

# Electricity spot prices greater than \$5000/MWh



AUSTRALIAN ENERGY  
REGULATOR

New South Wales and Queensland - 27 November 2009

## **Introduction**

The AER is required to publish a report whenever the electricity spot price exceeds \$5000/MWh.<sup>1</sup> The report:

- describes the significant factors contributing to the spot price exceeding \$5000/MWh, including factors such as 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 27 November 2009, the spot price in New South Wales exceeded \$5000/MWh for the 3.30 pm and 4 pm trading intervals. In Queensland the spot price exceeded \$5000/MWh for the 3.30 pm trading interval. There were also high spot prices above \$1000/MWh in the early afternoon from 1.30 pm in both New South Wales and Queensland. None of these high prices on 27 November 2009 were forecast.

The contributing factors included a planned network outage in New South Wales, which significantly reduced the capability for imports from Victoria. The impact of this outage was not forecast. Demand was also higher than forecast four hours ahead in both New South Wales and Queensland by a combined total of up to 700 MW.

The combination of higher than forecast demand, lower than forecast imports from Victoria and rebidding by generators into higher prices contributed to prices exceeding \$5000/MWh.

## **Actual and forecast demand**

Figures 1 and 2 compare the actual demand and spot price in New South Wales and Queensland with that forecast by AEMO four and 12 hours ahead of dispatch. Surrounding trading intervals where the price was less than \$5000/MWh have been included for completeness.

Demand reached a maximum for the day of 11 900 MW and 8180 MW in New South Wales and Queensland respectively. Demand was higher than forecast four hours ahead in both regions, by up to 700 MW in total across the two regions. Prices were much higher than forecast throughout the whole period.

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<sup>1</sup> This requirement is set out in clause 3.13.7 (d) of the National Electricity Rules

*Figure 1: Actual and forecast demand, and spot price in New South Wales*

<b>Friday 1.30 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	11 595	11 531	11 059
Spot Price (\$MW/h)	3365	299	120
<b>Friday 2 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	11 652	11 490	11 153
Spot Price (\$MW/h)	1274	293	235
<b>Friday 2.30 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	11 660	11 538	11 208
Spot Price (\$MW/h)	1030	299	239
<b>Friday 3 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	11 820	11 522	11 258
Spot Price (\$MW/h)	4099	246	241
<b>Friday 3.30 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	11 901	11 567	11 364
Spot Price (\$MW/h)	8933	291	243
<b>Friday 4 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	11 891	11 343	11 259
Spot Price (\$MW/h)	5462	236	234

\*There was also around 130 MW of non-scheduled generation that is not included in this demand figure. Actual non-scheduled generation was around 50 MW higher than forecast four hours ahead.

*Figure 2: Actual and forecast demand and spot price in Queensland*

<b>Friday 1.30 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	8101	7951	7872
Spot Price (\$MW/h)	2590	312	127
<b>Friday 2 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	8095	7931	7928
Spot Price (\$MW/h)	1004	305	251
<b>Friday 2.30 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	8180	7938	7937
Spot Price (\$MW/h)	1093	314	251
<b>Friday 3 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	8158	7937	7936
Spot Price (\$MW/h)	4097	251	251
<b>Friday 3.30 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	8127	7916	7915
Spot Price (\$MW/h)	7527	296	251
<b>Friday 4 pm</b>	<b>Actual</b>	<b>4 hr forecast</b>	<b>12 hr forecast</b>
Demand (MW)	8090	7940	7905
Spot Price (\$MW/h)	4575	251	247

### ***Generator offers and rebidding***

Initial generator offers in New South Wales for 27 November saw around 10 600 MW of capacity priced at \$304/MWh or less, with the remaining 1800 MW of capacity priced above \$8600/MWh.

In Queensland initial generator offers saw around 8700 MW of capacity priced at less than \$300/MWh, with the remaining 1700 MW of capacity priced above \$9000/MWh.

The steep supply curve above \$300/MWh, meant that small changes in demand, imports or generator offers led to the price fluctuating between around \$300/MWh and above \$8000/MWh.

