

Electricity spot prices above \$5000/MWh

31 January and
1 February 2011
Victoria



AUSTRALIAN ENERGY
REGULATOR

Introduction

The AER is required to publish a report covering the circumstances in which the spot price exceeds \$5000/MWh¹. 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.

Summary

On Monday 31 January and Tuesday 1 February, the spot price in Victoria exceeded \$5000/MWh for a total of three trading intervals. On Monday the spot price reached \$9597/MWh at 3.30 pm. On Tuesday the spot price reached \$5333/MWh at 1.30 pm and \$5078/MWh at 2 pm. High temperatures saw demand reach its highest level in Victoria this summer, peaking at 8924 MW on Monday and 9585 MW on Tuesday².

On Monday, the trip of Newport Power Station at 2.50 pm caused a 510 MW reduction in available capacity. This caused prices in excess of \$10 000/MWh for eight dispatch intervals between 2.55 pm and 4.20 pm. Snowy Hydro immediately shifted capacity into negative prices at Murray³. This forced flows out of Victoria counter-price into the lower priced New South Wales region.

The record demand and high prices in South Australia also contributed to the high prices on Monday. The AER has published a separate report covering the events in South Australia.

Record demand and high prices in New South Wales and rebidding by International Power at Hazelwood and Loy Yang B contributed to the high prices on Tuesday. The AER has published a separate report covering the events in New South Wales.

On both days, LYMMCO (through day-ahead initial offers) priced around one-third of the capacity at Loy Yang A close to the price cap.

¹ Pursuant to clause 3.13.7 (d) of the Electricity Rules.

² Record demand in Victoria is 10 445 MW which occurred in January 2009.

³ The Snowy region was abolished in July 2008 and as a result Snowy Hydro's Murray generator was moved to the expanded Victoria region.

Actual and forecast conditions

Monday 31 January

Figures 1 and 2 compare the actual demand, available capacity and spot price in Victoria with that forecast by AEMO 4 and 12 hours ahead of dispatch.

The actual price was lower than forecast, consistent with lower than forecast demand. Demand was up to almost 1000 MW below that forecast four hours ahead, and up to 830 MW below that forecast twelve hours ahead. Although the maximum temperature for Melbourne was forecast to be 39 degrees, it only reached 30 degrees. From 1.30 pm, AEMO reduced the demand forecast for the rest of the day by around 650 MW, which saw forecast prices reduce from close to the price cap to around \$300/MWh.

Available capacity was less than forecast following the trip of the Newport Power Station at 2.50 pm (see Generator offers and rebidding section for details).

Figure 1: Actual and forecast demand, spot price and available capacity – 31 January

Monday 3.30 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	8627	9523	9231
Spot Price (\$/MWh)	9597	11 533	11 683
Available capacity (MW)	9313	9923	10 029

Tuesday 1 February

Conditions at the time saw demand higher than forecast twelve hours ahead, but close to forecast four hours ahead. Demand reached its highest level in the region this summer.

The high demand was driven by hot conditions-the overnight minimum in Melbourne for Monday night did not fall below 20 degrees, with a maximum temperature of 40 degrees on Tuesday.

Available capacity was up to 334 MW below that forecast twelve hours ahead.

Figure 2: Actual and forecast demand, spot price and available capacity – 1 February

Tuesday 1.30 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	9535	9501	8977
Spot Price (\$/MWh)	5333	459	273
Available capacity (MW)	9965	10 037	10 299
Tuesday 2 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	9378	9516	9015
Spot Price (\$/MWh)	5078	11 102	298
Available capacity (MW)	9974	10 010	10 299

Generator offers and rebidding

Monday 31 January

During the times of high prices there was no capacity priced between \$300/MWh and \$9300/MWh, so small changes in import capability, rebidding of capacity or changes in demand, had the potential to result in significant changes in price.

