Market analysis

8–14 JANUARY 2006

Prices across the mainland averaged $26/MWh in New South Wales, $23/MWh in Victoria and $38/MWh in South Australia. In Queensland prices averaged $21/MWh, a return to long term average prices following the extremes of the previous two weeks.

Prices in Tasmania averaged $32/MWh, consistent with the previous week.

Turnover in the energy market for the mainland was just under $100 million. The total cost of ancillary services for the week was around $200 000, or 0.2 per cent of turnover. Turnover in Tasmania for the week was $5.7 million with the cost of ancillary services totaling $190 000 or 3 per cent of turnover.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 100, or almost a third of all trading intervals. Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in almost a third of all trading intervals across the market. These variations were most frequent in South Australia occurring in around two thirds 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

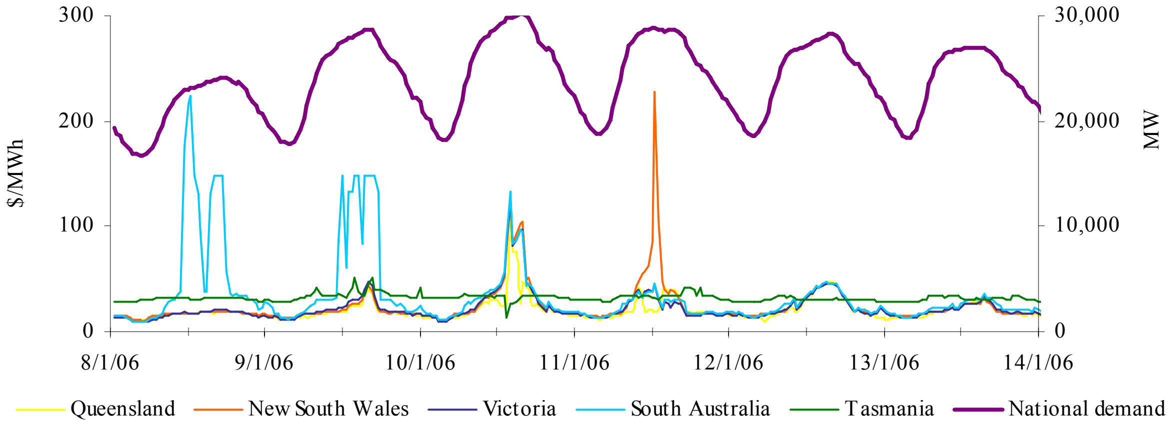


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	21	26	23	38	32
Previous week	45	27	16	22	47
Same quarter last year	25	35	22	31	-
Financial year to date	31	48	30	39	80
% change from previous week*	▼53%	▼3%	▲42%	▲69%	▼32%
% change from same quarter last year**	▼15%	▼27%	▲6%	▲22%	-
% change from year to date***	▼15%	▼20%	▼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	1.04	1.28	1.07	0.90	0.12
Previous week	0.25	0.18	0.32	0.69	0.24
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

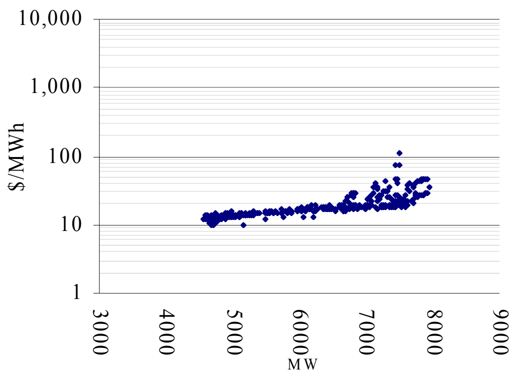


Figure 5: New South Wales

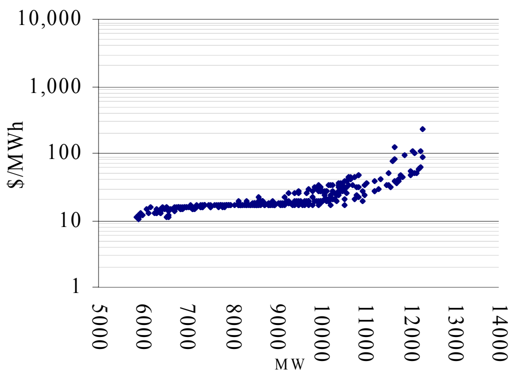


Figure 6: Victoria

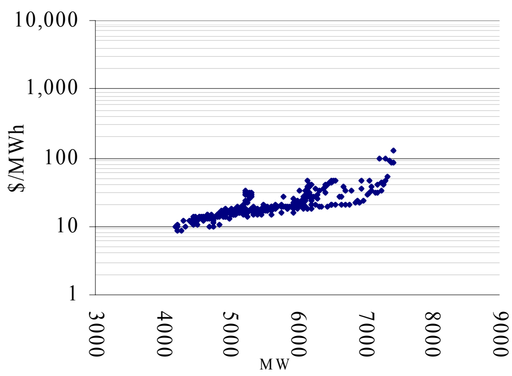


Figure 7: South Australia

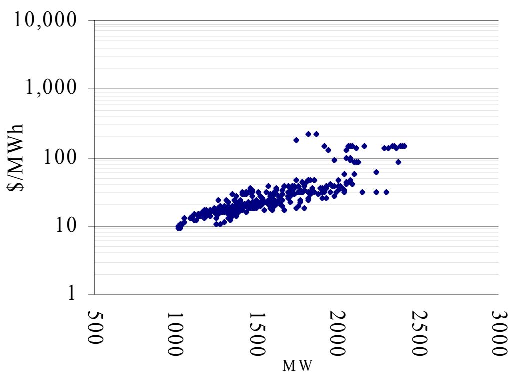
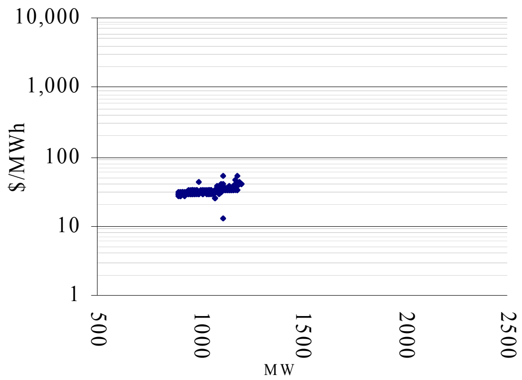


Figure 8: Tasmania



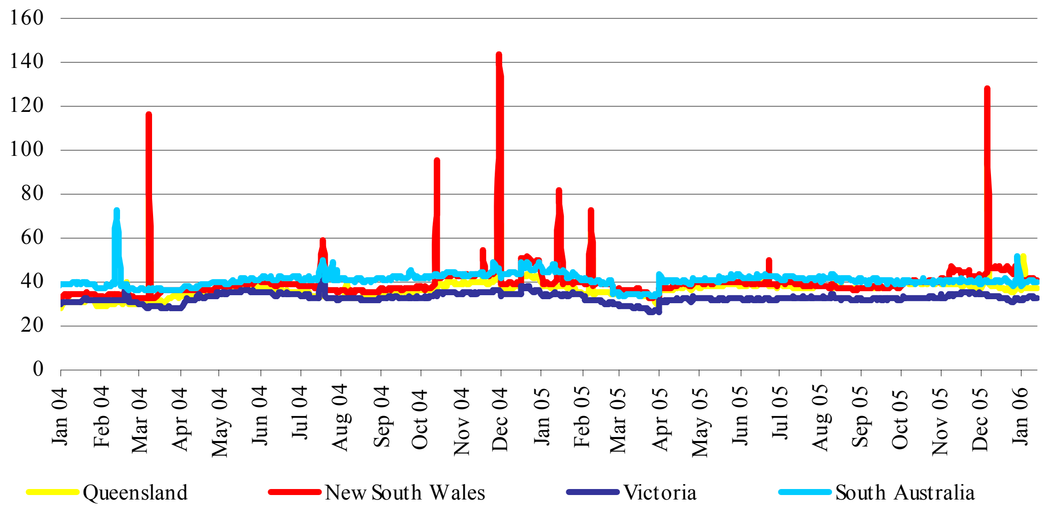
The maximum spot prices for the week were $108/MWh in Queensland and $127/MWh in Victoria at 2pm on Tuesday. The max price of $227/MWh in New South Wales occurred at 12.30pm on Wednesday. In South Australia the max price of $224/MWh occurred at 12.30pm on Sunday. In Tasmania, the highest price for the week was $52/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	36.87	37.65	37.44	37.33	37.00
New South Wales	41.40	42.09	42.13	41.10	40.83
Victoria	33.57	33.33	32.52	32.89	32.75
South Australia	41.21	40.31	39.75	39.99	40.13

Figure 10: d-cyphaTrade WEPI



Reserve

There were no low reserve conditions forecast for the week. A number of directions occurred during the week to manage local network issues in northern New South Wales and around the Gold Coast. The directions occurred on Monday, Tuesday, Wednesday, Friday and twice on Thursday. 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

