

Spot prices greater than \$5000/MWh



AUSTRALIAN ENERGY
REGULATOR

New South Wales - 31 October 2008

Introduction

The AER is required to publish a report covering the circumstances in which the spot price exceeded \$5000/MWh, pursuant to clause 3.13.7 (d) of the Rules. That report should:

- describe significant factors contributing to the spot price exceeding \$5000/MWh, including withdrawal of generation capacity and network availability;
- assess whether rebidding pursuant to clause 3.8.22 contributed to the spot price exceeding \$5000/MWh;
- identify the marginal scheduled generating units; and
- identify all units with offers for the trading interval equal to or greater than \$5000/MWh and compare these dispatch offers to relevant dispatch offers in previous trading intervals.

This report examines the factors that can contribute to the spot price exceeding \$5000/MWh, including: changes in demand (compared to that forecast by NEMMCO); generator offers and rebidding (including changes to generation capacity); and changes to network availability.

Summary

On 30 October 2008, low reserve conditions were forecast for New South Wales for 31 October as a result of high demand and low generation availability in New South Wales combined with reduced import capability. As a result, TransGrid cancelled a planned network outage close to Sydney, which improved import capability.

High temperatures in Sydney on 31 October saw demand reach its highest level since winter. Furthermore, a 500 MW New South Wales generating unit became unavailable on the day due to an unscheduled outage. Imports from Queensland and Victoria at the time were significantly lower than forecast and were constrained by a conservative system normal limit.

NEMMCO made alterations to the conservative system normal constraint four times to allow increased imports into New South Wales. Despite this, network constraints were violated for 28 five-minute dispatch intervals between 11.35 pm and 3.15 pm and imports exceeded the combined import limits by up to 800 MW. NEMMCO has advised, however, that the power system was operated safely during the period. The higher than forecast demand and lower than forecast supplies resulted in the spot price exceeding \$5000/MWh for seven trading intervals between midday and 3.30 pm.

At 3.20 pm NEMMCO's last alteration to the constraint saw imports into New South Wales increase by around 90 MW, which, combined with an increase in available generation capacity, saw spot prices return to more moderate levels.

Generator offers and rebidding

Almost one third of the total capacity of installed generation in New South Wales—around 4300 MW—was unavailable during the high-priced period. The majority of this reduction was as a result of unplanned outages during October. From mid morning on 28 October a 660 MW Vales Point unit (Delta Electricity) shut down due to a boiler tube leak. From mid morning on 30 October a 660 MW Eraring unit (Eraring Energy) shut down due to a boiler tube leak. On 30 October at 11.13 am the availability of a 500 MW Wallerawang unit (Delta Electricity) was reduced to 400 MW and further reduced to 350 MW at 3.16 pm, also as a result of a boiler tube leak. At 7.15 am on 31 October the Wallerawang unit was shut down altogether.

Figure 1 shows the generation outages in New South Wales at the time the spot price exceeded \$5000/MWh and whether the outage was planned or unplanned.

Figure 1: New South Wales generation outages

Date	Outage type	Participant	Unit	Capacity (MW)
14-Aug	unplanned	Babcock and Brown Power	Redbank	145
30-Sep	unplanned	Eraring Energy	Eraring Unit 4	660
4-Oct	planned	Delta Electricity	Wallerawang Unit 7	500
14-Oct	unplanned	Eraring Energy	Eraring Unit 1	660
17-Oct	planned	Macquarie Generation	Liddell Unit 2	518
28-Oct	unplanned	Delta Electricity	Vales Point Unit 6	660
30-Oct	unplanned	Eraring Energy	Eraring Unit 3	660
31-Oct	unplanned	Delta Electricity	Wallerawang Unit 8	500
Total				4303

Macquarie Generation and Eraring Energy were the only two participants in New South Wales that had capacity offered above \$5000/MWh during the high-priced period. Macquarie Generation offered 60 MW of capacity above \$5000/MWh for all trading intervals with the exception of the midday trading interval where it offered 104 MW of capacity above \$5000/MWh. Eraring Energy offered 5 MW of capacity priced above \$5000/MWh during the high-priced period.

The generators involved in setting the price during trading intervals where the spot price exceeded \$5000/MWh, and how that price was determined by the market systems are detailed in **Appendix A**.

Changes to network availability

Transmission network service providers determine the safe operating limits for their networks, and advise these limits to NEMMCO for inclusion into the market systems. Generators are then dispatched in economic merit order subject to these network limits to meet customer demand. The network limits are calculated to ensure that there is sufficient headroom to allow for the increased flows that occur following a credible contingency event, such as the unscheduled outage of a nearby network element or generator. When modelling the power system to determine these limits, some information is known with a high degree of certainty—such as the electrical characteristics of the network. Other information is known with less certainty—such as assumptions of future sub-regional demand and which generators will be in service and out of service. If actual power system conditions differ significantly from those assumed when the power system is modelled and the network limits determined, then these limits may impose unnecessary constraints on market outcomes.

The N>>N-NIL_E constraint is a “system normal” constraint that is designed to avoid overloading the Mt Piper to Wallerawang line if the Bayswater to Wallerawang line fails unexpectedly. This constraint was identified as limiting imports into New South Wales from Queensland and Victoria during the high-priced period, and also reduced the dispatch of generators at Mount Piper by up to 200 MW. At the same time, however, there was limited generation capacity available in New South Wales. In order to meet customer demand in New South Wales, the dispatch process allowed flows above these network limits into New South Wales—in other words the constraint was “violated”.

On 31 October, demand was relatively high and there were a significant number of large generators out of service. These factors combined to result in conservative network limits that overly restricted imports from Queensland and Victoria. In order to manage this modelling deficiency NEMMCO revised the N>>N-NIL_E constraint at 10.20 am, midday, 1.30 pm and 3.20 pm. This increased the ability to import from Queensland and Victoria. Although the constraint was still violated at times, NEMMCO’s actions reduced the impact on the market. NEMMCO has stated that during the times of constraint violations, the network was operated safely¹.