Over a number of rebids from 4.29 am to 3.07 pm, TRUenergy reduced the availability of its Yallourn Power Station by 216 MW (all of which was priced below \$5/MWh). The reasons given included “vacuum limitation”, “adj to capacity due to plant conditions”, “adj avail due to ambient temp” and “re heat pressue”.

At around 2.50 pm, Ecogen Energy’s Newport Power Station tripped, reducing available capacity by 510 MW (all of which was priced below \$45/MWh). As low-priced generation was ramp rate limited, high priced generation was dispatched in its place. This resulted in the 5-minute dispatch price increasing from \$300/MWh at 2.50 pm to \$11 501/MWh at 2.55 pm. Prices generally remained high until 4.25 pm when Newport Power Station returned to service and prices fell to below \$400/MWh.

The high price at 2.55 pm, led to flows across the Vic-NSW interconnector changing from 300 MW north to 260 MW south. Constraints between Murray and Dedarang (see “Changes to network availability” section) led to a reduction in the dispatch target of Murray from 1475 MW for the dispatch interval ending 2.50 pm, to 1263 MW for the 2.55 pm dispatch interval (at its maximum ramp down rate⁴). As a result, at 2.52 pm, effective from 3 pm, Snowy Hydro rebid 1530 MW (out of 1575 MW) of available capacity at Murray from prices above \$30/MWh to close to the price floor. The rebid also reduced the ramp down rate from 50 MW/min to the minimum allowable of 3 MW/min⁵. The reason given was “14:52 A Vic price 11200 hgr thn 5mpd @ 14:50”.

There was no other significant rebidding.

Tuesday 1 February

During the times of high prices there was no capacity priced between \$300/MWh and \$9300/MWh.

Over two rebids, at 12.08 pm and 12.10 pm, International Power shifted a total of 155 MW of available capacity at its Loy Yang B and Hazelwood power stations from prices below \$25/MWh to above \$12 100/MWh. The reasons given were “1206A change in Vic pd demand 9446 V 9637” and “1210A change in Vic pd demand 9446 V 9637”.

At 1.22 pm, Snowy Hydro rebid 75 MW of available capacity at its Murray Power Station from prices above \$12 200/MWh to below \$290/MWh. The reason given was “13:19:A Vic 294 disptch price lwr thn prev fcst @ 13:20”.

There was no other significant rebidding.

The generators involved in setting the price during the high-price period, and how that price was determined by the market systems is detailed in **Appendix A**. The prices were generally set by offers from generators in South Australia on Monday and generators in New South Wales on Tuesday.

⁴ The metered output for the dispatch interval ending 2.55 pm (that was measured at 2.50 pm) was 1513 MW. The ramp down rate was 50 MW per 5-minute dispatch interval. This meant that the maximum reduction in output for the unit by the end of the 2.55 pm dispatch interval was 50 MW less than the measured output, or 1263 MW.

In addition to rebidding of capacity by generators into high prices, on both days LYMMCO priced around one-third of the capacity at Loy Yang A close to the price cap, through initial offers (day-ahead). The closing bids for all participants in Victoria with capacity priced at or above \$5000/MWh are presented in **Appendix B**.

Changes to network availability

On 31 January from 2.55 pm to 3.15 pm, thermal transmission constraints (V>>V_NIL_1D and V>>V_NIL_1B, which manage the overload of one of the Dederang to Murray lines for the loss of the other) were limiting imports into Victoria across the Vic-NSW interconnector.

The Murray generator is located in the Victorian region and receives the Victorian price. Prior to the abolition of the Snowy region in July 2008, all of Snowy Hydro's generators were located in the Snowy region. Snowy Hydro's Murray generator is now located in the expanded Victorian region and the remainder of the former Snowy region generation is now located in the expanded New South Wales region.

Murray is located north of Dederang. When Snowy Hydro rebid capacity at Murray into negative prices (which was priced lower than the marginal generator offers in New South Wales), its capacity was dispatched in preference to higher-priced generators in New South Wales. The Murray to Dederang constraint did not allow this output to be dispatched south, and instead it forced counter-price flows into New South Wales across the Vic-NSW interconnector.