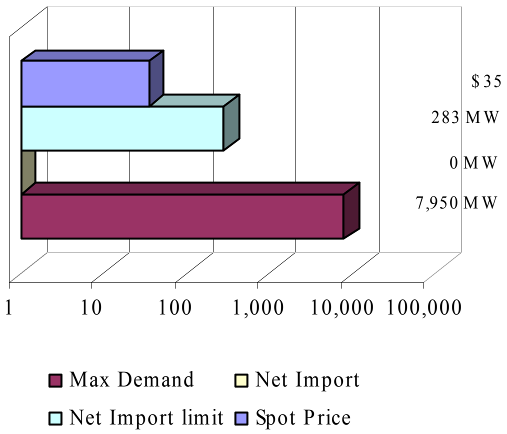


Figure 12: New South Wales

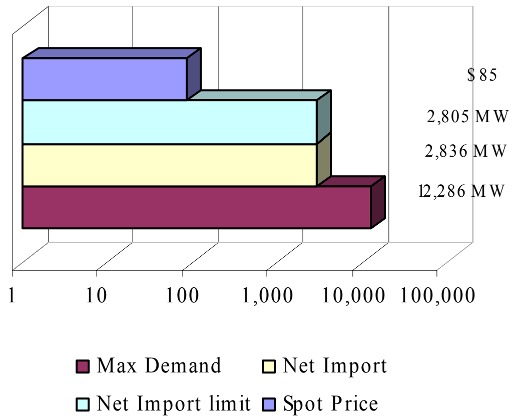


Figure 13: Victoria

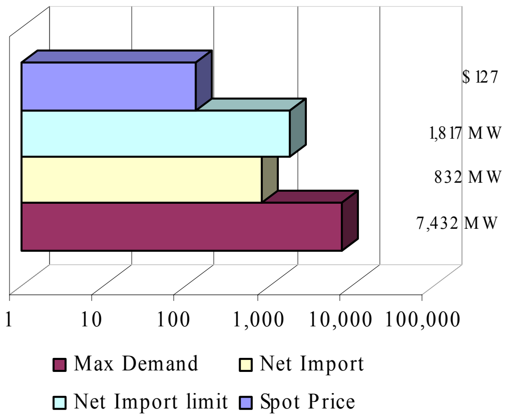
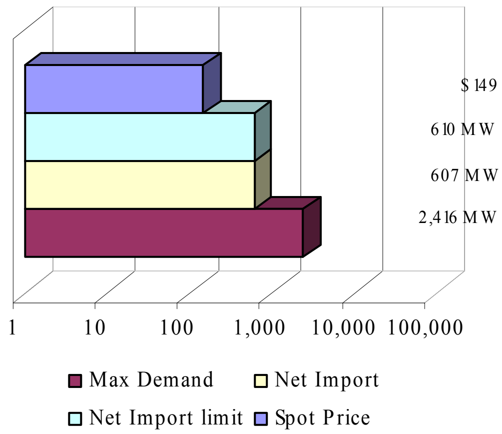


Figure 14: South Australia



In Tasmania, demand reached a maximum of 1200 MW at 6pm on Wednesday. The spot price at the time was $41/MWh.

Price variations

There were 100 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

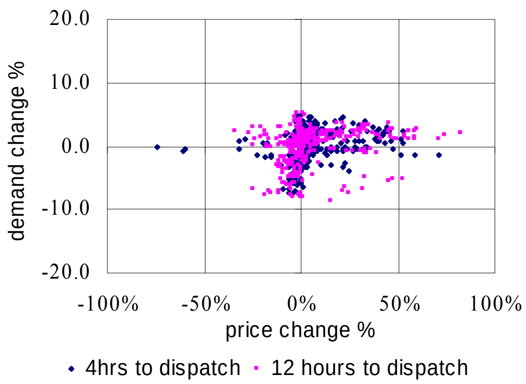


Figure 16: New South Wales

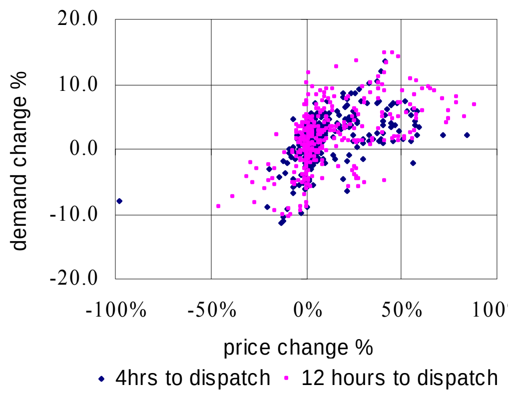


Figure 17: Victoria

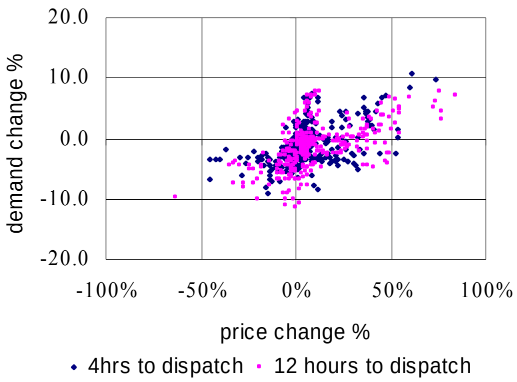


Figure 18: South Australia

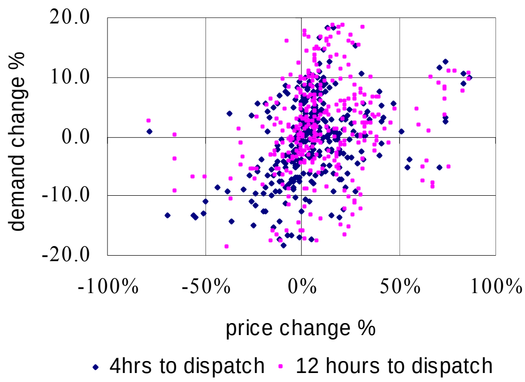


Figure 19: Tasmania

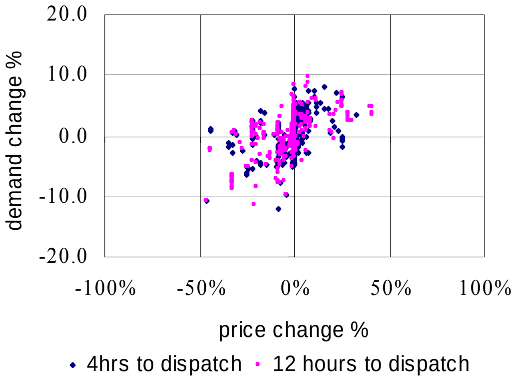
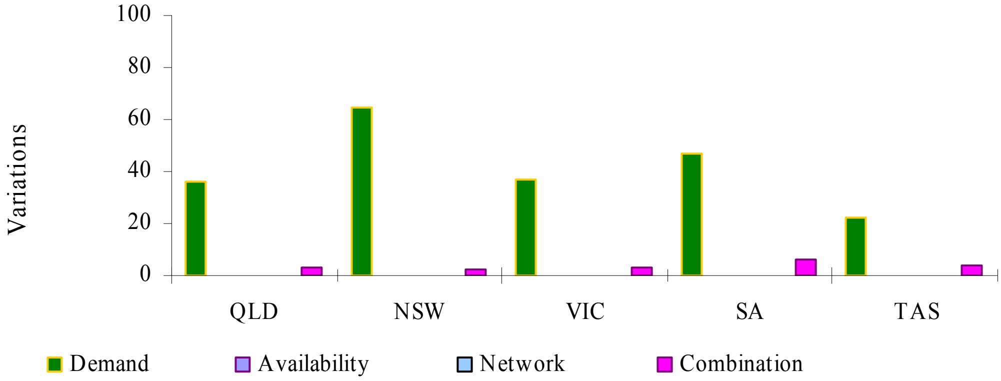


Figure 20 summarises the number and most probable reason for variations between forecast and actual prices.

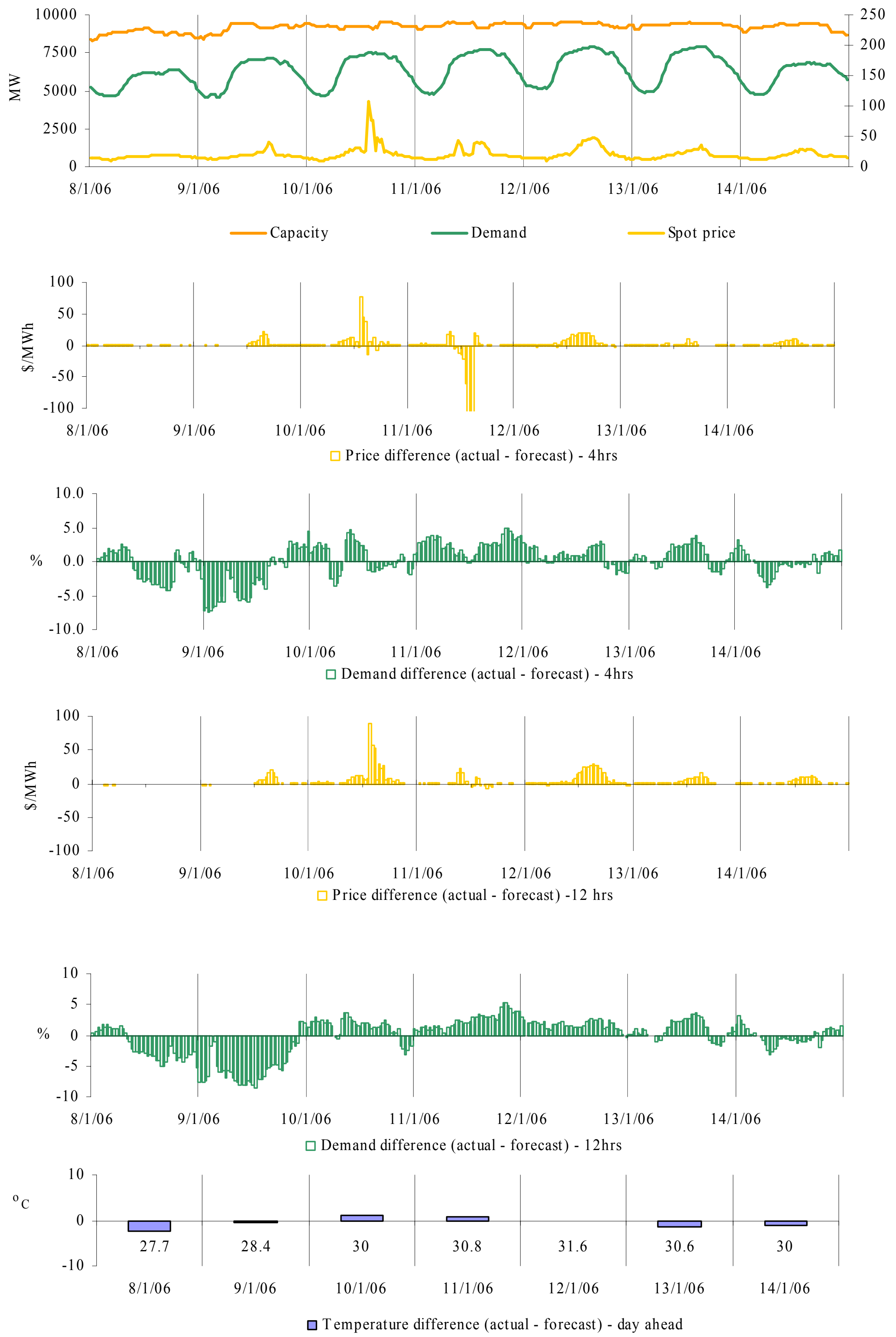
Figure 20: reasons for variations between forecast and actual prices