Figure 2 compares for each trading interval between midday and 3.30 pm the actual import limits and scheduled flows into New South Wales with that forecast by NEMMCO four and twelve hours ahead of dispatch. The import limits and scheduled flows are the combined total across the three interconnectors into New South Wales from Queensland and Victoria. The actual import limits and scheduled flows are the average of the six five-minute dispatch intervals for each 30 minute trading interval.

Figure 2 shows that the average actual flows exceeded the limit for every trading interval. On a five-minute dispatch interval basis network constraints were violated for 28 out of 48 dispatch intervals between 11.35 pm and 3.15 pm with combined imports exceeding the limits by up to 800 MW. Figure 2 also shows that import capability into New South Wales was considerably lower than forecast—by up to 800 MW for the 1 pm trading interval for the QNI, Directlink and the Vic-NSW interconnectors combined.

The AER will facilitate a meeting of all TNSPs and NEMMCO to determine whether there is a better solution to managing network limits under unusual conditions such as occurred on the day.

Figure 3 shows the five-minute combined (QNI, Directlink and Vic-NSW) scheduled flows and limits on the interconnectors into New South Wales for the day. The high price period—which is also when flows exceeded the import limits—is highlighted.

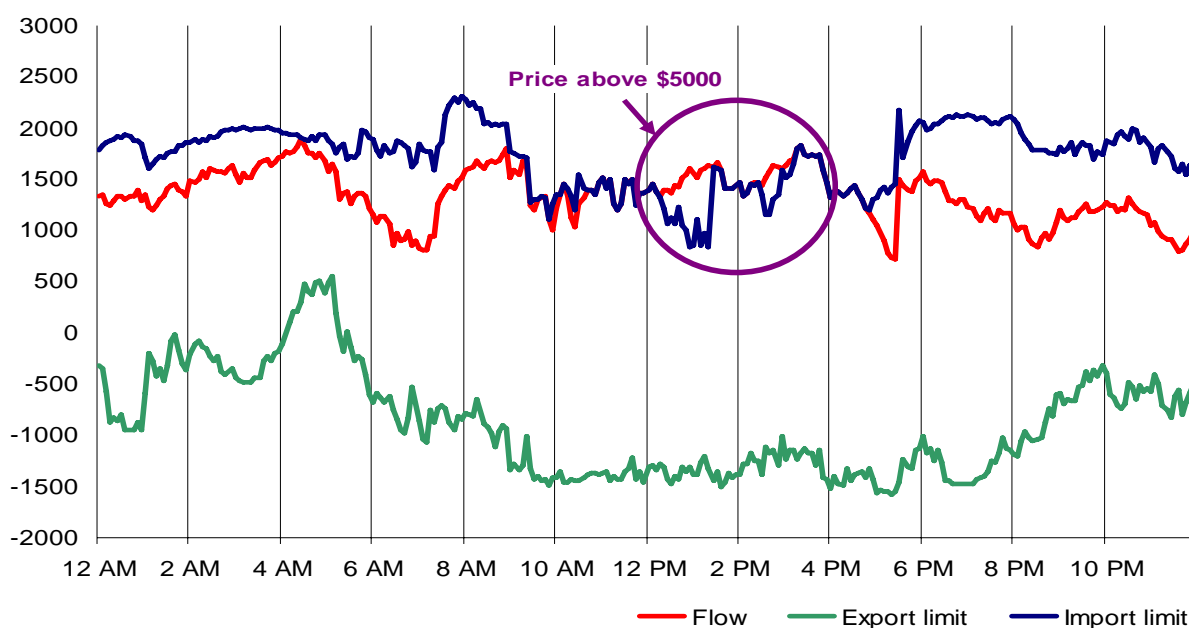
¹ NEMMCO verified that power system security was not compromised during this period through the use of its real time power system network applications.

Figure 2: Combined actual and forecast import limits and flows into NSW

Middy	Actual	4 hr forecast	12 hr forecast
Import limit	1403	1652	1745
Flows into NSW	1427	1652	1337
12:30 PM	Actual	4 hr forecast	12 hr forecast
Import limit	1304	1786	2055
Flows into NSW	1390	1786	1380
1:00 PM	Actual	4 hr forecast	12 hr forecast
Import limit	1051	1847	1735
Flows into NSW	1485	1847	1424
1:30 PM	Actual	4 hr forecast	12 hr forecast
Import limit	1039	1552	1749
Flows into NSW	1587	1552	1480
2:00 PM	Actual	4 hr forecast	12 hr forecast
Import limit	1477	1684	1722
Flows into NSW	1486	1685	1534
2:30 PM	Actual	4 hr forecast	12 hr forecast
Import limit	1419	1774	1668
Flows into NSW	1425	1774	1590
3:00 PM	Actual	4 hr forecast	12 hr forecast
Import limit	1315	1855	1628
Flows into NSW	1566	1855	1628
3:30 PM	Actual	4 hr forecast	12 hr forecast
Import limit	1676	1942	1626
Flows into NSW	1728	1942	1626

Note that shading indicates scheduled flows above the import limit

Figure 3: five-minute combined dispatch flows and import limits into New South Wales



Actual and forecast demand

Actual demand was higher than forecast for the whole period of high prices—up to 338 MW greater than that forecast four hours ahead of dispatch. Demand peaked at 11 214 MW at 3.30 pm.

Figure 4 compares the actual demand in New South Wales with that forecast by NEMMCO four and twelve hours ahead of dispatch. A comparison of actual and forecast available generator capacity and spot price is also included.