Over several rebids from 8.05 am Millmerran Energy Trader shifted 193 MW at Millmerran from prices below \$10/MWh to above \$9500/MWh. The reason given was “Qld & system demand above PD 2009112708PD”.

Over two rebids at around 9.45 am, Delta Electricity shifted 300 MW of capacity across Vales Point unit five and Wallerawang unit seven, from prices below \$290/MWh to above \$8660/MWh. The reasons given were “Forecast interconnector VIC-NSW limit::Band shift” and “Interconnector forecast limit PD0932: Band shift”.

At 10.50 am, effective from 10 am, CS Energy rebid 210 MW of available capacity at Callide B from prices below \$20/MWh to above \$6400/MWh. The reason given was “A change in sensitivities 2009112714”. At 1.17 pm a further 55 MW was rebid at Swanbank E from prices below zero to above \$7900/MWh. The reason given was “A:Swan\_E manage QNI constraint”.

At 3.16 pm, effective from 3.25 pm, Eraring Energy bid Shoalhaven Power station inflexible at 80 MW. The reason given was “Bid rearrangement due to constrained-off MWs”. The AER has written to Eraring Energy seeking further information about this rebid.

In New South Wales a number of generators bid into lower prices, which led to around 200 MW more capacity priced below \$300/MWh in closing bids compared to initial offers. In Queensland there was around 100 MW less capacity priced below \$300/MWh compared to initial offers.

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 closing bids for all participants in New South Wales and Queensland with significant capacity priced at or above \$5000/MWh for the high-price period are presented in **Appendix B**.

### **Changes to network availability**

Total import capability into New South Wales from Victoria was lower than forecast for the whole period. A planned outage of the Wallerawang to Sydney South 330kV line restricted imports, although this restriction was not forecast. Generation at Snowy Hydro's Tumut Three Station (in New South Wales) was also higher than forecast, which partly accounts for the reduction in import capability<sup>2</sup>.

At 3.05 pm AEMO invoked a further constraint that acted to reduce imports from Victoria and output from the Tallawarra and Shoalhaven<sup>3</sup> power stations. This constraint was revoked shortly after the return of the Wallerawang to Sydney South line at 4.40 pm.

Figure 3 shows actual import capability into New South Wales from Victoria and compares it against the forecast limits four and 12 hours ahead of dispatch.

*Figure 3: Victoria to New South Wales interconnector forecast and actual limits*

<b>Time</b>	<b>Actual limit (MW)</b>	<b>4 hr forecast (MW)</b>	<b>12 hr forecast (MW)</b>
<b>1:30 PM</b>	789	1107	1231
<b>2:00 PM</b>	857	1052	1225
<b>2:30 PM</b>	877	1048	1232
<b>3:00 PM</b>	784	1049	1232
<b>3:30 PM</b>	780	1052	1238
<b>4:00 PM</b>	784	1049	1232

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<sup>2</sup> The network constraints that were limiting imports across the Victoria to New South Wales interconnector were related to transmission lines between the Snowy Hydro generators at the Tumut stations and Sydney. When Snowy Hydro rebid capacity into lower prices at these stations the dispatch of these generators increased. This led to reduced flows from Victoria into New South Wales.

<sup>3</sup> Eraring Energy rebid inflexible at 80 MW in response.

## Appendix A – Price setters for 27 November 2009

The following table identifies, for each of the trading intervals above \$5000/MWh, each five minute dispatch interval price and the generating units involved in setting the energy price. Also shown is the energy (or ancillary service) offer price involved in determining the dispatch price and the contribution to the total energy price. Frequency control ancillary services (FCAS) can contribute to the energy price when in order for a unit to be dispatched for energy its dispatch in FCAS is altered and this must be made up by another unit. The column labeled “marginal change” shows the quantity of the service that is dispatched to meet an increment of demand at the regional reference node. The 30-minute spot price is the average of the six dispatch interval prices. This information is published by AEMO<sup>4</sup>.

