Market analysis

AUSTRALIAN ENERGY REGULATOR

1 – 7 JANUARY 2006

Spot prices in Queensland averaged $45/MWh, driven primarily by near record demand on Tuesday coinciding with reductions in generation availability across a number of stations. Prices in New South Wales, Victoria and South Australia averaged $27/MWh, $16/MWh and $22/MWh respectively. These prices represented reductions compared to the previous week as a result of reduced demand.

Tasmania's spot price averaged $47/MWh, up from $32/MWh the previous week as a result of two price spikes on Thursday.

Turnover in the energy market for the mainland was $113 million. The total cost of ancillary services for the week was around $154 000, or 0.1 per cent of turnover. Turnover in Tasmania for the week was $8 million with the cost of ancillary services totaling $190 000 or 2.5 per cent of turnover. Testing of Basslink continued with up to 400 MW transfers from Tasmania to Victoria.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 77, or around a quarter of all trading intervals. Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in more than a third of all trading intervals across the market. These variations were most frequent in South Australia occurring in around three quarters of all trading intervals.

Energy prices

Figure 1 sets out 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 financial year to date. Figure 3 compares the weekly price volatility index with the averages for the previous week and the same quarter last year.

Figure 1: national demand and spot prices

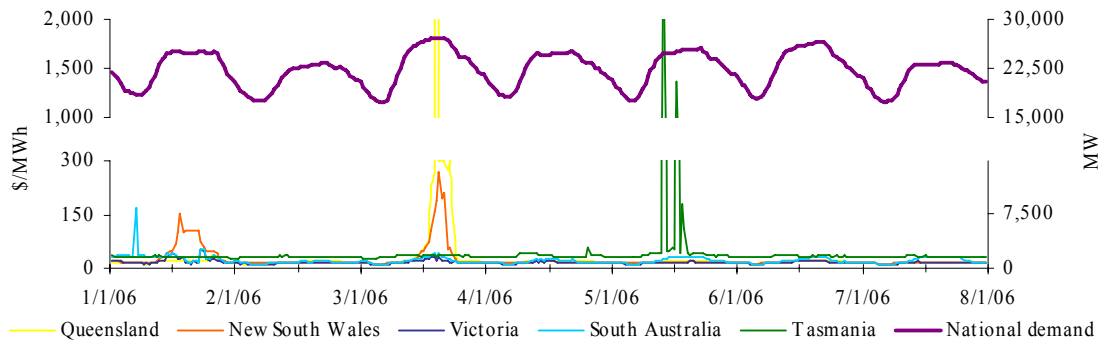


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	45	27	16	22	47
Previous week	52	117	99	151	32
Same quarter last year	25	35	22	31	-
Financial year to date	31	49	30	39	81
% change from previous week*	▼13%	▼77%	▼83%	▼85%	▲49%
% change from same quarter last year**	▲82%	▼24%	▼25%	▼28%	-
% change from year to date***	▼14%	▼16%	▼6%	▼11%	-

*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.

Figure 3: volatility index during peak periods

	QLD	NSW	VIC	SA	TAS
Last week	0.25	0.18	0.32	0.69	0.24
Previous week	2.52	2.98	2.44	4.21	0.15
Same quarter last year	0.73	0.74	0.78	0.70	-

Figures 4 to 8 show the weekly correlation between spot price and demand.

Figure 4: Queensland

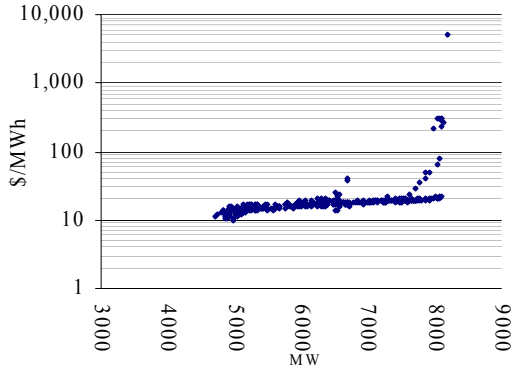


Figure 5: New South Wales

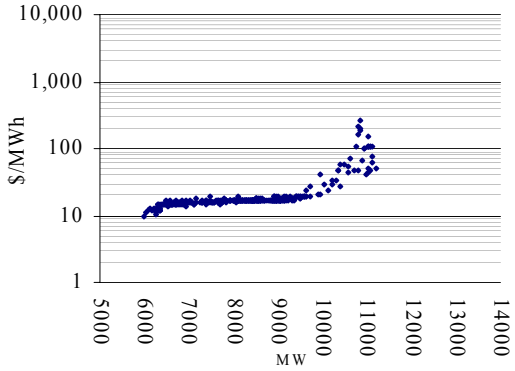


Figure 6: Victoria

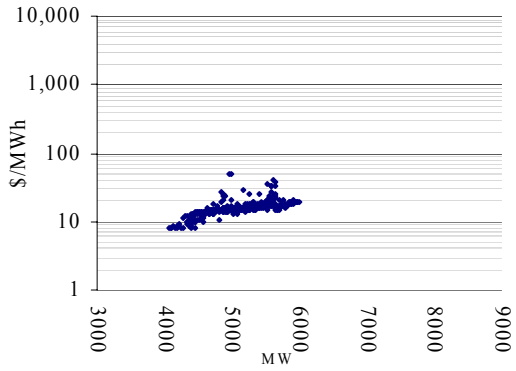


Figure 7: South Australia

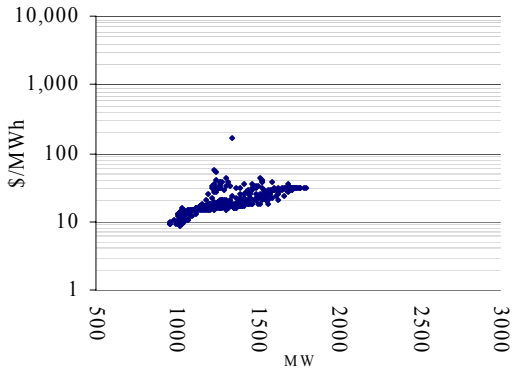
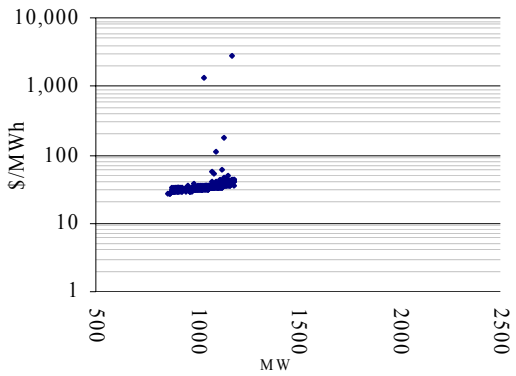


Figure 8: Tasmania



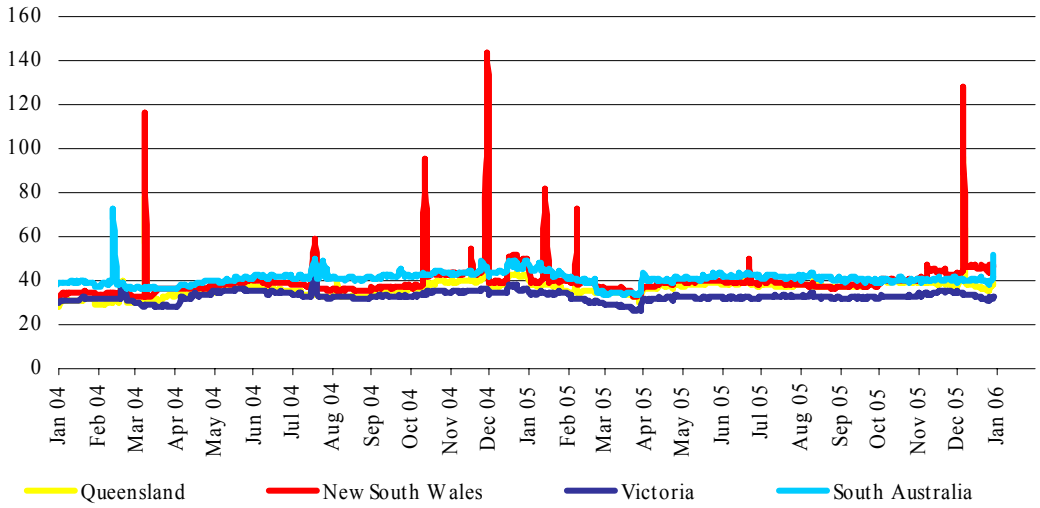
The maximum spot prices for the week were $5134/MWh in Queensland and $268/MWh in New South Wales on Tuesday and $51/MWh in Victoria and $169/MWh in South Australia on Monday. In Tasmania, the highest price for the week was recorded at 10am on Thursday at $2705/MWh.

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 2004.

Figure 9: d-cyphaTrade WEPI for the week

	Monday	Tuesday	Wednesday	Thursday	Friday
Queensland	36.14	51.74	37.15	37.07	36.85
New South Wales	39.11	40.78	40.65	40.67	40.86
Victoria	31.54	32.84	32.66	32.75	32.78
South Australia	38.25	39.65	39.72	40.17	40.09

Figure 10: d-cyphaTrade WEPI



Reserve

There were no low reserve conditions forecast for the week. Figures 11 to 14 show spot price, net imports and limits at the time of weekly maximum demand.