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 3 occasions in Queensland where the spot price was greater than three times the weekly average price of $21/MWh. These occurred during on Tuesday afternoon.

Tuesday, 10 January

2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	108.32	31.45	19.14
Demand (MW)	7485	7583	7339
Available capacity (MW)	9208	9355	9207
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	76.03	31.33	19.30
Demand (MW)	7493	7604	7364
Available capacity (MW)	9190	9355	9207
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	75.13	36.54	21.92
Demand (MW)	7446	7551	7371
Available capacity (MW)	9092	9310	9207

Demand for this period was slightly lower than the 4 hour forecast. Available capacity was as much as 200 MW lower than expected. Price was aligned across the mainland for most of this period.

From 10.30am, CS Energy reduced the available capacity at Swanbank B by as much as 85 MW. Most of this capacity was priced at less than $50/MWh. The rebid reasons given were "Swan B1 bag FLTR/emission" and "Swan B4 bag FLTR emission". At 1.35pm, effective 1.45pm, 43 MW of capacity at Swanbank was shifted from prices of zero to around $100/MWh. The rebid reason given was "Swan E change in predispatch, manage cons".

Around midday, Stanwell extended the period of reduced availability at unit 4 by 45 MW. Most of this capacity was priced at less than $20/MWh. The rebid reason given was "Delayed completion of maintenance".

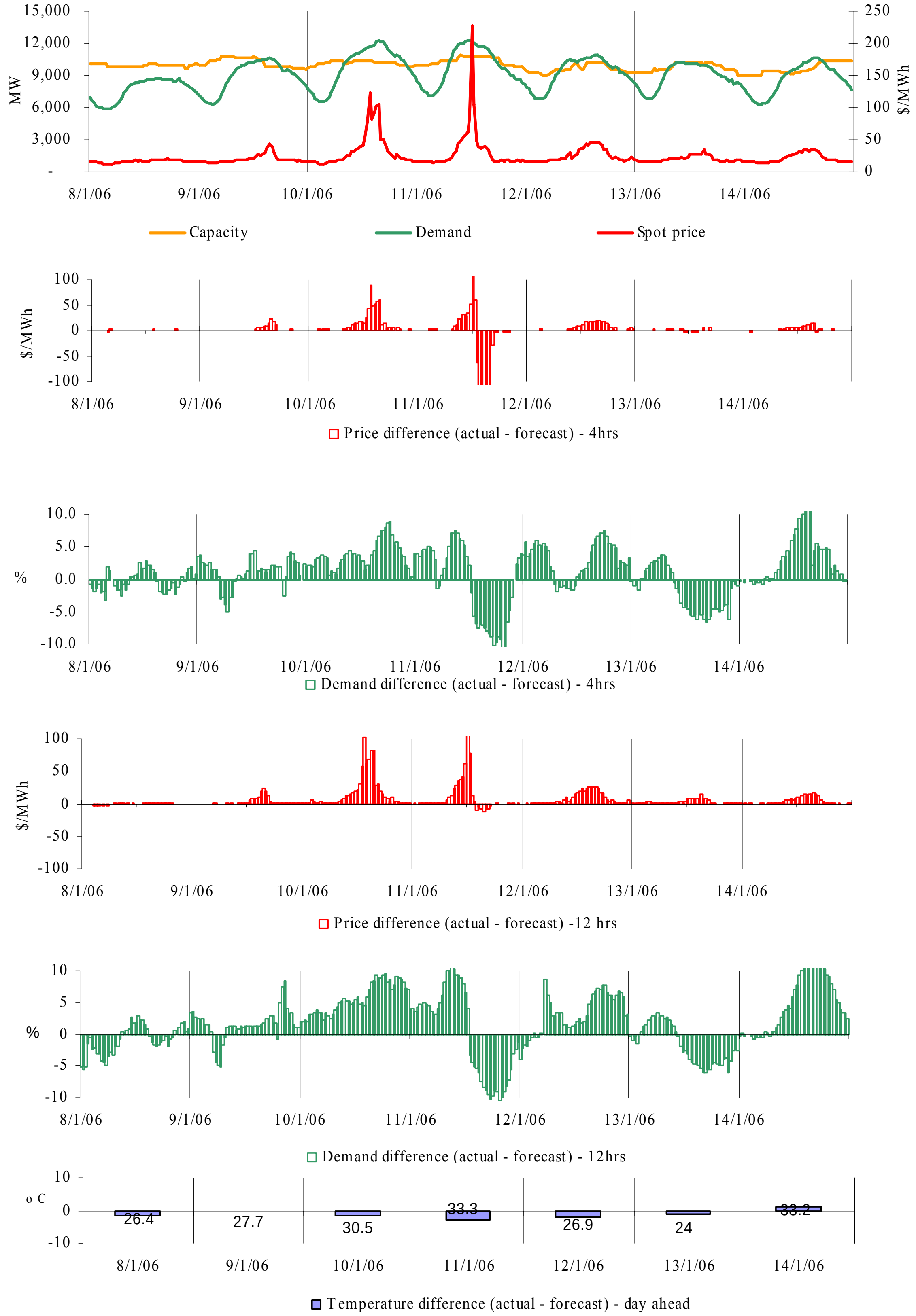
At 1.47pm, effective from 1.55pm, Origin shifted 29 MW of capacity at Roma from prices of more than $9000/MWh to $1/MWh. At 2.30pm, effective 2.40pm, a further 29 MW of capacity at Roma was shifted from prices of $9000/MWh to $1/MWh. The rebid reason given on each occasion was "Est (NP) change in PDS handover bid".

At 2pm, Enertrade shifted 110 MW of available capacity at Collinsville from prices around $100/MWh to zero. The rebid reason given was "material change in market conditions::change MW distrib".

At 2.18pm, effective 2.25pm, Enertrade reduced the availability of Yabulu unit 2 to from 82 MW to zero. The rebid reason given was "Unit trip – reason unknown::change availability". Effective 2.35pm, the availability of unit 1 was reduced by 45MW. The rebid reason given was "Plant problem::changed availability". All of this capacity had been priced at zero or less. By 3.05pm all of this capacity was returned. At 2.53pm, this capacity was returned. The rebid reason given was "Outage complete::change availability".

There was no other significant rebidding.

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



There were 9 occasions in New South Wales where the spot price was greater than three times the weekly average price of $26/MWh. These occurred on Tuesday and Wednesday afternoon.

Tuesday, 10 January

1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	77.91	34.70	19.57
Demand (MW)	11 598	11 439	11 045
Available capacity (MW)	10 377	10 369	10 719
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	123.28	34.73	20.09
Demand (MW)	11 674	11 424	11 101
Available capacity (MW)	10 373	10 369	10 719
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	82.87	34.32	20.71
Demand (MW)	11 678	11 432	11 148
Available capacity (MW)	10 320	10 344	10 719
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	92.16	39.76	23.53
Demand (MW)	11 889	11 435	11 199
Available capacity (MW)	10 207	10 329	10 719
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	102.75	44.53	21.71
Demand (MW)	12 104	11 565	11 244
Available capacity (MW)	10 227	10 327	10 719
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	104.52	44.22	21.52
Demand (MW)	12 232	11 517	11 240
Available capacity (MW)	10 255	10 327	10 719

Conditions at the time saw near summer record demand, as much as 700 MW higher than forecast four hours ahead, and as much as 1000 MW higher 12 hours ahead of dispatch. Prices were aligned across the southern mainland regions during this period.

At 2pm Macquarie Generation shifted a total of 510 MW of capacity at Bayswater and Liddel from prices of less than $40/MWh, to prices of between $85/MWh and $250/MWh. The rebid reason given was “NEMMCO load forecast change”.

There was no other significant rebidding.