Figure 4: Actual and forecast demand, spot price and available generation in NSW

Midday	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	6794.80	667.87	100.00
Demand (MW)	10 910	10 617	10 616
Available capacity (MW)	9724	9738	10 091
12:30 pm	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	6861.91	686.19	101.60
Demand (MW)	11 004	10 691	10 688
Available capacity (MW)	9714	9708	10 091
1:00 pm	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	10 000.00	693.18	102.52
Demand (MW)	11 071	10 733	10 732
Available capacity (MW)	9715	9668	10 091
1:30 pm	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	10 000.00	656.50	254.21
Demand (MW)	11 146	10 808	10 808
Available capacity (MW)	9722	9698	10 091
2:00 pm	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	2177.46	687.72	263.76
Demand (MW)	11 013	10 932	10 862
Available capacity (MW)	9706	9728	10 091
2:30 pm	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	6787.37	694.47	266.98
Demand (MW)	10 993	10 988	10 918
Available capacity (MW)	9735	9778	10 091
3:00 pm	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	10 000.00	685.95	303.25
Demand (MW)	11 146	11 043	10 976
Available capacity (MW)	9763	9778	10 091
3:30 pm	Actual	4 hr forecast	12 hr forecast
Spot price (\$/MWh)	5408.77	969.05	323.21
Demand (MW)	11 214	11 108	10 994
Available capacity (MW)	9743	9778	10 091

PASA and reserve assessments

The PASA (projected assessment of system adequacy) processes assist NEMMCO in assessing whether there is sufficient supply to meet demand in the short-term (STPASA—up to seven days into the future) and medium-term (MTPASA - seven days to two years into the future). The assessments include extreme demand forecasts and take into account generator availability offers and network capabilities to determine whether there are sufficient reserves.

Figures 5 and 6 compare the forecasts from MTPASA and STPASA with actual outcomes at the time of maximum demand on 31 October. The figures show that actual demand did not exceed the MTPASA extreme (10 per cent probability of exceedance (POE)) forecast. In the STPASA timeframe demand was generally higher than forecast, which is consistent with the higher than forecast temperature on the day.

Figure 5: NSW MTPASA demand forecasts and actual demand for 31 October at 3.30 pm

Forecast date	10% POE demand (MW)	Forecast available capacity (MW)
07-Oct	12 806	12 897
14-Oct	12 806	12 704
21-Oct	12 806	12 479
Actual	11 214	9743

Figure 6: NSW STPASA demand forecasts and actual demand for 31 October at 3.30 pm

Forecast date/time	Max forecast Temperature (°C)	10% POE demand (MW)	Forecast available capacity (MW)
24-Oct midday	28.0	10 190	11 542
25-Oct midday	30.2	10 190	11 542
26-Oct midday	31.0	10 190	11 545
27-Oct midday	31.3	11 389	11 545
28-Oct midday	31.3	10 864	11 548
29-Oct midday	34.3	10 864	11 059
30-Oct midday	34.4	11 544	10 068
Actual	35.5	11 214	9743

At 11.48 am on 30 October NEMMCO issued a market notice forecasting a lack of reserve condition level two (LOR2)² in New South Wales for 31 October between 10.30 am and 3 pm. This was cancelled at 2.04 pm following an increase in generator availability and the withdrawal of a transmission outage scheduled for this period³. At 8.16 am on 31 October NEMMCO issued another market notice forecasting an LOR2 on the day from 2.30 pm to 4.30 pm. An actual LOR2 was declared at 11.40 am for 11.30 am to 4.30 pm. This was cancelled at 4.56 pm.

Assessment

Conditions on 31 October saw higher than forecast demand driven by high temperatures in Sydney. Around 4300 MW of generation capacity was unavailable and actual capacity on the day was lower than forecast. Import capability into New South Wales was also lower than forecast. These factors resulted in a tight demand and supply balance and the spot price exceeding \$5000/MWh in New South Wales for seven trading intervals between midday and 3.30 pm. Rebidding did not contribute to the spot price exceeding \$5000/MWh.

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² LOR2 indicates that reserves in a region are less than the largest contingency (which at the time was 660MW).

³ At 1.21 pm TransGrid cancelled a network outage around Sydney that was scheduled to commence on the morning of 31 October and finish on 1 November. This significantly improved import capability.

Appendix A – Price setters for the 1 pm trading interval

The following table identifies 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, as published in the market systems are shown. This information is published by NEMMCO⁴. Also shown is the energy or ancillary service offer price involved in determining the dispatch price together with the quantity of that service and the contribution to the total energy price. The 30-minute spot price is the time weighted average of the six dispatch interval prices.

Monday 31 December – New South Wales– midday

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
11:35	\$178.30	Origin Energy	MSTUART2	Energy	\$110.87	2.49	\$275.68
		TRUenergy (SA)	TORRB1	Energy	\$52.72	-0.79	-\$41.54
		TRUenergy (SA)	TORRB2	Energy	\$52.72	-0.53	-\$27.69
		TRUenergy (SA)	TORRB4	Energy	\$52.72	-0.53	-\$27.69
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	-1.84	-\$0.92
		TRUenergy (SA)	TORRB1	Raise reg	\$0.25	0.79	\$0.20
		TRUenergy (SA)	TORRB2	Raise reg	\$0.25	0.53	\$0.13
		TRUenergy (SA)	TORRB4	Raise reg	\$0.25	0.53	\$0.13
11:40	\$24,262.25*	Macquarie Generation	BW04	Energy	\$8,808.01	2.78	\$24,453.85
		AGL Hydro	OAKEY1	Energy	\$250.78	-0.39	-\$98.20
		TRUenergy (SA)	TORRB1	Energy	\$52.72	-1.80	-\$94.66
		Hydro Tasmania	JBUTTERS	Lower 5 min	\$0.60	1.80	\$1.08
		Hydro Tasmania	REECE2	Lower 5 min	\$0.19	-1.80	-\$0.34
		TRUenergy (SA)	TORRB1	Lower reg	\$0.80	-1.80	-\$1.44
		Hydro Tasmania	REECE2	Lower reg	\$0.40	1.80	\$0.72
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.78	\$1.39
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.78	-\$0.11
		11:45	\$23,960.69*	Macquarie Generation	BW04	Energy	\$8,808.01
Origin Energy	MSTUART1			Energy	\$110.85	-0.39	-\$42.79
TRUenergy (SA)	TORRA1			Energy	\$52.72	-0.52	-\$27.31
TRUenergy (SA)	TORRB1			Energy	\$52.72	-0.62	-\$32.77
TRUenergy (SA)	TORRB2			Energy	\$52.72	-0.41	-\$21.85
TRUenergy (SA)	TORRB4			Energy	\$52.72	-0.41	-\$21.85
Babcock	LKBONNY2			Energy	\$0.00	0.36	\$0.00
Hydro Tasmania	JBUTTERS			Raise reg	\$0.50	2.74	\$1.37
Macquarie Generation	BW04			Raise reg	\$0.04	-2.74	-\$0.11
11:50	\$24,658.91*			Macquarie Generation	BW04	Energy	\$8,808.01
		Ecogen	JLB01	Energy	\$55.74	-1.56	-\$86.79
		Stanwell	STAN-1	Energy	\$43.52	-0.32	-\$13.94
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.81	\$1.41
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.81	-\$0.11
		11:55	\$24,667.16*	Macquarie Generation	BW02	Energy	\$8,804.00
Ecogen	JLB03			Energy	\$55.77	-1.56	-\$86.89
CS Energy	SWAN_B_1			Energy	\$54.40	-0.08	-\$4.36
CS Energy	SWAN_B_2			Energy	\$54.40	-0.08	-\$4.36
CS Energy	SWAN_B_3			Energy	\$54.40	-0.08	-\$4.36
CS Energy	SWAN_B_4			Energy	\$54.40	-0.08	-\$4.36
International Power	LOYYB1			Raise 60 sec	\$0.04	1.70	\$0.07
Macquarie Generation	BW02			Raise 60 sec	\$0.02	-1.70	-\$0.03
CS Energy	SWAN_B_2			Raise 6 sec	\$0.30	1.70	\$0.51
Macquarie Generation	BW02			Raise 6 sec	\$0.02	-1.70	-\$0.03
12:00	\$590.49			Ecogen	JLB03	Energy	\$55.77
		Delta Electricity	MP1	Energy	-\$1,000.00	-0.50	\$502.32
		Vic Power Trader	PTH03	Raise 6 sec	\$0.16	-0.50	-\$0.08
		Delta Electricity	MP1	Raise 6 sec	\$0.10	0.50	\$0.05
Spot price		\$6794.80/MWh					