Figures 11 to 14: spot price, net import and limit at time of weekly maximum demand

Figure 11: Queensland

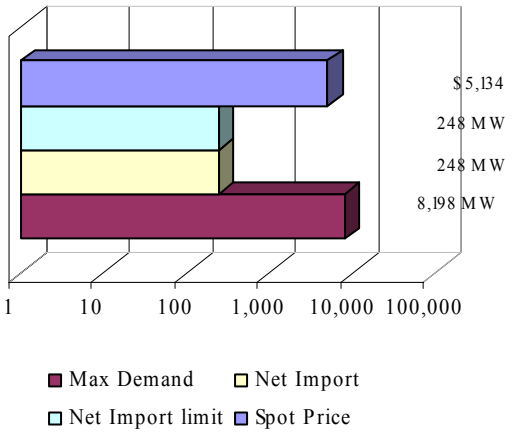


Figure 12: New South Wales

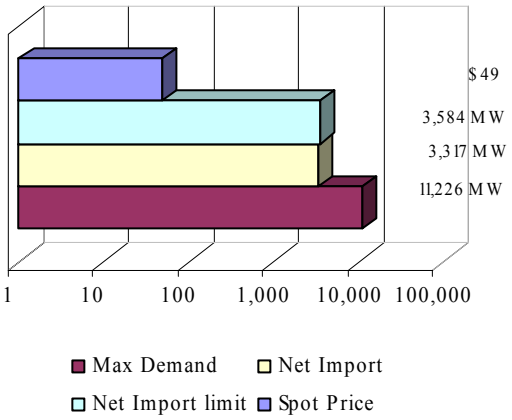


Figure 13: Victoria

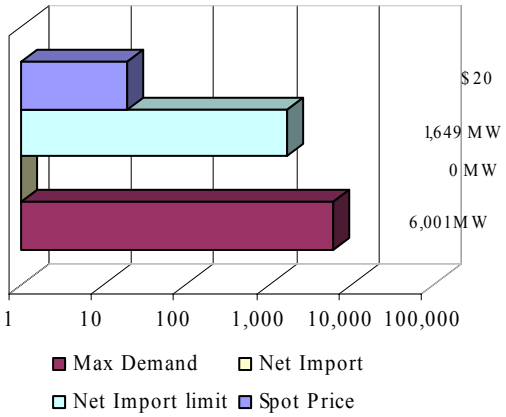
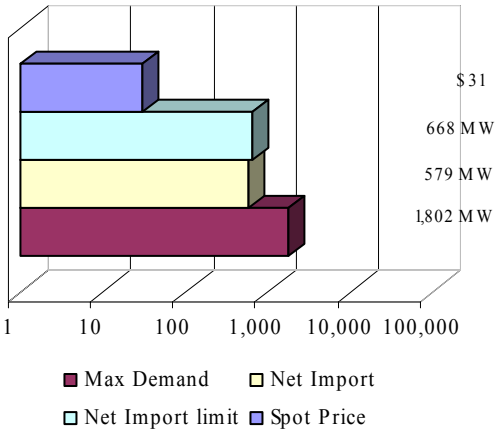


Figure 14: South Australia



In Tasmania, demand reached a maximum of 1188 MW at 8.30am on Thursday 5 January. The spot price at the time was $42/MWh.

Price variations

There were 77 trading intervals where actual prices significantly varied from forecasts made 4 and 12 hours ahead of dispatch. Figures 15 to 19 show the difference in actual and forecast price versus the difference in actual and forecast demand. The figures highlight the correlation 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 15: Queensland

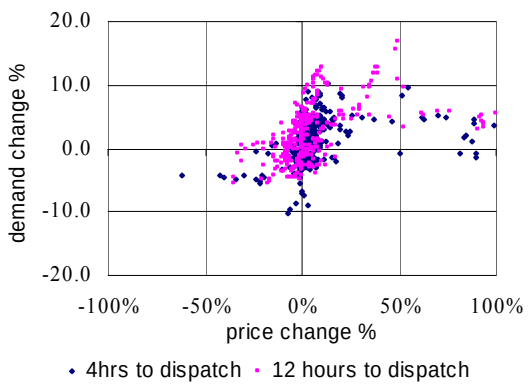


Figure 16: New South Wales

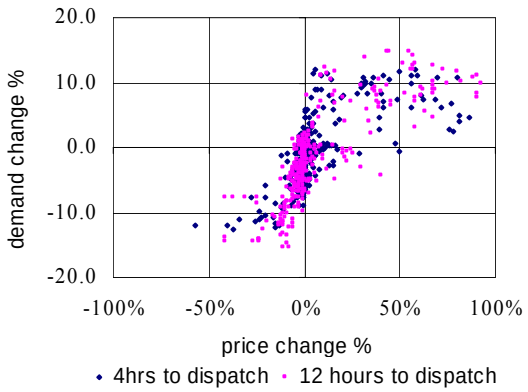


Figure 17: Victoria

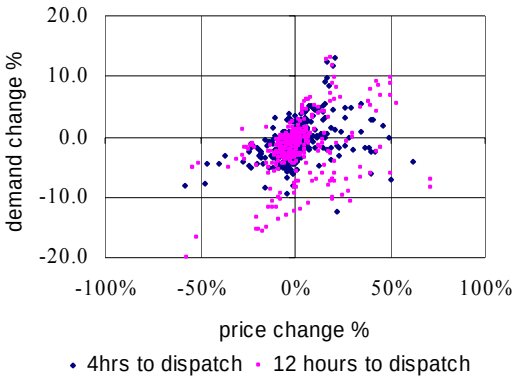


Figure 18: South Australia

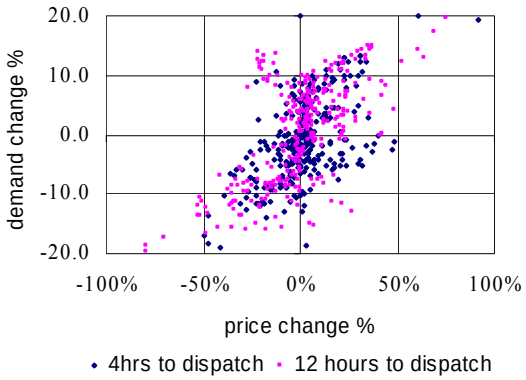


Figure 19: Tasmania

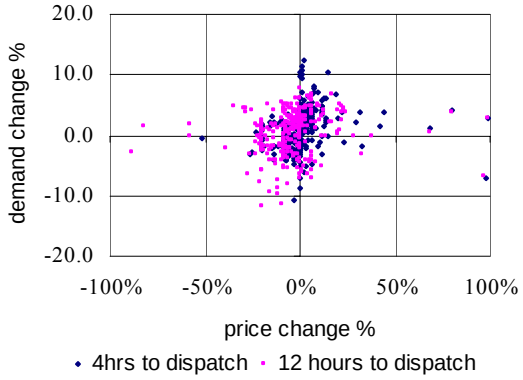
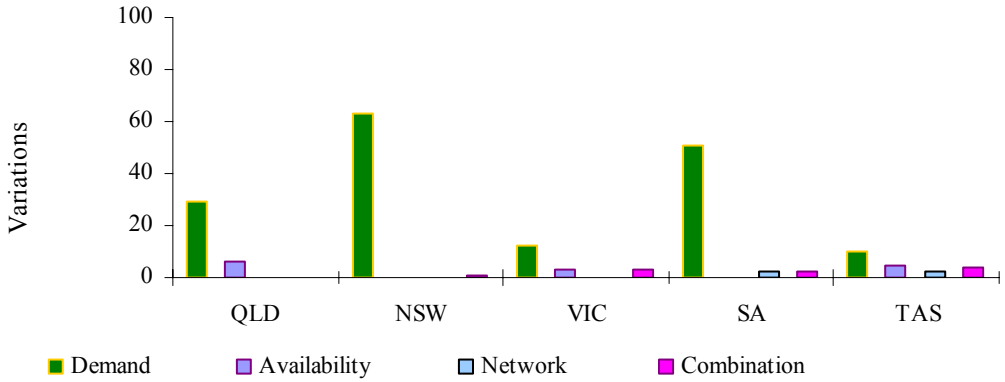


Figure 20 summarises the number and most probable reason for variations between forecast and actual prices.

