

Spot prices greater than \$5000/MWh



AUSTRALIAN ENERGY
REGULATOR

Victoria and Snowy: 17 March 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 17 March the spot price in Victoria and Snowy exceeded \$5000/MWh for two trading intervals at 4 pm and 4.30 pm. High temperatures in Victoria led to a record demand of 9776 MW, which is 764 MW above the previous record. South Australia also had high temperatures and record demand leading to \$5000/MWh pricing at the same time¹.

Actual and forecast demand

Temperatures in Melbourne reached 38 degrees, two degrees higher than forecast. The high temperatures led to a new record demand of 9776 MW at 4 pm. Demand was around 360 MW higher than that forecast four hours ahead. Figure 1 compares the actual demand in Victoria with that forecast four and twelve hours ahead of dispatch. A comparison of actual and forecast spot price is also included.

Figure 1: Actual and forecast demand and spot price in Victoria

Monday 4:00 PM	Actual	4 hr forecast	12 hr forecast
Demand (MW)	9776	9418	9469
Spot Price (\$/MWh)	7811	339	7601
Monday 4:30 PM	Actual	4 hr forecast	12 hr forecast
Demand (MW)	9720	9388	9445
Spot Price (\$/MWh)	7910	339	7601

¹ For more information refer to the AER's 5 to 17 March 2008 \$5000/MWh report published in May 2008 available at www.aer.gov.au.

On 10 March, NEMMCO forecast Low Reserve Conditions (LRC) for Victoria on 17 March between 10.30 am and 7 pm². A Lack of Reserve level 1 (LOR1³) condition existed for Victoria between 3.30 pm and 5.45 pm and a Lack of Reserve level 2 (LOR2) condition existed between 4.15 pm and 5.15 pm. Despite the record demands and periods of low reserves, the system remained reliable throughout the whole period.

Changes to network availability

During the times of high prices flows from Snowy into New South Wales of around 700 MW occurred - these flows were counter to the prevailing market prices. These flows were close to forecast and were caused by a system normal constraint that manages the load across the Upper Tumut to Murray (65) line for the loss of the Lower Tumut to Wagga line (51). This constraint also impacted on the dispatch of Snowy Hydro's Upper Tumut power station, reducing its output by up to 378 MW - all of this capacity was priced at less than \$10/MWh.

Flows from Snowy into Victoria were close to forecast at around 1500 MW compared to the limit of around 1700 MW. Flows from Tasmania were close to forecast at the maximum limit of 600 MW. Flows from South Australia were close to zero.

Generator offers and rebidding

Prices were aligned in Victoria, Snowy and South Australia⁴ during the high priced period.

In the Snowy region, Snowy Hydro had 810 MW of capacity at Murray power station priced above \$5000/MWh during the high priced period. This capacity was offered at this price through day-ahead bids. At other times of the day, much of this capacity was priced at less than \$20/MWh. Snowy Hydro set the price at greater than \$5000/MWh in one 5-minute dispatch interval.

In Victoria a total of 116 MW of capacity was priced above \$5000/MWh during the high priced period. The majority of this was offered through day-ahead bids by LYMMCO. At other times of the day this capacity was priced at less than \$20/MWh. LYMMCO set the price at greater than \$5000/MWh a number of times during the day.

There was around 580 MW less generation capacity presented in Victoria compared to the maximum summer capability. This included reductions through rebids of almost 400 MW of capacity in the four hours leading up to the high prices:

- From 10.12 am until 3.18 pm TRUenergy reduced the availability of its Yallourn units by 150 MW all of which was priced below \$5/MWh. The rebid reason given was "Vacuum limitation".
- At 2.51 pm International Power's Hazelwood unit four tripped reducing its available capacity by 220 MW. All of this capacity was priced below zero.

There was no other significant rebidding.

