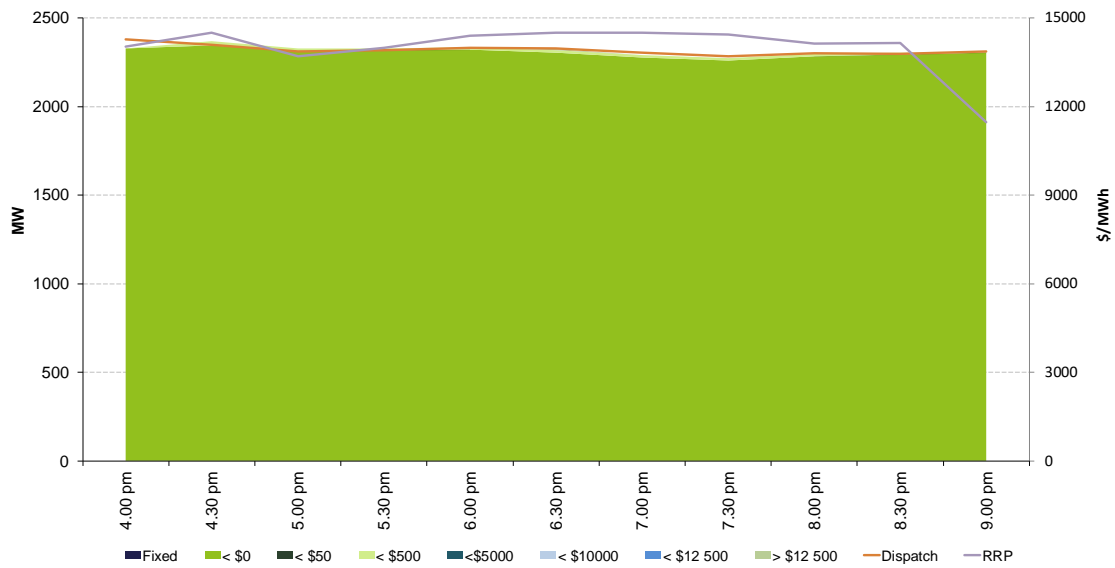


Figure 4: Alinta Energy

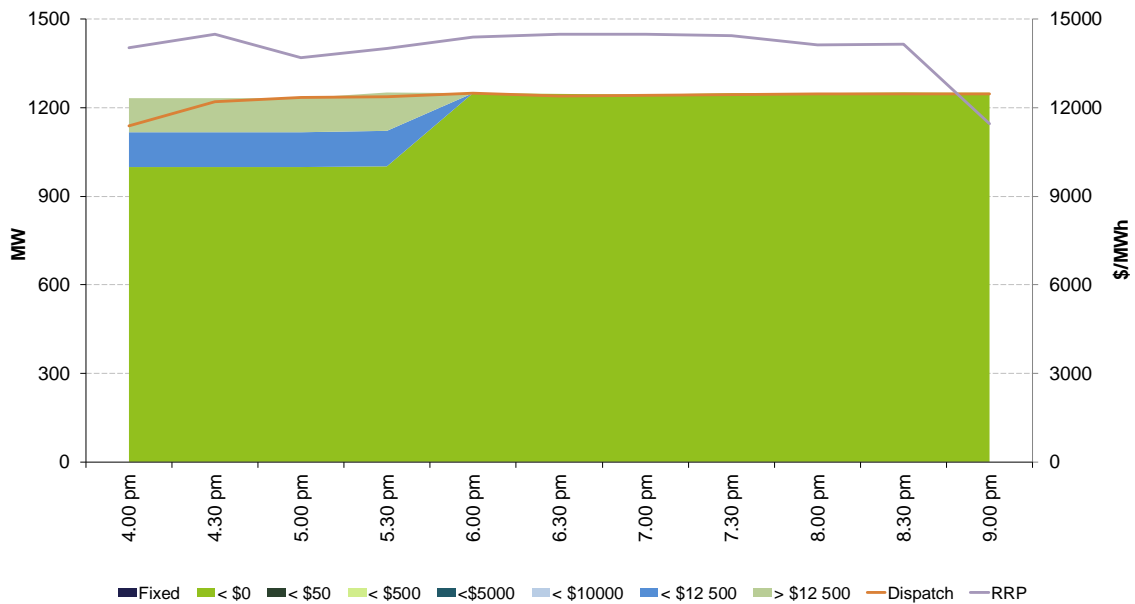


