Market analysis

AUSTRALIAN ENERGY REGULATOR

30 December 2007 – 5 January 2008

Summary

Spot prices for the week averaged around $35/MWh in Queensland, New South Wales and Tasmania and $61/MWh in Victoria.

In South Australia, where extreme temperatures led to near record demand, the price averaged $318/MWh with the spot price exceeding $5000/MWh on Monday and Friday. The AER will be issuing separate reports into the events of those days.

Turnover in the energy market in the week ended 5 January was $247 million. The total cost of ancillary services for the week was $4.2 million or 1.7 per cent of energy market turnover.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 249, or three quarters of all trading intervals. Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in a third of all trading intervals across the market. In South Australia for the third consecutive week these variations occurred in three quarters of all trading intervals.

Energy prices

Figure 1 sets out the national demand and spot prices in each region for each trading interval. Figure 2 compares the volume weighted average price with the averages for the previous week, the same quarter last year and for the previous financial year.

Figure 1: national demand and spot prices

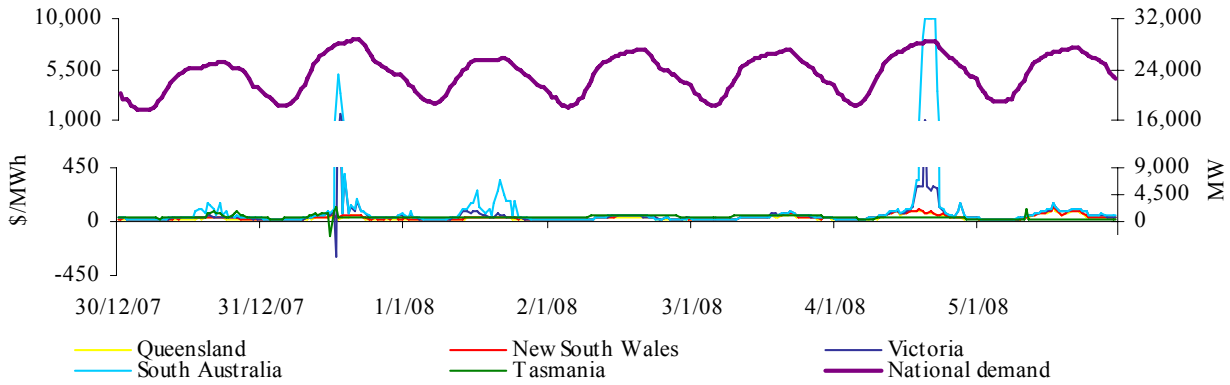


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	32	36	61	318	35
Previous week	24	30	32	37	38
Same quarter last year	23	27	29	40	37
Financial year to date	56	50	53	64	55
% change from previous week*	▲34%	▲18%	▲91%	▲769%	▼8%
% change from same quarter last year**	▲40%	▲31%	▲110%	▲695%	▼4%
% change from year to date***	▲128%	▲53%	▲54%	▲53%	▲38%

*The percentage change between last week's average spot price and the average price for the previous week.
**The percentage change between last week's average spot price and the average price for the same quarter last year.
***The percentage change between the average spot price for the current financial year to date and the average spot price over the similar period for the previous financial year.

Figures 3 to 7 show the weekly correlation between spot price and demand.

Figure 3: Queensland

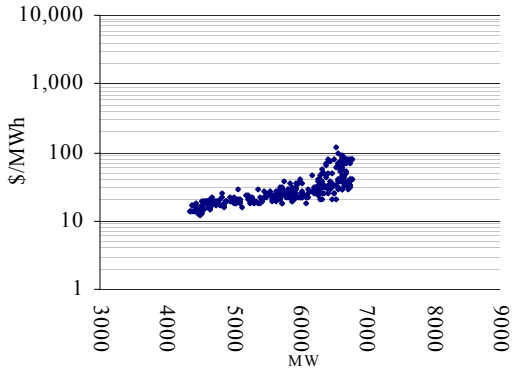


Figure 4: New South Wales

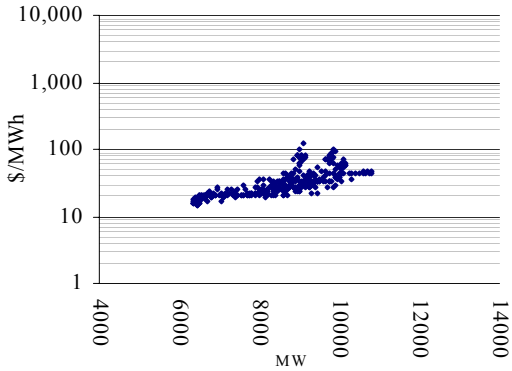


Figure 5: Victoria

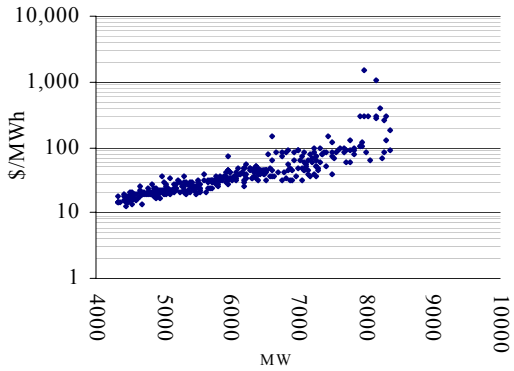


Figure 6: South Australia

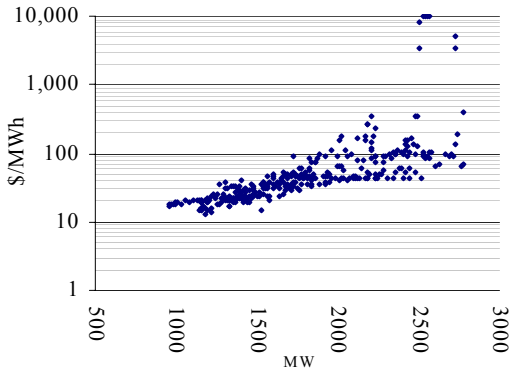
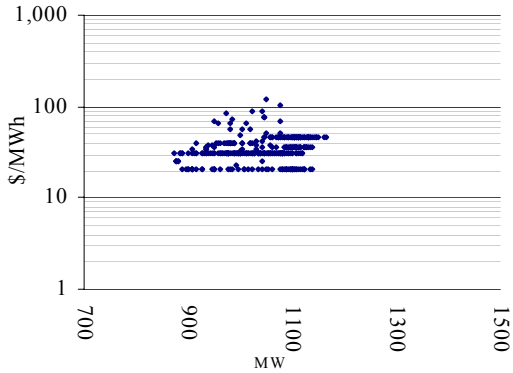


Figure 7: Tasmania



Maximum spot prices for the week ranged from $120/MWh in Queensland to $9950/MWh in South Australia. Figure 8 compares the weekly price volatility index with the averages for the previous week and the same quarter last year.

Figure 8: volatility index during peak periods

	QLD	NSW	VIC	SA	TAS
Last week	1.07	1.12	1.49	2.72	0.41
Previous week	0.37	0.70	1.03	0.92	1.90
Same quarter last year	0.79	0.78	0.78	0.75	0.70

The definition of the price volatility index is available on the AER website.
http://www.aer.gov.au/content/index.phtml/tag/MarketSnapshotLongTermAnalysis

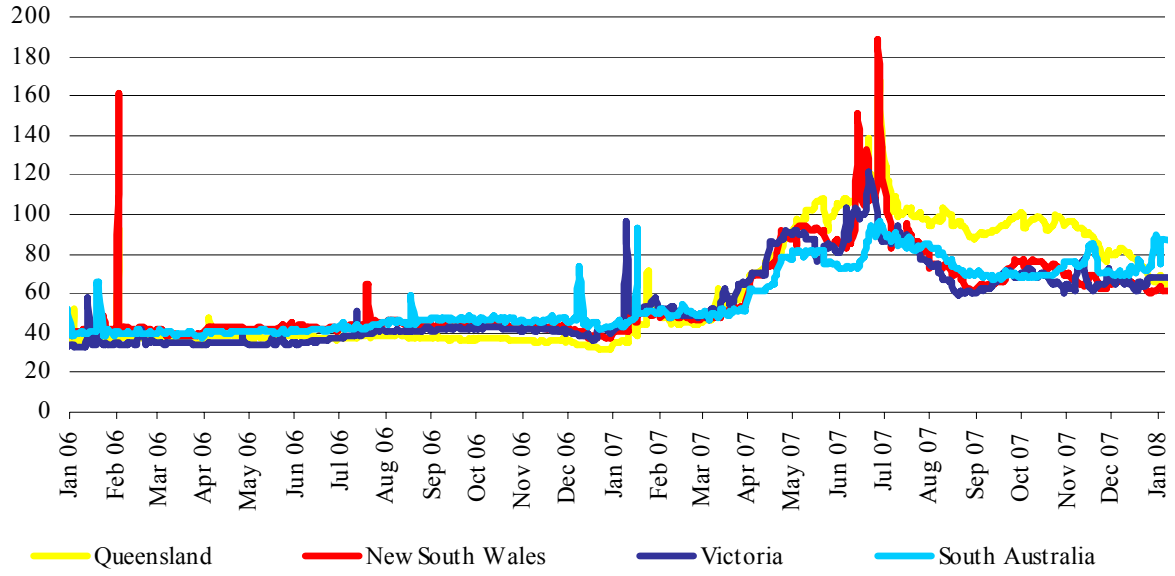
Figure 9 sets out the d-cyphaTrade wholesale electricity price index (WEPI)* for each region throughout the week excluding Tasmania. Figure 10 sets out the WEPI since 1 January 2006.

Figure 9: d-cyphaTrade WEPI for the week

	Monday	Tuesday	Wednesday	Thursday	Friday
Queensland	65.89	N/A	68.76	65.69	64.56
New South Wales	61.04	N/A	64.13	61.97	61.27
Victoria	65.56	N/A	63.29	64.74	67.80
South Australia	90.26	N/A	75.48	82.10	87.84

* The definition of the wholesale electricity price index is available on the d-cyphaTrade website
http://www.d-cyphatrade.com.au/products/wholesale_electricity_price_i
The WEPI applies for working days only.