² NEMMCO is required to assess whether sufficient generation is offered into the market to meet the forecast demands plus provide sufficient reserves to ensure reliability. These extra reserves provide a margin for risk management and ensure that the system remains stable even in the event of a failure of a generator. When reserves fall below the minimum required to ensure reliability NEMMCO publishes notification to the market to elicit a response.

³ An LOR1 condition is when available reserves are below the sum of the largest and second largest contingencies. An LOR2 condition is when available reserves are below the largest contingency.

⁴ For more information refer to the AER's 5 to 17 March 2008 \$5000/MWh report published in May 2008 available at www.aer.gov.au.

Figure 3 shows the capacity in Victoria and Snowy that was presented at prices above \$5000/MWh and the amount of capacity not presented to the market when compared to the summer ratings of the plant⁵. It also shows a combined total of high priced or unavailable capacity as a percentage of the summer rating.

Figure 3: Capacity offered above \$5000/MWh in Victoria and Snowy for 4 pm and 4.30 pm.

Participant	Summer rating (MW)	Capacity priced above \$5000/MWh	Capacity not presented	Combined total as % of summer rating
AGL Hydro Partnership	459	0	49	11%
Babcock and Brown Power - Bairnsdale	70	0	-6	-9%
Energy Brix Australia	139	5	-26	-15%
International Power - Hazelwood	1580	0	415	26%
International Power - Loy Yang B	965	0	-59.5	-6%
LYMMCO	2050	111	-74	2%
Snowy Hydro - Laverton North	300	0	-5	-2%
Snowy Hydro - Valley Power	270	0	98	36%
TRUenergy - Ecogen Energy	891	0	-59	-7%
TRUenergy - Yallourn	1420	0	167.5	12%
Victoria total	8298	116	534	8%
Snowy Hydro - Snowy	3539	814	75	25%

The closing bids for all participants in Victoria and Snowy with capacity priced at or above \$5000/MWh during the high priced periods are presented in **Appendix A**.

The generators involved in setting the spot price exceeding \$5000/MWh on 17 March are detailed in **Appendix B**.

Assessment

Extreme temperatures in Victoria and South Australia saw the highest-ever demands in those regions. There was 116 MW of the available capacity in Victoria, or less than two per cent, and 814 MW in the Snowy region priced above \$5000/MWh. There was no significant generator rebidding.

The AER has issued a separate report into the high priced events in South Australia in March 2008.

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⁵ Summer ratings are sourced from NEMMCO's 2007 SOO.

Appendix A – Closing bids for 17 March 2008

Figures A1 – A3 highlight the half hour closing bids for participants in Victoria and Snowy with capacity priced at or above \$5000/MWh during the trading intervals in which the spot price exceeded \$5000/MWh. It also shows the generation output of that participant and the spot price.