Figure 5: Energy Australia

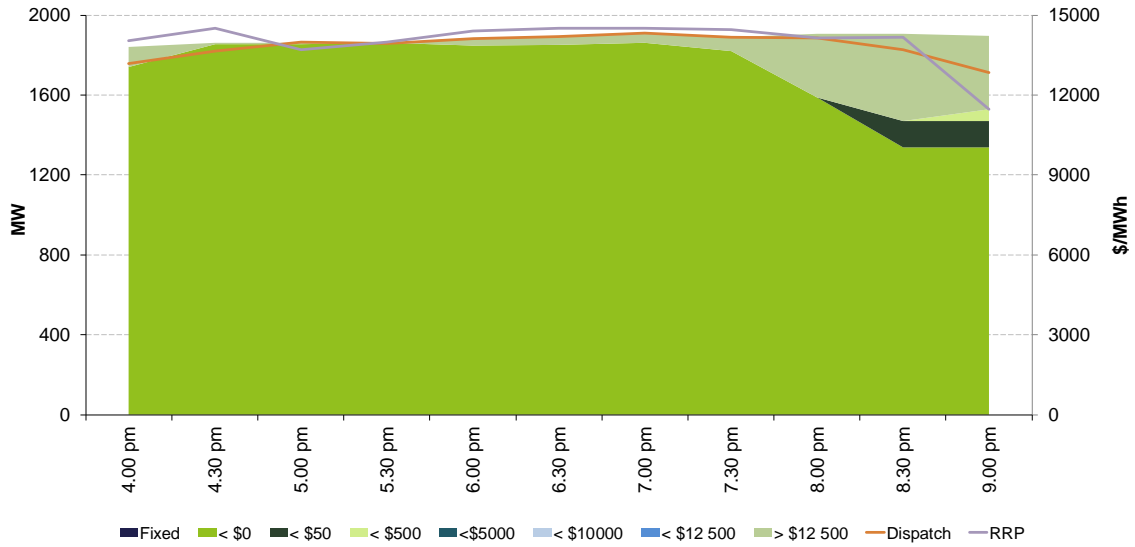
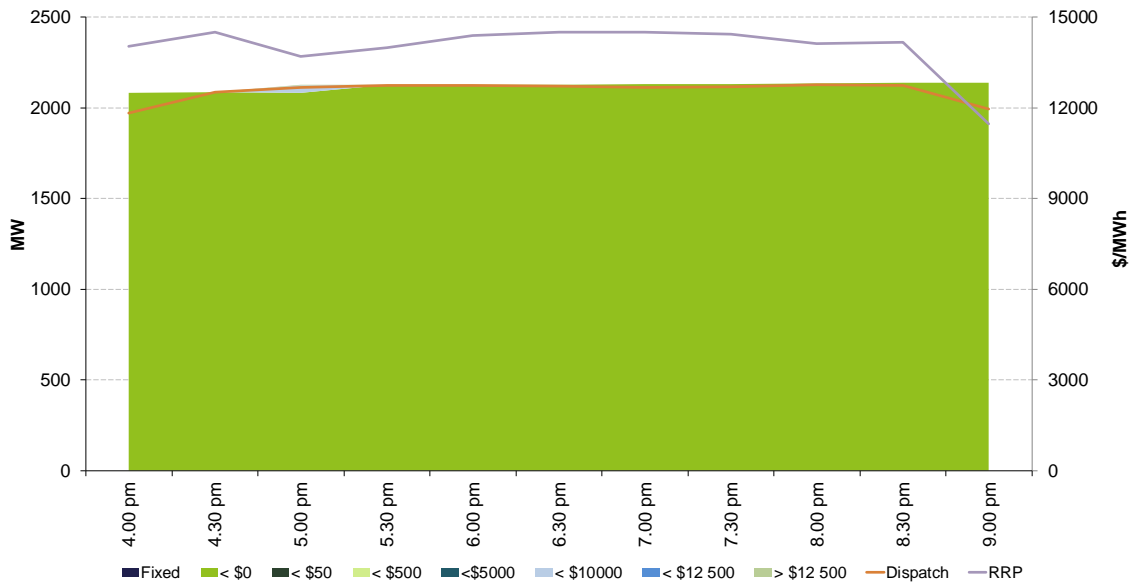