The counter-price flows led to accrual of \$341 000 of negative settlement residues. As a result, from 3.20 pm to 3.50 pm, a constraint was invoked by AEMO to minimise the negative residues, reducing flows out of Victoria on the Vic-NSW interconnector to 0 MW.

Appendix A – Price setters for 31 January and 1 February 2011

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. 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 January – 3.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
15:05	\$11 176.73	Alinta Energy	NPS2	Energy	\$12 495.00	0.89	\$11 176.78
15:10	\$10 662.57	International Power	DRYCGT3	Energy	\$11 999.30	0.89	\$10 662.58
15:15	\$10 829.74	Alinta Energy	NPS1	Energy	\$12 199.00	0.89	\$10 830.27
15:20	\$12 398.99	International Power	LOYB2	Energy	\$12 398.99	1.00	\$12 398.99
15:25	\$10 704.83	International Power	POR01	Energy	\$11 999.60	0.89	\$10 704.84
15:30	\$2681.28	International Power	DRYCGT3	Energy	\$11 999.30	0.27	\$3289.01
		Origin Energy	LADBROK1	Energy	-\$1000.00	0.30	-\$303.90
		Origin Energy	LADBROK2	Energy	-\$1000.00	0.30	-\$303.90
Spot price		\$9597/MWh					

Tuesday 1 February – 1.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
13:05	\$1134.00	Origin Energy	URANQ12	Energy	\$1064.21	1.07	\$1134.02
13:10	\$1120.80	Origin Energy	URANQ11	Energy	\$1063.15	1.05	\$1120.77
13:15	\$5308.10	Macquarie Generation	LD02	Energy	\$4994.00	1.06	\$5308.12
13:20	\$8193.94	Macquarie Generation	BW02	Energy	\$7706.00	1.06	\$8193.79
13:25	\$8008.96	Macquarie Generation	BW03	Energy	\$7604.00	1.05	\$8009.29
13:30	\$8230.25	Macquarie Generation	BW01	Energy	\$7808.00	1.05	\$8230.41
Spot price		\$5333/MWh					

Tuesday 1 February – 2 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
13:35	\$8124.23	CS Energy	CALL_B_2	Energy	\$6857.54	1.18	\$8124.13
13:40	\$7963.04	Macquarie Generation	BW02	Energy	\$7706.00	1.03	\$7963.38
13:45	\$7883.52	Macquarie Generation	BW02	Energy	\$7706.00	1.02	\$7883.24
13:50	\$5103.93	Macquarie Generation	LD01	Energy	\$4992.00	1.02	\$5103.82
13:55	\$1077.42	Origin Energy	URANQ14	Energy	\$1065.28	1.01	\$1077.42
14:00	\$313.53	Origin Energy	URANQ14	Energy	\$321.07	1.22	\$390.84
		Tarong Energy	W/HOE#2	Energy	\$298.00	-0.26	-\$77.30
Spot price		\$5078/MWh					

Appendix B – Closing Bids

Figures B1 – B7 highlight the half hour closing bids for participants in Victoria 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.

Figure B1: International Power (Loy Yang B) closing bid prices, dispatch and spot price on 31 January