Wednesday, 11 January

12:00 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	85.15	34.80	23.69
Demand (MW)	12 286	11 863	11 325
Available capacity (MW)	10 830	10 555	10 558
12:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	227.26	35.85	26.73
Demand (MW)	12 279	12 017	11 466
Available capacity (MW)	10 823	10 555	10 558
1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	105.43	45.85	27.43
Demand (MW)	12 053	12 299	11 568
Available capacity (MW)	10 827	10 555	10 558

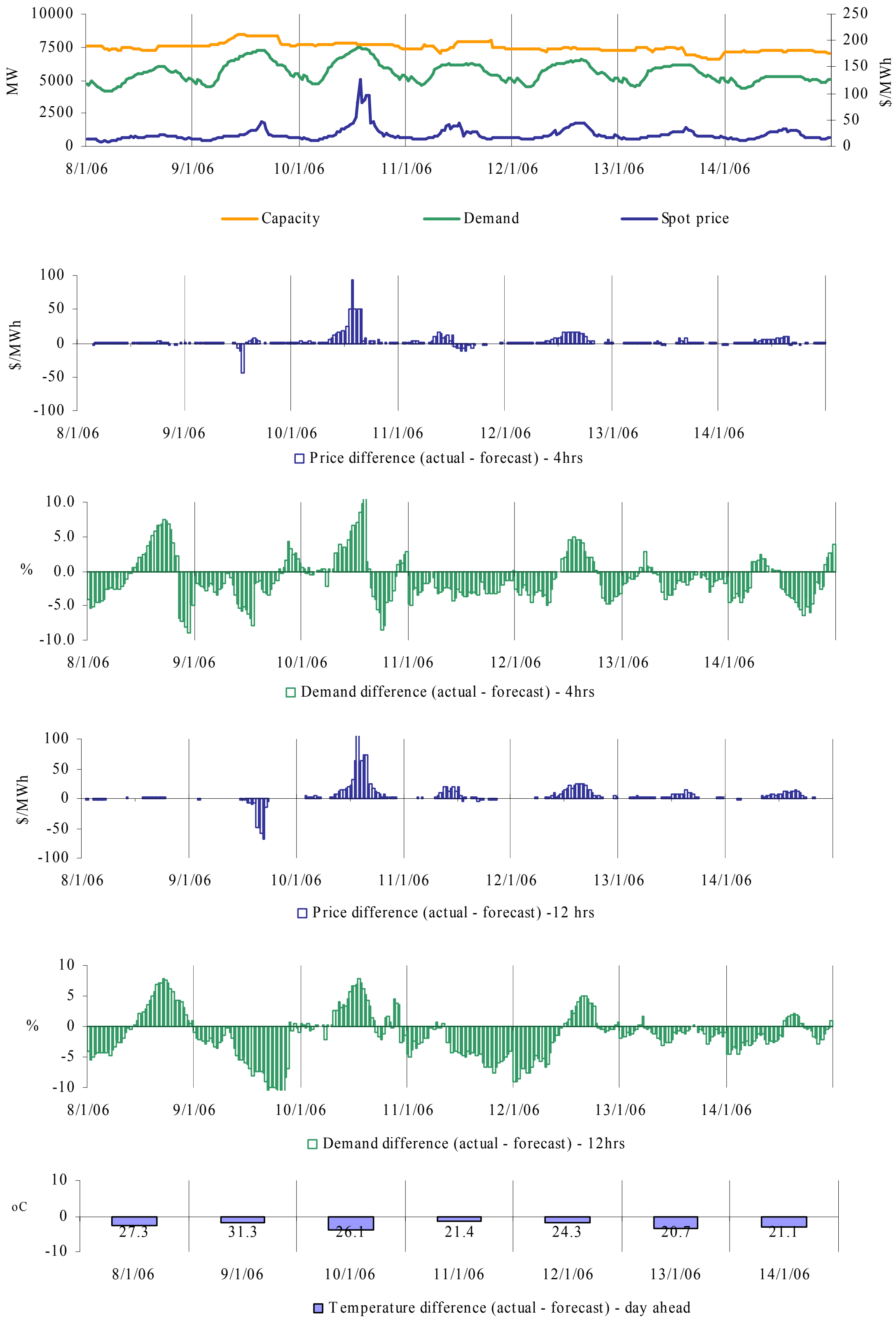
Conditions at the time saw near summer record demand, as much as 400 MW higher than forecast four hours ahead, and close to 1000 MW higher than forecast 12 hours ahead. Available capacity was almost 300 MW higher than forecast.

From around 11.40am, imports from Queensland were halved to around 350 MW in total across the QNI and Directlink interconnectors. These reductions were not forecast.

At 8.58am, Macquarie Generation rebid 510 MW of capacity from prices of less than $20/MWh to between $80/MWh and $300/MWh. The rebid reason given was “NEMMCO load forecast change”.

There was no other significant rebidding.

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



There were 6 occasions in Victoria where the spot price was greater than three times the weekly average price of $23/MWh. These occurred on Tuesday afternoon.

Tuesday, 10 January

1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	83.07	33.45	19.95
Demand (MW)	7428	6792	6848
Available capacity (MW)	7742	7825	8051
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	127.12	33.27	20.48
Demand (MW)	7432	6710	6900
Available capacity (MW)	7659	7845	8105
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	81.88	32.32	21.36
Demand (MW)	7389	6599	6935
Available capacity (MW)	7690	7855	8105
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	88.21	41.10	24.01
Demand (MW)	7357	7249	6972
Available capacity (MW)	7661	7835	8105
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	96.85	45.27	22.78
Demand (MW)	7308	7285	6990
Available capacity (MW)	7654	7840	8043
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	96.76	45.76	22.58
Demand (MW)	7221	7397	6989
Available capacity (MW)	7656	7845	8038

Conditions at the time saw demand up to 2.30pm almost 800 MW higher than forecast four hours ahead.

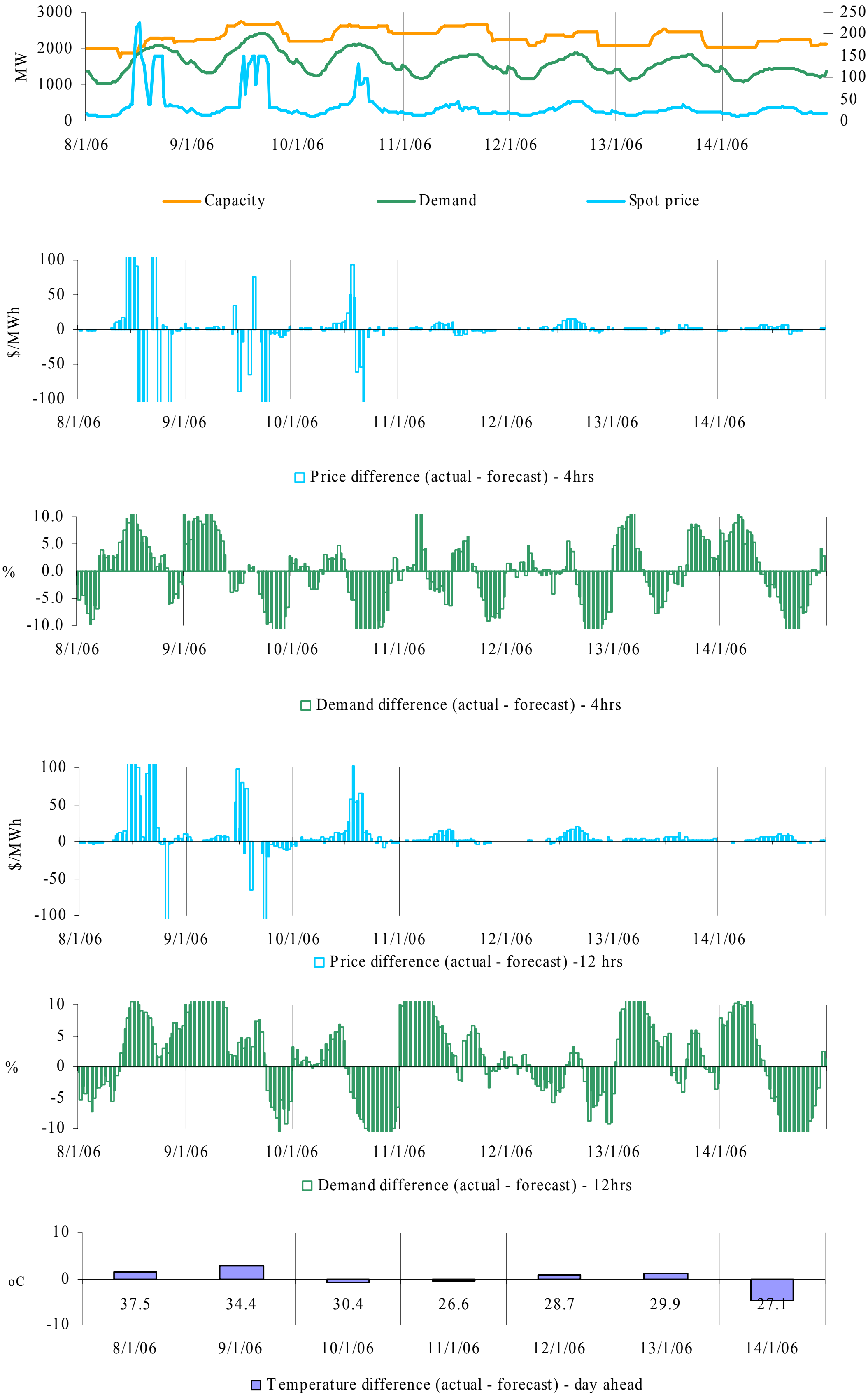
From 10am, TRU Energy reduced the available capacity at Yallourn by as much as 115 MW. All of this capacity was priced at less than $10/MWh. The rebid reason given was "Plant conditions::capacity limit".

From 1pm, Ecogen shifted as much as 428 MW of capacity across Jeeralang A and B from prices of around $300/MWh or more, to prices of around $1/MWh. The rebid reasons given were "Adj to unit commitment due to PD conditions" and "Capacity adj due to ambient temperature".

From 1.02pm, LYMMCO shifted 190 MW of capacity at Loy Yang A from prices of less than $20/MWh to more than $9000/MWh. The rebid reasons given were "demand tracking ahead of forecast", "material change in 5min PD" and "actual demand ahead of 5min PD".