Figure 6: Snowy Hydro



South Australia

Figure 7: Hornsdale Power Reserve

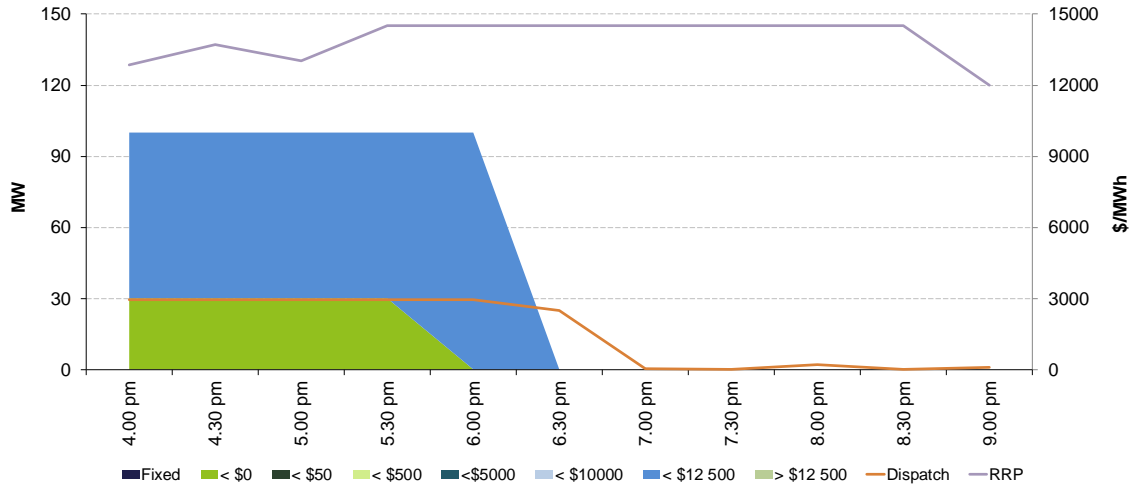
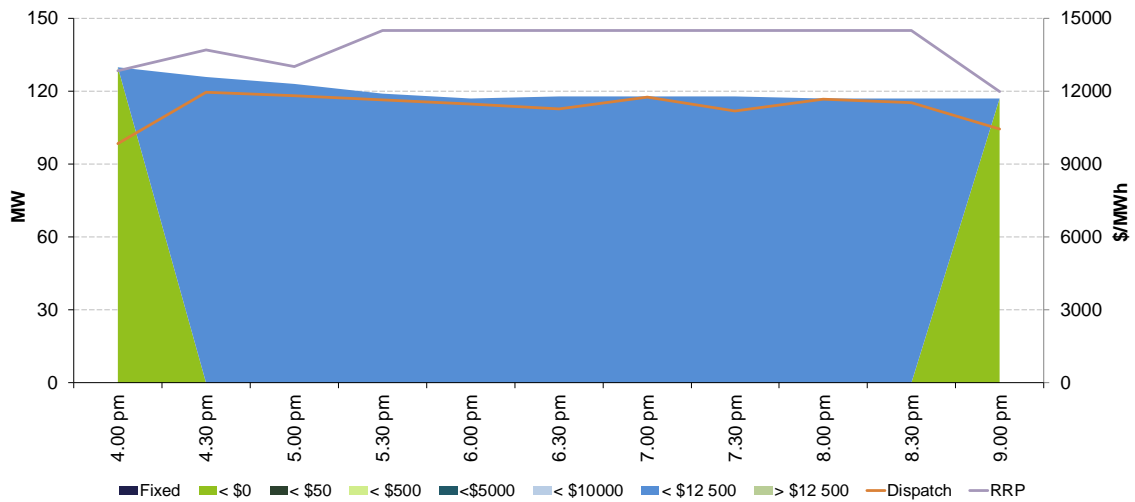


Figure 8: Snowy Hydro



Appendix D: Spot price for Victoria and South Australia

Table 38: Victoria and South Australia actual and forecast four and 12 hours ahead

Trading interval	Victoria Price (\$/MWh)			South Australia Price (\$/MWh)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
4 pm	14033	14500	14204	12844	13869	14122
4.30 pm	14497	14500	14500	13711	14500	14313
5 pm	13702	14500	14500	13025	14500	14500
5.30 pm	13999	14500	14500	14500	14500	14500
6 pm	14395	14500	14500	14500	14500	14500
6.30 pm	14500	14500	14500	14500	14500	14500
7 pm	14500	14500	13891	14500	14500	14500
7.30 pm	14445	14500	14345	14500	14500	14500
8 pm	14135	10063	14484	14500	10618	14500
8.30 pm	14158	180	13579	14500	197	13999
9 pm	11464	411	331	12000	439	378