Figure 10: d-cyphaTrade WEPI



Reserves

Low reserve conditions were forecast for every day except Sunday and Tuesday in South Australia. Low reserves were forecast for Monday in Victoria.

There was a direction issued in Tasmania on Monday from 1.55 pm to 3.10 pm, following the unplanned loss of the Gordon to Chapel Street line in Tasmania and the Basslink interconnector.

Imports at time of maximum demand

Figures 11 to 15 show spot price, net imports and limits at the time of weekly maximum demand.

Figure 11: Queensland

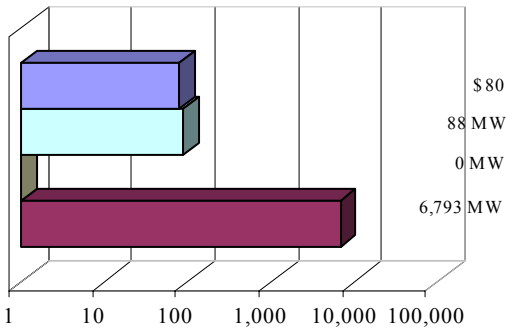


Figure 12: New South Wales

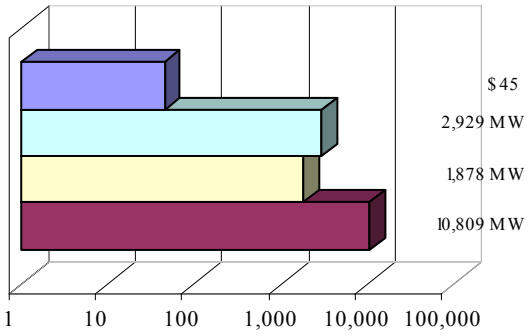


Figure 13: Victoria

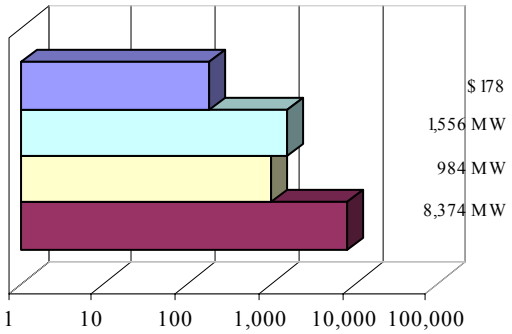


Figure 14: South Australia

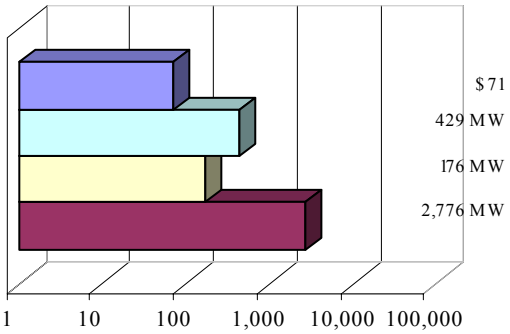
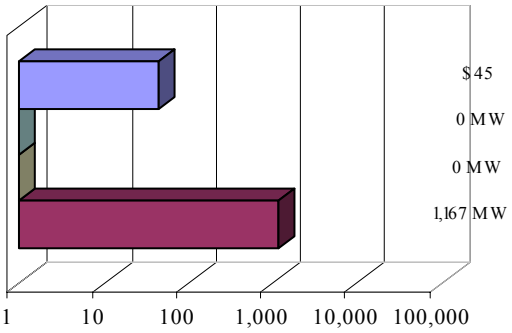


Figure 15: Tasmania



Price variations

There were 249 trading intervals where actual prices significantly varied from forecasts made 4 and 12 hours ahead of dispatch. Figures 16 to 20 show the difference in actual and forecast price against the difference in actual and forecast demand. The figures highlight the relationship between price variation and demand forecast error. The information is presented in terms of the percentage difference from actual. Price differences beyond 100 per cent have been capped.

Figure 16: Queensland

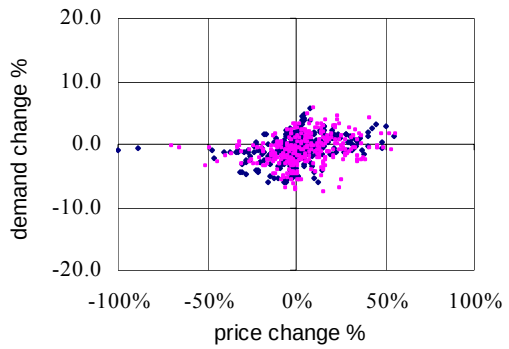


Figure 17: New South Wales

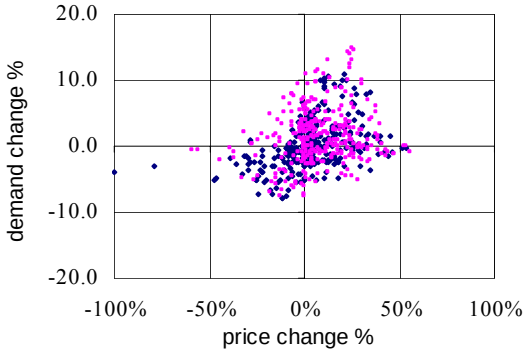


Figure 18: Victoria

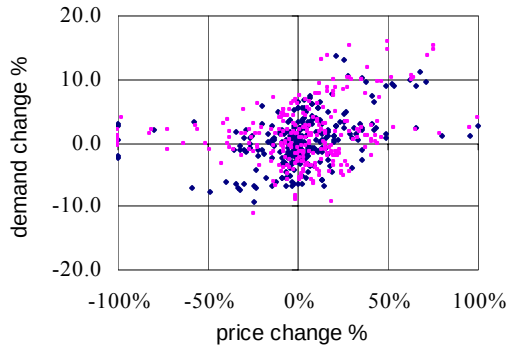
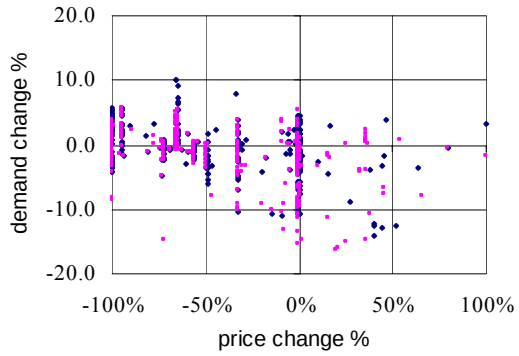


Figure 19: South Australia

Figure 20: Tasmania



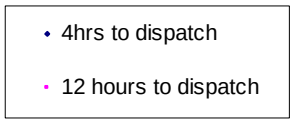
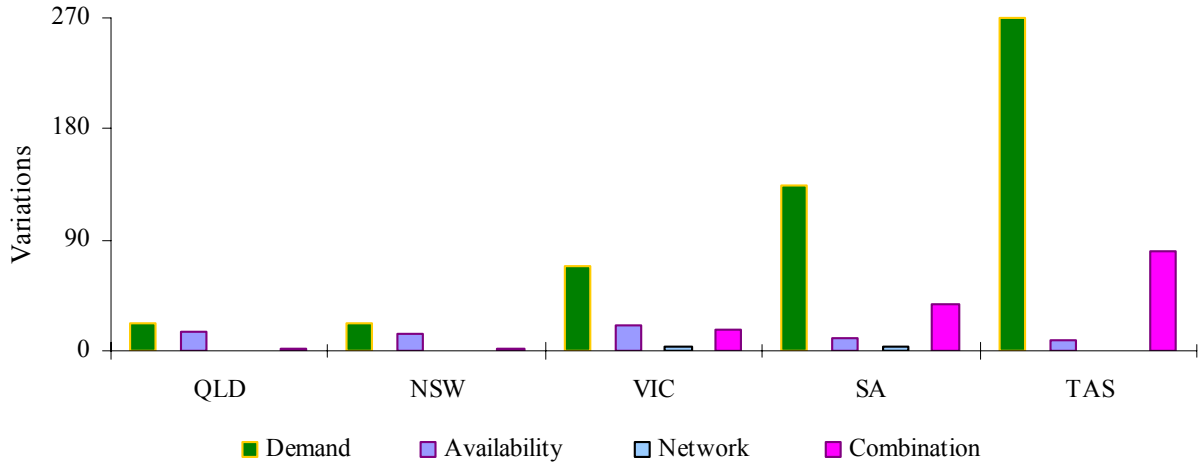


Figure 21 summarises the number and most probable reason for variations between forecast and actual prices.

Figure 21: reasons for variations between forecast and actual prices



Price and demand

Figures 22 – 56 set out details of spot prices and demand on a national and regional basis. They include the actual spot price, actual demand and variation from forecasts made 4 and 12 hours ahead of dispatch.