Figure A1: LYMMCO closing bid prices, dispatch and spot price on 17 March

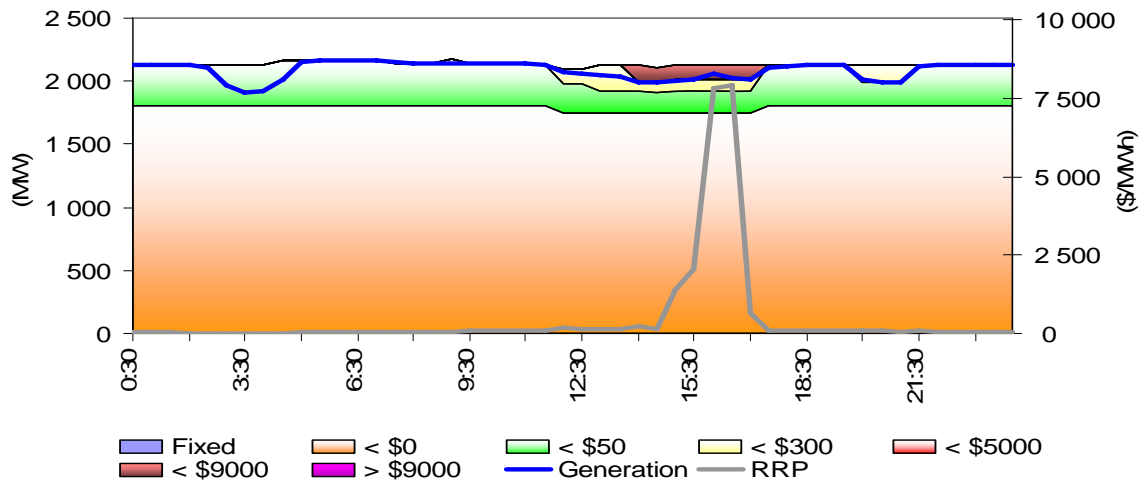


Figure A2: Energy Brix closing bid prices, dispatch and spot price on 17 March

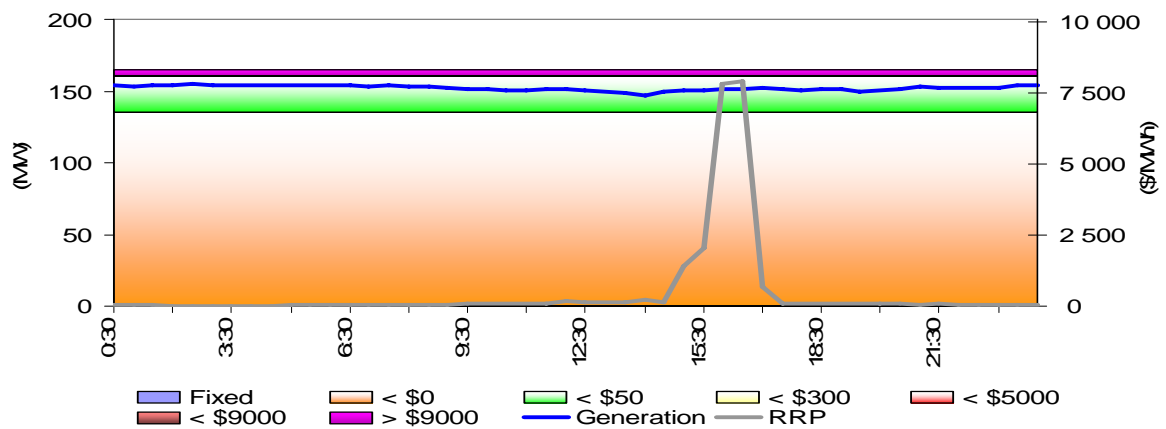
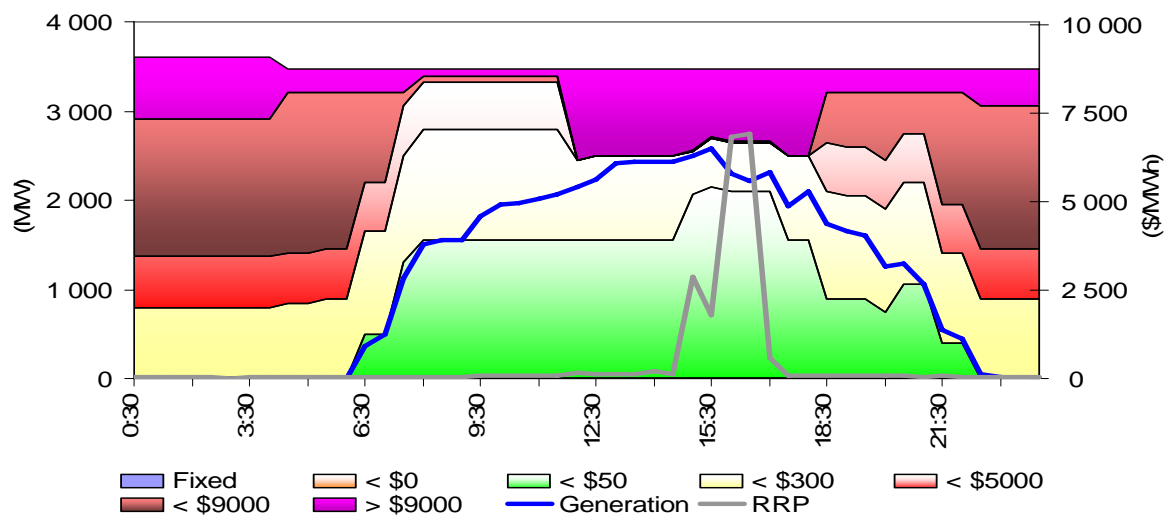