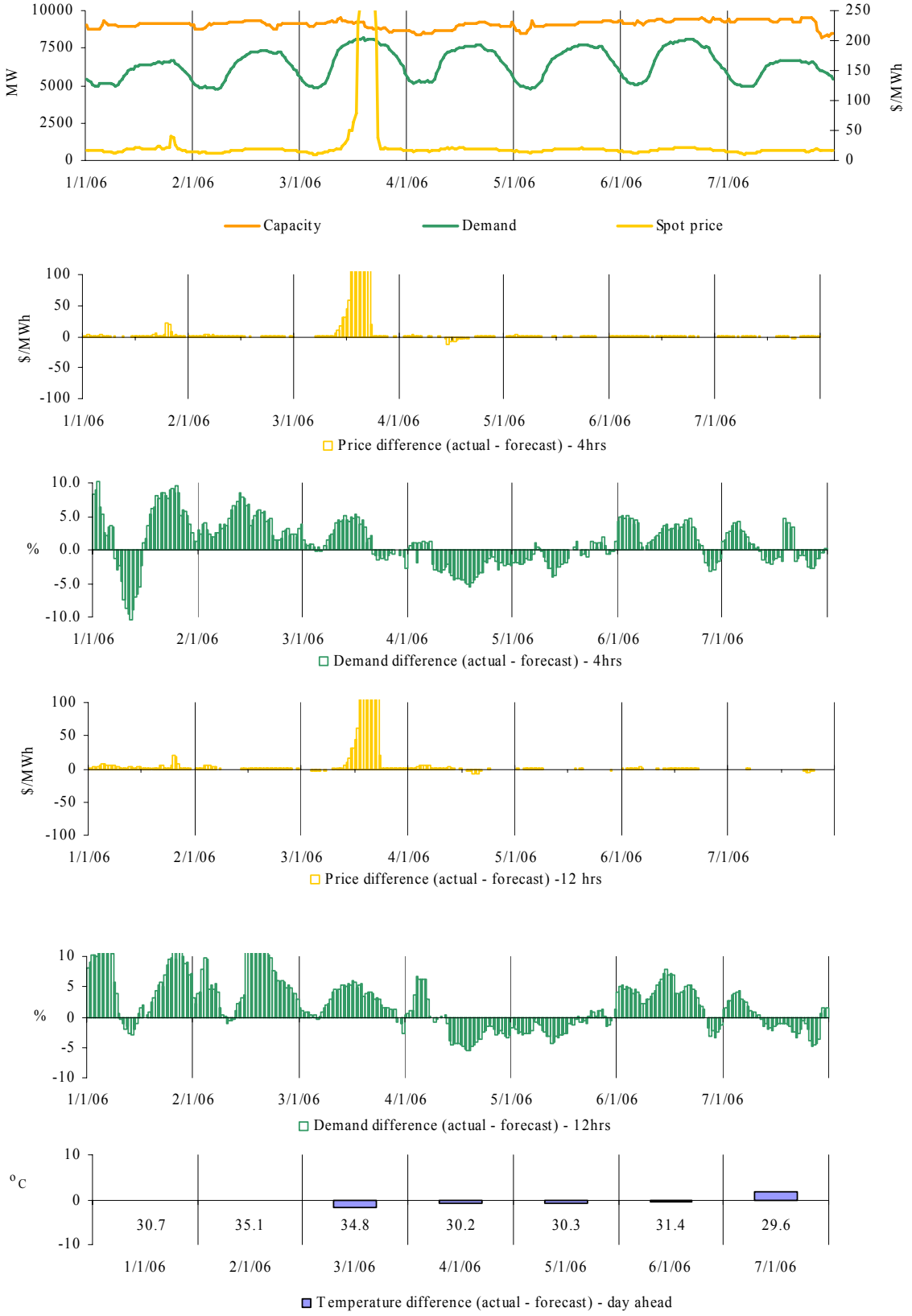
Figure 20: reasons for variations between forecast and actual prices



Price and demand

Figures 21 - 50 set out details of spot prices and demand on a regional basis. They include the actual spot price, actual demand outcomes and variation from forecasts made 4 and 12 hours ahead of dispatch on a daily basis. The differences between the maximum temperature and the temperature forecast at around 6.00 pm the day before are also included. Figures 51 - 55 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.

Figures 21-26: Queensland actual spot price, demand and forecast differences



There were 9 occasions in Queensland where the spot price was greater than three times the weekly average price of $46/MWh. These occurred between 1.30pm and 6pm on Tuesday.

Tuesday, 3 January

1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	228.78	25.15	19.22
Demand (MW)	8086	7772	7703
Available capacity (MW)	9242	9561	9634
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	267.39	30.62	18.83
Demand (MW)	8139	7774	7714
Available capacity (MW)	9263	9356	9634
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	5133.82	37.24	18.97
Demand (MW)	8198	7911	7748
Available capacity (MW)	9230	9356	9634
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	299.69	38.03	19.22
Demand (MW)	8028	7938	7761
Available capacity (MW)	8914	9324	9566
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	299.73	48.20	19.30
Demand (MW)	8073	7937	7762
Available capacity (MW)	8893	9356	9566
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	299.74	47.75	19.30
Demand (MW)	8093	7929	7765
Available capacity (MW)	8886	9348	9561
4:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	274.53	50.29	19.30
Demand (MW)	8109	8169	7777
Available capacity (MW)	8868	9283	9561
5:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	299.85	31.66	19.30
Demand (MW)	8087	8148	7765
Available capacity (MW)	8793	9503	9561
5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	213.19	21.50	18.69
Demand (MW)	7972	8082	7731
Available capacity (MW)	8803	9613	9561

Conditions at the time saw demand as much as 300MW higher than forecast four hours ahead and at near record levels. At 2.30pm, the spot price reached $5134/MWh, with the 5-minute price reaching the price cap of $10 000/MWh following the loss of 400MW at Millmerran.

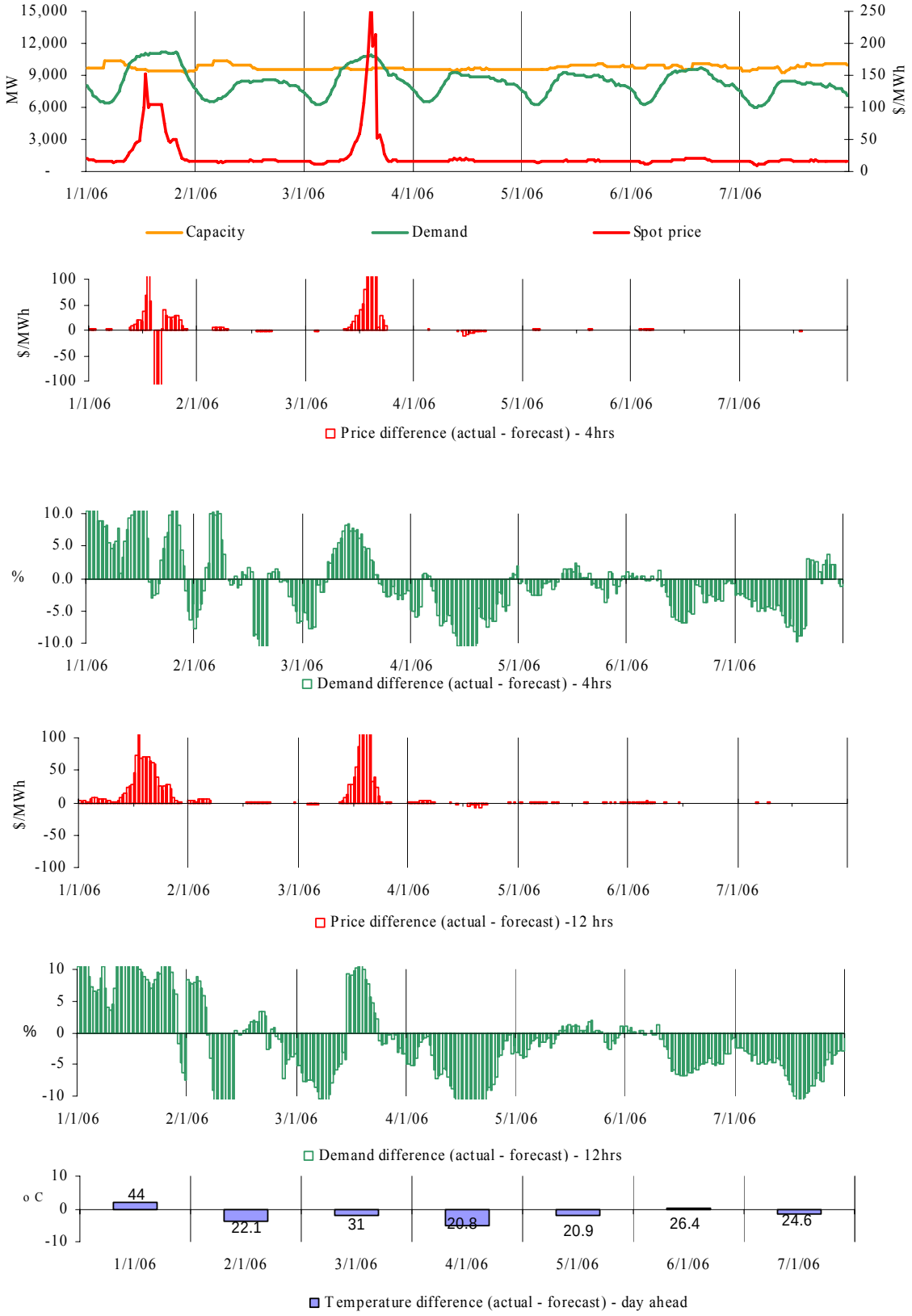
Available capacity was reduced by more than 400MW throughout the morning. This included a reduction in availability at Gladstone and Townsville of nearly 120 MW by Enertrade, 237MW at Callide C and 120MW across both units at Millmerran around midday. The rebid reasons given were"Extend/revise outage::Change avail MW distrib" and "Off AGC::Fixed bid" by Enertrade; "SCC Jammed" for Callide C and "ACC Backpressure limit" for Millmerran.

At 1.15pm, Enertrade shifted 175MW of capacity at Gladstone from prices of less than $60/MWh to $280/MWh. The rebid reason given was "Material changes in market conditions::change MW distrib". Following this rebid, prices increased to $300/MWh. At 1.50pm, a further 160MW of capacity at Oakey was shifted from prices of $260/MWh to more than $9000/MWh. The rebid reason given was "portfolio rearrangement::change MW distrib".

At 2.15pm a further 400MW of available capacity, all priced at less than zero, was lost when Millmerran unit 2 tripped. The rebid reason given was "Unit trip". The 5-minute price increased to $10 000/MWh at 2.20pm, following the loss of this unit.

There was no other significant rebidding.

Figures 27-32 New South Wales actual spot price, demand and forecast differences



There were 15 occasions in New South Wales where the spot price was greater than three times the weekly average price of $27/MWh. These occurred on Sunday and Tuesday afternoon.