Table 39: Actual and forecast spot price, demand and available capacity for Victoria)

Trading Interval	Price (\$/MWh)			Demand (MW)			Generator Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
4 pm	14033	14500	14204	8807	8575	8226	8483	8498	8357
4.30 pm	14497	14500	14500	8999	8753	8441	8494	8563	8374
5 pm	13702	14500	14500	9159	8844	8595	8494	8515	8358
5.30 pm	13999	14500	14500	9187	8877	8605	8544	8477	8312
6 pm	14395	14500	14500	9281	8876	8643	8543	8416	8258
6.30 pm	14500	14500	14500	9106	8841	8682	8463	8375	8206
7 pm	14500	14500	13891	8852	8674	8524	8309	8320	8480
7.30 pm	14445	14500	14345	8669	8493	8497	8250	8263	8437
8 pm	14135	10063	14484	8556	8217	8291	8247	8253	8297
8.30 pm	14158	180	13579	8468	8023	8111	8270	8292	8281
9 pm	11464	411	331	8058	7643	7669	8290	8279	8357

Table 40: Actual and forecast spot price, demand and available capacity for the South Australia

Trading Interval	Price (\$/MWh)			Demand (MW)			Generator Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
4 pm	12844	13869	14122	2838	2833	2841	3097	3188	3159
4.30 pm	13711	14500	14313	2938	2911	2911	3071	3125	3152
5 pm	13025	14500	14500	2954	2959	2990	3041	3120	3130
5.30 pm	14500	14500	14500	2967	3047	3020	3057	3104	3113
6 pm	14500	14500	14500	2922	3092	3042	3052	3083	3099
6.30 pm	14500	14500	14500	2973	3131	3062	3020	3057	3082
7 pm	14500	14500	14500	2994	3160	3089	2951	2991	3062
7.30 pm	14500	14500	14500	2992	3136	3073	2883	2951	3014
8 pm	14500	10618	14500	2968	3087	3006	2761	2955	2980
8.30 pm	14500	197	13999	2896	3022	2934	2725	2941	2995
9 pm	12000	439	378	2846	2958	2821	2721	2968	3037

Appendix E: Relevant Market Notices

Table 41: Lack of Reserves – Victoria

Market Notice	Time	LOR	Contingent capacity requirement (MW)	Minimum reserve capacity available (MW)
66484	2.47 pm (21 Jan)	Forecast LOR1	1120	740
66486	5.04 pm (21 Jan)	Forecast LOR 2	1075	908
66489	7.43 am (22 Jan)	Forecast LOR2 update	1100	902
66499	3.26 pm (22 Jan)	Forecast LOR1 cancellation		
66542	1.13 pm (23 Jan)	Forecast LOR2	991	256
66553	3.04 pm (23 Jan)	Forecast LOR1	1120	1050
66556	4.18 pm (23 Jan)	Forecast LOR3	39 MW to be interrupted	
66569	8.50 pm (23 Jan)	Forecast LOR3 cancellation		
RERT contracts dispatched at 2.24 pm (Market Notice 66619)				
66621	3.21 pm (24 Jan)	Actual LOR1	1120	761
RERT contracts activated from 4.30 pm (Market Notice 66629)				
66630	4.22 pm (24 Jan)	Actual LOR2	560	56
66637	5.03 pm (24 Jan)	Forecast LOR3	39 MW to be interrupted	
66670	6.14 pm (24 Jan)	Actual LOR3	Max of 266 MW to be interrupted at 6.10 pm	
66708	8 pm (24 Jan)	Actual LOR3 cancellation		
66710	8.32 pm (24 Jan)	Load restoration direction cancellation	Load restoration as directed is complete In response to 66670	
66722	9.54 pm (24 Jan)	Actual LOR2 cancellation		
66723	9.56 pm (24 Jan)	Actual LOR1 cancellation		