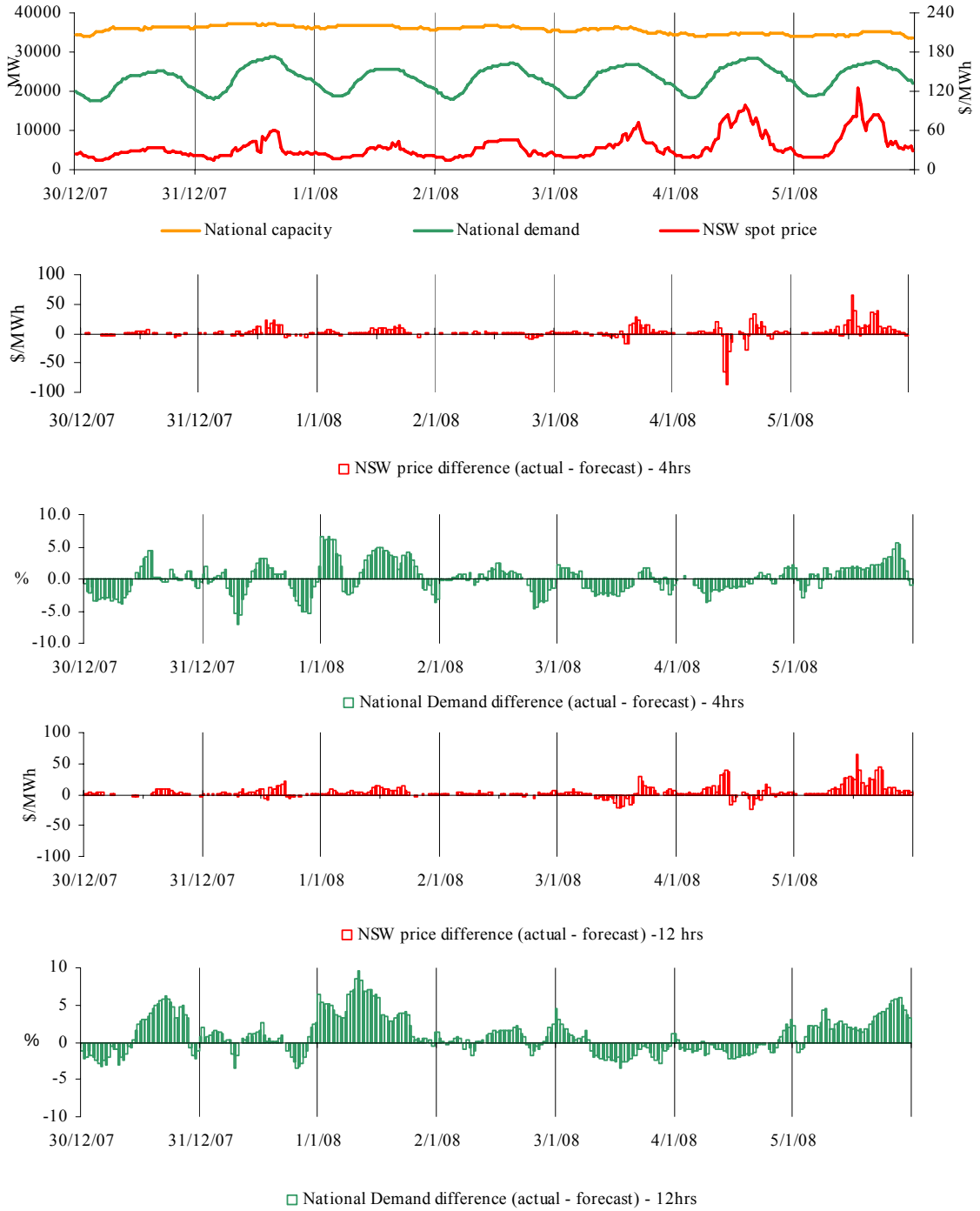
On a regional basis the differences between the maximum temperature and the temperature forecast at around 6.00 pm the day before are also included.

In each section, all prices for the week greater than three times the average have been presented. This threshold is used to filter the material price outcomes for the week. The actual price, demand and generator availability is compared with the forecasts made 4 and 12 hours ahead, with significant changes to these forecasts explained.

National Market

Spot prices within the national market are regularly aligned with conditions in one region reflected across all others. Figures 22-26 shows pricing events that occurred when spot prices were generally aligned across all regions of the national electricity market – the New South Wales spot price has been used as a proxy national price under these conditions as New South Wales is located in the centre of the NEM.

Figures 22-26: National market outcomes



There was one occasion where the spot price aligned nationally and the New South Wales price was greater than three times the New South Wales weekly average price of $36/MWh.

Saturday, 5 January

1:00 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	123.98	58.00	58.63
Demand (MW)	26 700	26 208	26 144
Available capacity (MW)	34 540	35 060	35 369

Conditions at the time saw demand 500 MW higher than forecast and available capacity 500 MW lower than that forecast four hours ahead.

At 11.11 am CS Energy extended the duration of maintenance work on Kogan Creek, reducing capacity by 391 MW - all of this capacity was priced below $10/MWh. The reason given was “SCC repairs”.

At 12.14 pm LYMMCO rebid 145 MW of capacity at Loy Yang A units one and two from prices below $20/MWh to above $145/MWh. The reason given was “CHG IN PD AT 1201”.

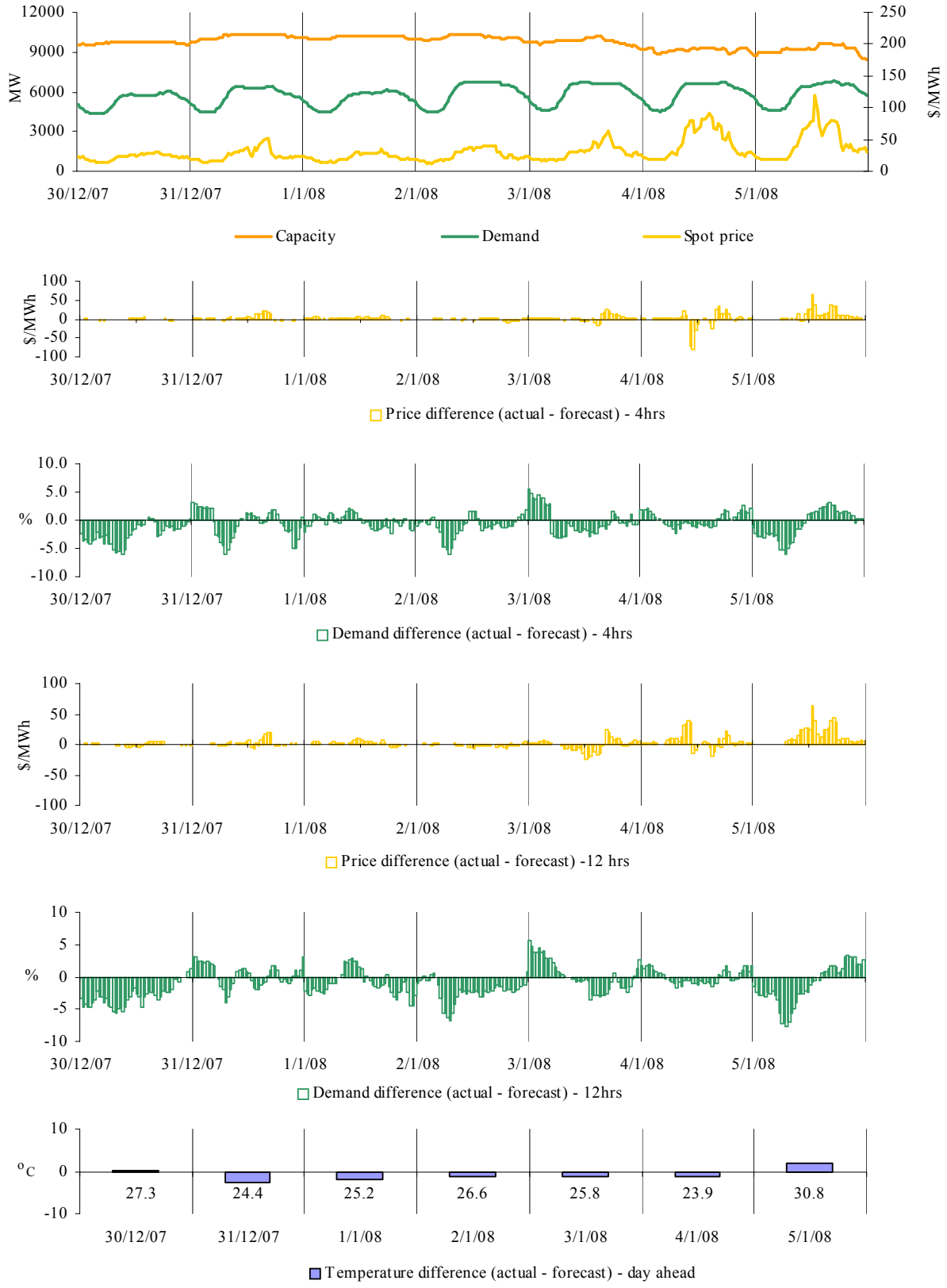
At 12.27 pm Macquarie Generation rebid 120 MW of capacity at Bayswater units two and three from prices below $65/MWh to above $140/MWh. The reason given was “Management of constraint”.

There was no other significant rebidding.

Queensland

Figures 27-32 show spot market prices in Queensland over the week along with actual demand and differences between actual and forecast demand and prices.