⁴ NEMMCO first published details on how the price is determined, for every dispatch interval, in June 2004. Documentation of this process can be found at <http://www.nemmco.com.au/dispatchandpricing/140-0036.htm>

Monday 31 December – New South Wales– 12.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
12:05	\$24,647.81*	Macquarie Generation	BW02	Energy	\$8,804.00	2.81	\$24,753.06
		Stanwell	STAN-3	Energy	\$55.86	-0.40	-\$22.22
		Ecogen	JLB01	Energy	\$55.74	-1.52	-\$84.73
		Hydro Tasmania	JBUTTERS	Lower 5 min	\$0.60	0.40	\$0.24
		Hydro Tasmania	REECE2	Lower 5 min	\$0.19	-0.40	-\$0.08
		Hydro Tasmania	REECE2	Lower reg	\$0.40	0.40	\$0.16
		Stanwell	STAN-3	Lower reg	\$0.01	-0.40	\$0.00
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.81	\$1.41
		Macquarie Generation	BW02	Raise reg	\$0.02	-2.81	-\$0.06
12:10	\$585.99	Ecogen	JLB02	Energy	\$55.76	1.57	\$87.29
		Delta Electricity	MP1	Energy	-\$1,000.00	-0.50	\$498.70
12:15	\$585.45	Ecogen	JLB03	Energy	\$55.77	1.56	\$87.20
		Delta Electricity	MP1	Energy	-\$1,000.00	-0.50	\$498.27
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	-0.82	-\$0.41
		Macquarie Generation	BW01	Raise reg	\$0.40	0.82	\$0.33
		Macquarie Generation	BW04	Raise 60 sec	\$0.04	0.50	\$0.02
		Macquarie Generation	BW01	Raise 60 sec	\$0.01	-0.50	\$0.00
		Delta Electricity	MP1	Raise 6 sec	\$0.10	0.50	\$0.05
		Macquarie Generation	BW01	Raise 6 sec	\$0.01	-0.50	\$0.00
12:20	\$24,831.76*	Macquarie Generation	BW04	Energy	\$8,808.01	2.83	\$24,969.74
		CS Energy	SWAN_E	Energy	\$135.09	-0.40	-\$54.16
		Ecogen	JLB01	Energy	\$55.74	-1.53	-\$85.14
		Hydro Tasmania	REECE1	Raise reg	\$0.50	2.83	\$1.42
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.83	-\$0.11
12:25	\$24,457.67*	Macquarie Generation	BW04	Energy	\$8,808.01	2.79	\$24,594.69
		Millmerran	MPP_1	Energy	\$130.23	-0.39	-\$51.43
		TRUenergy (SA)	TORRA1	Energy	\$45.72	-0.24	-\$10.86
		TRUenergy (SA)	TORRA2	Energy	\$45.72	-0.12	-\$5.43
		TRUenergy (SA)	TORRA4	Energy	\$45.72	-0.12	-\$5.43
		TRUenergy (SA)	TORRB1	Energy	\$45.72	-0.47	-\$21.71
		TRUenergy (SA)	TORRB2	Energy	\$45.72	-0.47	-\$21.71
		TRUenergy (SA)	TORRB4	Energy	\$45.72	-0.47	-\$21.71
		Babcock	LKBONNY2	Energy	\$0.00	0.35	\$0.00
		TRUenergy (SA)	TORRB1	Lower reg	\$0.80	-0.47	-\$0.38
		TRUenergy (SA)	TORRB2	Lower reg	\$0.80	-0.47	-\$0.38
		TRUenergy (SA)	TORRB4	Lower reg	\$0.80	0.95	\$0.76
		Hydro Tasmania	GORDON	Raise reg	\$0.50	2.79	\$1.40
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.79	-\$0.11
12:30	\$24,456.71*	Macquarie Generation	BW04	Energy	\$8,808.01	2.79	\$24,584.92
		CS Energy	SWAN_E	Energy	\$135.09	-0.32	-\$42.97
		Ecogen	JLA04	Energy	\$55.81	-1.55	-\$86.54
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.79	\$1.40
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.79	-\$0.11
Spot price		\$6861.91/MWh					