### New South Wales – 3.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
15:05	\$9250.01	Eraring Energy	ER01	Energy	\$9250.01	0.50	\$4625.01
		Eraring Energy	ER02	Energy	\$9250.01	0.50	\$4625.01
15:10	\$9250.01	Eraring Energy	ER01	Energy	\$9250.01	0.50	\$4625.01
		Eraring Energy	ER02	Energy	\$9250.01	0.50	\$4625.01
15:15	\$8803.58	Delta Electricity	VP5	Energy	\$8803.58	1.00	\$8803.58
15:20	\$8803.58	Delta Electricity	VP5	Energy	\$8803.58	1.00	\$8803.58
15:25	\$8490.15	LYMMCO	LYA4	Energy	\$19.20	-0.35	-\$6.62
		Macquarie Generation	BW04	Energy	\$6502.00	1.31	\$8494.54
		Hydro Tasmania	GORDON	Raise 5 min	\$1.75	1.31	\$2.29
		Macquarie Generation	BW04	Raise reg	\$0.04	-1.31	-\$0.05
15:30	\$9000.00	Delta Electricity	MM3	Energy	\$9000.00	1.00	\$9000.00
<b>Spot price</b>		<b>\$8933/MWh</b>					

### Queensland – 3.30 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
15:05	\$7765.45	Eraring Energy	ER01	Energy	\$9250.01	0.42	\$3880.93
		Eraring Energy	ER02	Energy	\$9250.01	0.42	\$3880.93
		LYMMCO	LYA1	Energy	\$19.30	0.17	\$3.32
		CS Energy	CALL_B_2	Raise 5 min	\$2.50	0.17	\$0.43
		LYMMCO	LYA1	Raise reg	\$0.90	-0.17	-\$0.15
15:10	\$7827.79	Eraring Energy	ER01	Energy	\$9250.01	0.42	\$3910.72
		Eraring Energy	ER02	Energy	\$9250.01	0.42	\$3910.72
		Hydro Tasmania	CETHANA	Energy	\$38.14	0.17	\$6.31
		Basslink	MNSP1TAS1	Energy	\$0.00	-0.17	\$0.00
15:15	\$7448.17	Delta Electricity	VP5	Energy	\$8803.58	0.85	\$7444.84
		LYMMCO	LYA4	Energy	\$19.20	0.17	\$3.31
15:20	\$7387.37	Delta Electricity	VP5	Energy	\$8803.58	0.84	\$7384.09
		LYMMCO	LYA4	Energy	\$19.20	0.17	\$3.29
15:25	\$7118.65	Macquarie Generation	BW04	Energy	\$6502.00	1.09	\$7119.04
		LYMMCO	LYA4	Energy	\$19.20	-0.12	-\$2.27
		Hydro Tasmania	GORDON	Raise 5 min	\$1.75	1.09	\$1.92
		Macquarie Generation	BW04	Raise reg	\$0.04	-1.09	-\$0.04
15:30	\$7615.70	Delta Electricity	MM3	Energy	\$9000.00	0.85	\$7612.29
		International Power	PPCCGT	Energy	\$19.69	0.17	\$3.38
<b>Spot price</b>		<b>\$8933/MWh</b>					

<sup>4</sup> Details on how the price is determined can be found at [www.aemo.com.au](http://www.aemo.com.au)

