

Spot prices greater than \$5000/MWh



AUSTRALIAN ENERGY
REGULATOR

New South Wales: 15 January 2009

Introduction

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

As part of this role, the AER investigates and reports on any instances in the NEM where the half hour spot price exceeds \$5000/MWh. Under the Rules, the AER must:

- 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.

Summary

On 15 January 2009, the spot market price in New South Wales exceeded \$5000/MWh for the 2 pm trading interval.

On the day, the temperature in western Sydney reached 43 degrees, resulting in a new summer record demand of 13 567 MW. In addition, around 2100 MW of generation in New South Wales was unavailable and planned network outages led to reduced import capability. The resulting tight supply-demand balance coupled with rebidding by New South Wales generators saw the spot price reach \$5210/MWh.

Actual and forecast demand

Demand in New South Wales peaked at a summer record of 13 567 MW¹ at 2 pm, 300 MW greater than that forecast four hours ahead.

At around midday, up to 350 MW of load reduction in New South Wales occurred following the five-minute dispatch price spiking to \$8800/MWh. This appeared to be a price responsive demand reduction. The load reduction continued for around one hour. At around 2.30 pm, following further high prices, a second load reduction for around one hour occurred. Five minute demand and prices illustrating these load reductions, which appeared to be price-driven demand-side responses, are detailed in **Appendix A**.

Figure 1 compares the actual demand for the 2 pm trading interval 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.

¹ The previous New South Wales summer record demand occurred in the 2005-06 summer, reaching 13 297 MW. The highest-ever demand of 14 287 MW occurred in the winter of 2008.

Figure 1: Actual and forecast demand, spot price and available generation in NSW

Thursday 2 pm	Actual	4 hr forecast	12 hr forecast
Spot Price (\$/MWh)	5210.57	119.40	89.69
Demand (MW)	13 567	13 267	13 065
Available capacity(MW)	13 666	13 859	13 415

Generator offers and rebidding

On 15 January, at 2 pm, up to 2100 MW of capacity was unavailable for dispatch and up to 1170 MW (9 per cent of the capacity in New South Wales) was priced above \$5000/MWh.

Around 2100 MW of installed generation capacity in New South Wales was unavailable during the high-priced period. The majority of this reduction was a result of unplanned outages and delays in returning generation plant to service.

Available capacity was also around 650 MW less than the Short Term Projected Assessment of System Adequacy (ST PASA) forecast at midday the previous day and 1662 MW less than the most up-to-date Medium Term PASA released on 6 January. PASA and reserve assessments for the 2 pm trading interval are further detailed in **Appendix B**.

On 13 January, unit five at Delta Electricity’s Vales Point had an unscheduled outage. It was forecast to return to service on 15 January. At 12 pm, Delta reduced the available capacity by 420 MW, all of which was priced at less than \$40/MWh. The reason given was “Return to service::capacity limit change/ROC change”. At 1.49 pm, Delta rebid a further 90 MW as unavailable, all of which was priced below zero. The reason given was “Superheater/reheater temps too high::capacity limit change”. Over two rebids at 1.42 pm and 1.49 pm, Delta reduced the available capacity at Vales Point unit six by 110 MW. The reason given was “PA Fan limit::capacity limit”.

Following a short-term outage, unit three at Macquarie Generation’s Liddell plant was forecast to return to service during the morning of 15 January. However, at 9.50 pm on 14 January, Macquarie Generation extended the outage until the end of the day. The reason given was “LUOP Failure”. Liddell unit two was forecast to return to service at the start of 15 January. However, over several rebids in the morning, the return to service was delayed. The reasons given were “Revised RTS profile” and “RTS delayed”. The unit reached a maximum available capacity of 400 MW by 3 pm.

Following a long-term outage, Liddell unit four was forecast to be in service for 15 January from around 12 noon with 90 MW of available capacity at 2 pm. At 7 am, Macquarie Generation reduced the available capacity at Liddell unit four to zero. The reason given was “RTS delayed”.

Figure 4 shows the generation capacity not available in New South Wales at the time the spot price exceeded \$5000/MWh and whether the outage was planned or unplanned.

Figure 4: New South Wales generation capacity not available at 2 pm

Participant	Capacity not available (MW)	Comment
Delta Electricity		
Vales Point Unit 5	450	Delayed return to service
Vales Point Unit 6	72	Revised capacity limit
Wallerawang Unit 7	100	Planned capacity reduction
Macquarie Generation		
Liddell Unit 2	200	Delayed return to service
Liddell Unit 3	520	Unplanned outage
Liddell Unit 4	505	Delayed return to service
TRU Energy		
Tallawarra	117	Commissioning of new plant
Others		
	155	
Total capacity unavailable	2119 MW	

Over several rebids from 8.30 am, Delta Electricity shifted 540 MW of capacity across its portfolio, from prices below \$100/MWh to above \$9000/MWh. The reasons given were “Plant stability::band shift”, “Demand higher than forecast: band shift” and “Ash management::Band shift”. A total of 660 MW of capacity was offered at above \$5000/MWh by Delta Electricity.