Figures 27-32: Queensland actual spot price, demand and forecast differences

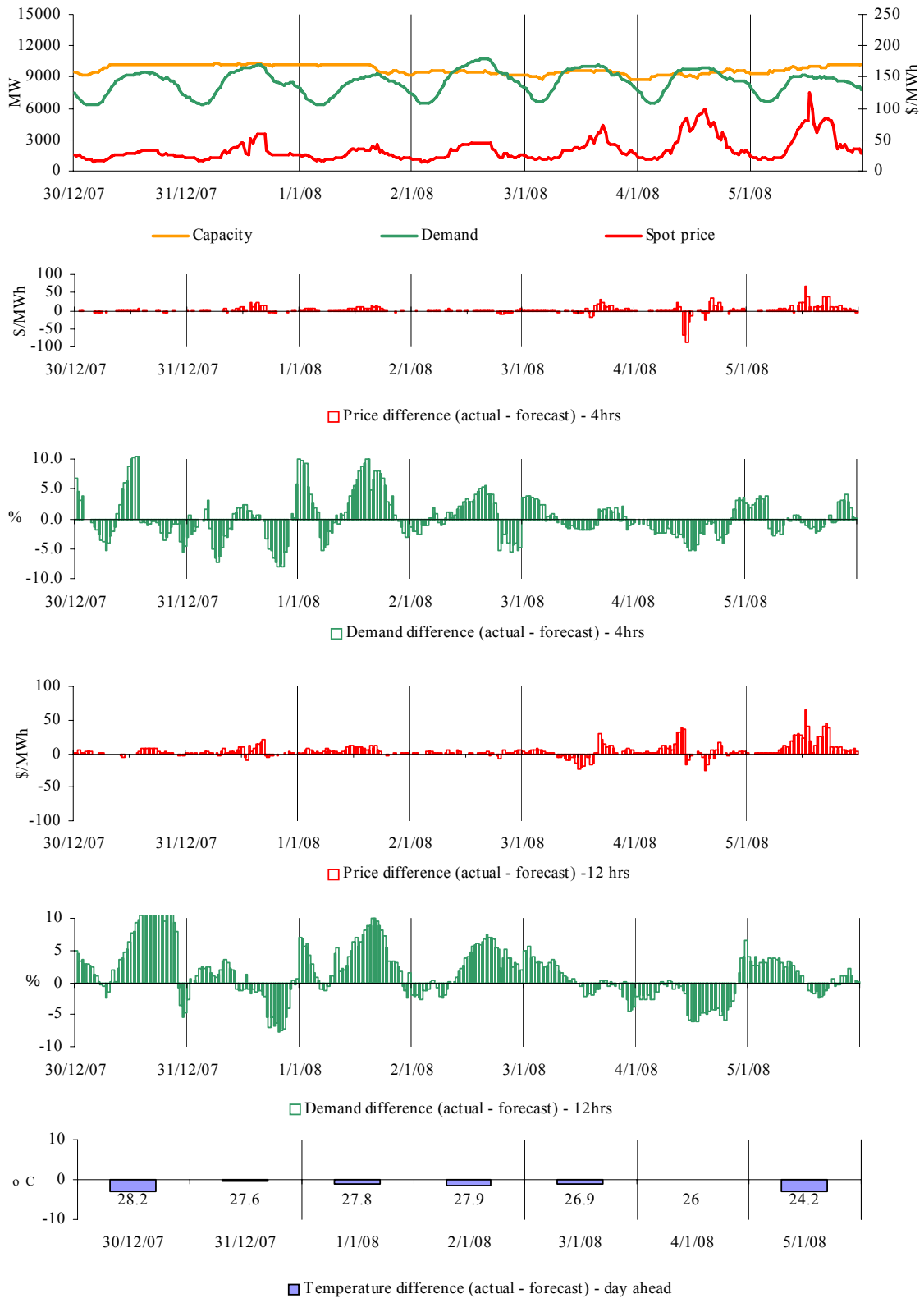


There was one occasion where the spot price in Queensland was greater than three times the Queensland weekly average price of $32/MWh. This occurred when prices were aligned across all regions and is detailed in the national market outcomes section.

New South Wales

Figures 33-38 show spot market prices in New South Wales over the week along with actual demand and differences between actual and forecast demand and prices.

Figures 33-38 New South Wales actual spot price, demand and forecast differences

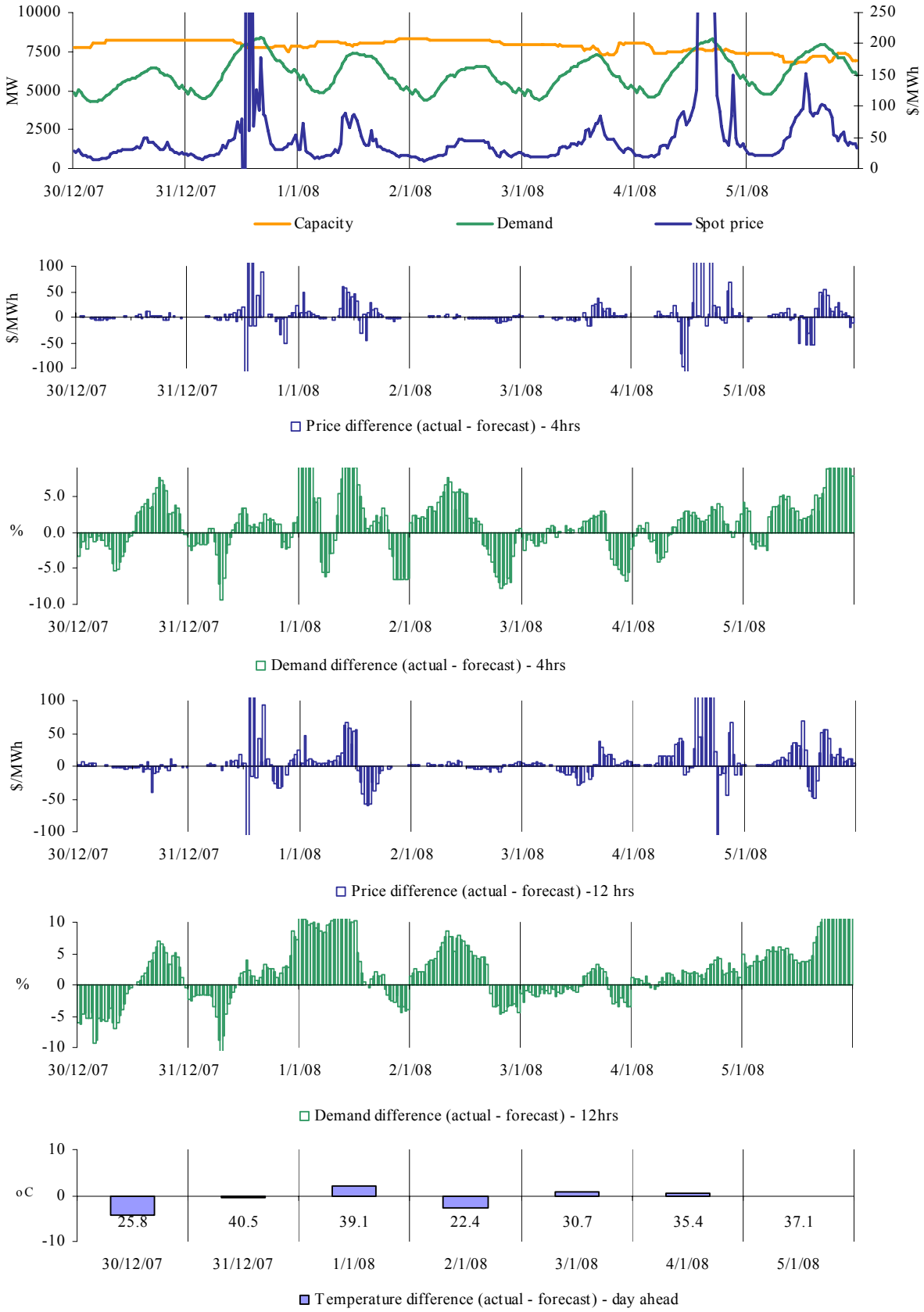


There was one occasion where the spot price in New South Wales was greater than three times the New South Wales weekly average price of $36/MWh. This occurred when prices were aligned across all regions and is detailed in the national market outcomes section.

Victoria

Figures 39-44 show spot market prices in Victoria over the week along with actual demand and differences between actual and forecast demand and prices.

Figures 39-44: Victoria actual spot price, demand and forecast differences



There were 10 occasions where the spot price in Victoria was greater than three times the Victoria weekly average price of $61/MWh.

Monday, 31 December

1:30 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	1525.04	73.91	74.69
Demand (MW)	7982	7906	7801
Available capacity (MW)	7774	8252	8252

Conditions at the time saw near record demand, which was slightly higher than forecast. Available capacity was around 500 MW lower than forecast.

At 12.50 pm, following the loss of the Moorabool 220 kV 2 busbar, and the subsequent offloading of two lines around Moorabool, NEMMCO invoked a constraint to manage the change in network configuration. This constraint caused a step change on flows across Murraylink from 96 MW into South Australia at 12.45 pm to 10 MW into Victoria at 12.50 pm. At the same time flows from Snowy into Victoria increased from 1022 MW to 1654 MW. Flows on the Snowy interconnector were also affected.

The increased imports caused the five minute price to fall from around $80/MWh at 12.45 pm to $-1000/MWh at 12.50 pm. At around 1 pm an unplanned outage of Basslink occurred, which saw imports from Tasmania decrease from around 150 MW to zero. At 1.10 pm the constraint managing the loss of the Moorabool equipment was revoked and flows across Snowy to Victoria and Murraylink returned to previous levels. This reduced imports into Victoria from 1736 MW to 1233 MW and the five minute price increased from $9/MWh to $8988/MWh for the 1.10 pm 5-minute dispatch interval. By 1.15 pm, prices had returned to previous levels.

There was no significant rebidding.

Monday, 31 December

2:30 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	386.12	75.08	82.77
Demand (MW)	8209	8119	8086
Available capacity (MW)	7732	8211	8252

Conditions at the time saw near record demand, which was slightly higher than forecast. Available capacity was around 500 MW lower than forecast.

A step change in the offer profiles of generators in Victoria and South Australia at the beginning of the trading interval saw the five minute dispatch interval price increase from around $70/MWh to $1000/MWh at 2.05 pm.

Over numerous rebids from 11 am TRUenergy reduced the capacity at Yallourn by 300 MW –all of which was priced below $5/MWh. The reasons were related to plant conditions and ambient temperatures.

Between 12.30 pm and 1 pm LYMMCO reduced the capacity of Loy Yang A unit one by 130 MW priced below $20/MWh. The reason given was “Revised plant limits”.

There was no other significant rebidding.

Friday, 4 January

2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	289.91	101.15	101.13
Demand (MW)	7913	7731	7746
Available capacity (MW)	7630	7711	8236
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	295.14	292.29	250.70
Demand (MW)	7992	7837	7845
Available capacity (MW)	7629	7711	8236
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	295.61	295.57	250.70
Demand (MW)	8028	7910	7911
Available capacity (MW)	7622	7716	8236
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1069.41	302.16	275.74
Demand (MW)	8148	8023	8015
Available capacity (MW)	7602	7706	8236
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	288.30	286.89	101.19
Demand (MW)	8165	8059	8089
Available capacity (MW)	7594	7699	8236
4:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	267.41	283.74	100.98
Demand (MW)	8266	8126	8122
Available capacity (MW)	7615	7709	8236
5:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	291.11	286.50	97.01
Demand (MW)	8298	8104	8087
Available capacity (MW)	7603	7614	8206
5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	284.81	97.36	74.00
Demand (MW)	8166	7869	7894
Available capacity (MW)	7661	7713	8299

Conditions at the time saw demand higher than forecast and close to record levels.