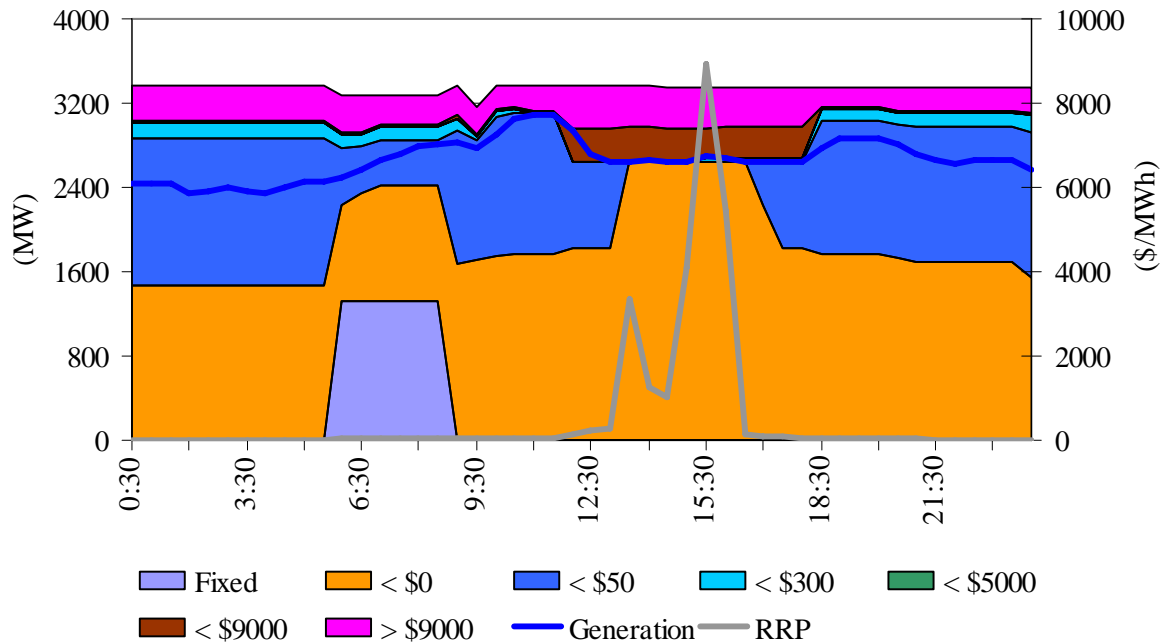
## New South Wales – 4 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
15:35	\$7738.97	LYMMCO	LYA1	Energy	\$19.30	-0.21	-\$4.12
		Macquarie Generation	BW02	Energy	\$6506.00	1.19	\$7741.49
		Macquarie Generation	BW02	Raise 5 min	\$0.02	-1.19	-\$0.02
		Eraring Energy	ER01	Raise reg	\$1.07	1.19	\$1.27
		Macquarie Generation	BW02	Raise 60 sec	\$0.02	-0.72	-\$0.01
		CS Energy	SWAN_B_2	Raise 60 sec	\$0.30	0.72	\$0.22
		Macquarie Generation	BW02	Raise 6 sec	\$0.02	-0.72	-\$0.01
		Ecogen	NPS	Raise 6 sec	\$0.25	0.72	\$0.18
15:40	\$8803.58	Delta Electricity	VP5	Energy	\$8803.58	1.00	\$8803.58
15:45	\$7784.77	TRUenergy	TALWA1	Energy	-\$996.81	0.02	-\$24.49
		LYMMCO	LYA1	Energy	\$19.30	-0.25	-\$4.92
		Macquarie Generation	BW01	Energy	\$6508.00	1.20	\$7813.44
		Eraring Energy	ER01	Raise 5 min	\$1.00	1.20	\$1.20
		Macquarie Generation	BW01	Raise reg	\$0.40	-1.20	-\$0.48
15:50	\$338.82	LYMMCO	LYA1	Energy	\$19.30	-0.21	-\$3.96
		Stanwell	GSTONE5	Energy	\$285.01	1.20	\$342.78
15:55	\$7773.54	TRUenergy	TALWA1	Energy	-\$996.81	0.02	-\$24.46
		TRUenergy (SA)	TORRB1	Energy	\$33.77	-0.13	-\$4.24
		TRUenergy (SA)	TORRB4	Energy	\$33.77	-0.13	-\$4.24
		Macquarie Generation	BW01	Energy	\$6508.00	1.20	\$7803.87
		TRUenergy (SA)	TORRB1	Lower reg	\$0.25	-0.13	-\$0.03
		TRUenergy (SA)	TORRB4	Lower reg	\$0.25	-0.13	-\$0.03
		Delta Electricity	VP5	Lower reg	\$1.40	0.25	\$0.35
		Hydro Tasmania	FISHER	Raise 5 min	\$1.75	1.45	\$2.54
		Macquarie Generation	BW01	Raise reg	\$0.01	-1.20	-\$0.01
		TRUenergy (SA)	TORRB1	Raise reg	\$0.80	-0.13	-\$0.10
		TRUenergy (SA)	TORRB4	Raise reg	\$0.80	-0.13	-\$0.10
16:00	\$329.95	Origin Energy	OSB-AG	Energy	\$19.99	-0.20	-\$4.05
		Stanwell	GSTONE1	Energy	\$280.00	0.60	\$167.00
		Stanwell	GSTONE2	Energy	\$280.00	0.60	\$167.00
<b>Spot price</b>		<b>\$8933/MWh</b>					