Sunday, 1 January

1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	99.57	30.00	26.81
Demand (MW)	10 948	9 774	9 630
Available capacity (MW)	9554	9984	10 304
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	153.18	30.00	30.00
Demand (MW)	11 014	9826	9738
Available capacity (MW)	9534	9984	10 304
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	100.75	44.23	33.05
Demand (MW)	10 961	10 290	9861
Available capacity (MW)	9434	9764	10 304
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	103.60	104.42	33.79
Demand (MW)	11 013	11 063	9971
Available capacity (MW)	9384	9764	10 304
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	103.65	265.27	33.99
Demand (MW)	11 010	11 347	10 042
Available capacity (MW)	9354	9634	10 304
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	104.24	266.33	34.18
Demand (MW)	11 063	11 361	10 134
Available capacity (MW)	9352	9654	10 304
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	104.36	265.27	40.29
Demand (MW)	11 079	11 332	10 188
Available capacity (MW)	9351	9564	10 304
4:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	104.25	100.94	43.52
Demand (MW)	11 051	11 135	10 271
Available capacity (MW)	9431	9564	10 304
5:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	103.93	62.99	43.51
Demand (MW)	11 129	10 819	10 272
Available capacity (MW)	9431	9564	10 304

Temperatures for the first day of the year reached 44 degrees in Sydney, the second highest on record and 2 degrees higher than forecast. Demand reached above 11 000 MW close to the highest ever for a Sunday. Demand was up to 1100MW higher than forecast four hours ahead of dispatch.

Reductions in available capacity due to the high ambient temperatures saw around 300MW of capacity removed from the market.

Delta Electricity reduced the available capacity at Vales Point by 90MW at 11.12am. The rebid reason given was “lake temps::capacity limit”.

At 1.40pm, Macquarie Generation reduced the available capacity at Bayswater by 200MW. The rebid reason given was “high ambient temperature – fan limit”.

There was no other significant rebidding

Tuesday, 3 January

1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	106.03	24.61	18.53
Demand (MW)	10 761	10 019	9666
Available capacity (MW)	9532	9640	10 273
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	159.06	30.00	18.28
Demand (MW)	10 803	10 270	9654
Available capacity (MW)	9535	9640	10 273
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	186.86	35.41	18.28
Demand (MW)	10 840	10 396	9655
Available capacity (MW)	9602	9642	10 273
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	268.05	35.90	18.65
Demand (MW)	10 845	10 354	9763
Available capacity (MW)	9582	9642	10 273
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	195.79	46.39	19.00
Demand (MW)	10 839	10 523	9939
Available capacity (MW)	9677	9612	10 273
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	212.73	46.09	19.00
Demand (MW)	10 802	10 532	9958
Available capacity (MW)	9725	9612	10 273

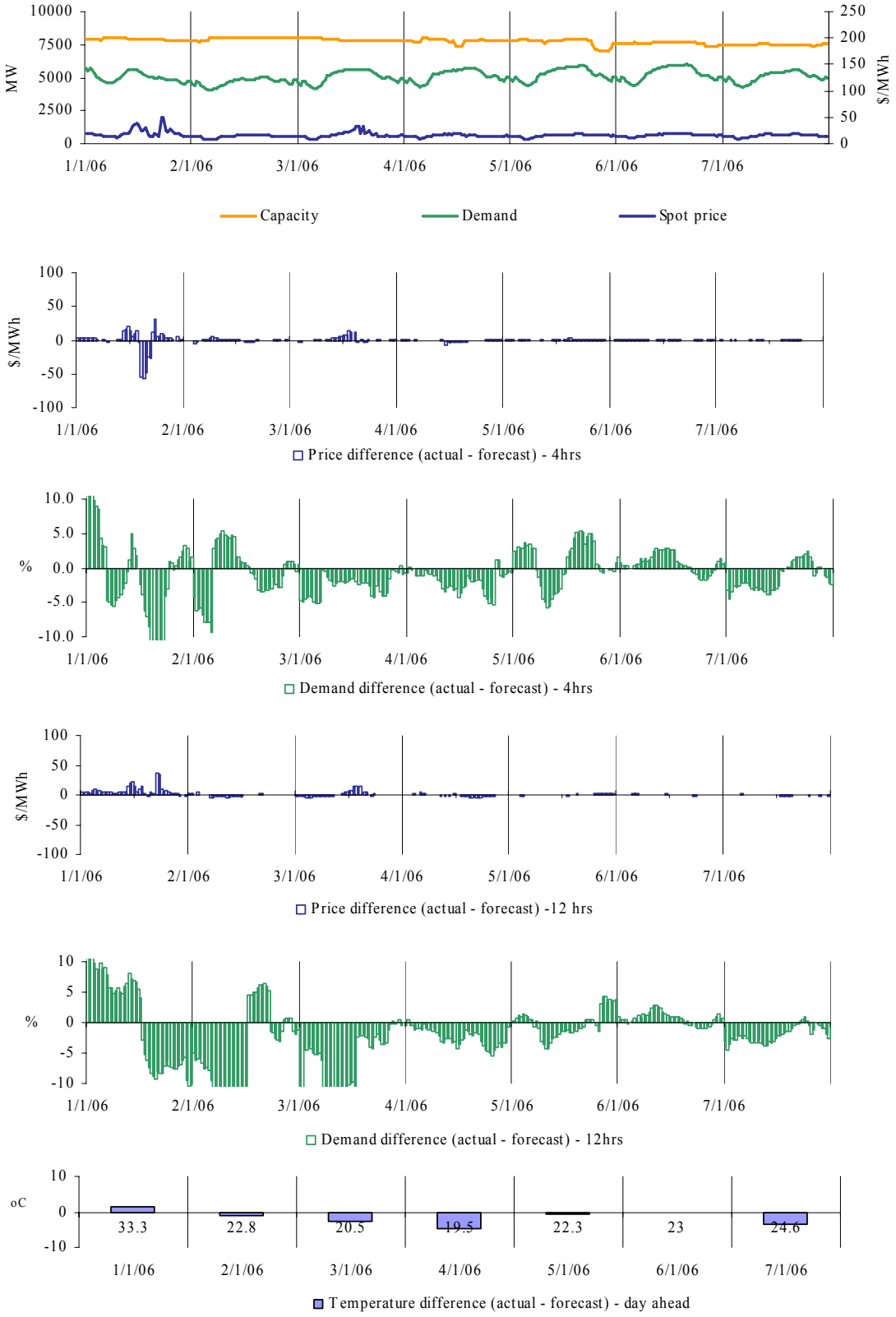
Conditions at the time saw demand around 500MW higher than forecast four hours ahead. A change to the forecasts, made around 11pm the previous night, reduced the forecast peak demand for the day by 1300 MW from 11 340 MW to 10 050 MW. Actual demand peaked at around 10 840 MW. Flows north into Queensland were as high as 300MW, with prices in Queensland peaking above $5000/MWh at 2.30pm, following the loss of 400MW at Millmerran.

From 10am Eraring Energy shifted as much as 170MW of capacity from prices below $30/MWh to prices above $900/MWh. The rebid reason given was "P:Lake temperature management bandshift up".

At 1.08pm, Macquarie Generation rebid 400MW of capacity at Bayswater from prices below $90/MWh to prices over $250/MWh and 100MW of capacity at Liddell from $14/MWh to over $250/MWh. The reason given was "sensitivities have changed". At 1.59pm, a further 200MW of capacity was shifted at Bayswater from prices of less than $20/MWh to around $900/MWh. At the same time, 100MW of capacity at Liddell was shifted from prices of around $300/MWh to less than $20/MWh. The rebid reason given was "Manage QNI constraints".

There was no other significant rebidding.

Figures 33-38: Victoria actual spot price, demand and forecast differences



There was one occasions in Victoria where the spot price was greater than three times the weekly average price of $17/MWh. This occurred on Sunday afternoon.