Monday 31 December – New South Wales– 1 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
12:35	\$24,434.64*	Macquarie Generation	BW04	Energy	\$8,808.01	2.80	\$24,626.84
		CS Energy	SWAN_E	Energy	\$240.13	-0.39	-\$94.67
		TRUenergy (SA)	TORRA1	Energy	\$45.72	-0.27	-\$12.36
		TRUenergy (SA)	TORRA2	Energy	\$45.72	-0.14	-\$6.18
		TRUenergy (SA)	TORRA4	Energy	\$45.72	-0.14	-\$6.18
		TRUenergy (SA)	TORRB1	Energy	\$45.72	-0.54	-\$24.71
		TRUenergy (SA)	TORRB2	Energy	\$45.72	-0.54	-\$24.71
		TRUenergy (SA)	TORRB4	Energy	\$45.72	-0.54	-\$24.71
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.80	\$1.40
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.80	-\$0.11
12:40	\$24,407.08*	Macquarie Generation	BW04	Energy	\$8,808.01	2.79	\$24,589.67
		CS Energy	SWAN_E	Energy	\$240.13	-0.39	-\$94.80
		TRUenergy (SA)	TORRA1	Energy	\$45.72	-0.97	-\$44.55
		TRUenergy (SA)	TORRA2	Energy	\$45.72	-0.49	-\$22.28
		TRUenergy (SA)	TORRA4	Energy	\$45.72	-0.49	-\$22.28
		Babcock	LKBONNY2	Energy	\$0.00	0.35	\$0.00
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.79	\$1.40
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.79	-\$0.11
12:45	\$24,227.29*	Macquarie Generation	BW04	Energy	\$8,808.01	2.77	\$24,396.95
		AGL Hydro	OAKEY1	Energy	\$250.78	-0.16	-\$39.58
		AGL Hydro	OAKEY2	Energy	\$250.78	-0.16	-\$39.58
		TRUenergy (SA)	TORRA1	Energy	\$45.72	-0.33	-\$15.30
		TRUenergy (SA)	TORRA2	Energy	\$45.72	-0.17	-\$7.65
		TRUenergy (SA)	TORRA4	Energy	\$45.72	-0.17	-\$7.65
		TRUenergy (SA)	TORRB1	Energy	\$45.72	-0.67	-\$30.60
		TRUenergy (SA)	TORRB2	Energy	\$45.72	-0.67	-\$30.60
		Babcock	LKBONNY2	Energy	\$0.00	0.36	\$0.00
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.77	\$1.38
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.77	-\$0.11
12:50	\$63,184.89*	Macquarie Generation	BW04	Energy	\$8,808.01	7.38	\$64,984.44
		AGL Hydro	OAKEY1	Energy	\$250.78	-3.49	-\$876.12
		AGL Hydro	OAKEY2	Energy	\$250.78	-3.49	-\$876.12
		TRUenergy (SA)	TORRB1	Energy	\$52.72	-0.41	-\$21.75
		TRUenergy (SA)	TORRB2	Energy	\$52.72	-0.28	-\$14.50
		TRUenergy (SA)	TORRB4	Energy	\$52.72	-0.28	-\$14.50
		Hydro Tasmania	GORDON	Raise reg	\$0.50	7.38	\$3.69
		Macquarie Generation	BW04	Raise reg	\$0.04	-7.38	-\$0.30
12:55	\$23,976.42*	Macquarie Generation	BW04	Energy	\$8,808.01	2.74	\$24,175.08
		AGL Hydro	OAKEY1	Energy	\$250.78	-0.19	-\$48.79
		AGL Hydro	OAKEY2	Energy	\$250.78	-0.19	-\$48.79
		TRUenergy (SA)	TORRB2	Energy	\$52.72	-0.98	-\$51.91
		TRUenergy (SA)	TORRB4	Energy	\$52.72	-0.98	-\$51.91
		Babcock	LKBONNY2	Energy	\$0.00	0.36	\$0.00
		Stanwell	STAN-2	Lower reg	\$0.99	1.97	\$1.95
		TRUenergy (SA)	TORRB2	Lower reg	\$0.25	-0.98	-\$0.25
		TRUenergy (SA)	TORRB4	Lower reg	\$0.25	-0.98	-\$0.25
		Hydro Tasmania	GORDON	Raise reg	\$0.50	2.74	\$1.37
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.74	-\$0.11
13:00	\$23,636.08*	Macquarie Generation	BW04	Energy	\$8,808.01	2.71	\$23,838.79
		AGL Hydro	OAKEY1	Energy	\$250.78	-0.15	-\$38.68
		AGL Hydro	OAKEY2	Energy	\$250.78	-0.15	-\$38.68
		AGL Hydro	WKIEWA1	Energy	\$81.00	-1.83	-\$147.83
		TRUenergy (SA)	TORRB1	Energy	\$52.72	0.17	\$9.12
		TRUenergy (SA)	TORRB2	Energy	\$52.72	0.12	\$6.08
		TRUenergy (SA)	TORRB4	Energy	\$52.72	0.12	\$6.08
		Babcock	LKBONNY2	Energy	\$0.00	-0.07	\$0.00
		Hydro Tasmania	GORDON	Raise reg	\$0.50	2.71	\$1.35
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.71	-\$0.11