There was no other significant rebidding.

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



There were 21 occasions in South Australia where the spot price was greater than three times the weekly average price of $38/MWh. These occurred on Sunday, Monday and Tuesday.

Sunday, 8 January

11:30 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	177.46	23.61	29.60
Demand (MW)	1753	1581	1618
Available capacity (MW)	1880	2159	2159
12:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	217.00	35.93	29.60
Demand (MW)	1819	1657	1646
Available capacity (MW)	1893	1894	2159
12:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	224.00	38.00	30.01
Demand (MW)	1879	1682	1683
Available capacity (MW)	2083	1894	2159
1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	148.83	38.00	30.90
Demand (MW)	1924	1684	1715
Available capacity (MW)	2022	1894	2159
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	130.19	38.00	31.00
Demand (MW)	1947	1720	1735
Available capacity (MW)	2071	1891	2159
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	130.33	292.00	38.00
Demand (MW)	2056	1926	1876
Available capacity (MW)	2277	2066	2159
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	148.83	149.00	38.00
Demand (MW)	2078	1953	1904
Available capacity (MW)	2277	2062	2159
4:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	149.00	149.00	38.00
Demand (MW)	2098	2004	1933
Available capacity (MW)	2277	2211	2159
5:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	149.00	38.00	38.00
Demand (MW)	2096	2026	1963
Available capacity (MW)	2277	2211	2159
5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	148.33	38.00	38.00
Demand (MW)	2087	2035	2013
Available capacity (MW)	2262	2209	2159

Conditions for the early periods saw demand more than 200 MW higher than forecast four hours ahead, and the available capacity was close to 300 MW lower than forecast. This followed the trip of unit 2 at NRG Flinder's Northern Power Station at 7.30am. That capacity was restored with this unit's return at 2pm.

Over a number of rebids from 8.33am, International Power shifted 80 MW of capacity at Pelican Point from prices of less than $40/MWh to more than $9000/MWh. The rebid reason given was "change in price forecast".

At 11.30am, AGL rebid 100 MW of Hallet Power Station from above $9000/MWh to $0/MWh committing the unit. The rebid reason given was "predispatch: forecast price increase: demand".

From 11.22am, Origin Energy shifted a total of 84 MW of capacity from Quarantine and 40 MW at Ladbroke from $9000/MWh and $2000/MWh respectively to $0/MWh committing both stations. The rebid reason given was "Est (n) change in PDS".

There was no other significant rebidding.

Monday, 9 January

12:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	149.00	149.00	51.01
Demand (MW)	2176	2257	2157
Available capacity (MW)	2716	2731	2734
1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	132.75	149.00	53.35
Demand (MW)	2293	2328	2189
Available capacity (MW)	2662	2752	2734
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	132.31	149.00	149.00
Demand (MW)	2315	2369	2249
Available capacity (MW)	2677	2748	2734
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	148.83	149.00	76.59
Demand (MW)	2344	2348	2239
Available capacity (MW)	2675	2744	2734
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	148.83	149.00	149.00
Demand (MW)	2359	2358	2250
Available capacity (MW)	2674	2744	2734
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	149.00	149.00	149.00
Demand (MW)	2398	2383	2319
Available capacity (MW)	2670	2744	2734
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	149.00	72.20	149.00
Demand (MW)	2414	2393	2234
Available capacity (MW)	2669	2738	2734

4:30 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	149.00	149.00	149.00
Demand (MW)	2416	2413	2239
Available capacity (MW)	2665	2698	2734
5:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	149.00	149.00	149.00
Demand (MW)	2402	2406	2221
Available capacity (MW)	2665	2677	2734
5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	132.30	149.00	149.00
Demand (MW)	2367	2465	2237
Available capacity (MW)	2665	2677	2734

Conditions at the time saw price, demand and availability close to forecast four hours ahead. Demand was around 200 MW higher than the 12 hours ahead.

At 3.47pm the previous day, TRU Energy rebid 400 MW across Torrens Island from prices of less than $40/MWh to prices of $150/MWh or higher. The rebid reason given was "Correction to bidding – market conditions". This rebid reversed a rebid made around one and a half hours earlier.

Over the course of the morning, Origin Energy shifted 120 MW of capacity at Quarantine and Ladbroke from prices of $9000/MWh and $2000/MWh respectively to zero. The rebid reason given was "Est (N) change in pds".

At 8.25am, International Power rebid 50 MW from prices of less than $40/MWh to $150/MWh. The rebid reason given was "Change in price forecasts".

At 11.28am, AGL shifted 50 MW of capacity at Hallet from prices above $9000/MWh to zero. The rebid reason given was "Predispatch: forecast price increase::prices". This was increased to 100 MW over the course of the day.

There was no other significant rebidding.

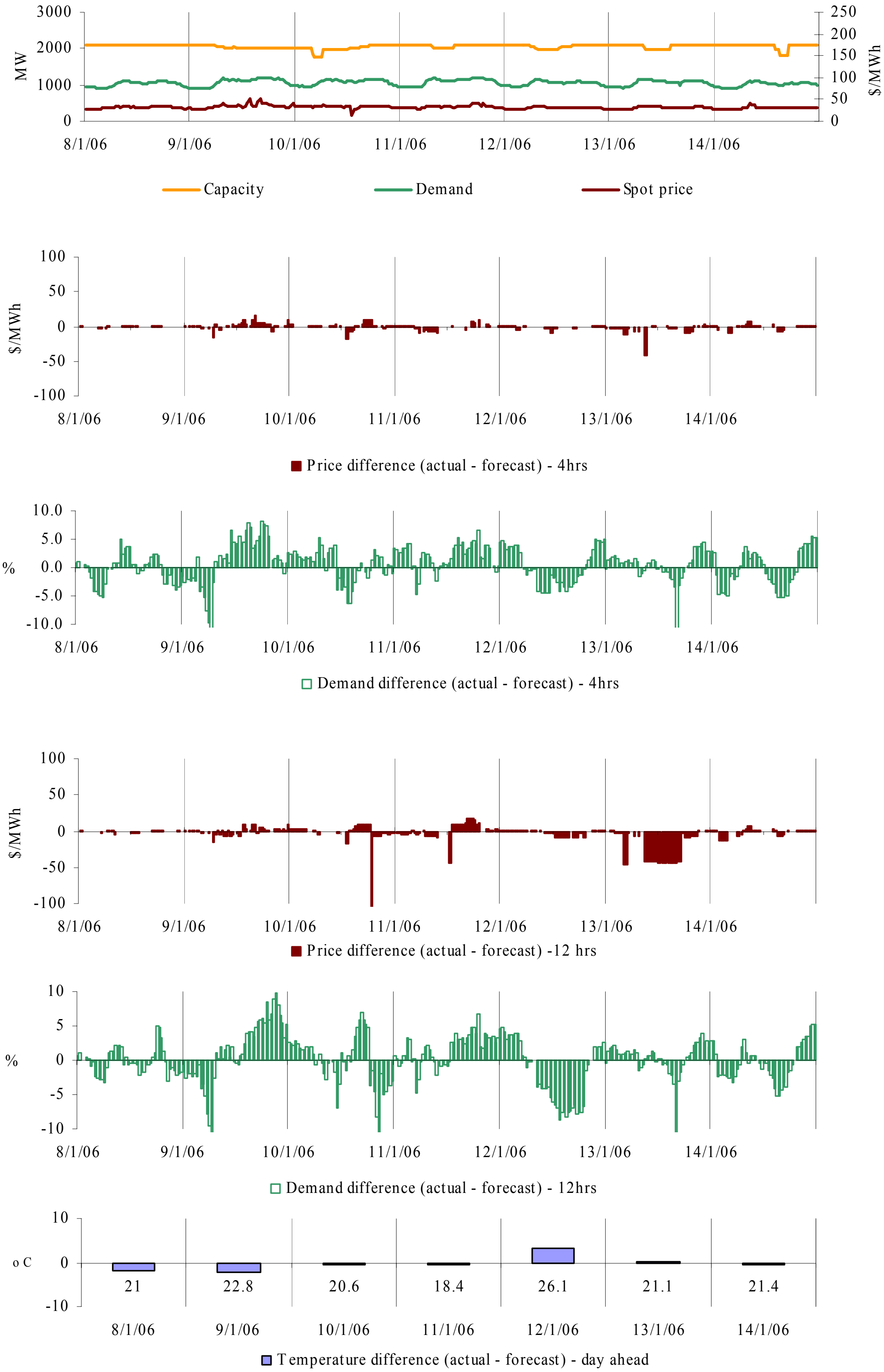
Tuesday, 10 January

2:00 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	132.97	38.93	31.00
Demand (MW)	2 119	2 232	2 226
Available capacity (MW)	2 630	2 635	2 651

Conditions at the time saw demand lower than forecast, with prices aligned with New South Wales and Victoria. During this period an outage of Murraylink reduced its capability to zero in both directions.

There was no significant rebidding.

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



There was no occasion in Tasmania where the spot price was greater than three times the weekly average price of $32/MWh.