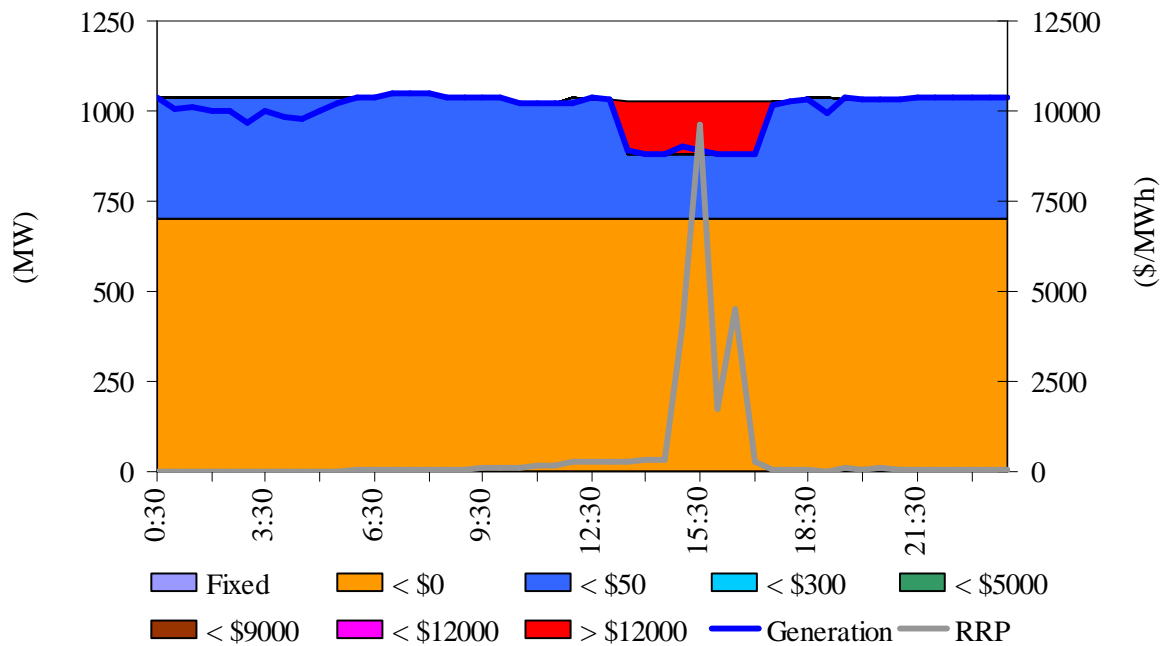


Figure B2: LYMMCo closing bid prices, dispatch and spot price on 31 January

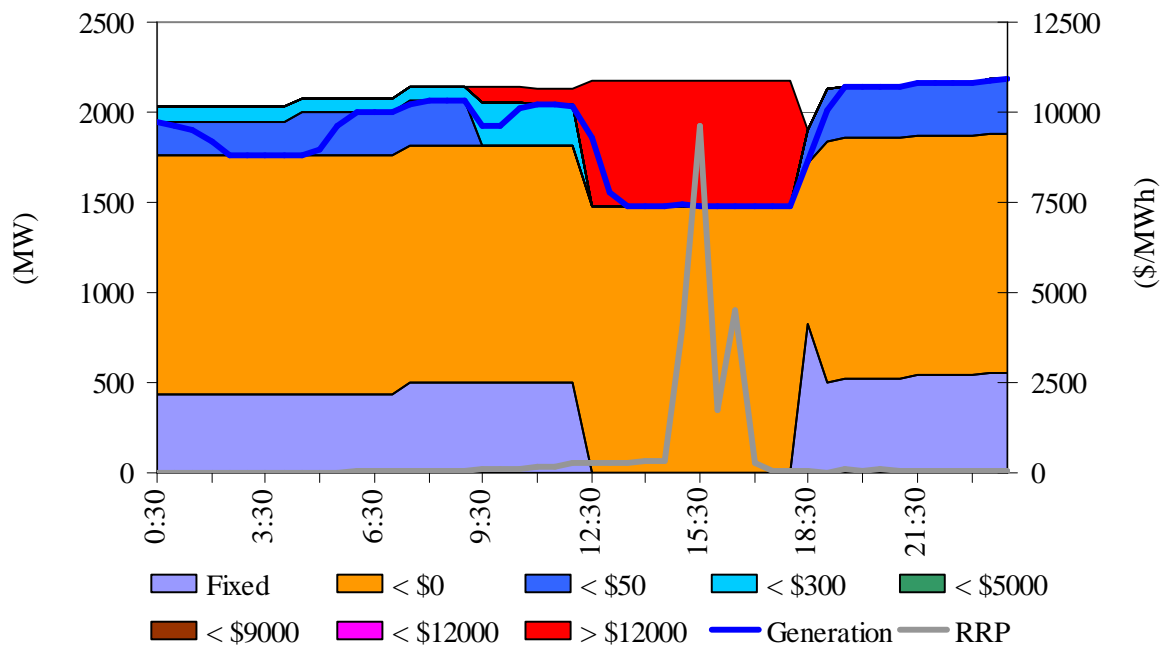


Figure B3: Snowy Hydro (Vic) closing