Figure A3: Snowy closing bid prices, dispatch and spot price on 17 March



Appendix B – Price setters for 17 March 2008

The following tables identify 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 NEMMCO⁶. 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 17 March – Victoria - 4 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
15:35	\$8024.00	AGL	TORRB4	Energy	\$7500.72	0.27	\$2005.92
		AGL	TORRB3	Energy	\$7500.72	0.27	\$2005.92
		AGL	TORRB2	Energy	\$7500.72	0.27	\$2005.92
		AGL	TORRB1	Energy	\$7500.72	0.27	\$2005.92
		AGL	TORRB1	Raise reg	\$1.60	-0.80	-\$1.28
		AGL	TORRB4	Raise reg	\$1.60	-0.27	-\$0.43
		Stanwell	GSTONE3	Raise reg	\$1.99	1.07	\$2.13
		AGL	TORRB1	Raise 6 sec	\$0.50	1.07	\$0.53
		AGL	TORRB3	Raise 6 sec	\$0.50	-0.53	-\$0.27
		AGL	TORRB2	Raise 6 sec	\$0.50	-0.53	-\$0.27
15:40	\$7950.49	LYMMCO	LYA4	Energy	\$7950.49	1.00	\$7950.49
15:45	\$7638.89	AGL	TORRB3	Energy	\$7500.72	0.34	\$2546.27
		AGL	TORRB2	Energy	\$7500.72	0.34	\$2546.27
		AGL	TORRB1	Energy	\$7500.72	0.34	\$2546.27
		AGL	TORRB2	Raise 6 sec	\$0.50	-0.68	-\$0.34
		AGL	TORRB1	Raise 6 sec	\$0.50	-0.68	-\$0.34
		LYMMCO	LYA2	Raise 6 sec	\$0.50	1.36	\$0.68
15:50	\$7950.49	LYMMCO	LYA4	Energy	\$7950.49	1.00	\$7950.49
15:55	\$7651.48	LYMMCO	LYA2	Energy	\$7650.39	1.00	\$7650.39
		LYMMCO	LYA2	Raise reg	\$0.90	-1.00	-\$0.90
		Stanwell	GSTONE6	Raise reg	\$1.99	1.00	\$1.99
		LYMMCO	LYA2	Raise 6 sec	\$0.50	-0.29	-\$0.14
16:00	\$7650.39	LYMMCO	LYA2	Energy	\$7650.39	1.00	\$7650.39
		AGL	TORRB2	Raise 6 sec	\$0.50	0.29	\$0.14
		LYMMCO	LYA2	Raise 6 sec	\$0.50	-0.29	-\$0.14
Spot price		\$7811/MWh					