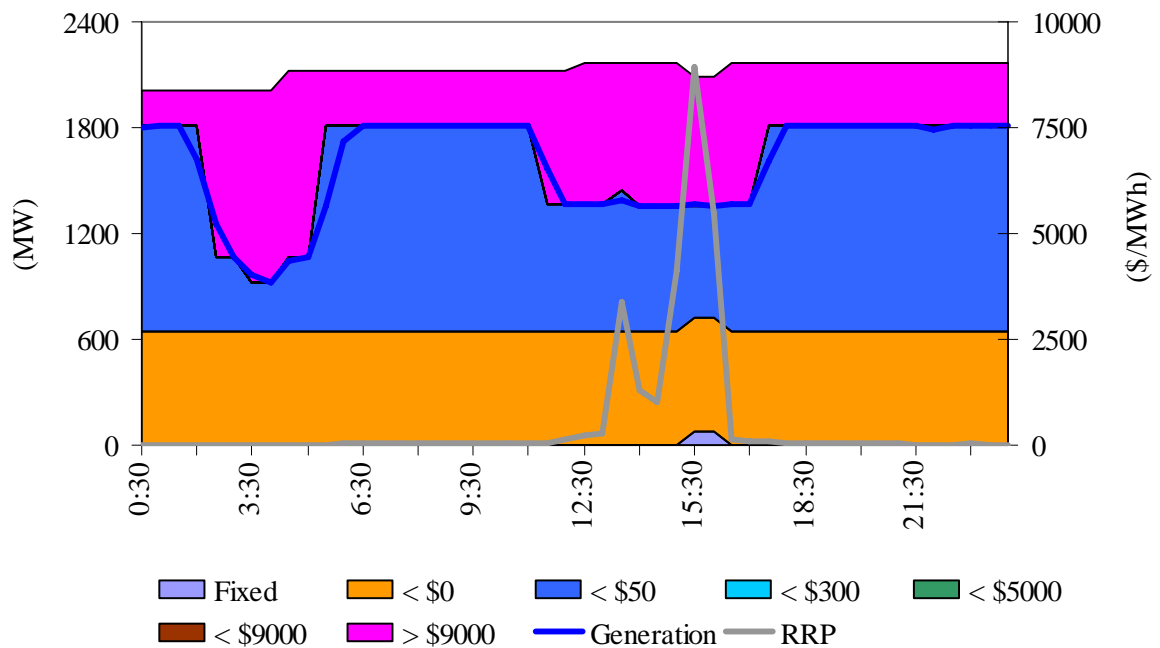
## Appendix B – Closing bids

Figures B1 to B8 highlight the half hour closing bids for participants in New South Wales and Queensland with significant capacity priced at or above \$5000/MWh during the trading intervals in which the spot price exceeded \$5000/MWh. The figures also show the generation output of the relevant participants and the spot price.