bid prices, dispatch and spot price on 31 January

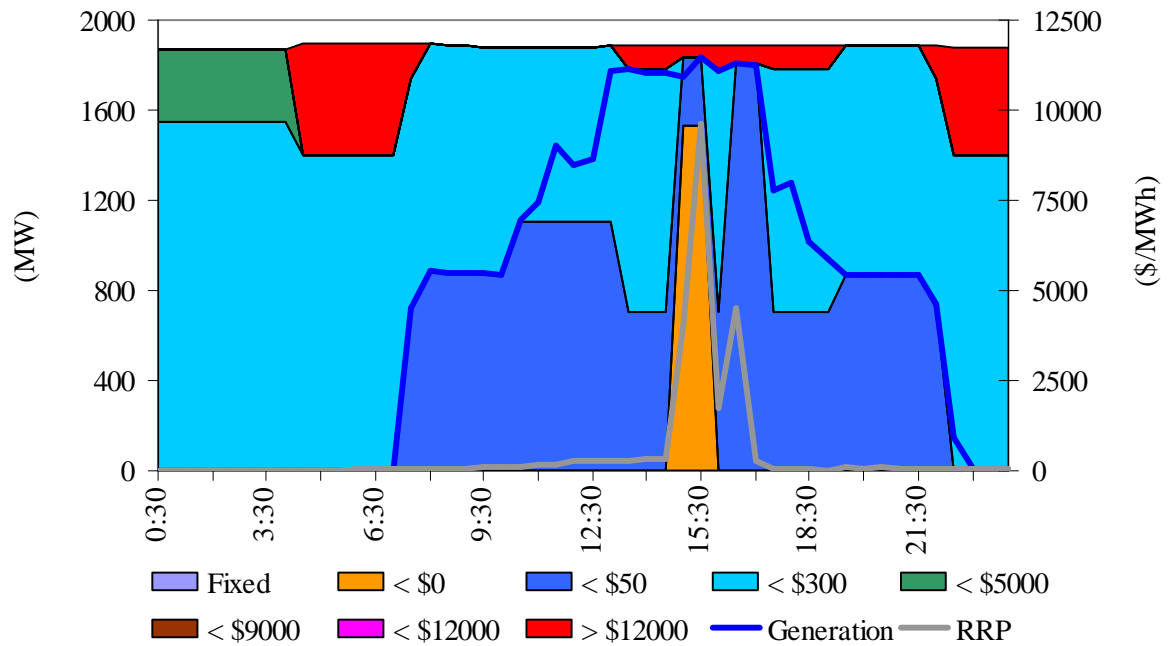


Figure B4: International Power (Loy Yang B) closing bid prices, dispatch and spot price on 1 February