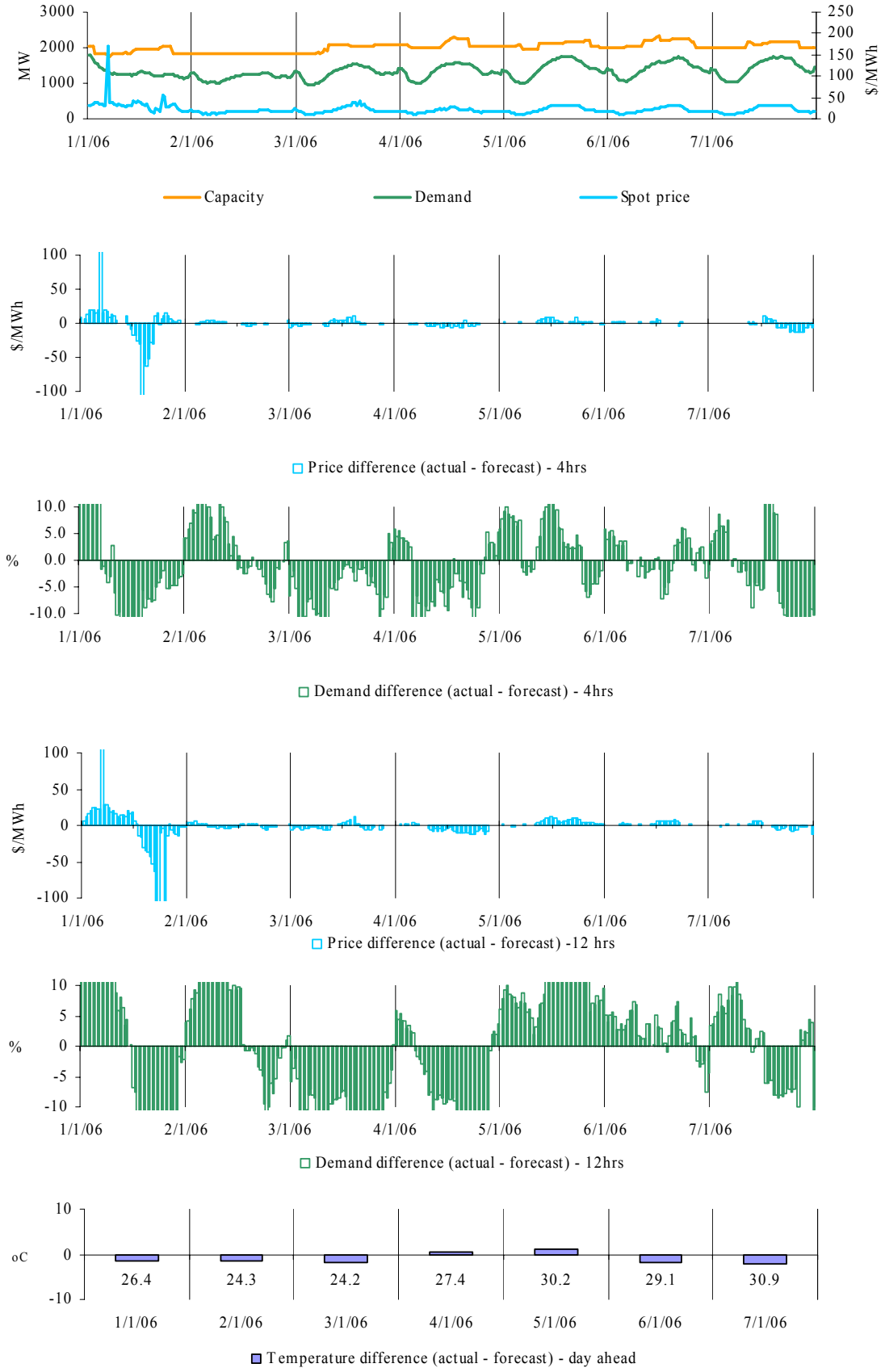
Sunday, 1 January

5:30 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	50.65	39.68	14.28
Demand (MW)	4979	5592	5397
Available capacity (MW)	7865	7875	8046

Conditions at the time saw demand almost 400MW lower than forecast. Earlier in the day, exports north into Snowy were limited to as low as 500 MW to manage an unplanned network outage in the Snowy region. Following the return of this plant at 5.05pm, exports increased and prices re-aligned with those in New South Wales and Queensland.

There was no significant rebidding.

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



There was one occasion in South Australia where the spot price was greater than three times the weekly average price of $23/MWh. This occurred on Sunday morning.

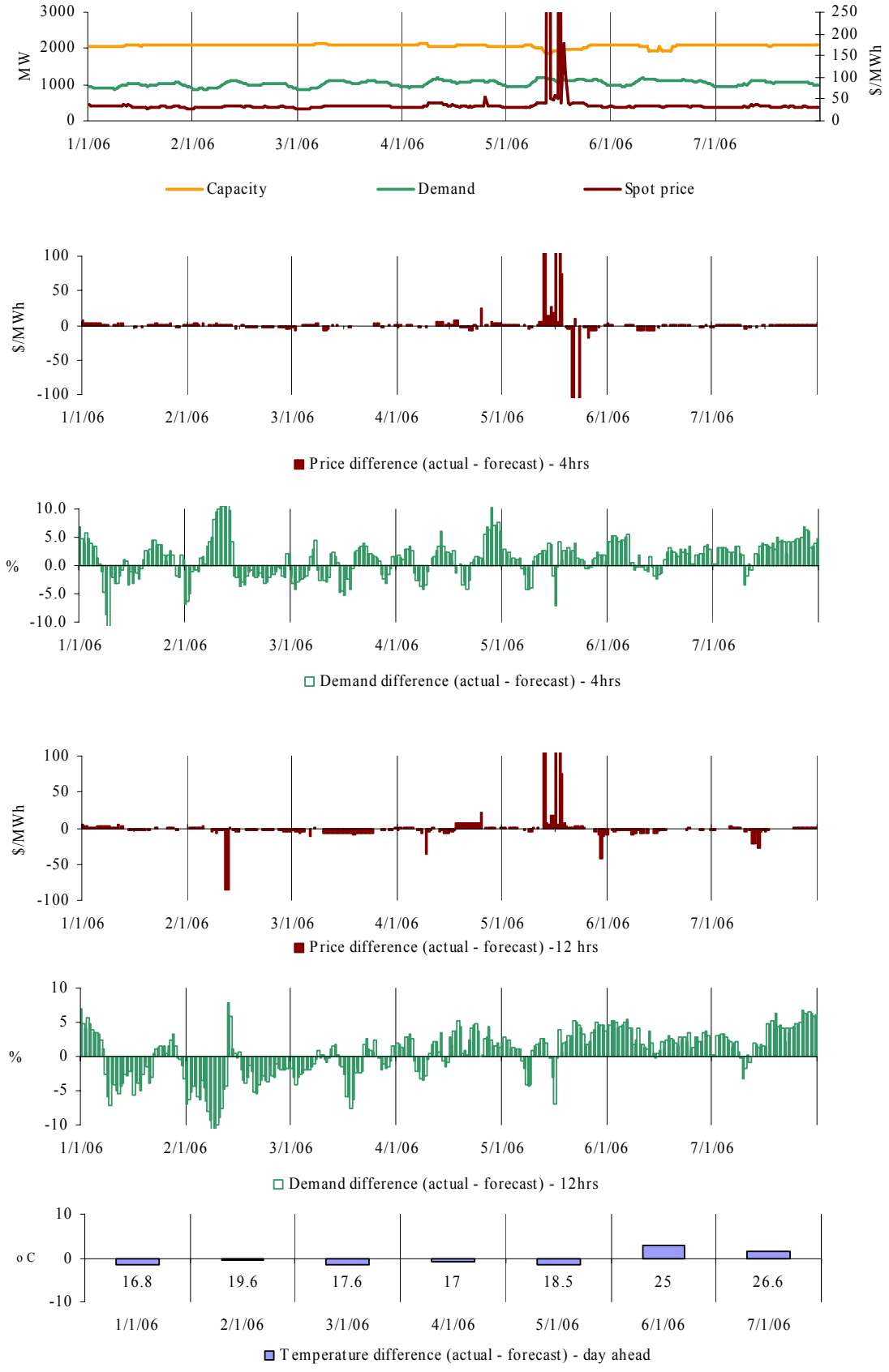
Sunday, 1 January

5:00 am	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	169.39	13.74	9.44
Demand (MW)	1335	1079	1015
Available capacity (MW)	1807	1823	1823

Conditions at the time saw demand almost 300MW higher than forecast four hours to dispatch. At 4.40am the Murraylink interconnector tripped, reducing flows from Victoria across Murraylink from above 200MW to zero. The 5 minute price in South Australia increased from $31/MWh at 4.35am to $600/MWh at 4.45am before returning to $38/MWh at 4.50am.

There was no other significant rebidding.

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



There were three occasions in Tasmania where the spot price was greater than three times the weekly average price of $47/MWh. These all occurred on Thursday morning.

Thursday, 5 January

10:00 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	2705.13	37.66	42.00
Demand (MW)	1169	1138	1138
Available capacity (MW)	1836	1895	1895
12:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1369.97	35.00	40.86
Demand (MW)	1031	1103	1102
Available capacity (MW)	1914	1880	1880
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	177.40	36.09	35.12
Demand (MW)	1136	1089	1092
Available capacity (MW)	1971	1880	1880

At around 9.40am, Bellbay unit 1 tripped from 118MW. All of this capacity was priced at zero. The rebid reason given was "HSCS rebid – urgent spanner work". Price in Tasmania increased from $37/MWh to $8000/MWh for two dispatch intervals at 9.40am and 9.45am before stabilising to around $75/MWh.

A second 5-minute price spike of $8000/MWh occurred at 12.25pm. At 11.55am, demand in Tasmania dropped by 90MW and remained at these lower levels for four dispatch intervals. At 12.20pm, demand increased again, by more than 100 MW over two dispatch intervals. This rapid increase combined with limited ramp rate and binding network constraints led to the price spiking.

The third increase in price for the day coincided with testing on Basslink which began at 1.05pm. Prices increased from $30/MWh at 1.20pm to around $500/MWh from 1.25pm to 1.35pm with flows into Victoria as high as 470MW during the test. There were increases in the price of some frequency control ancillary services at the time in Tasmania. The raise 6 second market peaked at $1000/MWh for two dispatch intervals.

There was no significant rebidding.

Figure 51: Queensland closing bid prices, dispatched generation and spot price

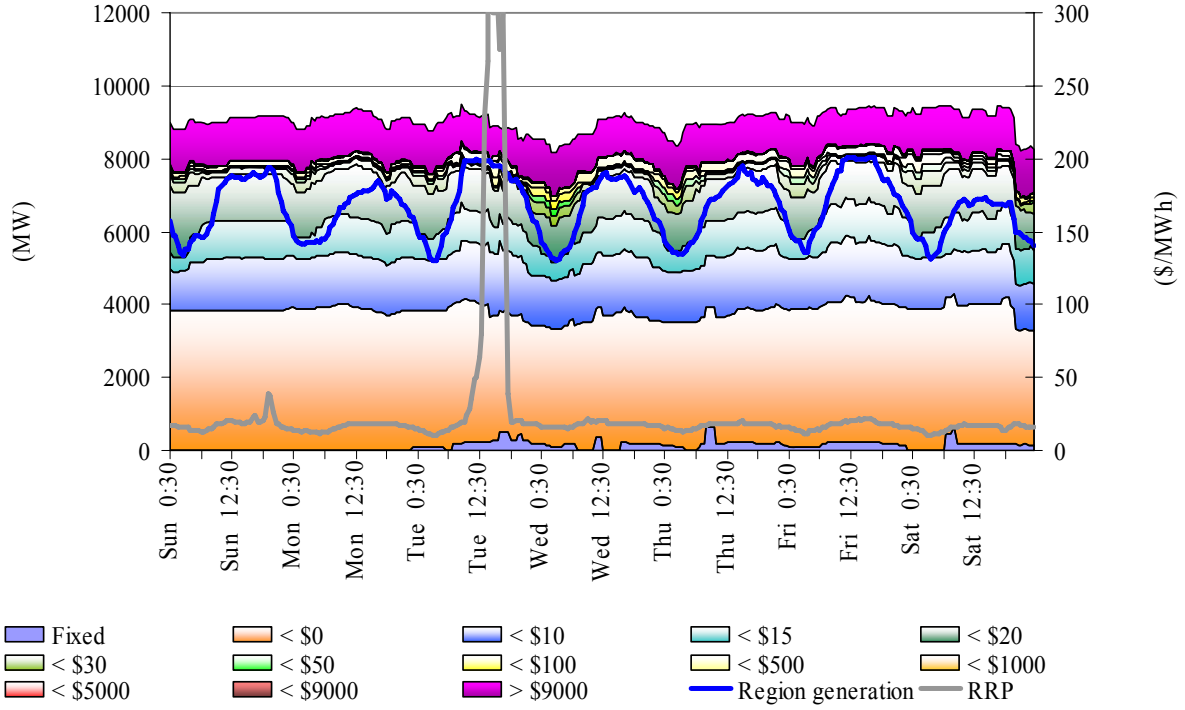


Figure 52: New South Wales closing bid prices, dispatched generation and spot price