Monday 17 March – Victoria – 4.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
16:05	\$10 000.00	Snowy Hydro	MURRAY	Energy	\$9999.00	1.14	\$11427.16
16:10	\$7650.44	LYMMCO	LYA2	Energy	\$7650.39	1.00	\$7650.39
		AGL	TORRB4	Raise reg	\$1.60	-0.13	-\$0.21
		Stanwell	GSTONE1	Raise reg	\$1.99	0.13	\$0.27
		LYMMCO	LYA4	Raise 60 sec	\$0.40	0.43	\$0.17
		LYMMCO	LYA2	Raise 60 sec	\$0.40	-0.43	-\$0.17
		LYMMCO	LYA2	Raise 6 sec	\$0.50	-0.29	-\$0.14
		AGL	TORRB4	Raise 6 sec	\$0.50	0.29	\$0.14
		AGL	TORRB4	Raise 6 sec	\$0.50	0.29	\$0.14
16:15	\$7481.16	AGL	TORRB3	Energy	\$7500.72	0.19	\$1454.69
		AGL	TORRB4	Energy	\$7500.72	0.19	\$1454.69
		AGL	TORRB2	Energy	\$7500.72	0.19	\$1454.69
		AGL	TORRB1	Energy	\$7500.72	0.19	\$1454.69
		AGL	TORRA2	Energy	\$7500.72	0.11	\$831.23
		AGL	TORRA1	Energy	\$7500.72	0.11	\$831.23
		AGL	TORRA1	Energy	\$7500.72	0.11	\$831.23
16:20	\$7479.28	AGL	TORRB1	Energy	\$7500.72	0.19	\$1454.31
		AGL	TORRB2	Energy	\$7500.72	0.19	\$1454.31
		AGL	TORRB3	Energy	\$7500.72	0.19	\$1454.31
		AGL	TORRB4	Energy	\$7500.72	0.19	\$1454.31
		AGL	TORRA2	Energy	\$7500.72	0.11	\$831.00
		AGL	TORRA1	Energy	\$7500.72	0.11	\$831.00
		AGL	TORRA1	Energy	\$7500.72	0.11	\$831.00
16:25	\$7480.76	AGL	TORRB4	Energy	\$7500.72	0.19	\$1454.61
		AGL	TORRB2	Energy	\$7500.72	0.19	\$1454.61
		AGL	TORRB1	Energy	\$7500.72	0.19	\$1454.61
		AGL	TORRA2	Energy	\$7500.72	0.11	\$831.23
		AGL	TORRA1	Energy	\$7500.72	0.11	\$831.23
		AGL	TORRB3	Energy	\$7500.72	0.19	\$1454.61
		AGL	TORRB3	Energy	\$7500.72	0.19	\$1454.61

⁶ 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>

16:30	\$7368.82	AGL	TORRB4	Energy	\$7500.72	0.19	\$1432.86
		AGL	TORRA1	Energy	\$7500.72	0.11	\$818.78
		AGL	TORRA2	Energy	\$7500.72	0.11	\$818.78
		AGL	TORRB1	Energy	\$7500.72	0.19	\$1432.86
		AGL	TORRB2	Energy	\$7500.72	0.19	\$1432.86
		AGL	TORRB3	Energy	\$7500.72	0.19	\$1432.86

Spot price \$7910/MWh

Monday 17 March – Snowy - 4 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
15:35	\$7094.83	AGL	TORRB4	Energy	\$7500.72	0.24	\$1773.62
		AGL	TORRB3	Energy	\$7500.72	0.24	\$1773.62
		AGL	TORRB1	Energy	\$7500.72	0.24	\$1773.62
		AGL	TORRB2	Energy	\$7500.72	0.24	\$1773.62
		AGL	TORRB4	Raise reg	\$1.60	-0.24	-\$0.38
		AGL	TORRB1	Raise reg	\$1.60	-0.71	-\$1.14
		Stanwell	GSTONE3	Raise reg	\$1.99	0.95	\$1.88
		AGL	TORRB3	Raise 6 sec	\$0.50	-0.47	-\$0.24
		AGL	TORRB1	Raise 6 sec	\$0.50	0.95	\$0.47
		AGL	TORRB2	Raise 6 sec	\$0.50	-0.47	-\$0.24
15:40	\$6991.49	LYMMCO	LYA4	Energy	\$7950.49	0.88	\$6991.50
15:45	\$6707.37	AGL	TORRB2	Energy	\$7500.72	0.30	\$2235.81
		AGL	TORRB1	Energy	\$7500.72	0.30	\$2235.81
		AGL	TORRB3	Energy	\$7500.72	0.30	\$2235.81
		AGL	TORRB1	Raise 6 sec	\$0.50	-0.60	-\$0.30
		AGL	TORRB2	Raise 6 sec	\$0.50	-0.60	-\$0.30
		LYMMCO	LYA2	Raise 6 sec	\$0.50	1.19	\$0.60
15:50	\$6914.84	LYMMCO	LYA4	Energy	\$7950.49	0.87	\$6914.86
15:55	\$6618.83	LYMMCO	LYA2	Energy	\$7650.39	0.87	\$6617.89
		LYMMCO	LYA2	Raise reg	\$0.90	-0.87	-\$0.78
		Stanwell	GSTONE6	Raise reg	\$1.99	0.87	\$1.72
16:00	\$6619.82	LYMMCO	LYA2	Energy	\$7650.39	0.87	\$6619.81
		AGL	TORRB2	Raise 6 sec	\$0.50	0.25	\$0.12
		LYMMCO	LYA2	Raise 6 sec	\$0.50	-0.25	-\$0.12