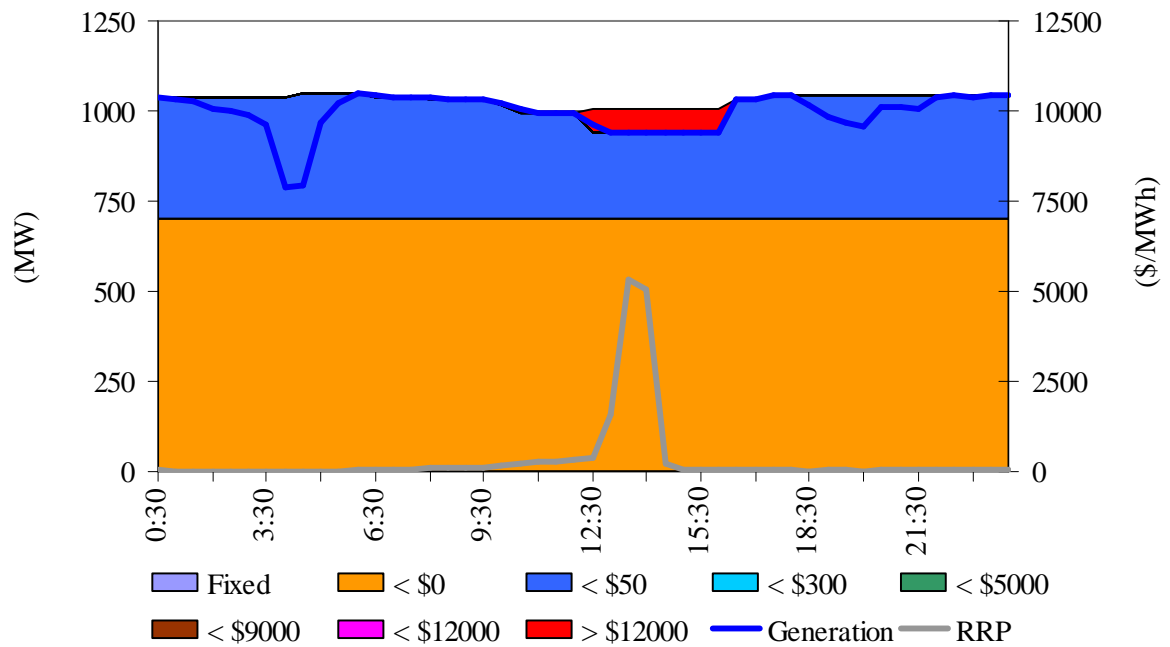


Figure B5: International Power (Hazelwood) closing bid prices, dispatch and spot price on 1 February