At 10.56 am, Eraring Energy shifted 320 MW of capacity across its Eraring units from prices below \$30/MWh to above \$8600/MWh. The reason given was “F: material change in PD sensitivities”. A total of 510 MW of capacity was offered at above \$5000/MWh by Eraring Energy for the high price period.

The generators involved in setting the price during the high-price period, and how that price was determined by the market systems are detailed in **Appendix C**.

The closing bids for all participants in New South Wales with capacity priced at or above \$5000/MWh for the 2 pm trading interval are presented in **Appendix D**.

Changes to network availability

Total import capability into New South Wales was around 290 MW lower than forecast four hours ahead.

On 15 January, the Lower Tumut to Upper Tumut 64 line was out for service as part of a 12 day planned network outage that commenced on 5 January. Two months notice of this outage was provided in the market systems. The outage limited generation from Snowy Hydro and Uranquinty and restricted imports from Victoria.

The QNI import limit was close to forecast. Outages of equipment associated with the Terranora interconnector reduced import capability below nominal levels, further tightening the supply-demand balance in the region.

Assessment

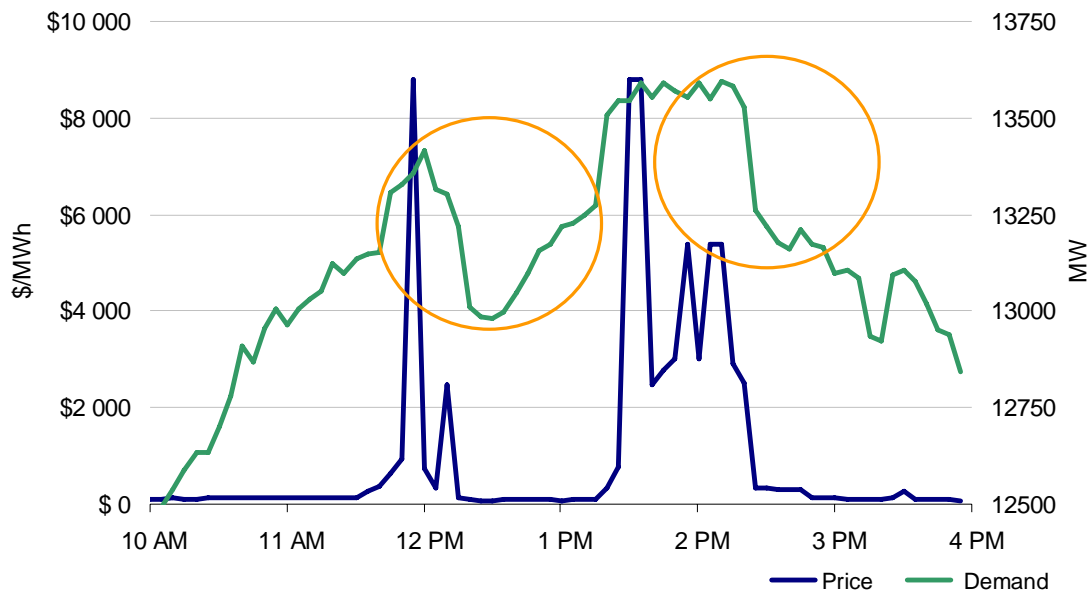
On 15 January the spot price in New South Wales reached \$5210/MWh at 2 pm. The high temperature in the region resulted in a new summer demand record of 13 567 MW. The high demand coupled with around 2100 MW of generation capacity unavailable and a reduction in import capability across the interconnectors led to a tight supply–demand balance in the region. At the time around 1170 MW, or 9 per cent of available capacity in New South Wales was priced above \$5000/MWh, 890 MW of which was from rebidding by participants.

**Australian Energy Regulator
February 2009**

Appendix A – New South Wales five minute demand and price

Figure A1 shows the five minute demand and price in New South Wales on 15 January with the two apparent load response periods highlighted.

Figure A1: NSW 5 minute demand and price on 15 January 2009



Appendix B – 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 B1 and B2 compare the forecasts from MTPASA and STPASA with actual outcomes at the time of maximum demand on 15 January. 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 also lower than the most recent forecasts despite higher than forecast temperature on the day.

Figure B1: NSW MTPASA peak demand forecasts and actual peak demand for 15 January

Forecast date	10% POE demand (MW)	Forecast available capacity (MW)
23-Dec	14 860	15 328
30-Dec	14 860	15 328
06-Jan	14 860	15 328
Actual	13 567	13 666

Figure B2: NSW STPASA demand forecasts and actual demand for 15 January at 2 m

Forecast date/time	Max forecast Temperature (°C)	10% POE demand (MW)	Forecast available capacity (MW)
08-Jan midday	27.0	11 804	14 882
09-Jan midday	27.0	11 804	15 047
10-Jan midday	27.0	11 804	14 895
11-Jan midday	28.0	12 809	14 897
12-Jan midday	31.0	12 809	14 878
13-Jan midday	31.0	13 849	14 863
14-Jan midday	33.0	13 849	14 319
Actual	33.4²	13 567	13 666

At 11.15 am on 15 January, NEMMCO issued a market notice declaring a lack of reserve condition level one (LOR1)³ in New South Wales until 1 pm. At 12.15 pm another notice was issued extending the LOR1 period to 3 pm. The notice was cancelled at 4.20 pm.