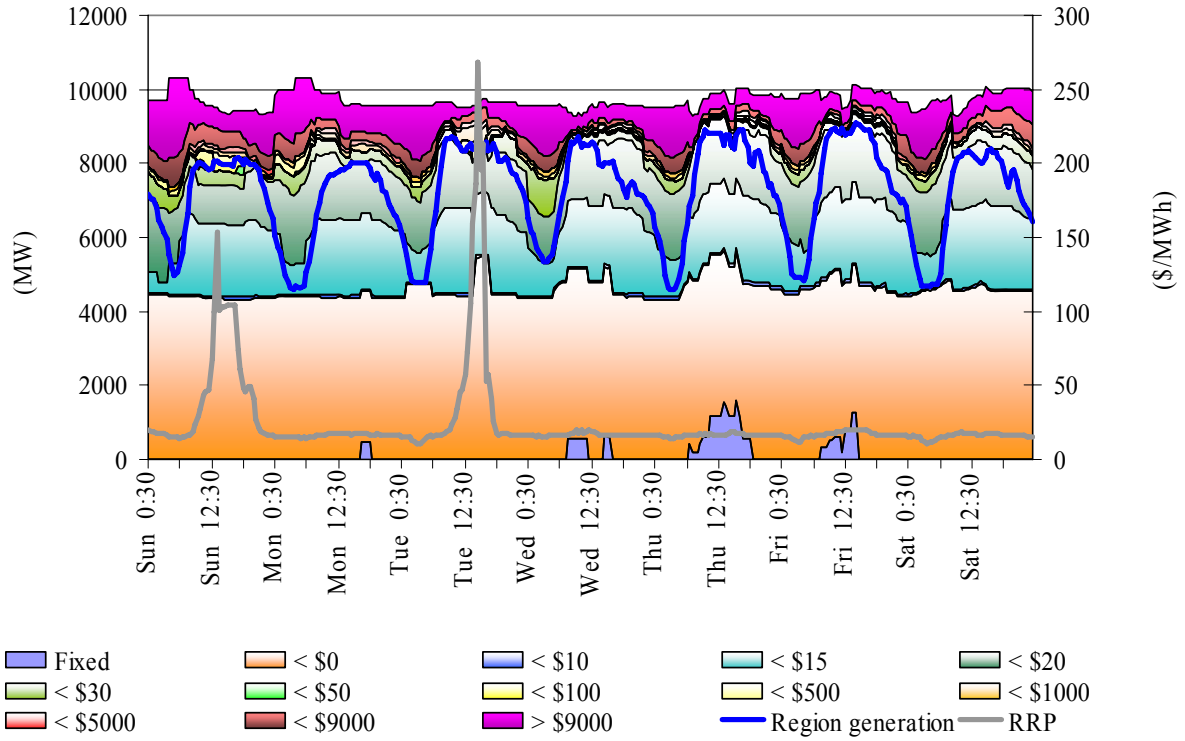


Figure 53: Victoria closing bid prices, dispatched generation and spot price

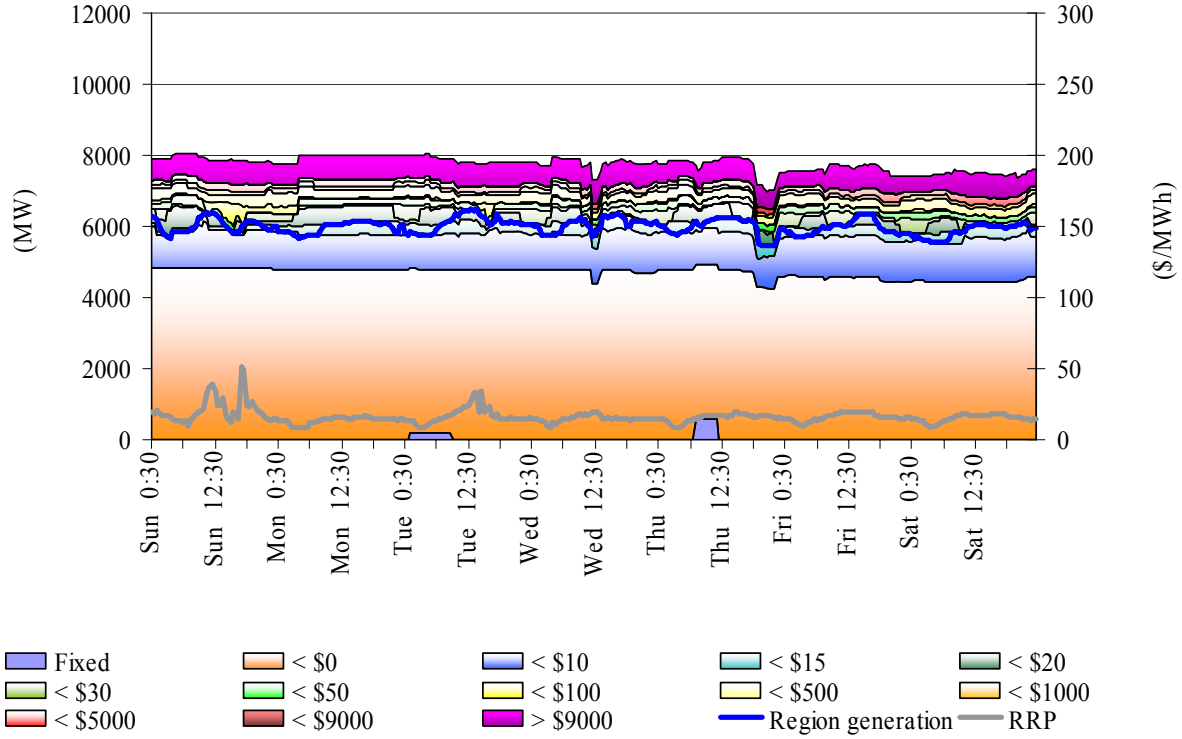


Figure 54: South Australia closing bid prices, dispatched generation and spot price