Spot price \$10 000/MWh

Monday 31 December – New South Wales– 1.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
13:05	\$24,000.98*	Macquarie Generation	BW04	Energy	\$8,808.01	2.75	\$24,181.16
		AGL Hydro	OAKEY1	Energy	\$250.78	-0.19	-\$48.81
		AGL Hydro	OAKEY2	Energy	\$250.78	-0.19	-\$48.81
		TRUenergy (SA)	TORRA2	Energy	\$45.72	-0.92	-\$41.93
		TRUenergy (SA)	TORRA4	Energy	\$45.72	-0.92	-\$41.93
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.75	\$1.37
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.75	-\$0.11
13:10	\$24,041.18*	Macquarie Generation	BW04	Energy	\$8,808.01	2.75	\$24,221.15
		AGL Hydro	OAKEY1	Energy	\$250.78	-0.19	-\$48.74
		AGL Hydro	OAKEY2	Energy	\$250.78	-0.19	-\$48.74
		Ecogen	JLB03	Energy	\$55.77	-1.50	-\$83.71
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.75	\$1.37
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.75	-\$0.11
13:15	\$23,817.67*	Macquarie Generation	BW04	Energy	\$8,808.01	2.72	\$23,996.45
		AGL Hydro	OAKEY1	Energy	\$250.78	-0.19	-\$48.43
		AGL Hydro	OAKEY2	Energy	\$250.78	-0.19	-\$48.43
		Ecogen	JLB02	Energy	\$55.76	-1.49	-\$83.20
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.72	\$1.36
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.72	-\$0.11
13:20	\$24,821.82*	Macquarie Generation	BW04	Energy	\$8,808.01	2.91	\$25,618.36
		AGL Hydro	OAKEY1	Energy	\$250.78	-1.54	-\$387.39
		AGL Hydro	OAKEY2	Energy	\$250.78	-1.54	-\$387.39
		AGL Hydro	WKIEWA1	Energy	\$81.00	-0.29	-\$23.09
		Hydro Tasmania	JBUTTERS	Raise reg	\$0.50	2.91	\$1.45
		Macquarie Generation	BW04	Raise reg	\$0.04	-2.91	-\$0.12
13:25	\$42,895.05*	Macquarie Generation	BW04	Energy	\$8,808.01	5.01	\$44,166.44
		AGL Hydro	OAKEY1	Energy	\$250.78	-2.46	-\$616.46
		AGL Hydro	OAKEY2	Energy	\$250.78	-2.46	-\$616.46
		AGL Hydro	MCKAY1	Energy	\$82.77	-0.49	-\$40.80
		Hydro Tasmania	MACKNTSH	Raise reg	\$0.50	5.01	\$2.51
		Macquarie Generation	BW04	Raise reg	\$0.04	-5.01	-\$0.20
13:30	\$51,454.71*	Macquarie Generation	BW04	Energy	\$8,808.01	6.01	\$52,944.51
		AGL Hydro	OAKEY1	Energy	\$250.78	-2.89	-\$725.32
		AGL Hydro	OAKEY2	Energy	\$250.78	-2.89	-\$725.32
		TRUenergy (SA)	TORRB1	Energy	\$52.72	-0.34	-\$17.75
		TRUenergy (SA)	TORRB2	Energy	\$52.72	-0.22	-\$11.83
		TRUenergy (SA)	TORRB4	Energy	\$52.72	-0.22	-\$11.83
		Babcock	LKBONNY2	Energy	\$0.00	0.14	\$0.00
		Hydro Tasmania	FISHER	Lower 5 min	\$0.60	0.79	\$0.47
		Hydro Tasmania	REECE2	Lower 5 min	\$0.19	-0.79	-\$0.15
		TRUenergy (SA)	TORRB1	Lower reg	\$0.80	-0.34	-\$0.27
		TRUenergy (SA)	TORRB2	Lower reg	\$0.80	-0.22	-\$0.18
		TRUenergy (SA)	TORRB4	Lower reg	\$0.80	-0.22	-\$0.18
		Hydro Tasmania	REECE2	Lower reg	\$0.40	0.79	\$0.31
		Hydro Tasmania	GORDON	Raise 5 min	\$0.20	6.01	\$1.20
		Macquarie Generation	BW04	Raise 5 min	\$0.04	-6.01	-\$0.24
		Hydro Tasmania	GORDON	Raise 6 sec	\$0.40	3.64	\$1.46
		Macquarie Generation	BW04	Raise 6 sec	\$0.04	-3.64	-\$0.15

Spot price \$10 000/MWh

Monday 31 December – New South Wales– 2.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
14:05	\$9,425.33	Eraring Energy	ER02	Energy	\$9,350.00	1.00	\$9,350.00
		Ecogen International	JLA04	Energy	\$55.81	1.00	\$55.81
		Power International	LOYB1	Energy	\$29.89	-1.00	-\$29.89
		Power International	LOYB1	Raise 5 min	\$50.00	1.00	\$50.00
		Eraring Energy	ER02	Raise 5 min	\$0.59	-1.00	-\$0.59
14:10	\$567.17	TRUenergy (SA)	TORRB1	Energy	\$45.72	0.81	\$37.08
		TRUenergy (SA)	TORRB4	Energy	\$45.72	0.81	\$37.08
		Delta Electricity	MP1	Energy	-\$1,000.00	-0.25	\$247.43
		Delta Electricity	MP2	Energy	-\$1,000.00	-0.25	\$247.43
		CS Energy	SWAN_E	Lower reg	\$1.40	-1.62	-\$2.27
		TRUenergy (SA)	TORRB1	Lower reg	\$0.25	0.81	\$0.20
		TRUenergy (SA)	TORRB4	Lower reg	\$0.25	0.81	\$0.20
14:15	\$13,005.16*	Tarong	TARONG#2	Energy	\$4,800.00	2.72	\$13,051.87
		TRUenergy (SA)	TORRA3	Energy	\$32.72	-1.53	-\$50.09
		LYMMCO	LYA1	Raise reg	\$0.90	2.72	\$2.45
		Tarong	TARONG#2	Raise reg	\$0.00	-2.72	\$0.00
		Snowy Hydro	UPPTUMUT	Raise 60 sec	\$0.75	2.72	\$2.04
		LYMMCO	LYA1	Raise 60 sec	\$0.40	-2.72	-\$1.09
		LYMMCO	LYA1	Raise 6 sec	\$0.50	-1.81	-\$0.91
		LYMMCO	LYA3	Raise 6 sec	\$0.50	1.81	\$0.91
14:20	\$731.71	Tarong	TARONG#2	Energy	\$298.00	0.89	\$266.45
		Tarong	TARONG#3	Energy	\$298.00	0.89	\$266.45
		Tarong	TARONG#4	Energy	\$298.00	0.89	\$266.45
		TRUenergy (SA)	TORRB1	Energy	\$45.72	-0.76	-\$34.93
		TRUenergy (SA)	TORRB2	Energy	\$45.72	-0.76	-\$34.93
		CS Energy	SWAN_B_3	Lower reg	\$1.70	1.53	\$2.60
		TRUenergy (SA)	TORRB1	Lower reg	\$0.25	-0.76	-\$0.19
		TRUenergy (SA)	TORRB2	Lower reg	\$0.25	-0.76	-\$0.19
14:25	\$60,276.54*	CS Energy	SWAN_E	Energy	\$8,001.00	7.74	\$61,890.30
		TRUenergy (SA)	TORRB1	Energy	\$45.72	-1.18	-\$53.96
		TRUenergy (SA)	TORRB2	Energy	\$45.72	-1.18	-\$53.96
		TRUenergy (SA)	TORRB4	Energy	\$45.72	-1.18	-\$53.96
		International Power	LOYB1	Energy	\$29.89	72.50	\$2,166.96
		Snowy Hydro	TUMUT3	Energy	\$0.00	-72.50	\$0.00
		Stanwell	GSTONE4	Lower reg	\$1.95	3.54	\$6.90
		TRUenergy (SA)	TORRB1	Lower reg	\$0.25	-1.18	-\$0.30
		TRUenergy (SA)	TORRB2	Lower reg	\$0.25	-1.18	-\$0.30
		TRUenergy (SA)	TORRB4	Lower reg	\$0.25	-1.18	-\$0.30
		International Power	LOYB1	Raise 5 min	\$50.00	-72.50	-\$3,624.88
		Snowy Hydro	TUMUT3	Raise 5 min	\$0.00	72.50	\$0.00
14:30	\$12,536.33*	Tarong	TARONG#2	Energy	\$4,800.00	0.66	\$3,154.22
		Tarong	TARONG#3	Energy	\$4,800.00	1.31	\$6,308.45
		Tarong	TARONG#4	Energy	\$4,800.00	0.66	\$3,154.22
		Ecogen	JLA01	Energy	\$55.71	-1.45	-\$80.56
Spot price		\$6787.37/MWh					