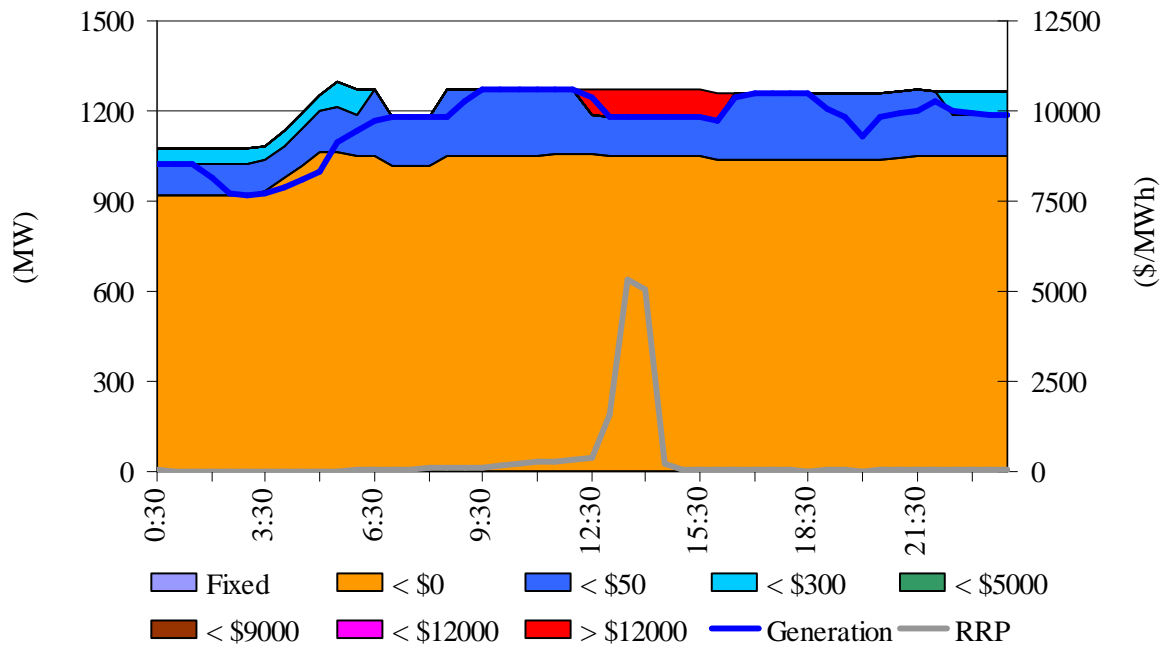


Figure B6: LYMMCo closing bid prices, dispatch and spot price on 1 February

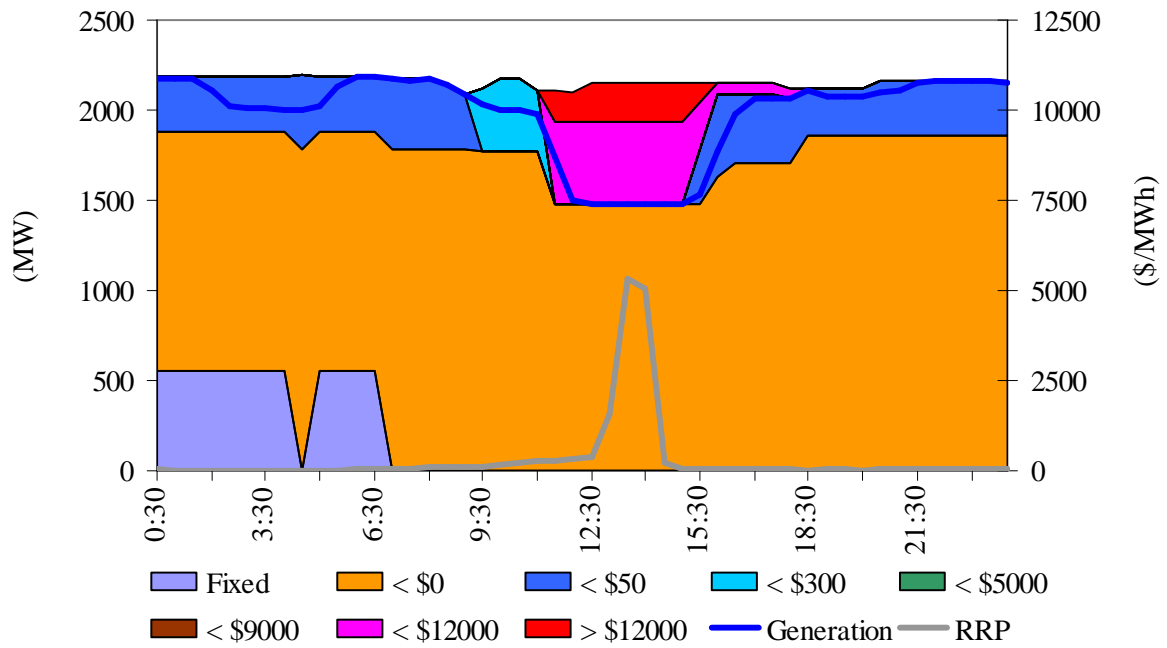
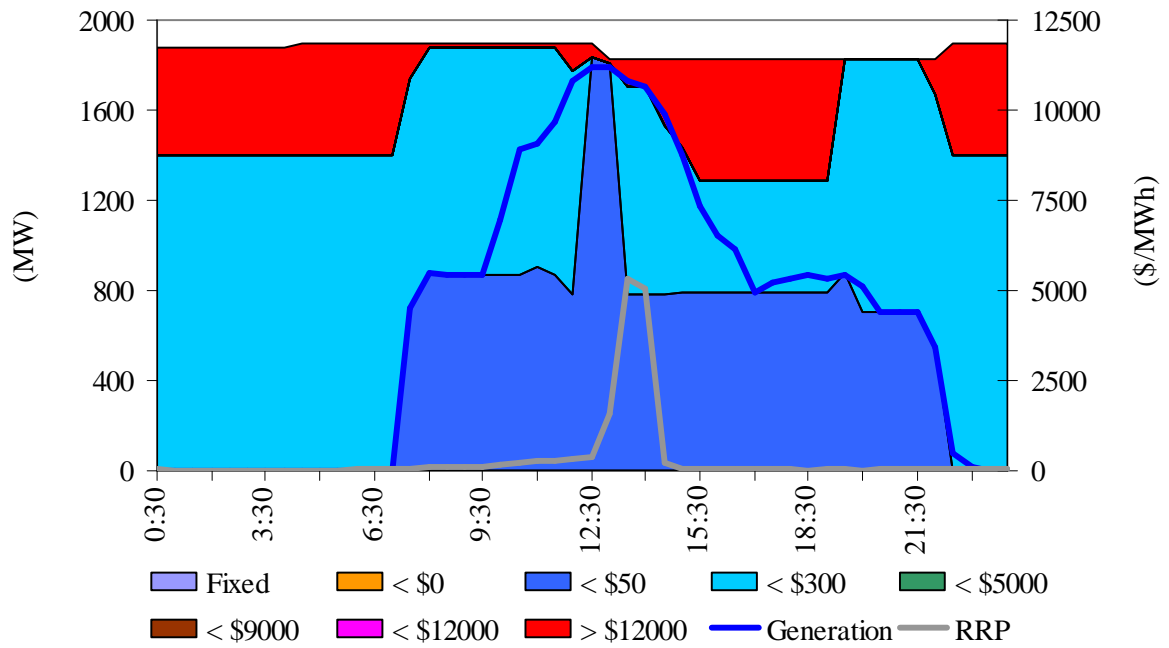