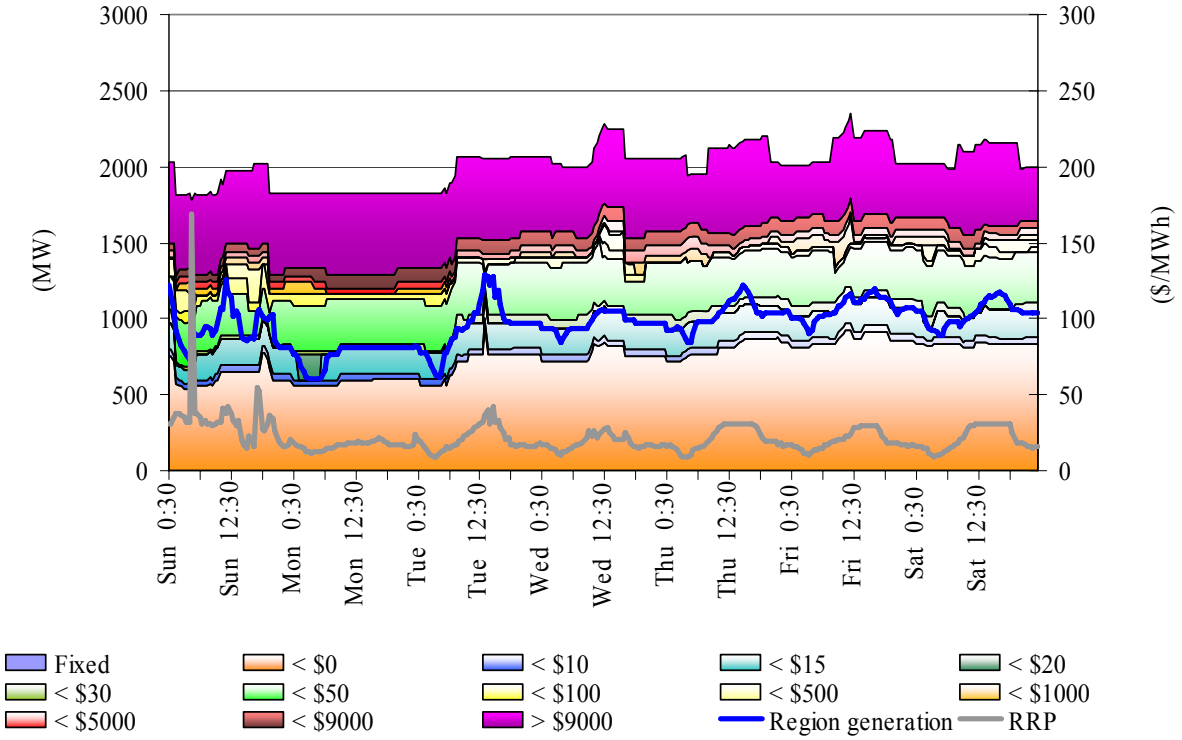
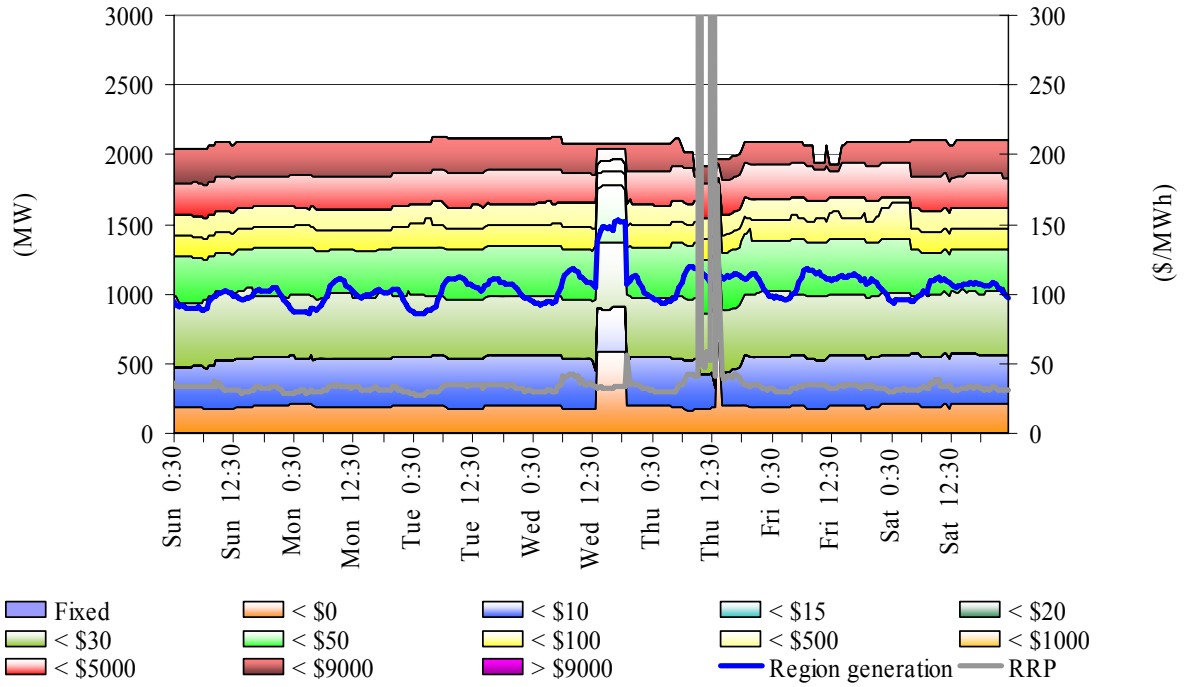


Figure 55: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was around $154 000 or around 0.1 per cent of the total turnover in the energy market. Figure 56 summarises the volume weighted average prices and costs for the eight frequency control ancillary services across the interconnected regions.

Figure 56: frequency control ancillary service prices and costs

	Raise 6 sec	Raise 60 sec	Raise 5 min	Raise reg	Lower 6 sec	Lower 60 sec	Lower 5 min	Lower reg
Last week ($/MW)	0.62	0.36	0.83	0.69	0.15	0.19	0.21	1.47
Previous week ($/MW)	0.90	0.44	1.29	1.28	0.19	0.23	0.23	2.05
Last quarter ($/MW)	1.76	0.73	1.15	1.54	0.39	2.28	5.00	1.93
Market Cost ($1000s)	30	18	53	15	1	2	3	32
% of energy market	0.03%	0.02%	0.05%	0.01%	0.00%	0.00%	0.00%	0.03%

The total cost of ancillary services in Tasmania for the week was $190 000 or 2.5 per cent of the total turnover in the energy market in Tasmania. Figure 57 summarises for Tasmania the prices and costs for the eight frequency control ancillary services.

Figure 57: 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 ($/MW)	4.69	1.05	1.06	1.21	1.64	1.10	1.06	1.08
Previous week ($/MW)	4.92	1.05	1.06	1.06	1.85	1.06	1.06	1.07
Last quarter ($/MW)	7.89	1.05	1.05	1.58	4.43	1.06	1.06	1.97
Market Cost ($1000s)	$56	$16	$15	$10	$26	$36	$26	$9
% of energy market	0.68%	0.19%	0.19%	0.12%	0.31%	0.44%	0.32%	0.11%

Figure 58 shows the daily breakdown of cost for each frequency control ancillary service.

Figure 58: daily frequency control ancillary service costs

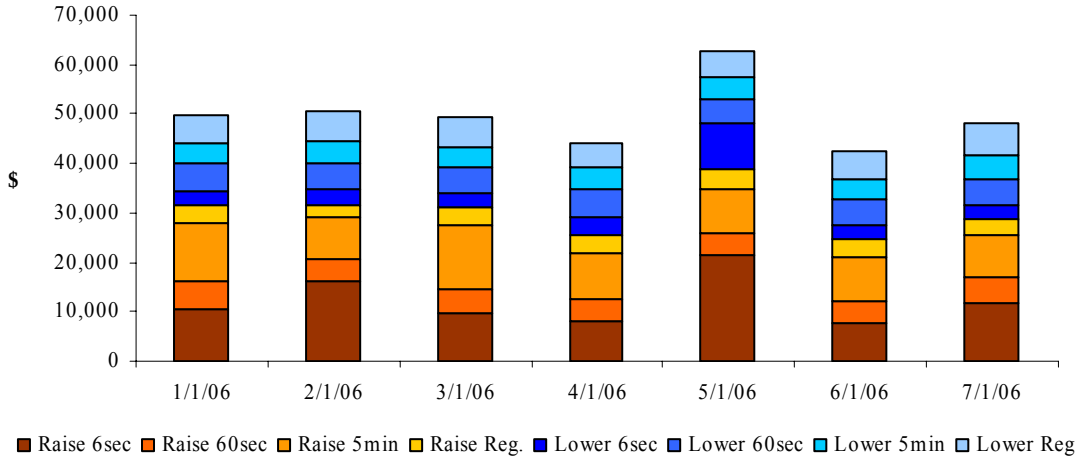
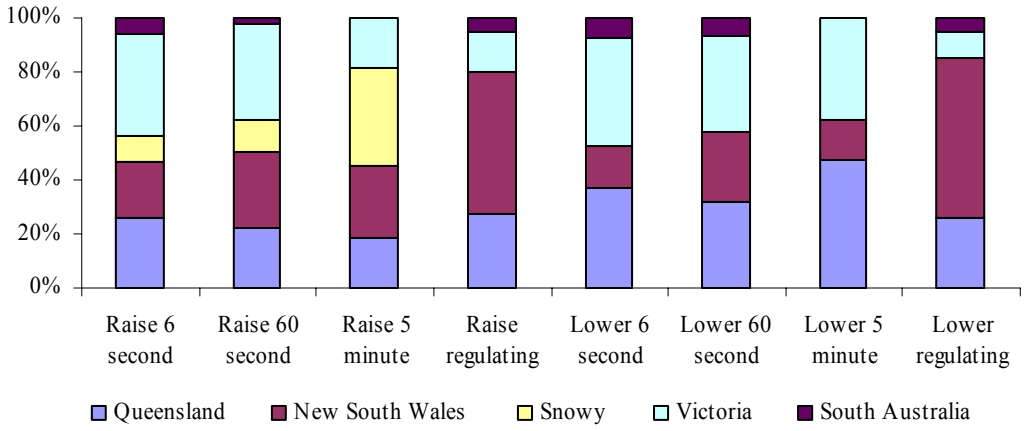


Figure 59 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

Figure 59: regional participation in ancillary services on the mainland



Figures 60 and 61 show 30-minute prices for each frequency control ancillary service throughout the week.