Monday 31 December – New South Wales– 3 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
14:35	\$53,941.63*	CS Energy International Power	SWAN_E LOYB1	Energy Energy	\$8,001.00 \$29.89	6.75 -3.48	\$54,045.55 -\$103.96
14:40	\$63,377.65*	Macquarie AGL Hydro Ecogen Macquarie Macquarie Tarong Macquarie Stanwell Macquarie	BW04 OAKEY2 JLA02 BW03 BW04 TARONG#4 BW04 GSTONE6 BW04	Energy Energy Energy Raise 5 min Raise 5 min Raise 60 sec Raise 60 sec Raise 6 sec Raise 6 sec	\$8,808.01 \$250.78 \$55.72 \$88.00 \$5.80 \$1.00 \$0.04 \$0.95 \$0.04	7.33 -7.00 -0.71 7.33 -7.33 4.44 -4.44 4.44 -4.44	\$64,561.66 -\$1,755.14 -\$39.70 \$645.03 -\$42.51 \$4.44 -\$0.18 \$4.22 -\$0.18
14:45	\$51,219.38*	Macquarie Tarong Tarong Tarong Ecogen International Power Int. Power Macquarie Macquarie Macquarie Macquarie Macquarie	BW04 TARONG#2 TARONG#3 TARONG#4 JLA04 LOYB2 LOYB2 BW04 BW03 BW04 BW03 BW04	Energy Energy Energy Energy Energy Energy Raise 5 min Raise 5 min Raise 60 sec Raise 60 sec Raise 6 sec Raise 6 sec	\$8,808.01 \$298.00 \$298.00 \$298.00 \$55.81 \$9.99 \$51.00 \$0.04 \$1.60 \$0.04 \$1.60 \$0.04	5.95 -1.93 -1.93 -1.93 5.37 -5.95 5.95 -5.95 3.60 -3.60 3.60 -3.60	\$52,386.70 -\$573.94 -\$573.94 -\$573.94 \$299.56 -\$59.42 \$303.33 -\$0.24 \$5.76 -\$0.14 \$5.76 -\$0.14
14:50	\$34,445.78*	Macquarie Tarong Tarong Tarong TRUenergy (SA) TRUenergy (SA) International Power Int. Power Macquarie Stanwell Stanwell Stanwell Macquarie Stanwell Macquarie	BW04 TARONG#2 TARONG#3 TARONG#4 TORRB1 TORRB2 LOYB2 LOYB2 BW04 GSTONE1 STAN-3 STAN-3 BW04 STAN-3 BW04	Energy Energy Energy Energy Energy Energy Energy Raise 5 min Raise 5 min Raise reg Raise reg Raise 60 sec Raise 60 sec Raise 6 sec Raise 6 sec	\$8,808.01 \$298.00 \$298.00 \$298.00 \$52.72 \$52.72 \$9.99 \$51.00 \$0.04 \$1.99 \$0.49 \$0.95 \$0.04 \$0.95 \$0.04	4.01 -1.36 -1.36 -1.36 2.35 1.56 -4.01 4.01 -4.01 2.43 -2.43 2.43 -2.43 2.43 -2.43	\$35,283.65 -\$405.42 -\$405.42 -\$405.42 \$123.73 \$82.49 -\$40.02 \$204.30 -\$0.16 \$4.83 -\$1.19 \$2.30 -\$0.10 \$2.30 -\$0.10
14:55	\$61,665.21*	Macquarie Tarong Tarong Tarong Ecogen International Power Int. Power Macquarie Tarong Stanwell Stanwell Macquarie Stanwell Macquarie	BW02 TARONG#2 TARONG#3 TARONG#4 JLA02 LOYB2 LOYB2 BW02 TARONG#4 STAN-3 STAN-3 BW02 STAN-3 BW02	Energy Energy Energy Energy Energy Energy Raise 5 min Raise 5 min Raise reg Raise reg Raise 60 sec Raise 60 sec Raise 6 sec Raise 6 sec	\$8,804.00 \$4,800.00 \$4,800.00 \$4,800.00 \$55.72 \$9.99 \$51.00 \$1.20 \$1.95 \$0.49 \$0.95 \$0.02 \$0.95 \$0.02	13.76 -3.17 -6.33 -3.17 12.42 -13.76 13.76 -13.76 8.33 -8.33 8.33 -8.33 8.33 -8.33	\$121,184.15 -\$15,196.70 -\$30,393.36 -\$15,196.70 \$692.14 -\$137.51 \$702.00 -\$16.52 \$16.25 -\$4.08 \$7.92 -\$0.17 \$7.92 -\$0.17
15:00	\$24,185.73*	Macquarie AGL Hydro TRUenergy (SA) TRUenergy (SA) TRUenergy (SA) Hydro Tasmania Hydro Tasmania CS Energy TRUenergy (SA) TRUenergy (SA) TRUenergy (SA) Hydro Tasmania Macquarie LYMMCO Macquarie Macquarie Macquarie	BW04 OAKEY2 TORRB1 TORRB2 TORRB4 POAT220 BASSLINK FISHER SWAN_E TORRB1 TORRB2 Basslink JBUTTERS BW04 LYA1 BW04 LD03 BW04	Energy Energy Energy Energy Energy Energy Energy Lower 5 min Lower reg Lower reg Lower reg Lower reg Lower 60 sec Raise 5 min Raise 60 sec Raise 60 sec Raise 6 sec Raise 6 sec	\$8,808.01 \$250.78 \$52.72 \$52.72 \$52.72 \$1.32 \$0.00 \$0.60 \$1.40 \$0.80 \$0.80 \$0.80 \$2.00 \$0.04 \$0.40 \$0.04 \$0.40 \$0.04	2.75 -0.39 0.59 0.39 0.39 -2.75 2.75 -2.75 -1.38 0.59 0.39 0.39 -2.75 -2.75 -1.08 -1.67 1.67 -1.67	\$24,223.26 -\$98.57 \$31.13 \$20.76 \$20.76 -\$3.63 \$0.00 -\$1.65 -\$1.93 \$0.47 \$0.31 \$0.31 -\$5.50 -\$0.11 -\$0.43 -\$0.07 \$0.67 -\$0.07
Spot price		\$10 000/MWh					