Table 42: Lack of Reserves – South Australia

Market Notice	Time	LOR	Contingent capacity requirement (MW)	Minimum reserve capacity available (MW)
66498	3.26 pm (22 Jan)	Forecast LOR1	600	474
66506	4:51 pm (22 Jan)	Forecast LOR2	351	215
66550	1.14 pm (23 Jan)	Forecast LOR2	316	256
66551	2.58 pm (23 Jan)	Forecast LOR1	429	300
66552	3.01 pm (23 Jan)	Forecast LOR2 cancellation		
RERT contracts dispatched at 2.24 pm (Market Notice 66619)				
RERT contracts activated from 4.30 pm (Market Notice 66629)				
66558	4.18 pm (23 Jan)	Forecast LOR3	39 MW to be interrupted	
66560	4.49 pm (23 Jan)	Forecast LOR2	260	54
66570	8.53 pm (23 Jan)	Forecast LOR3 cancellation		
66627	4 pm (24 Jan)	Suspect forecast LOR3		
66638	5.03 pm (24 Jan)	Forecast LOR3	39 MW to be interrupted	
66666	6.06 pm (24 Jan)	Actual LOR2	233	10
66721	9.53 pm (24 Jan)	Actual LOR2 cancellation		

The following market notices published by AEMO are relevant to AEMO's use of intervention pricing through the RERT during the price events on the day.

Market Notice	Type	Date of issue	Last Changed
66616	Market Intervention	24/01/2019 13:54	24/01/2019 13:54
External Reference			
INTENTION TO COMMENCE RERT CONTRACT NEGOTIATIONS			
Reason			
<p>AEMO ELECTRICITY MARKET NOTICE.</p> <p>Reliability and Emergency Reserve Trader (RERT) Intention to negotiate for additional reserve - SA1, VIC1 Region- 24/01/2019</p> <p>Refer to AEMO Electricity Market Notice no. 66605.</p> <p>AEMO intends to commence negotiations with RERT Panel members for the provision of additional reserve by issuing requests for tender for the following period of time;</p> <p>14:00 to 22:00 hrs 24/01/2019</p> <p>If reserve is required, the period of activation or dispatch will be within this period but may not be for the entire period.</p> <p>AEMO will issue a further advice if reserve is contracted.</p> <p>Manager NEM Real Time Operations</p>			

Market Notice	Type	Date of issue	Last Changed
66619	Market Intervention	24/01/2019 14:24	24/01/2019 14:24
External Reference			
RERT DISPATCHED			
Reason			
<p>AEMO ELECTRICITY MARKET NOTICE.</p> <p>AEMO Intervention Event, Reliability and Emergency Reserve Trader (RERT) - SA1, VIC1 Region- 24/01/2019</p> <p>Refer AEMO Electricity Market Notice no. 66616</p> <p>AEMO has dispatched/activated reserve contract(s) to maintain the power system in a Secure and Reliable operating state.</p> <p>The reserve contract(s) was dispatched/activated at 16:30 hrs 24/01/2019 and is forecast to apply until 19:00 hrs 24/01/2019</p> <p>AEMO has implemented an AEMO intervention event for the duration the reserve contract(s) is dispatched/activated/</p> <p>To facilitate the RERT process, constraints commencing with the following identifiers may be evident at various times in dispatch,</p> <p>#RT_SA1, #RT_VIC1</p> <p>Manager NEM Real Time Operations</p>			

Market Notice	Type	Date of issue	Last Changed
66629	Market Intervention	24/01/2019 16:04	24/01/2019 16:04

External Reference

AEMO Intervention Event - Intervention price dispatch intervals - 24/01/2019

Reason

AEMO ELECTRICITY MARKET NOTICE.

AEMO Intervention Event - Intervention price dispatch intervals - 24/01/2019

Refer AEMO Electricity Market Notice no. 66619

An AEMO Intervention Event, the dispatch of Reliability and Emergency Reserve Trader (RERT) has been implemented.

The AEMO Intervention Event commenced at 14:30 hrs 24/01/2019 and is forecast to apply until 22:00 hrs 24/01/2019

AEMO declares all dispatch intervals during the AEMO Intervention Event to be intervention price dispatch intervals.

The AEMO Intervention Event is expected to affect dispatch quantities for intervention pricing purposes from the 16:05 hrs dispatch interval on 24/01/2019

Manager NEM Real Time Operations

Market Notice	Type	Date of issue	Last Changed
66710	Market Intervention	24/01/2019 20:32	24/01/2019 20:32

External Reference

Load Restoration Direction Cancellation

Reason

AEMO ELECTRICITY MARKET NOTICE

ELECTRICITY MARKET DIRECTION NOTICE

Cancellation - Load Restoration Direction in the Victoria Region - 24/01/2019

Refer to AEMO Electricity Market Notice 66670

Load restoration as directed is complete. Direction cancelled from 2000 hrs 24/01/2019

Manager NEM Real Time Operations

Market Notice	Type	Date of issue	Last Changed
66725	Market Intervention	24/01/2019 22:34	24/01/2019 22:34

External Reference

End of RERT Dispatch - null and End of intervention event

Reason

AEMO ELECTRICITY MARKET NOTICE.