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

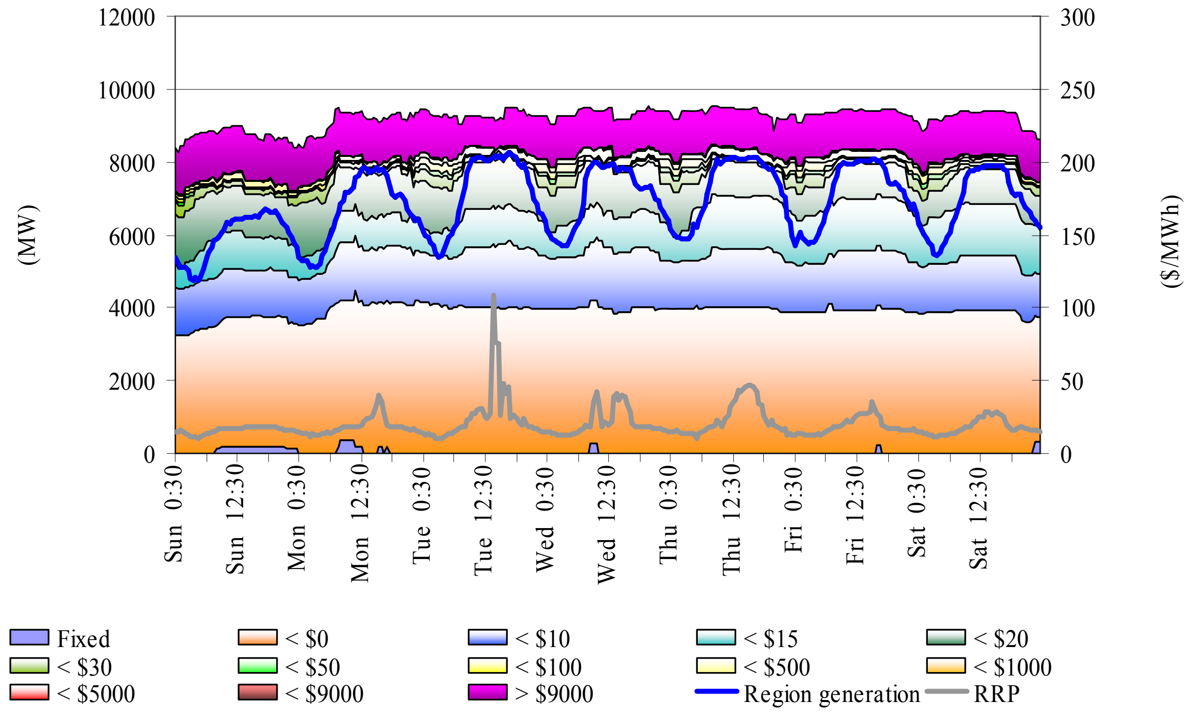


Figure 52: New South Wales closing bid prices, dispatched generation and spot price

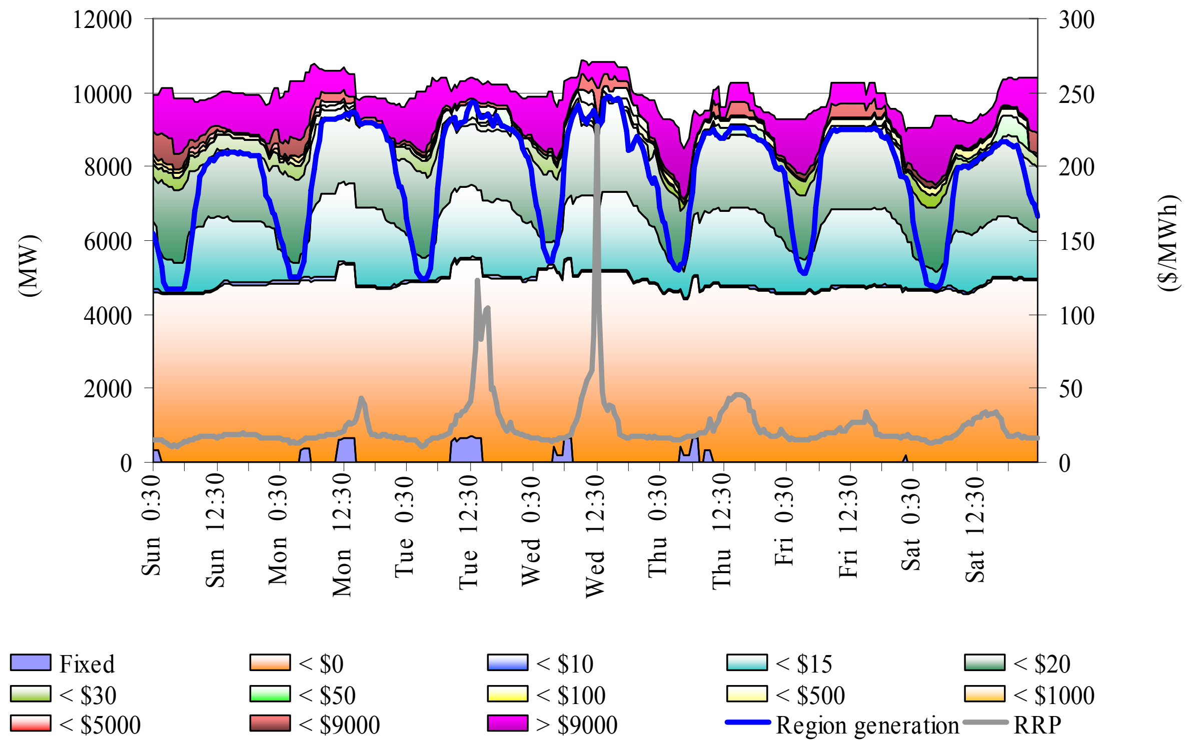


Figure 53: Victoria closing bid prices, dispatched generation and spot price

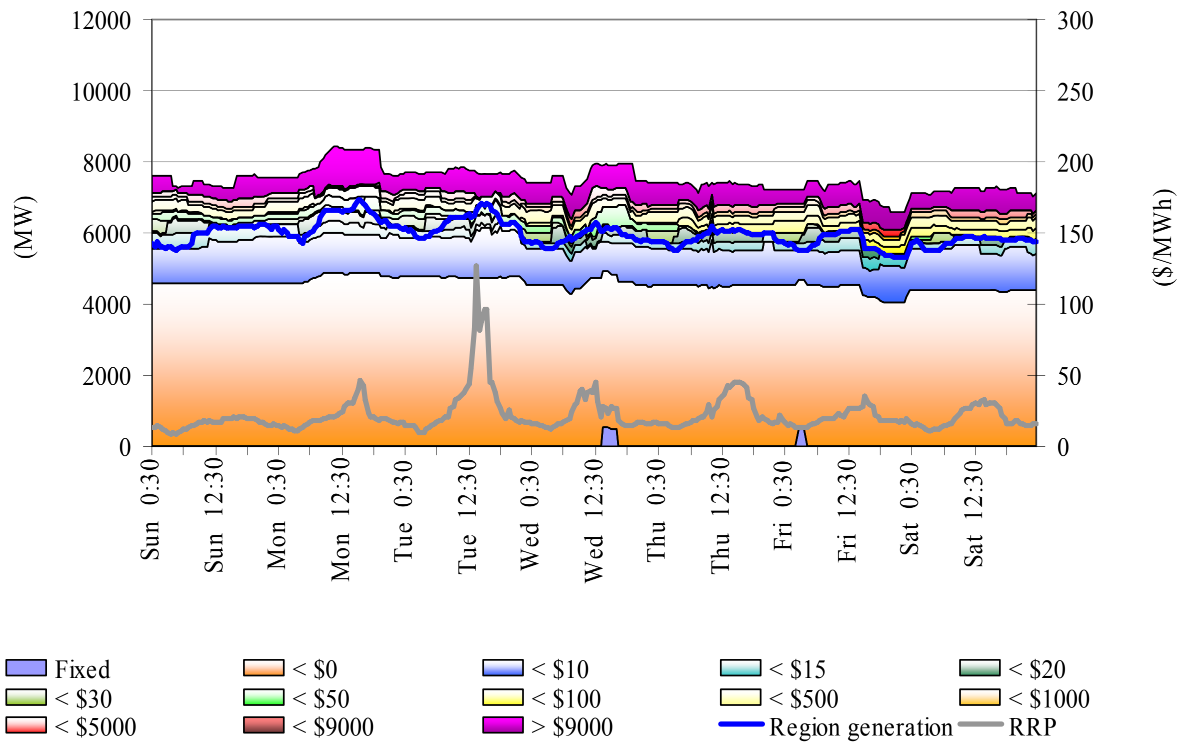


Figure 54: South Australia closing bid prices, dispatched generation and spot price