Monday 31 December – New South Wales– 3.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
15:05	\$63,044.42*	Macquarie Generation	BW04	Energy	\$8,808.01	7.33	\$64,528.89
		AGL Hydro	OAKEY2	Energy	\$290.80	-6.99	-\$2,032.72
		AGL Hydro	MCKAY1	Energy	\$82.77	6.74	\$557.88
		Hydro Tasmania	REECE2	Energy	\$1.30	-7.33	-\$9.52
			BASSLINK	Energy	\$0.00	7.33	\$0.00
		Hydro Tasmania	REECE2	Lower 5 min	\$0.19	-7.33	-\$1.39
		TRUenergy (Vic)	YWPS2	Lower 5 min	\$0.05	7.33	\$0.37
		Hydro Tasmania	MEADOWBK	Lower 60 sec	\$0.18	-7.33	-\$1.32
		Hydro Tasmania	GORDON	Raise 5 min	\$0.20	7.33	\$1.47
		Macquarie Generation	BW04	Raise 5 min	\$0.04	-7.33	-\$0.29
		TRUenergy (Vic)	Basslink	Raise 60 sec	\$0.05	-2.89	-\$0.14
		Macquarie Generation	BW04	Raise 60 sec	\$0.04	-4.44	-\$0.18
		Tarong	TARONG#4	Raise 6 sec	\$0.35	4.44	\$1.55
		Macquarie Generation	BW04	Raise 6 sec	\$0.04	-4.44	-\$0.18
15:10	\$46,268.32*	Macquarie Generation	BW04	Energy	\$8,808.01	5.38	\$47,377.58
		AGL Hydro	OAKEY2	Energy	\$290.80	-5.30	-\$1,540.00
		AGL Hydro	MCKAY1	Energy	\$82.77	-0.53	-\$43.56
		Macquarie Generation	BW03	Raise 5 min	\$88.00	5.38	\$473.34
		Macquarie Generation	BW04	Raise 5 min	\$0.04	-5.38	-\$0.22
		TRUenergy (Vic)	YWPS1	Raise 60 sec	\$0.05	3.26	\$0.16
		Macquarie Generation	BW04	Raise 60 sec	\$0.04	-3.26	-\$0.13
		Macquarie Generation	LD03	Raise 6 sec	\$0.40	3.26	\$1.30
		Macquarie Generation	BW04	Raise 6 sec	\$0.04	-3.26	-\$0.13
15:15	\$23,885.34*	Macquarie Generation	BW04	Energy	\$8,808.01	2.71	\$23,881.86
		AGL Hydro	OAKEY2	Energy	\$290.80	-0.39	-\$112.68
		AGL Hydro	MCKAY1	Energy	\$82.77	-1.49	-\$122.94
		Macquarie Generation	BW03	Raise 5 min	\$88.00	2.71	\$238.60
		Macquarie Generation	BW04	Raise 5 min	\$0.04	-2.71	-\$0.11
		TRUenergy (Vic)	YWPS2	Raise 60 sec	\$0.05	1.64	\$0.08
		Macquarie Generation	BW04	Raise 60 sec	\$0.04	-1.64	-\$0.07
		Hydro Tasmania	GORDON	Raise 6 sec	\$0.40	1.64	\$0.66
		Macquarie Generation	BW04	Raise 6 sec	\$0.04	-1.64	-\$0.07
15:20	\$657.48	AGL Hydro	OAKEY2	Energy	\$290.80	1.42	\$412.50
		Delta Electricity	MP2	Energy	-\$1,000.00	-0.24	\$244.98
15:25	\$1,142.26	Tarong	TARONG#2	Energy	\$298.00	1.51	\$450.50
		Tarong	TARONG#3	Energy	\$298.00	1.51	\$450.50
		Tarong	TARONG#4	Energy	\$298.00	1.51	\$450.50
		AGL Hydro	MCKAY1	Energy	\$82.77	-2.53	-\$209.22
15:30	\$652.90	AGL Hydro	OAKEY2	Energy	\$290.80	1.41	\$409.20
		Delta Electricity	MP1	Energy	-\$1,000.00	-0.12	\$121.85
		Delta Electricity	MP2	Energy	-\$1,000.00	-0.12	\$121.85

Spot price \$5408.77/MWh

* If the dispatch price exceeds the price cap of \$10 000/MWh it is capped at \$10 000/MWh