² Temperature at Sydney airport

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

Appendix C – Price setters for 15 January 2009

The following table identifies the trading interval 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 NEMMCO.⁴ 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 trading interval spot price is the time weighted average of the six dispatch interval prices.

Thursday 15 January – New South Wales – 2 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
13:35	\$8,800.00	Eraring Energy	ER01	Energy	\$8,800.00	0.25	\$2,200.00
		Eraring Energy	ER02	Energy	\$8,800.00	0.25	\$2,200.00
		Eraring Energy	ER03	Energy	\$8,800.00	0.25	\$2,200.00
		Eraring Energy	ER04	Energy	\$8,800.00	0.25	\$2,200.00
13:40	\$8,800.00	Eraring Energy	ER01	Energy	\$8,800.00	0.25	\$2,200.00
		Eraring Energy	ER02	Energy	\$8,800.00	0.25	\$2,200.00
		Eraring Energy	ER03	Energy	\$8,800.00	0.25	\$2,200.00
		Eraring Energy	ER04	Energy	\$8,800.00	0.25	\$2,200.00
13:45	\$2,488.50	Snowy Hydro	MURRAY	Energy	\$44.92	3.62	\$162.44
		Snowy Hydro	TUMUT3	Energy	-\$1,000.00	-2.33	\$2,326.05
13:50	\$2,775.23	AGL Hydro	MCKAY1	Energy	\$82.86	3.85	\$319.33
		Snowy Hydro	TUMUT3	Energy	-\$1,000.00	-2.46	\$2,455.89
13:55	\$3,024.78	Ecogen	JLA02	Energy	\$65.72	0.13	\$8.27
		Snowy Hydro	MURRAY	Energy	\$90.31	4.08	\$368.43
		Snowy Hydro	TUMUT3	Energy	-\$1,000.00	-2.65	\$2,648.07
14:00	\$5,374.90	Tarong	W/HOE#2	Energy	\$4,904.73	1.10	\$5,374.90
Spot price		\$5021/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>

Appendix D – Closing bids

Figures D1 – D2 highlight the half hour closing bids for generators in New South Wales with significant capacity priced at or above \$5000/MWh during the trading interval in which the spot price exceeded \$5000/MWh. It also shows the generation output and the spot price (RRP).

Figure D1: Eraring closing bid prices, dispatch and spot price on 15 January

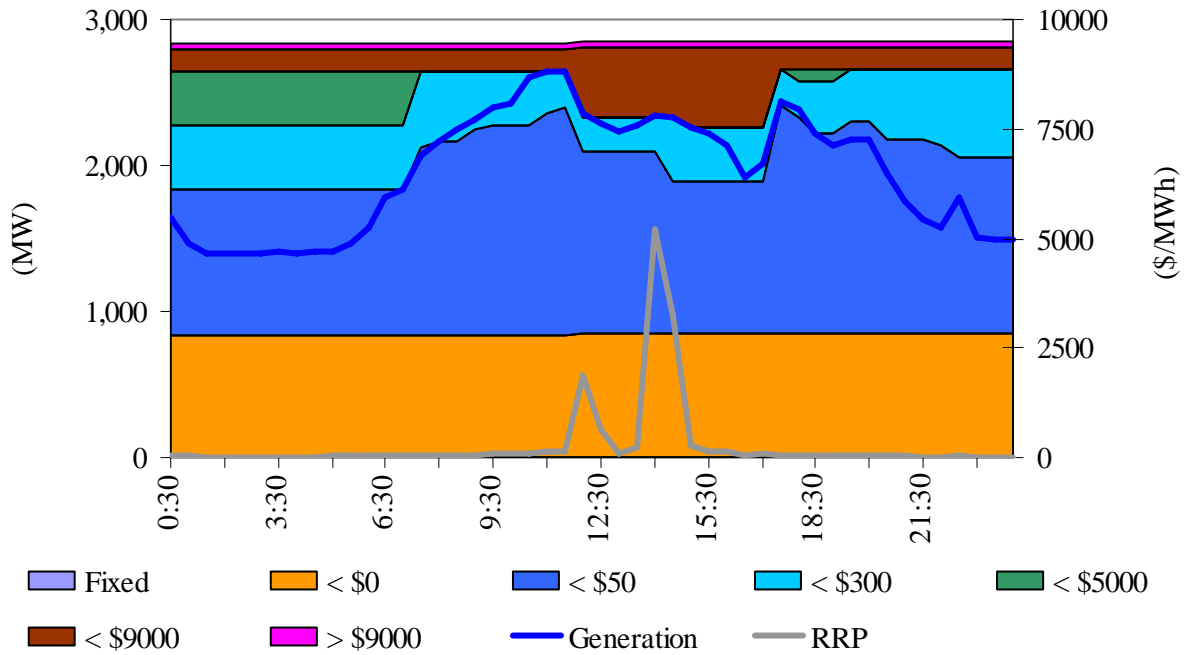


Figure D2: Delta Electricity closing bid prices, dispatch and spot price on 15 January