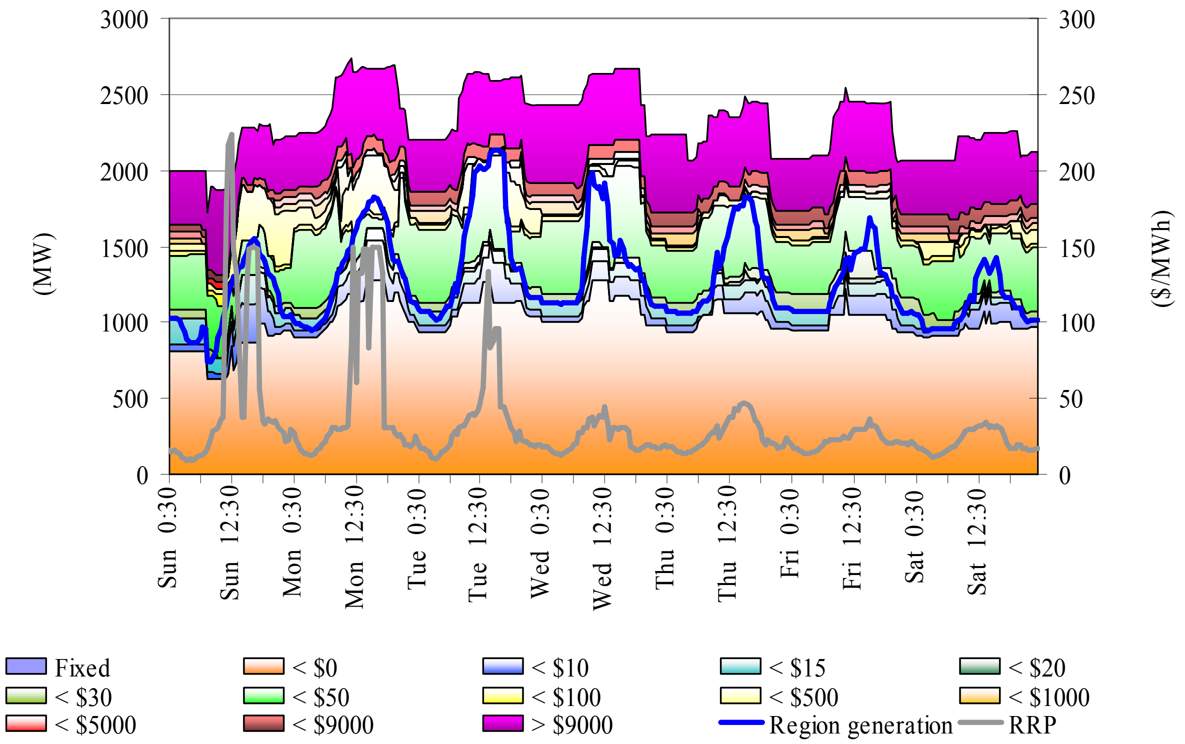
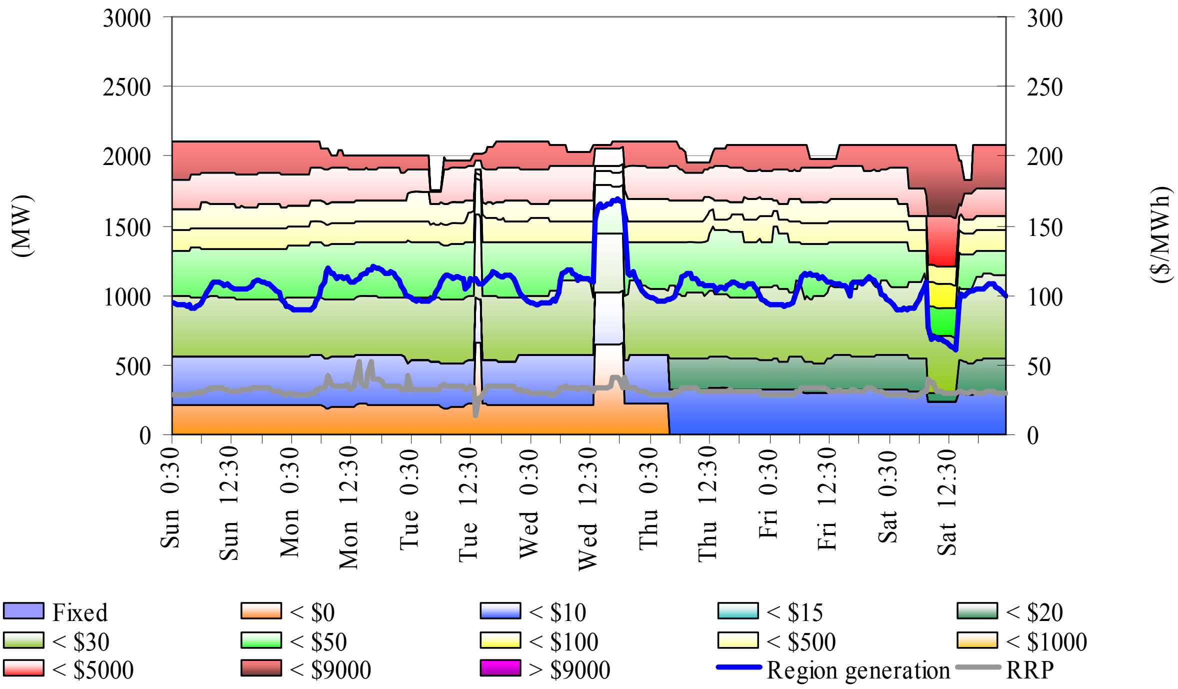


Figure 55: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was around $200 000 or around 0.2 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 ($/MW)	0.79	0.42	1.11	1.16	0.21	0.35	0.57	1.66
Previous week ($/MW)	0.62	0.36	0.83	0.69	0.15	0.19	0.21	1.47
Last quarter ($/MW)	1.76	0.73	1.15	1.54	0.39	2.28	5.00	1.93
Market Cost ($1000s)	$37	$19	$72	$25	$1	$3	$8	$36
% of energy market	0.04%	0.02%	0.08%	0.03%	0.00%	0.00%	0.01%	0.04%

The total cost of ancillary services in Tasmania for the week was $190 000 or 3 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 ($/MW)	6.92	1.05	1.05	1.06	1.12	1.06	1.05	1.08
Previous week ($/MW)	4.69	1.05	1.06	1.21	1.64	1.10	1.06	1.08
Last quarter ($/MW)	7.89	1.05	1.05	1.58	4.43	1.06	1.06	1.97
Market Cost ($1000s)	$73	$13	$13	$9	$17	$33	$25	$9
% of energy market	1.28%	0.24%	0.22%	0.15%	0.30%	0.58%	0.43%	0.15%

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

Figure 58: daily frequency control ancillary service costs

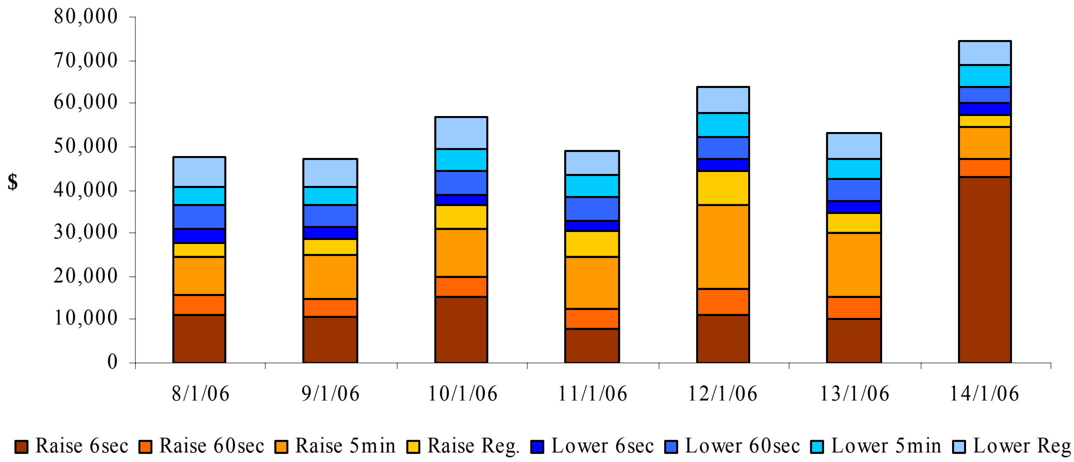
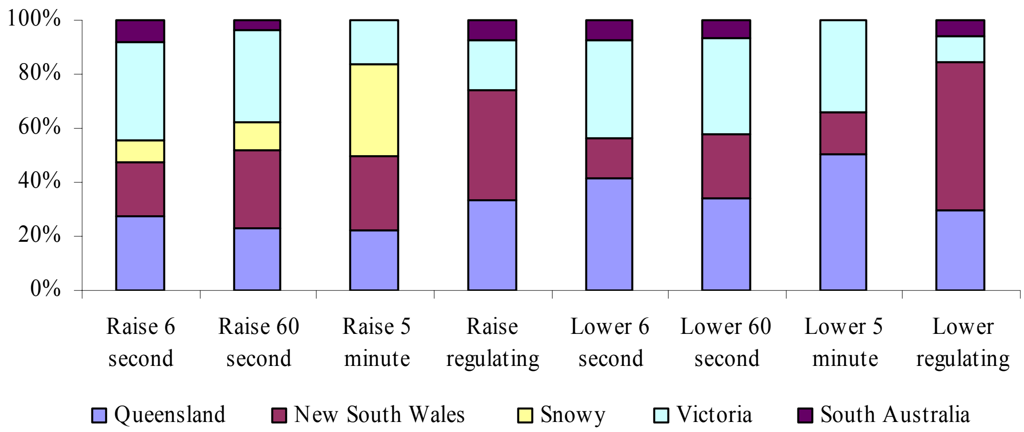