Figure B7: Snowy Hydro (Vic) closing bid prices, dispatch and spot price on 1 February



Appendix C - Actual and forecast demand, spot price and available capacity

As part of its Weekly Market Analysis reports, the AER provides further information if the spot price exceeds three times the weekly average for a region and is above \$250/MWh. On 31 January there were four trading intervals and on 1 February three trading intervals where this occurred in Victoria. All of these high prices were related to the events that are explained as part of this report.

Figure C1: Actual and forecast demand, spot price and available capacity – 31 January

Monday 3 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	8650	9453	9089
Spot Price (\$MW/h)	4024	11 306	10 781
Available capacity (MW)	9805	9992	10 025
Monday 3.30 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	8627	9523	9231
Spot Price (\$MW/h)	9597	11 533	11 683
Available capacity (MW)	9313	9923	10 029
Monday 4 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	8564	9554	9346
Spot Price (\$MW/h)	1763	12 103	11 976
Available capacity (MW)	9339	9893	10 053
Monday 4.30 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	8528	9516	9358
Spot Price (\$MW/h)	4510	11 562	11 917
Available capacity (MW)	9510	9897	10 076

Figure C2: Actual and forecast demand, spot price and available capacity – 1 February

Tuesday 1 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	9521	9372	8948
Spot Price (\$MW/h)	1585	340	260
Available capacity (MW)	9936	10 145	10 299
Tuesday 1.30 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	9535	9501	8977
Spot Price (\$MW/h)	5333	459	273
Available capacity (MW)	9965	10 037	10 299
Tuesday 2 pm	Actual	4 hr forecast	12 hr forecast
Demand (MW)	9378	9516	9015
Spot Price (\$MW/h)	5078	11 102	298
Available capacity (MW)	9974	10 010	10 299