Figure 60: prices for raise services

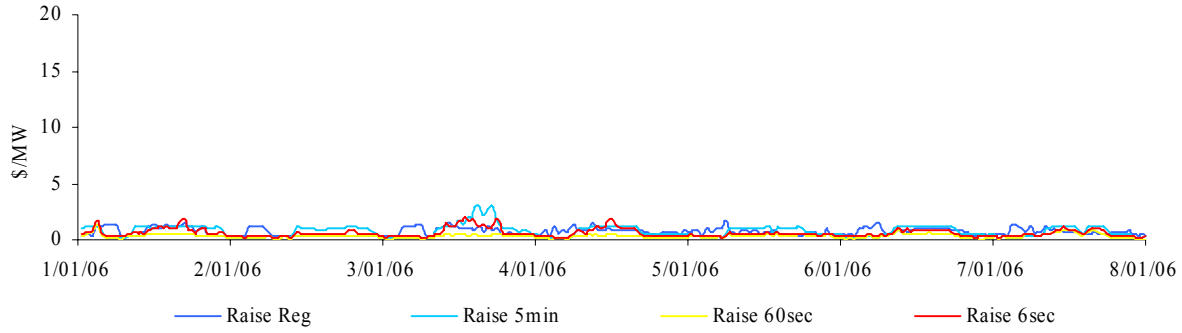


Figure 60A: prices for raise services - Tasmania

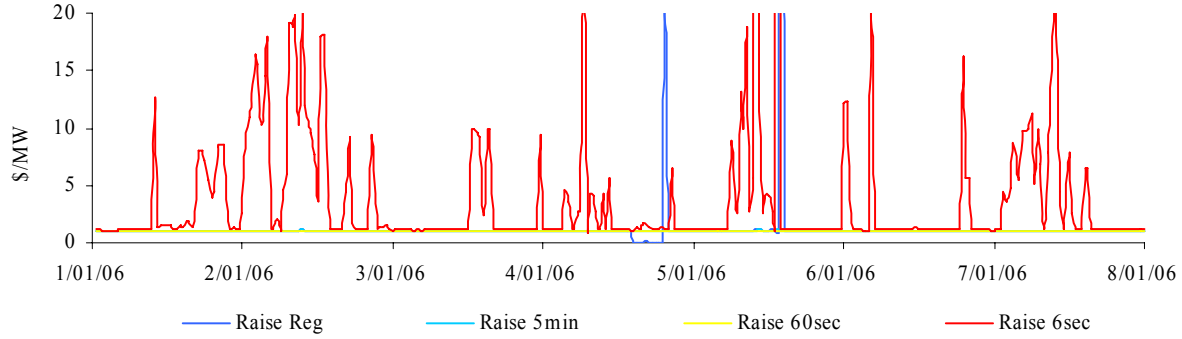


Figure 61: prices for lower services

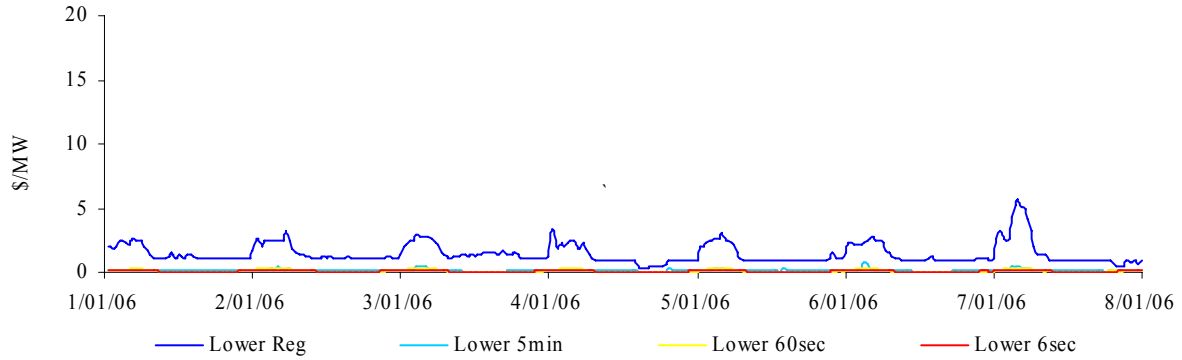
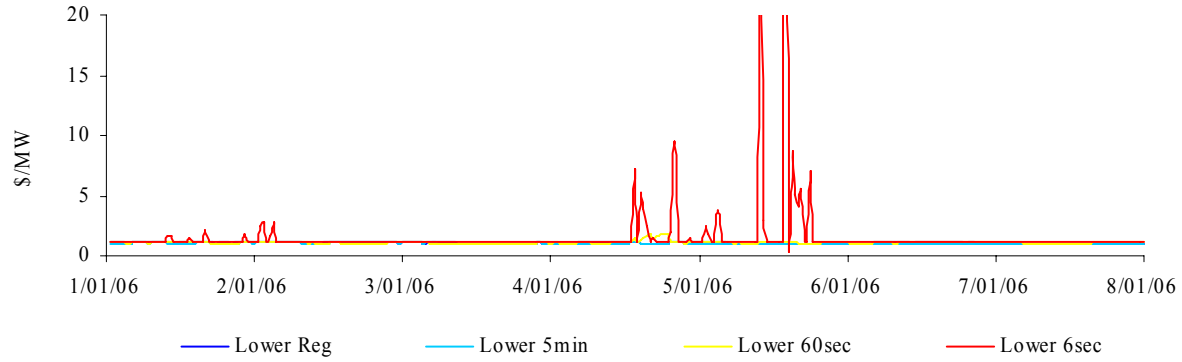


Figure 61A: prices for lower services - Tasmania



Figures 62 and 63 present for both raise and lower frequency control services the requirement, established by NEMMCO, for each service to satisfy the frequency standard.

Figure 62: raise requirements

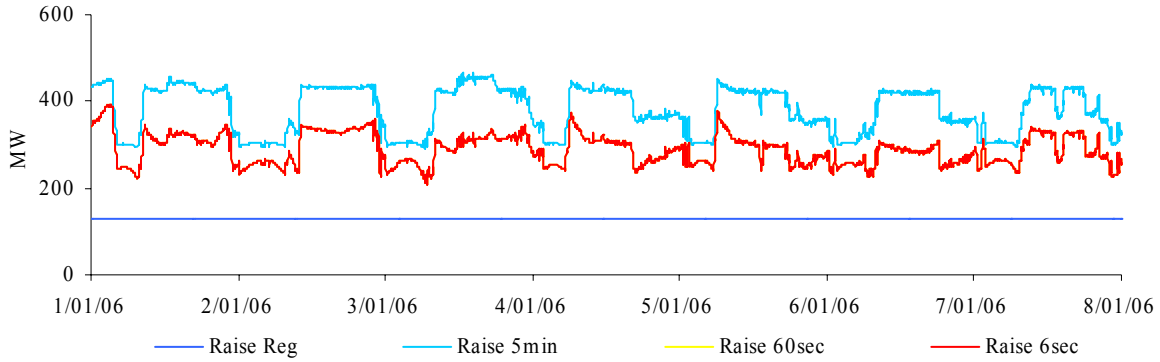


Figure 62A: raise requirements - Tasmania

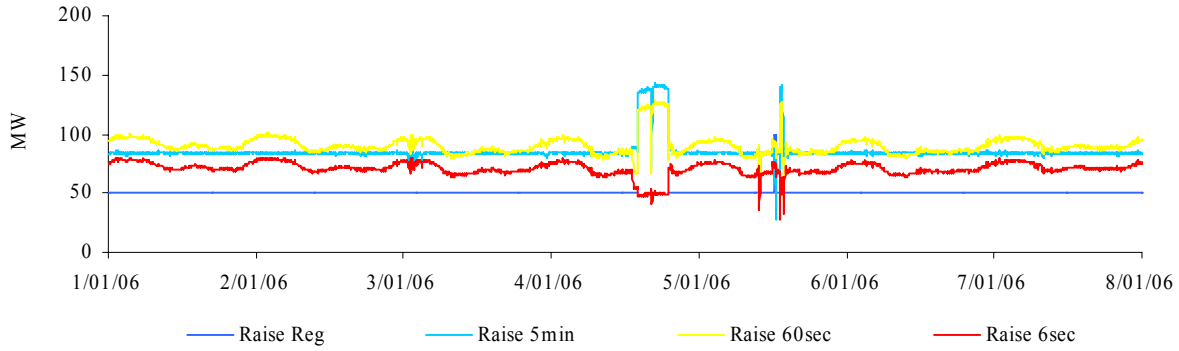


Figure 63: lower requirements

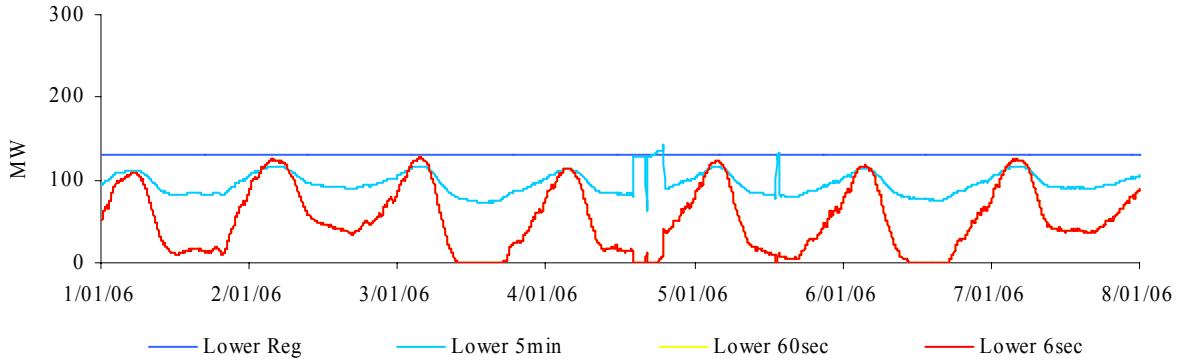
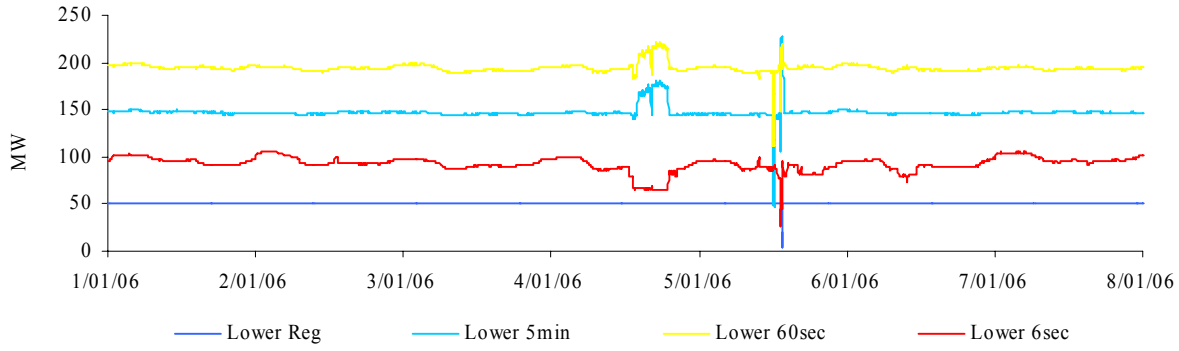


Figure 63A: lower requirements - Tasmania



Australian Energy Regulator
January 2006