Spot price \$6825/MWh

Monday 17 March – Snowy – 4.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
16:05	\$9396.78	Snowy Hydro	MURRAY	Energy	\$9999.00	1.00	\$9999.00
16:10	\$6586.71	LYMMCO	LYA2	Energy	\$7650.39	0.86	\$6586.68
		AGL	TORRB4	Raise reg	\$1.60	-0.11	-\$0.18
		Stanwell	GSTONE1	Raise reg	\$1.99	0.11	\$0.23
		LYMMCO	LYA2	Raise 60 sec	\$0.40	-0.37	-\$0.15
		LYMMCO	LYA4	Raise 60 sec	\$0.40	0.37	\$0.15
		AGL	TORRB4	Raise 6 sec	\$0.50	0.25	\$0.12
		LYMMCO	LYA2	Raise 6 sec	\$0.50	-0.25	-\$0.12
16:15	\$6442.16	AGL	TORRB3	Energy	\$7500.72	0.17	\$1252.62
		AGL	TORRB4	Energy	\$7500.72	0.17	\$1252.62
		AGL	TORRB1	Energy	\$7500.72	0.17	\$1252.62
		AGL	TORRA2	Energy	\$7500.72	0.10	\$715.79
		AGL	TORRA1	Energy	\$7500.72	0.10	\$715.79
		AGL	TORRB2	Energy	\$7500.72	0.17	\$1252.62
16:20	\$6442.15	AGL	TORRB3	Energy	\$7500.72	0.17	\$1252.62
		AGL	TORRA1	Energy	\$7500.72	0.10	\$715.79
		AGL	TORRA2	Energy	\$7500.72	0.10	\$715.79
		AGL	TORRB2	Energy	\$7500.72	0.17	\$1252.62
		AGL	TORRB1	Energy	\$7500.72	0.17	\$1252.62
		AGL	TORRB4	Energy	\$7500.72	0.17	\$1252.62
16:25	\$6477.09	AGL	TORRB2	Energy	\$7500.72	0.17	\$1259.45
		AGL	TORRA2	Energy	\$7500.72	0.10	\$719.69
		AGL	TORRB1	Energy	\$7500.72	0.17	\$1259.45
		AGL	TORRB3	Energy	\$7500.72	0.17	\$1259.45
		AGL	TORRB4	Energy	\$7500.72	0.17	\$1259.45
		AGL	TORRA1	Energy	\$7500.72	0.10	\$719.69
16:30	\$6345.66	AGL	TORRA1	Energy	\$7500.72	0.09	\$705.07
		AGL	TORRB4	Energy	\$7500.72	0.16	\$1233.87
		AGL	TORRB3	Energy	\$7500.72	0.16	\$1233.87
		AGL	TORRB2	Energy	\$7500.72	0.16	\$1233.87
		AGL	TORRB1	Energy	\$7500.72	0.16	\$1233.87
		AGL	TORRA2	Energy	\$7500.72	0.09	\$705.07

Spot price \$6948/MWh