Figure 59 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

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

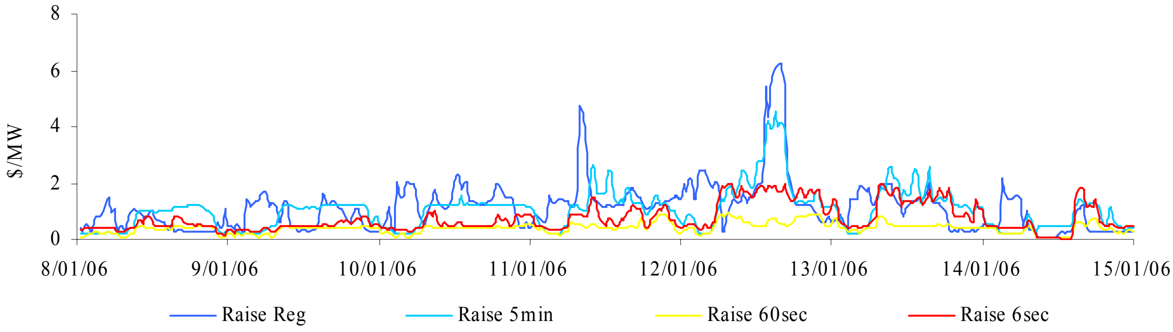


Figure 60A: prices for raise services - Tasmania

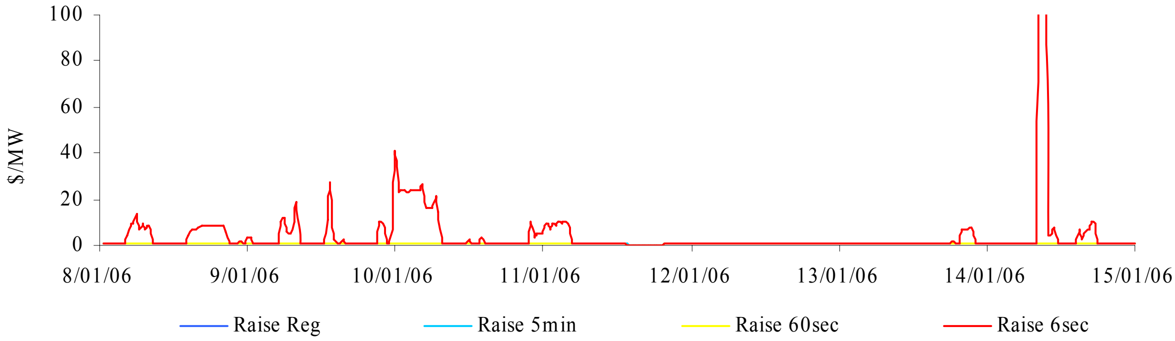


Figure 61: prices for lower services

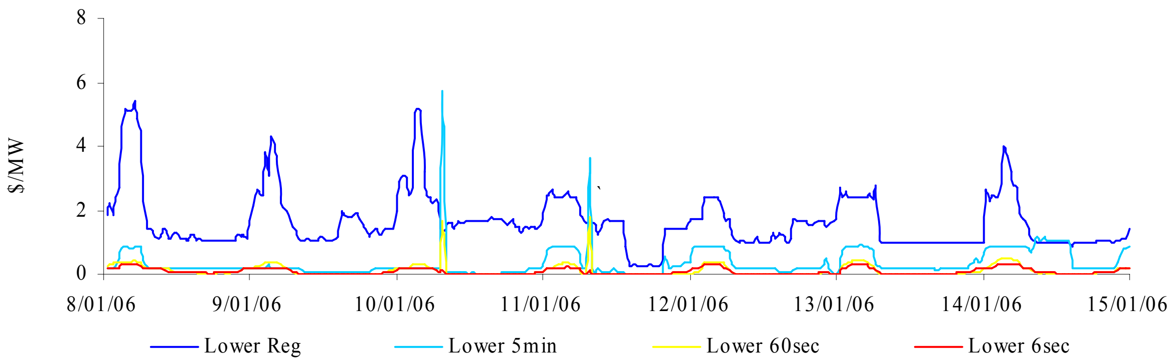
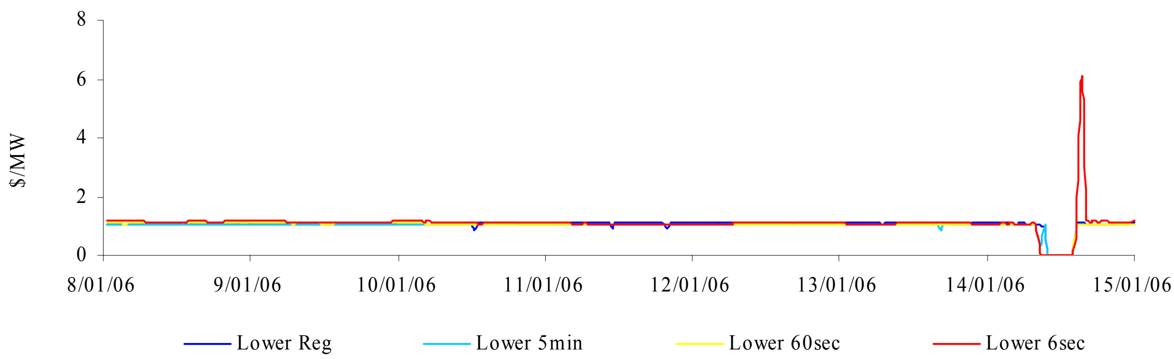


Figure 61A: prices for lower services - Tasmania



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

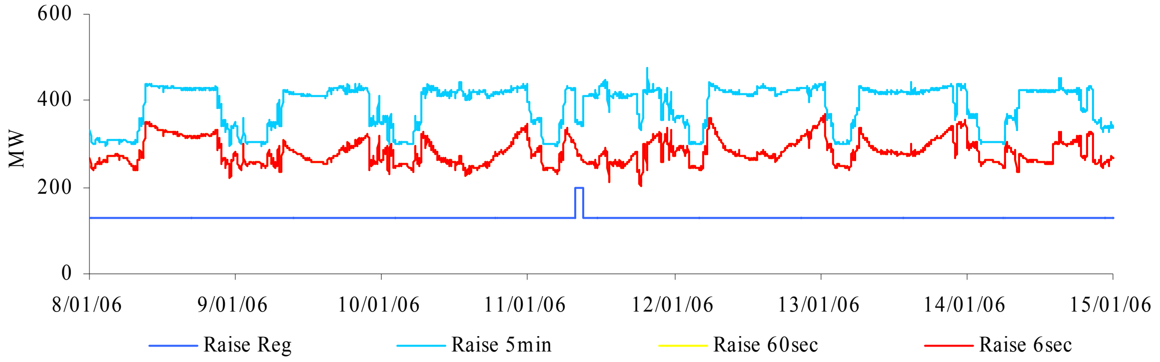


Figure 62A: raise requirements - Tasmania

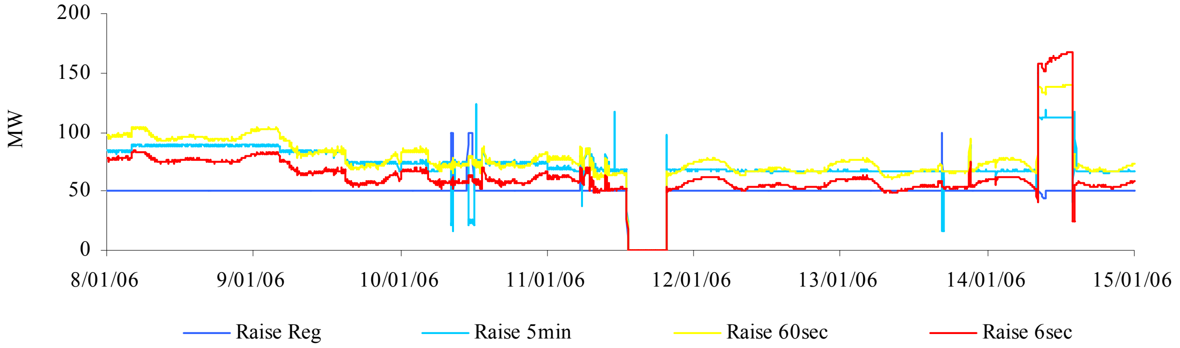


Figure 63: lower requirements

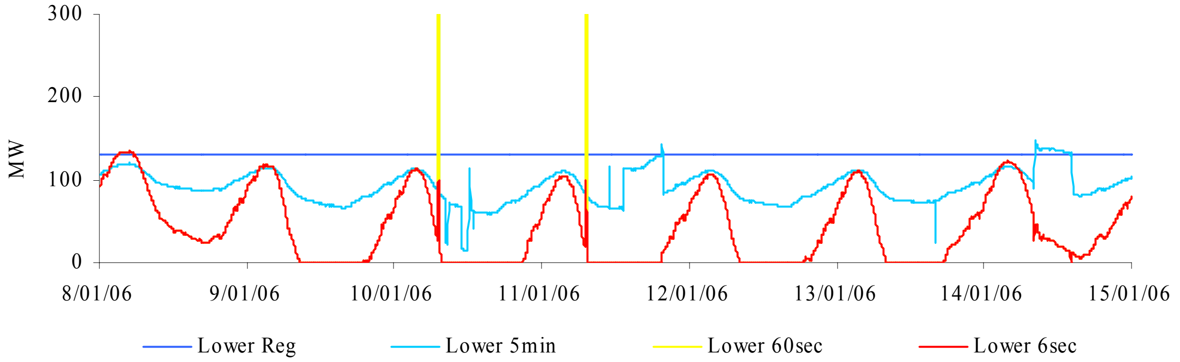
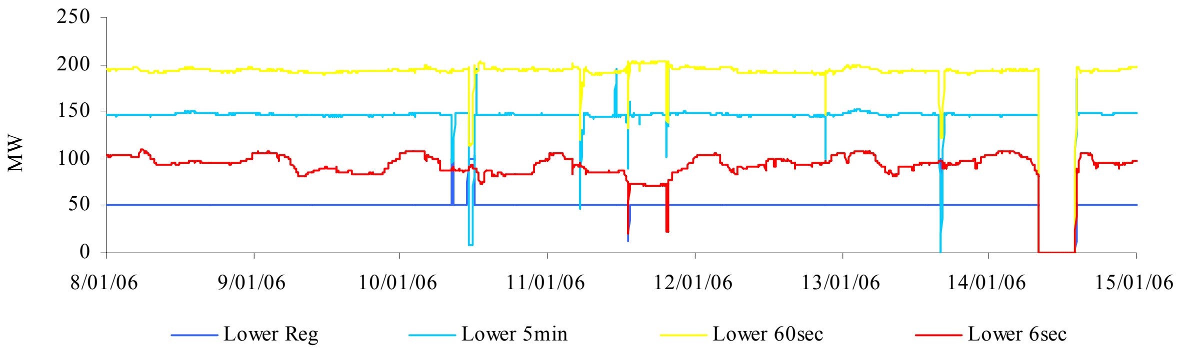


Figure 63A: lower requirements - Tasmania



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