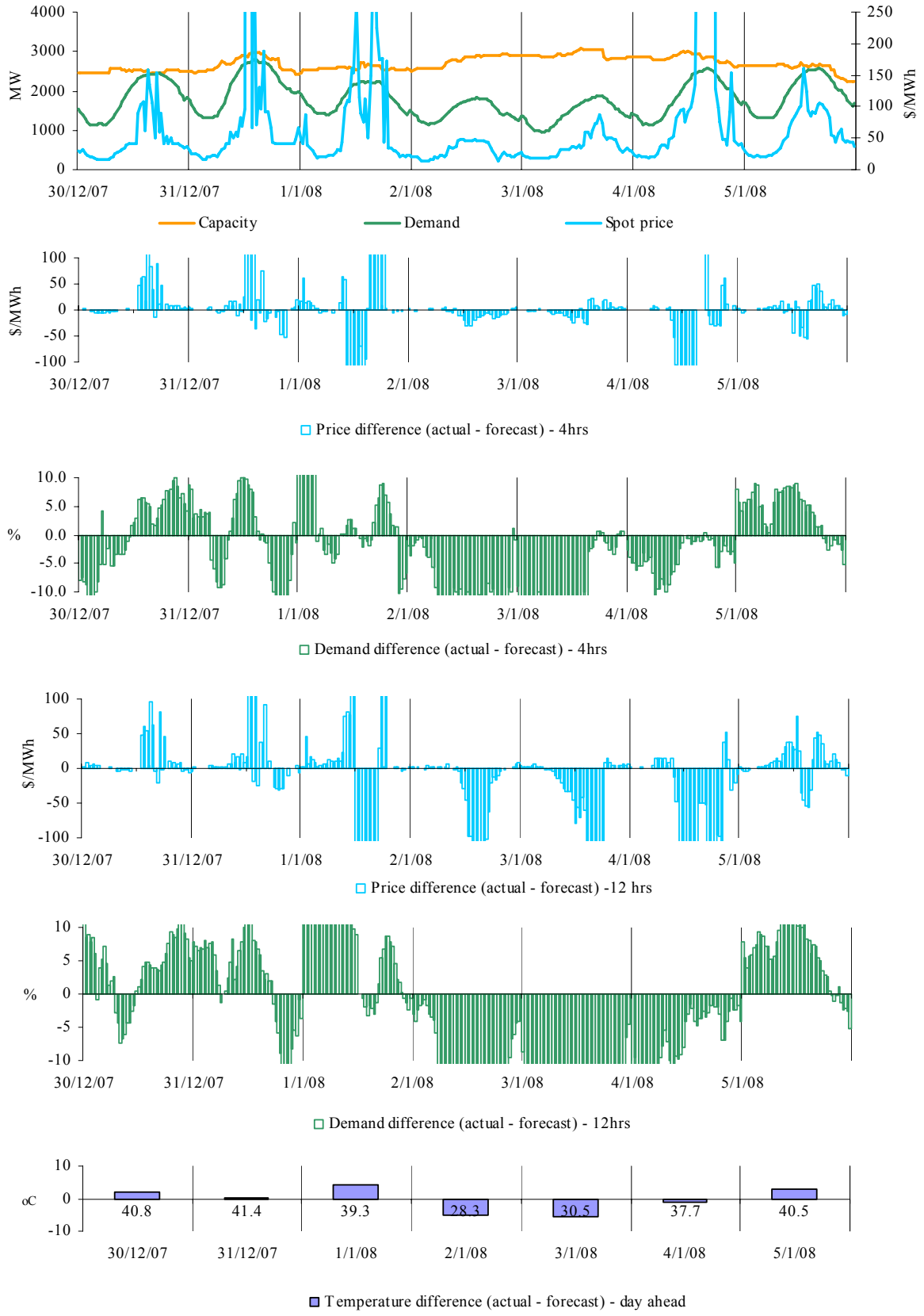
Prices were generally close to those forecast four hours ahead.

There was no significant rebidding.

South Australia

Figures 45-50 show spot market prices in South Australia over the week along with actual demand and differences between actual and forecast demand and prices.

Figures 45-50: South Australia actual spot price, demand and forecast differences



There were eight occasions where the spot price in South Australia was greater than three times the South Australia weekly average price of $318/MWh.

Monday, 31 December

1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	5057.04	72.00	61.71
Demand (MW)	2722	2455	2432
Available capacity (MW)	2861	2843	2843
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3307.63	80.31	82.53
Demand (MW)	2727	2490	2509
Available capacity (MW)	2947	2846	2852

Conditions at the time saw demand around 250 MW higher than forecast four hours ahead and at close to record levels.

At 12.50 pm, following the loss of the Moorabool 220 kV 2 busbar, and the subsequent offloading of two lines around Moorabool, NEMMCO invoked a constraint to manage the change in network configuration. This constraint caused a step change on flows across Murraylink from 96 MW into South Australia at 12.45 pm to 10 MW into Victoria at 12.50 pm. At the same time flows from Snowy into Victoria increased from 1022 MW to1654 MW.

The five minute price increased from around $110/MWh at 12.45 pm to above $9000/MWh at 12.50 pm and remained at this level until 1.10 pm. At 1.10 pm the constraint managing the loss of the Moorabool equipment was revoked and flows across Snowy to Victoria and Murraylink returned to previous levels. By 1.15 pm, prices also returned to previous levels.

In accordance with clause 3.13.7 of the Rules, the AER will be issuing a report into the circumstances that led to the spot price exceeding $5000/MWh.

Friday, 4 January

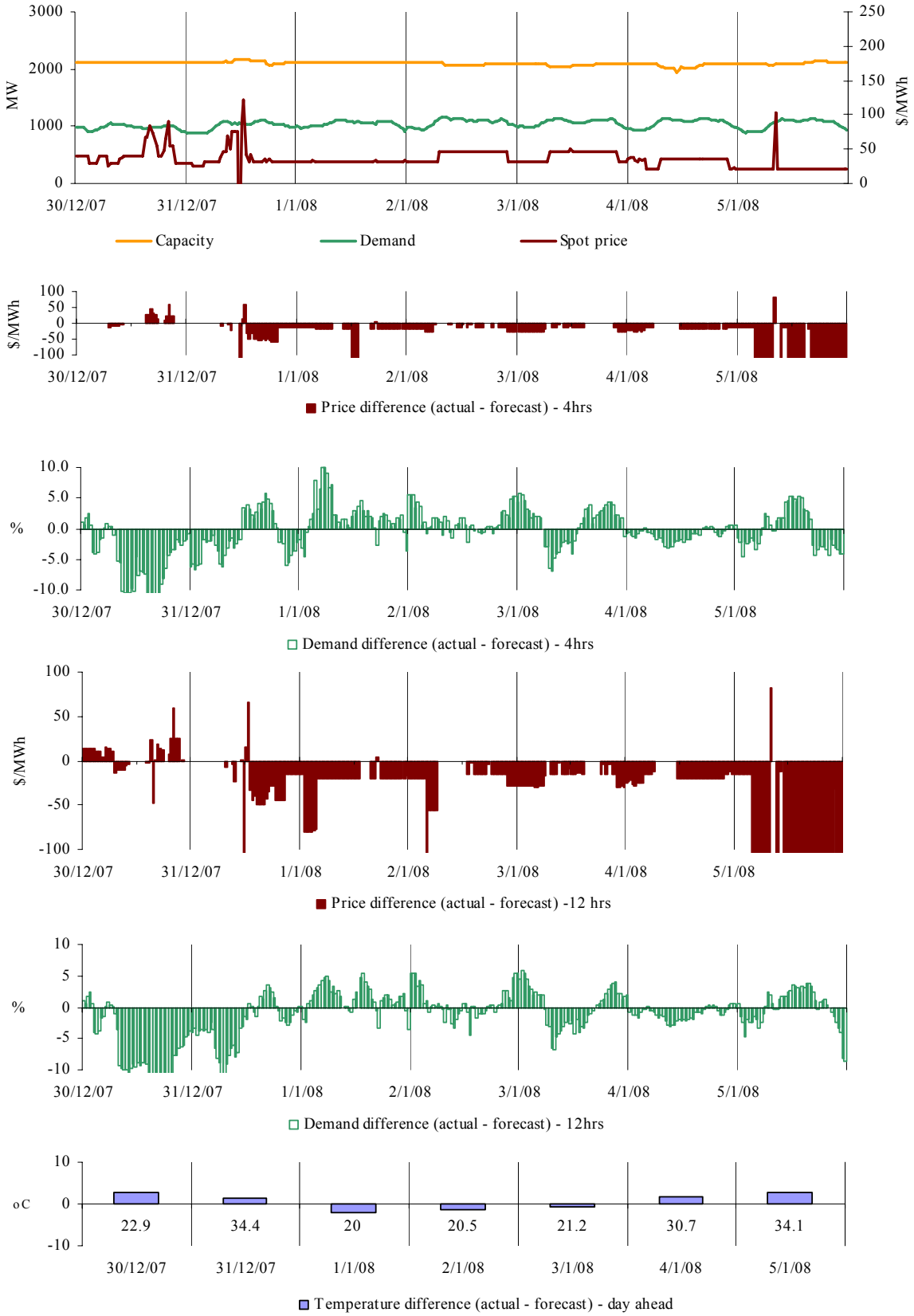
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	8353.99	9946.82	9999.32
Demand (MW)	2509	2537	2601
Available capacity (MW)	2820	2899	2958
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	9950.37	9949.51	9999.72
Demand (MW)	2539	2565	2630
Available capacity (MW)	2829	2899	2958
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	9950.32	9949.45	9999.72
Demand (MW)	2564	2574	2632
Available capacity (MW)	2849	2934	2958
4:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	9949.94	9949.51	9999.72
Demand (MW)	2555	2585	2642
Available capacity (MW)	2849	2931	2954
5:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	9948.25	9947.48	9999.72
Demand (MW)	2535	2554	2609
Available capacity (MW)	2853	2920	2946
5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3526.58	145	9950.77
Demand (MW)	2499	2488	2542
Available capacity (MW)	2856	2918	2946

Conditions at the time saw demand at close to record levels. Prices were generally close to forecast. In accordance with clause 3.13.7 of the Rules, the AER will be issuing a report into the circumstances that led to the spot price exceeding $5000/MWh.

Tasmania

Figures 51-56 show spot market prices in Tasmania over the week along with actual demand and differences between actual and forecast demand and prices.

Figures 51-56: Tasmania actual spot price, demand and forecast differences



There was one occasion where the spot price in Tasmania was greater than three times the Tasmania weekly average price of $35/MWh.