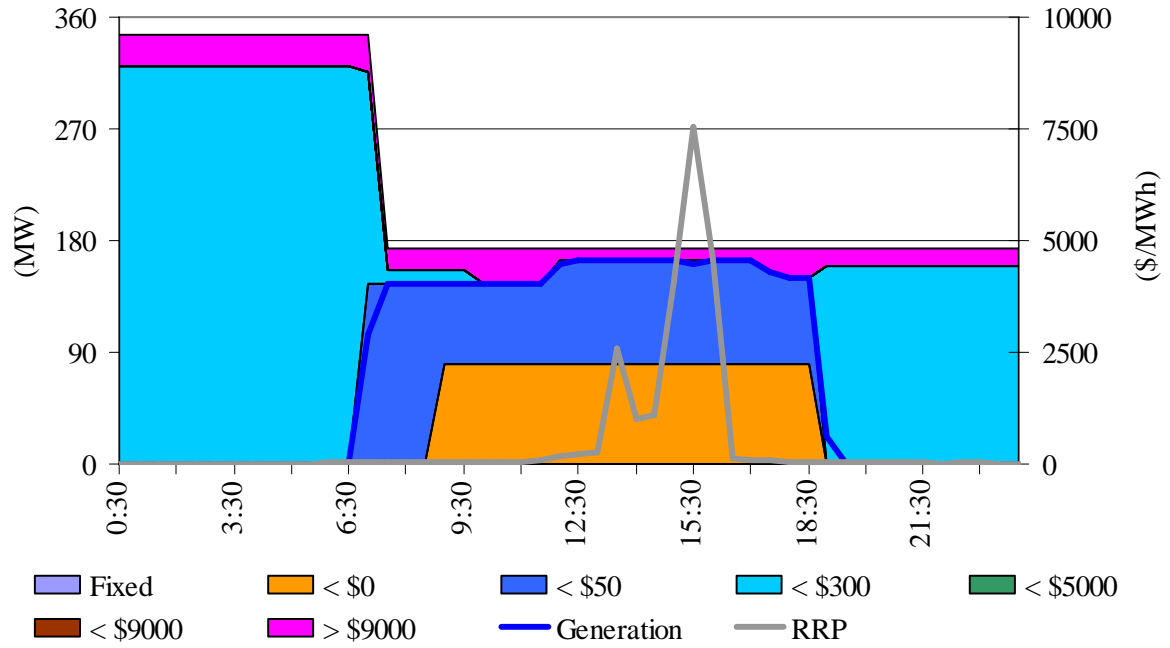
**Figure B1: Delta Electricity closing bid prices, dispatch and spot price**



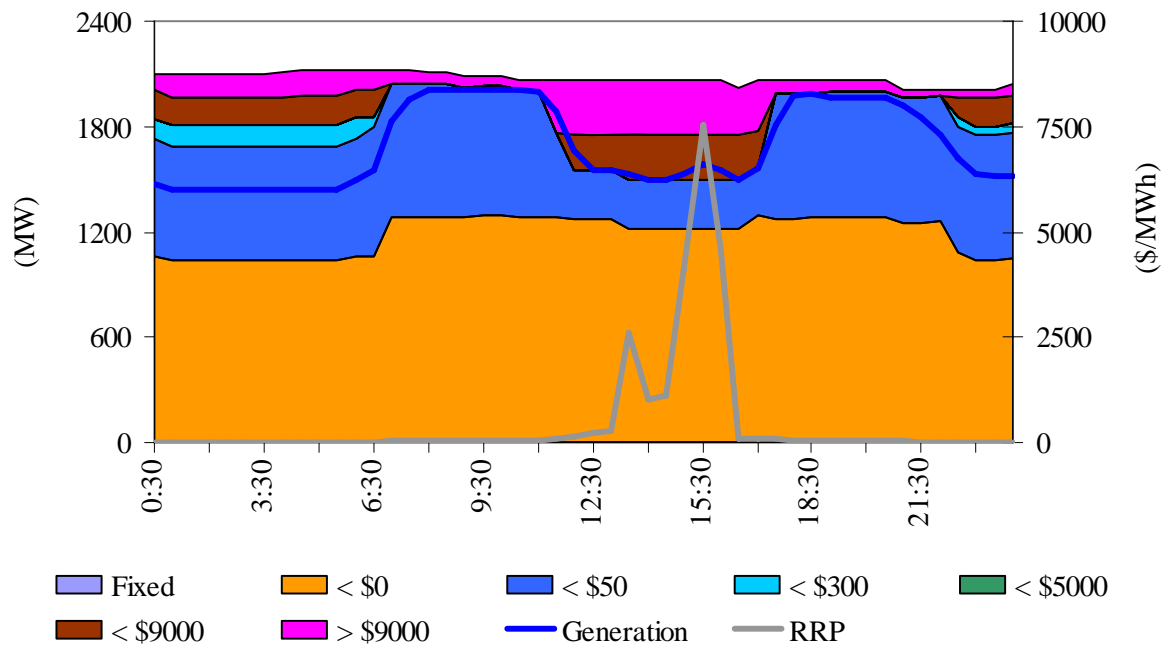
**Figure B2: Eraring Energy closing bid prices, dispatch and spot price**