End of Reliability and Emergency Reserve Trader (RERT) dispatch for - SA1, VIC1 Region - <#TIMESTAMP> and end of AEMO Intervention Event.

Refer AEMO Electricity Market Notices 66629

Activation of reserve contract(s) has ended.

The reserve contract(s) were activated from <#INTERVENTION_START_DATETIME> to <#INTERVENTION_END_DATETIME>

The AEMO Intervention Event ended from <#INTERVENTION_END_DATETIME>

Manager NEM Real Time Operations

Market Notice	Type	Date of issue	Last Changed
66726	Market Intervention	24/01/2019 22:36	24/01/2019 22:36

External Reference

Cancellation - AEMO Intervention Event - Intervention price dispatch intervals

Reason

AEMO ELECTRICITY MARKET NOTICE

Cancellation - AEMO Intervention Event - Intervention price dispatch intervals

Refer Market Notice 66629

The AEMO Intervention Event, the dispatch of Reliability and Emergency Reserve Trader (RERT) has ended at 2230 hrs 24/01/2019

Manager NEM Real Time Operations

Appendix F: Pricing during an intervention

At times, AEMO, may need to override the normal dispatch process to maintain system security. In accordance with the National Electricity Rules, a dispatch interval where an AEMO intervention event occurs, must be declared an intervention price dispatch interval and set the energy and Frequency Control Ancillary Service (FCAS) prices for all regions as if AEMO had not intervened in the market. An intervention pricing interval is declared when AEMO directs a participant to operate plant other than in accordance with dispatch instructions, or activates a reliability and emergency reserve trader (RERT) contract.

RERT contracts refer to specific arrangements by AEMO by which additional capacity may be made available under special circumstances. AEMO may dispatch or activate RERT contract(s) to address a power system security situation.

Under normal operations AEMO sets targets for generation and interconnectors and determines wholesale electricity market prices (energy and FCAS) in a single calculation for every five minute dispatch interval. Under “Intervention pricing” these are calculated twice for each dispatch interval, one taking into account the direction called “Intervention” and one that does not include the direction called “What-if”.

The “Intervention” calculation takes into account the direction by AEMO and is used to set targets for generation in order to meet demand. The pricing outcome of this calculation is not received by the generators.

The “What-If” calculation does not take the direction into account and is used to calculate the wholesale electricity market price and is received by generators. The generation targets calculated are not used to dispatch generation.

These calculations dispatch generation to meet demand (intervention calculation) while providing the pricing signal to indicate a shortage of supply (what-if calculation).

The RERT was activated in Victoria and South Australia from 4.05 pm to 10.30 pm, during this time the spot price was above \$5000/MWh from for the trading intervals from 4 pm until 9 pm.

Table 43: "What-if" and intervention pricing outcomes

Trading Interval	Victoria		South Australia	
	Intervention price (\$/MWh)	“What-if” price (\$/MWh)	Intervention Price (\$/MWh)	“What-if” price (\$/MWh)
4.30 pm	14,450	14,497	13,652	13,711
5.00pm	13,129	13,702	12,778	13,025
5.30 pm	14,089	13,999	13,068	14,500
6.00 pm	14,500	14,395	12,157	14,500
6.30 pm	13,695	14,500	12,761	14,500
7.00 pm	14,476	14,498	12,759	14,176

7.30 pm	14,500	14,445	13,853	14,500
8.00 pm	14,500	14,135	14,500	14,500
8.30 pm	13,786	14,158	13,853	14,500
9.00 pm	3,884	11,465	4,027	12,000

Appendix G: Lack of Reserve explained

AEMO is required to monitor the level of reserve, or spare capacity, within each region of the NEM. Reserves are defined as the difference between the volume of electricity that can be made available to consumers, either by local generation or through the network from other regions of the NEM, and the regional customer demand at that time.