Monday, 31 December

1:00 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	122.7	65.54	56.68
Demand (MW)	1049	1008	1042
Available capacity (MW)	2169	2149	2129

Conditions at the time saw demand and available capacity close to forecast.

An unplanned outage of the Gordon to Chapel Street No. 1 220kV line occurred at 12.31pm. This led to an increased requirement for frequency control ancillary services in Tasmania and also restricted Gordon from providing those services.

There was no significant rebidding.

Figures 57 – 61 set out for each region the extent of capacity offered into the market within a series of price thresholds. Actual price and generation dispatched in a region are overlaid.

Figure 57: Queensland closing bid prices, dispatched generation and spot price

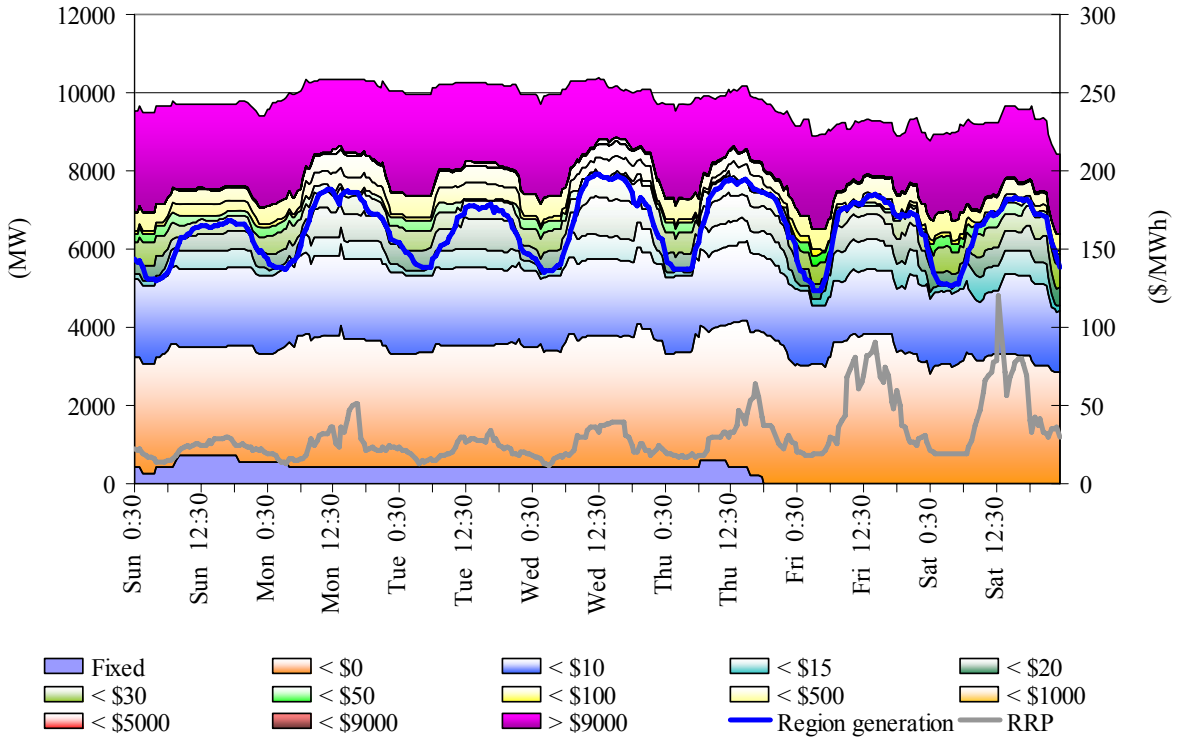


Figure 58: New South Wales closing bid prices, dispatched generation and spot price

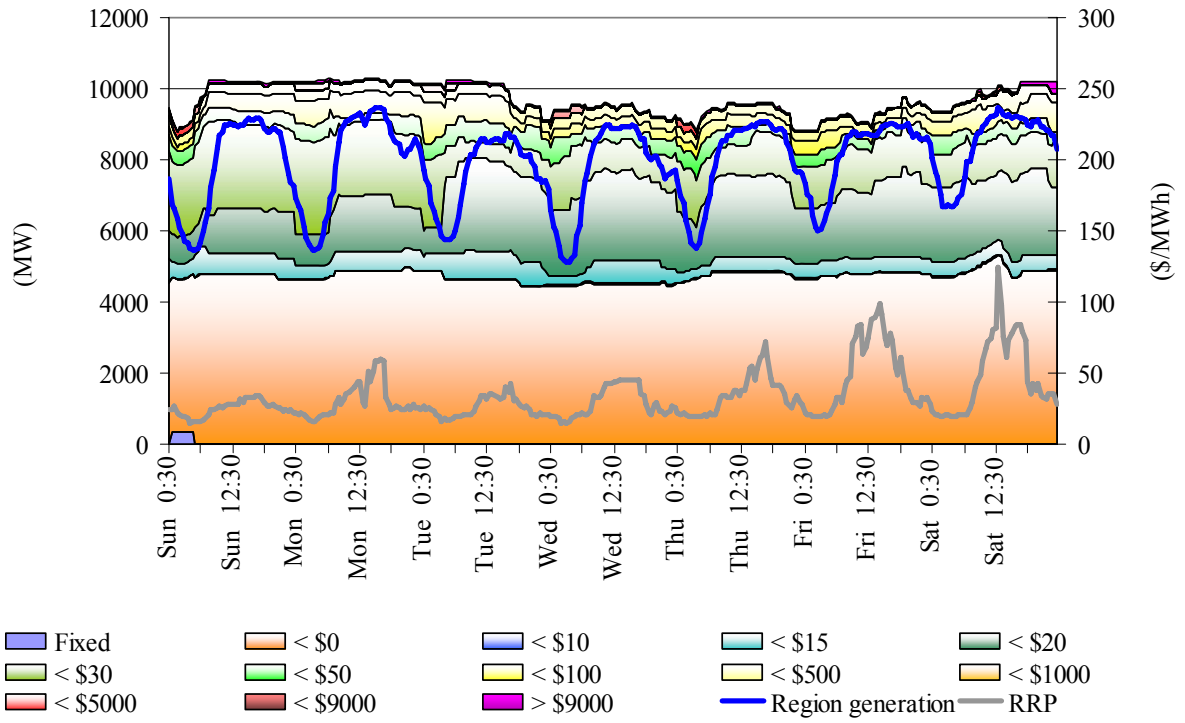


Figure 59: Victoria closing bid prices, dispatched generation and spot price

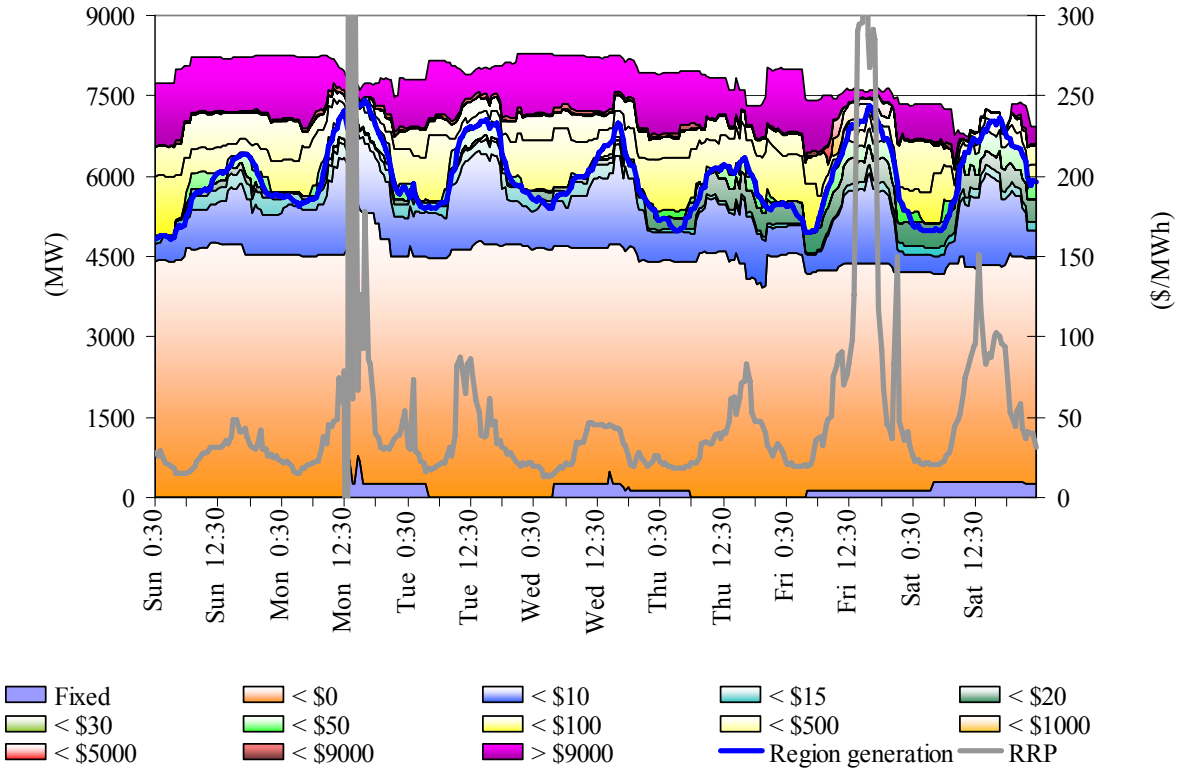


Figure 60: South Australia closing bid prices, dispatched generation and spot price