**Figure B3: ERM Power and Arrow closing bid prices, dispatch and spot price**

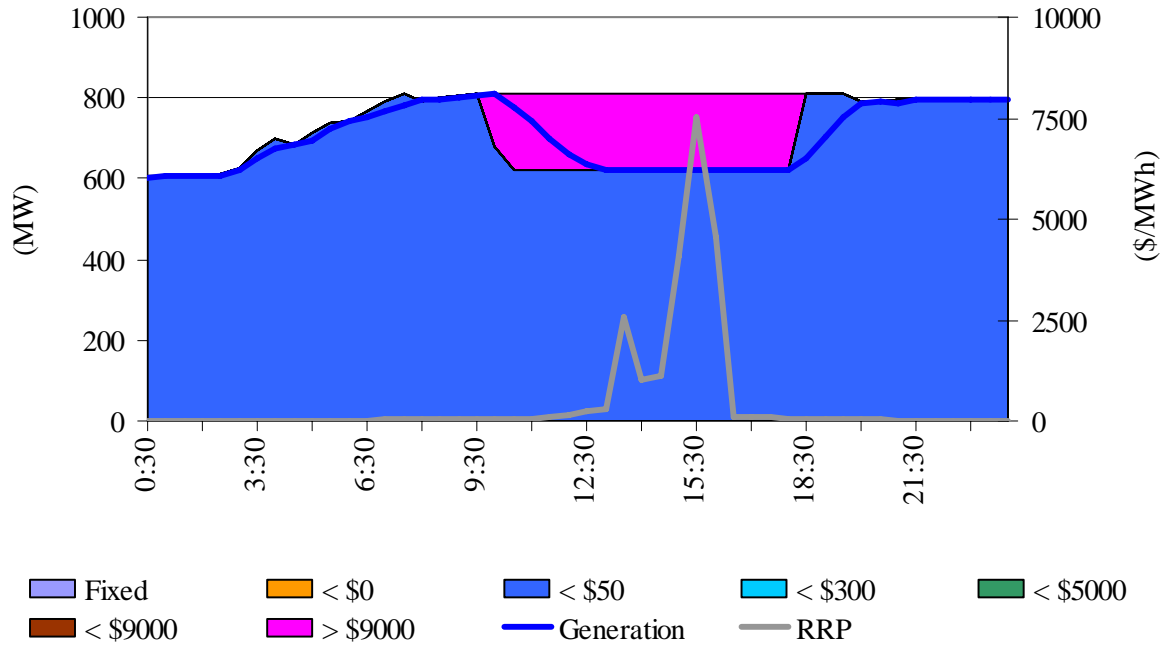


**Figure B4: CS Energy closing bid prices, dispatch and spot price**

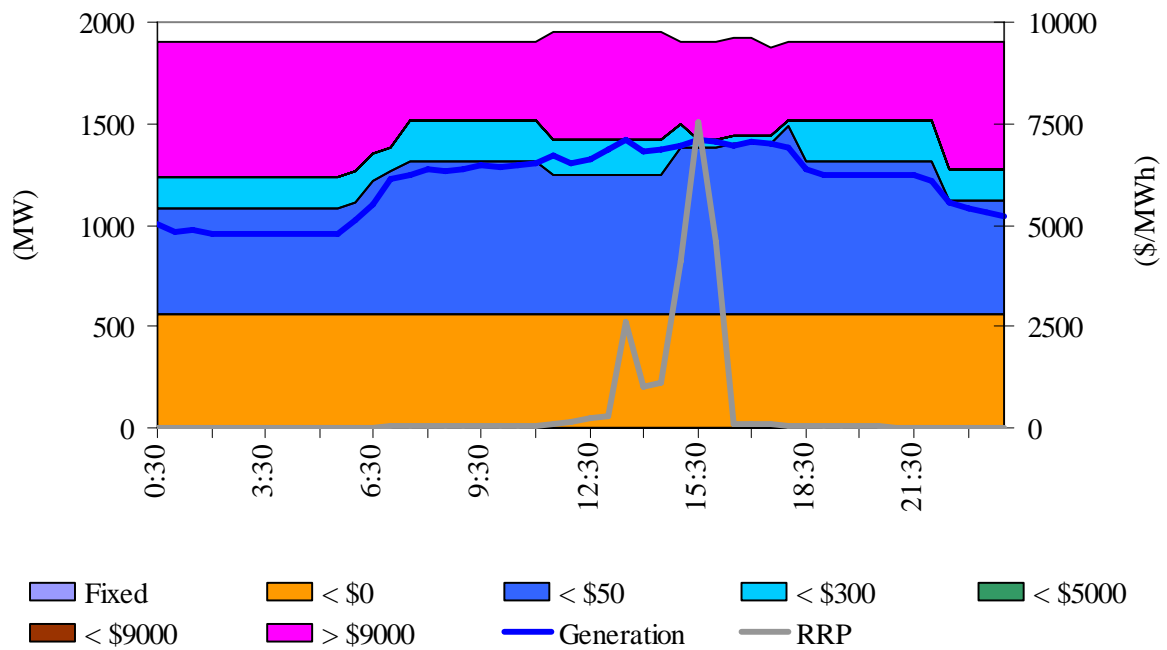




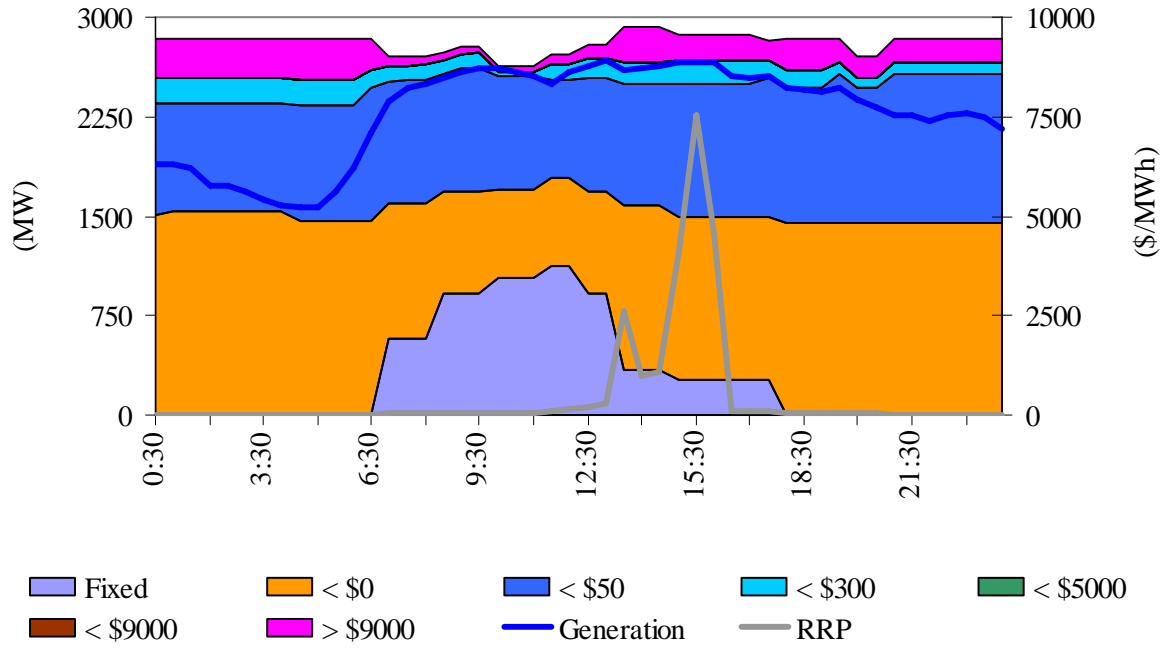
**Figure B5: Millmerran closing bid prices, dispatch and spot price**



**Figure B6: Tarong Energy closing bid prices, dispatch and spot price**



**Figure B7: Stanwell closing bid prices, dispatch and spot price**



**Figure B8: Callide Power Trading closing bid prices, dispatch and spot price**