Reserves are an indicator of the supply demand balance and an important tool to communicate with the market potential and actual shortfalls. This is achieved through the release of lack of reserve (LOR) notices by AEMO. Forecast LOR notices are designed to elicit a market response from generators to increase their declared available capacity or retailers to reduce demand to address any forecast reserve shortfalls. Actual LOR notices are also issued when the thresholds are actually triggered.

There are three reserve thresholds, which relate to managing power system security following a defined number of unplanned failures of either transmission or generating equipment (credible contingencies). An example of a credible contingency would be the failure of a large generator or the failure of a transmission line that would reduce interconnector capacity.

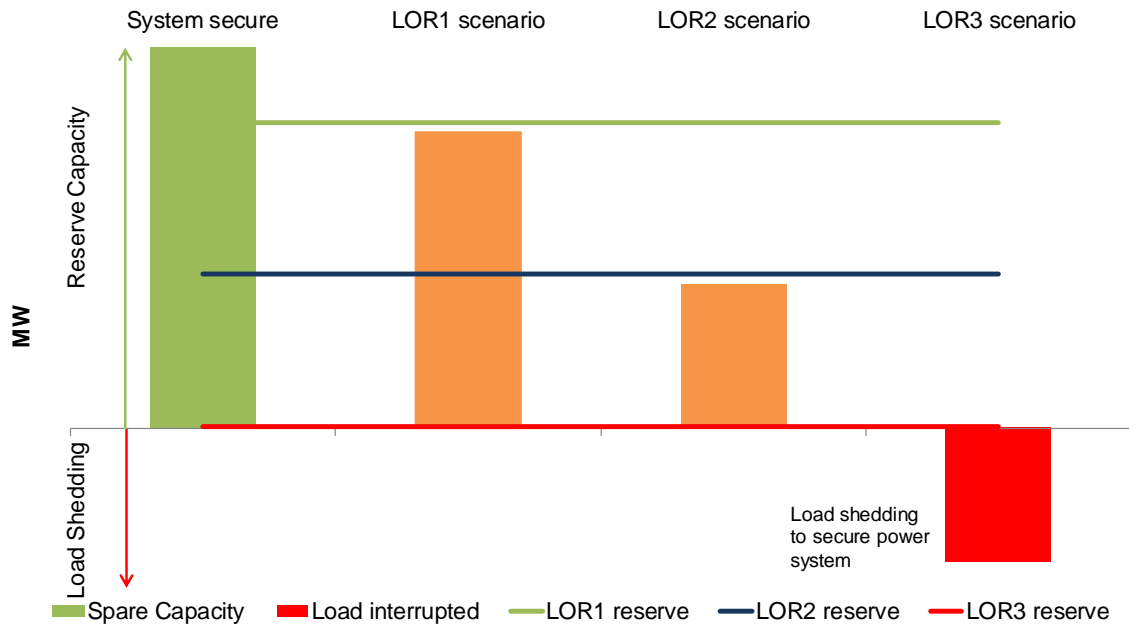
The three LOR levels are broadly categorised as follows:⁶

- LOR1: declared when AEMO the minimum level of reserves are low enough that load shedding is likely to occur in the event of the two largest credible contingencies in a region.
- LOR2: declared when AEMO the minimum level of reserves are low enough that load shedding is likely to occur in the event of the single largest credible contingency in a region.
- LOR3: declared when the minimum level of reserves are at (or below) zero, where customer(s) load would be, or is, shed in order to maintain power system security.

Figure 9 shows the four possible spare capacity and the lack of reserve threshold situations graphically.

⁶ These definitions have been simplified for the sake of readability. An interactive glossary of electricity market terms can be found on the AEMO website at: <https://www.aemo.com.au/Datasource/Archives/Archive1767#>

Figure 9: Spare capacity and lack of reserve



Assuming that the horizontal axis line represents a situation when supply equals demand, then excess generating capacity (above the x axis) amounts to spare or reserve capacity. As discussed above, the three reserve levels are shown as three horizontal lines, reserve requirements for LOR1 in green, for LOR2 in blue and where there are no reserves and all capacity is being used to meet demand, LOR3, in red.

The solid green and amber blocks represent spare capacity. As the spare capacity drops below a reserve line (the horizontal lines) either by a reduction in available capacity or an increase in demand, a new reserve condition exists. AEMO monitors this situation continuously and issues LOR notices to inform participants.

When there is insufficient capacity to meet demand load must be shed for load other than non-interruptible load (including commercial, industrial and residential customers) and an LOR3 is issued.