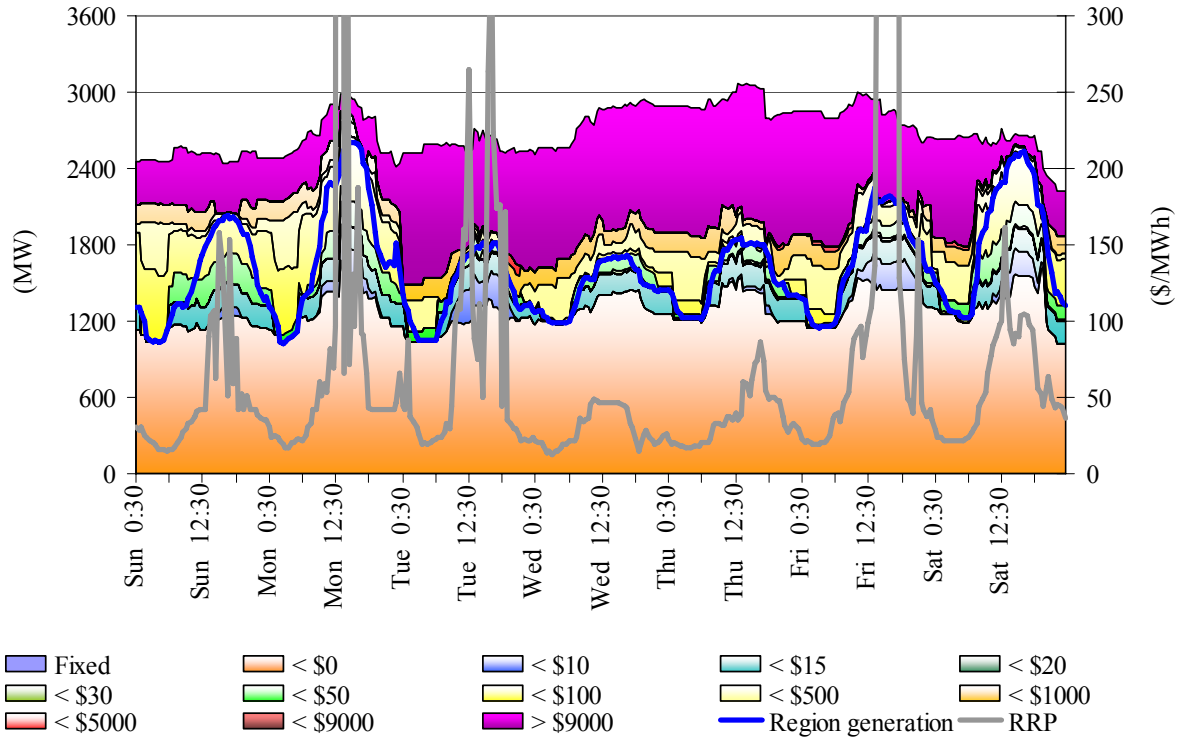
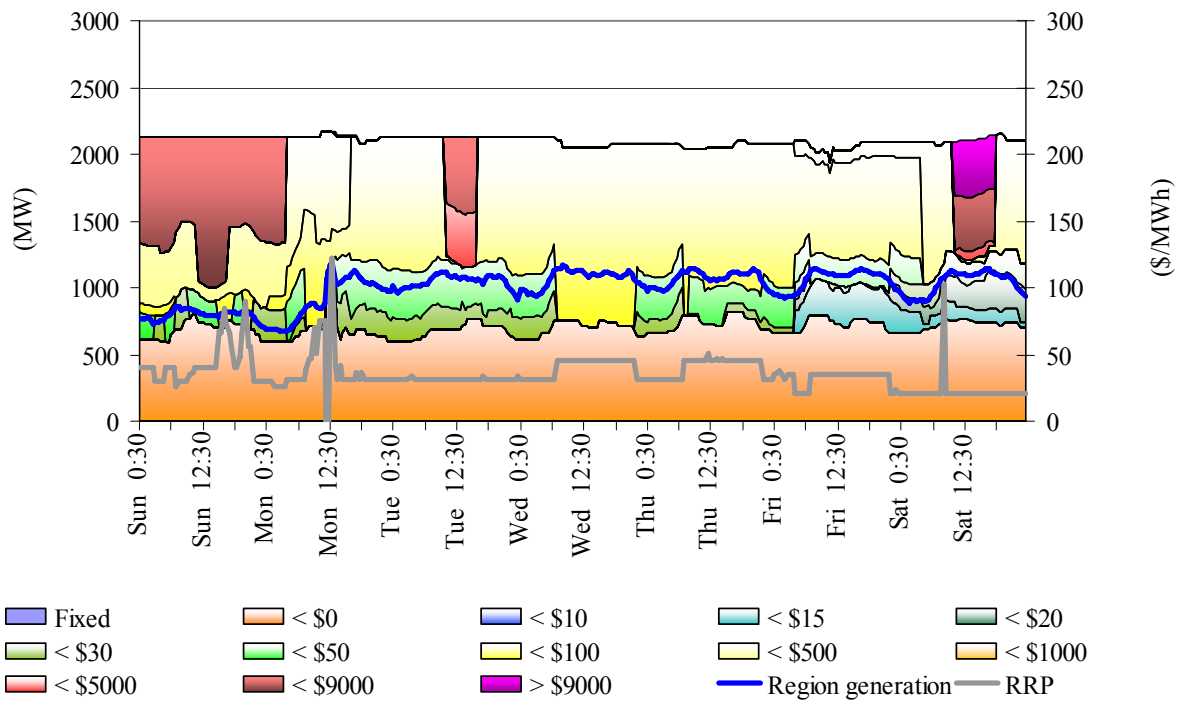


Figure 61: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was $2.6 million or 1.1 per cent of turnover in the energy market. Figure 62 summarises the volume weighted average prices and costs for the eight frequency control ancillary services across the mainland.

Figure 62: frequency control ancillary service prices and costs for the mainland

	Raise 6 sec	Raise 60 sec	Raise 5 min	Raise reg	Lower 6 sec	Lower 60 sec	Lower 5 min	Lower reg
Last week ($/MW)	12.84	2.57	17.85	2.31	0.27	0.20	0.99	2.70
Previous week ($/MW)	11.84	1.12	7.82	1.57	0.29	0.19	0.27	2.19
Last quarter ($/MW)	3.43	0.83	2.05	6.07	0.06	0.14	0.48	1.84
Market Cost ($1000s)	$817	$157	$1,443	$50	$2	$1	$22	$53
% of energy market	0.34%	0.07%	0.60%	0.02%	0.01%	0.01%	0.01%	0.02%

The total cost of ancillary services in Tasmania for the week was $1.7 million or 27 per cent of the turnover in the Tasmanian energy market. An unplanned outage of the Gordon to Chapel Street line occurred at 12.31 pm on Monday. This led to an increased requirement for local services in Tasmania and also restricted Gordon from providing those services. At 12.51 pm there was an unplanned outage of Basslink, which lasted until 8 January. From 12.50 pm until 2 pm the price of raise 6 second service was $10 000/MW with a total cost of $1.4 million.

Figure 63 summarises for Tasmania the prices and costs for the eight frequency control ancillary services.

Figure 63: frequency control ancillary service prices and costs for Tasmania

	Raise 6 sec	Raise 60 sec	Raise 5 min	Raise reg	Lower 6 sec	Lower 60 sec	Lower 5 min	Lower reg
Last week ($/MW)	226.97	0.93	14.44	2.73	4.87	0.17	0.03	2.58
Previous week ($/MW)	20.63	0.89	16.61	1.63	2.94	0.52	0.24	2.31
Last quarter ($/MW)	9.36	1.98	3.68	5.15	9.32	1.87	1.58	1.52
Market Cost ($1000s)	$1,412	$13	$139	$20	$70	$5	$1	$20
% of energy market	23.1%	0.21%	2.27%	0.32%	1.14%	0.08%	0.01%	0.32%

Figure 64 shows the daily breakdown of cost for each frequency control ancillary service.

Figure 64: daily frequency control ancillary service cost

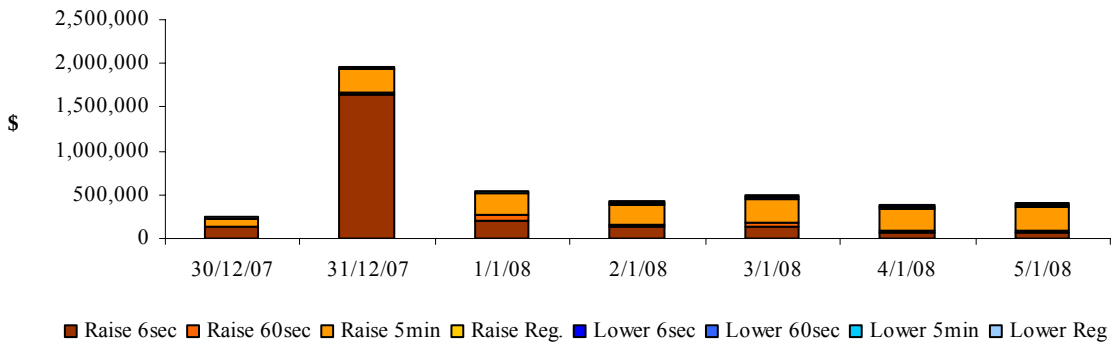
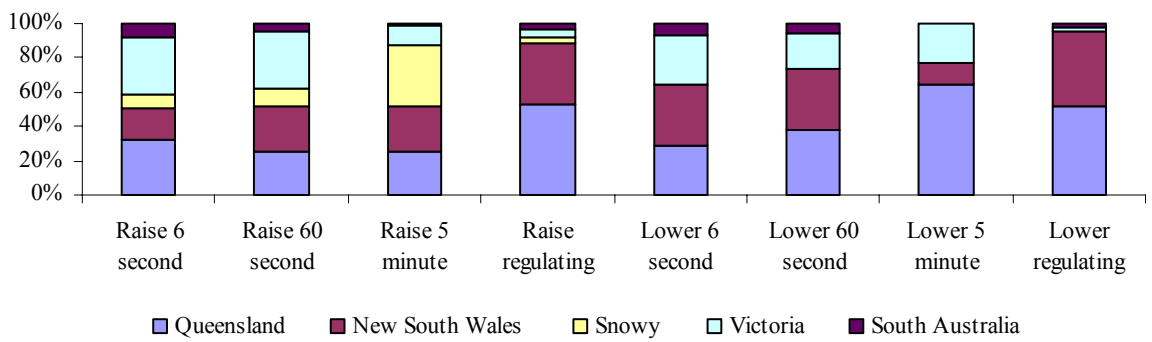


Figure 65 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

Figure 65: regional participation in ancillary services on the mainland



Figures 66 and 67 show 30-minute prices for each frequency control ancillary service throughout the week.

Figure 66: prices for raise services

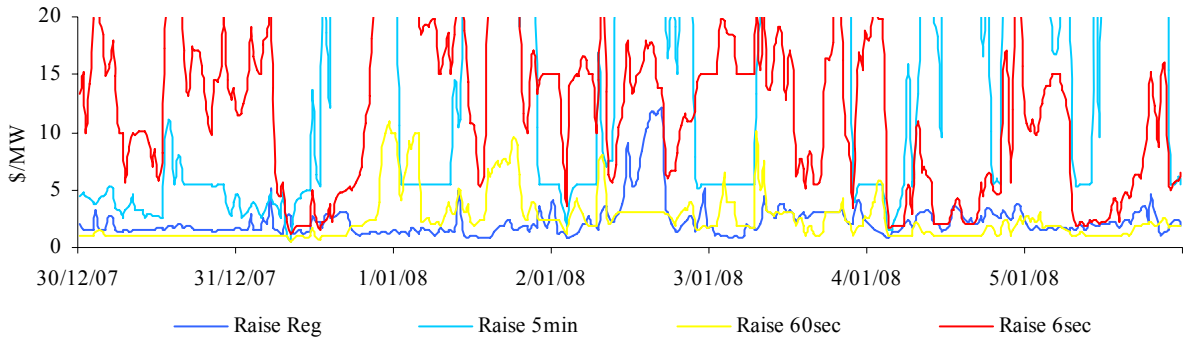


Figure 66A: prices for raise services – Tasmania

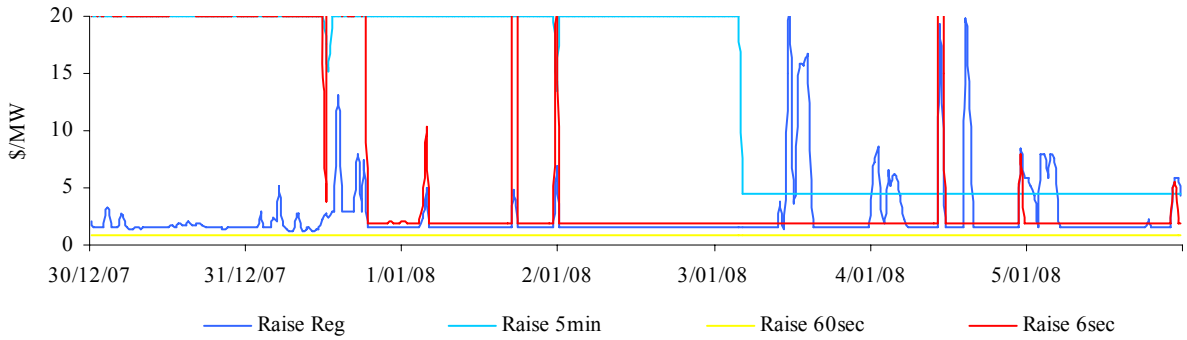


Figure 67: prices for lower services

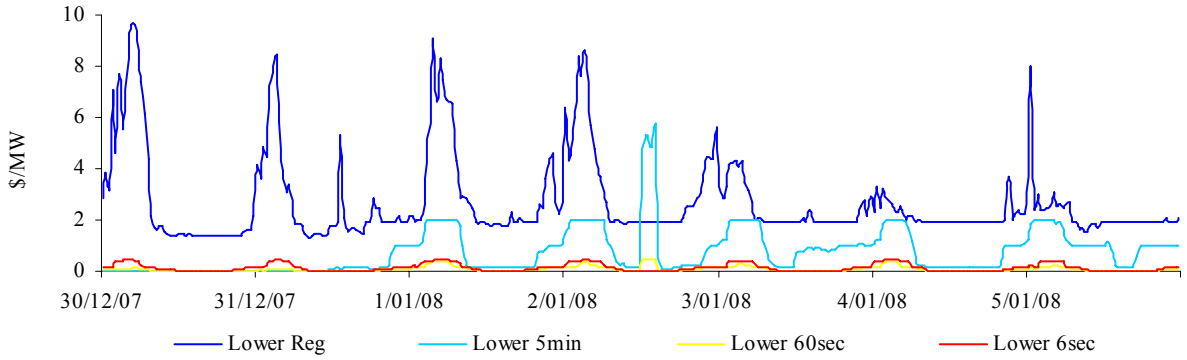
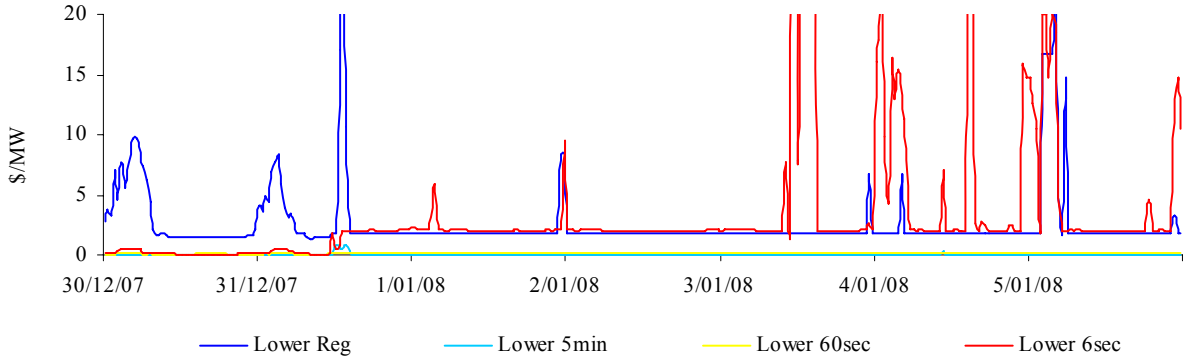


Figure 67A: prices for lower services – Tasmania



Figures 68 and 69 present for both raise and lower frequency control services the requirement, established by NEMMCO, for each service to satisfy the frequency standard.

Figure 68: raise requirements

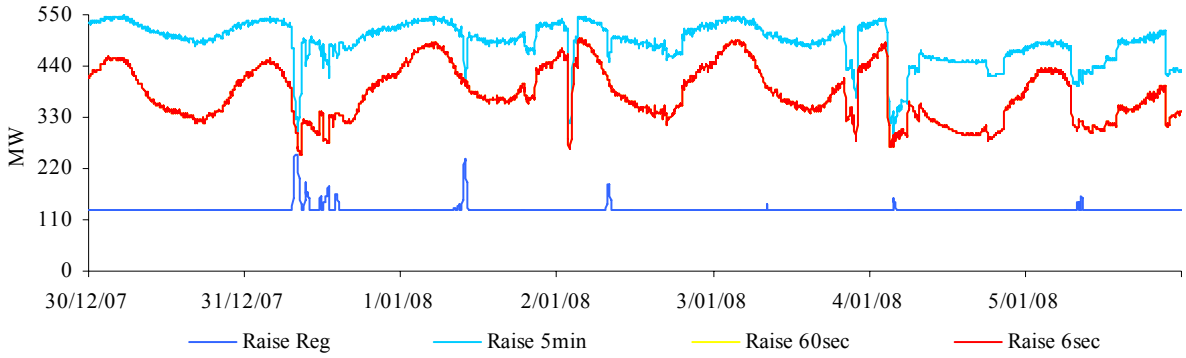


Figure 68A: raise requirements – Tasmania

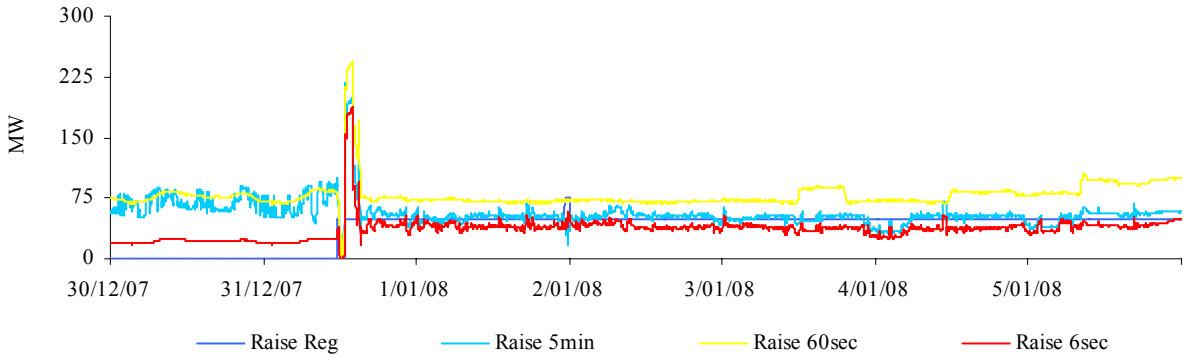


Figure 69: lower requirements

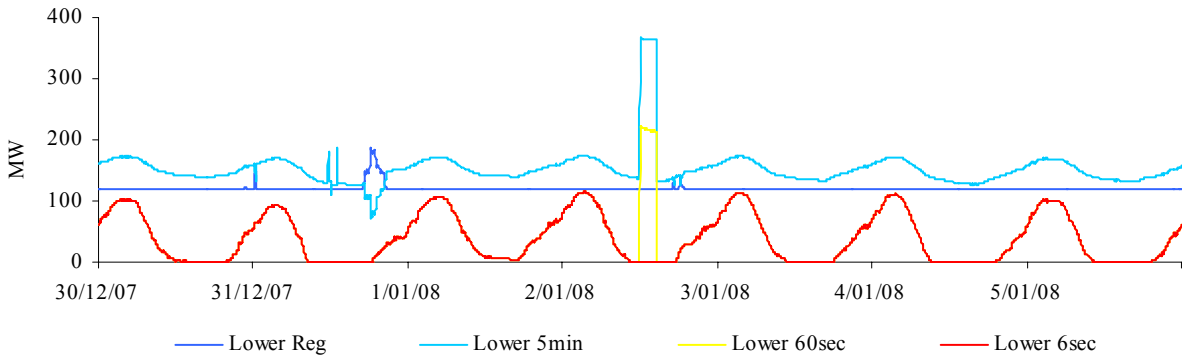


Figure 69A: lower requirements – Tasmania