Market analysis

AUSTRALIAN ENERGY REGULATOR

12–18 FEBRUARY 2006

Prices for the week were aligned across the mainland for almost 90 per cent of the time, with prices from Victoria to Queensland aligned 98 per cent of the week. Average prices ranged from $24/MWh in Queensland to $30/MWh in South Australia. A new record demand of around 8270 MW occurred in Queensland on Monday, just exceeding the previous record. The demand on Tuesday was slightly higher again. Prices in Tasmania averaged $32/MWh.

Turnover in the energy market for the mainland was $96 million. The total cost of ancillary services for the week was around $200 000, or 0.2 per cent of the energy market. Turnover in Tasmania for the week was $5.6 million with the cost of ancillary services totaling $40 000 or 0.7 per cent of turnover.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 40, or around 12 per cent of all trading intervals. Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in approximately 20 per cent of all trading intervals across the market. These variations were most frequent in South Australia occurring in around 40 per cent of all trading intervals. In New South Wales, demand forecast errors occurred in around a quarter of all trading intervals, which with the aligned prices was the main reason for price variations across the mainland.

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

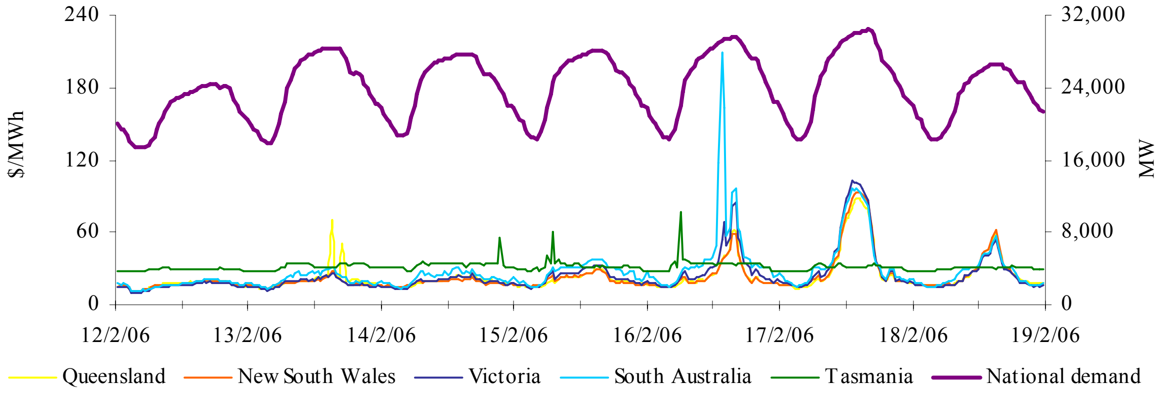


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	24	24	26	30	32
Previous week	20	20	18	21	37
Same quarter last year	25	35	22	31	-
Financial year to date	36	53	35	48	73
% change from previous week	▲19%	▲22%	▲44%	▲44%	▼14%
% change from same quarter last year	▼4%	▼31%	▲16%	▼3%	-
% change from year to date	▼1%	▼7%	▲14%	▲14%	-

Figure 3: volatility index during peak periods

	QLD	NSW	VIC	SA	TAS
Last week	0.98	1.01	1.24	1.02	0.08
Previous week	0.20	0.29	0.37	0.61	0.05
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

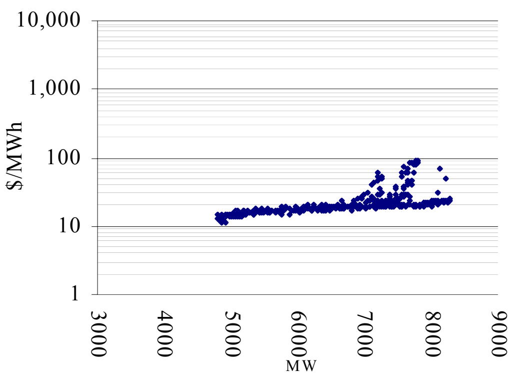


Figure 5: New South Wales

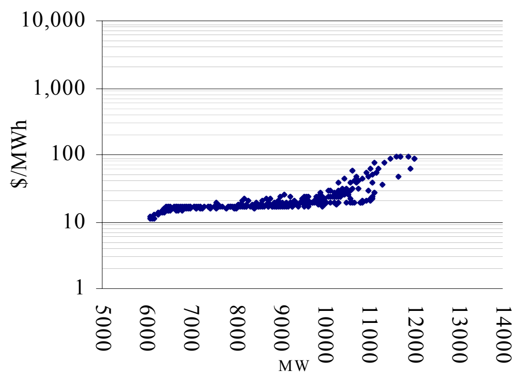


Figure 6: Victoria

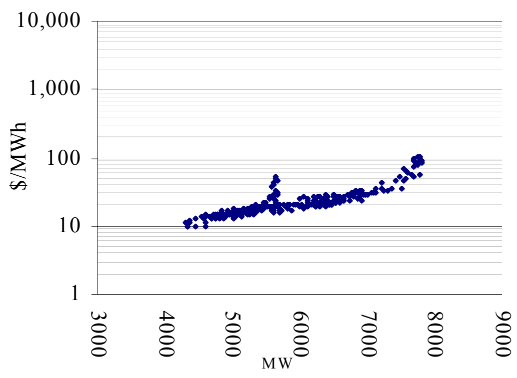


Figure 7: South Australia

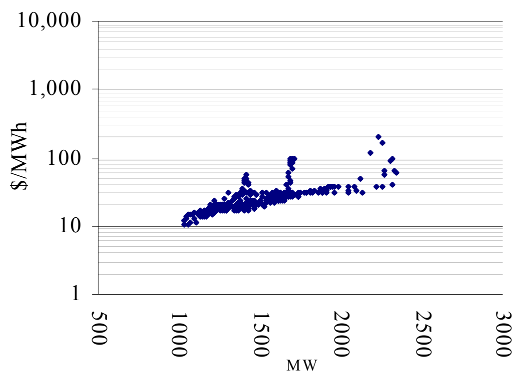
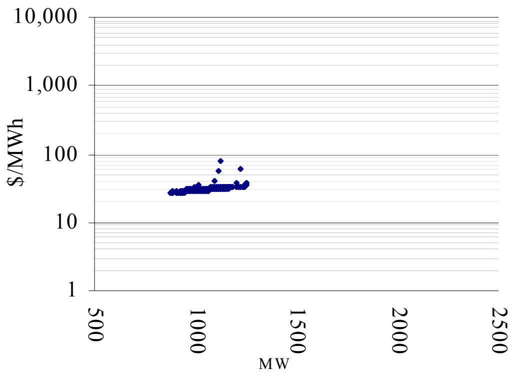


Figure 8: Tasmania



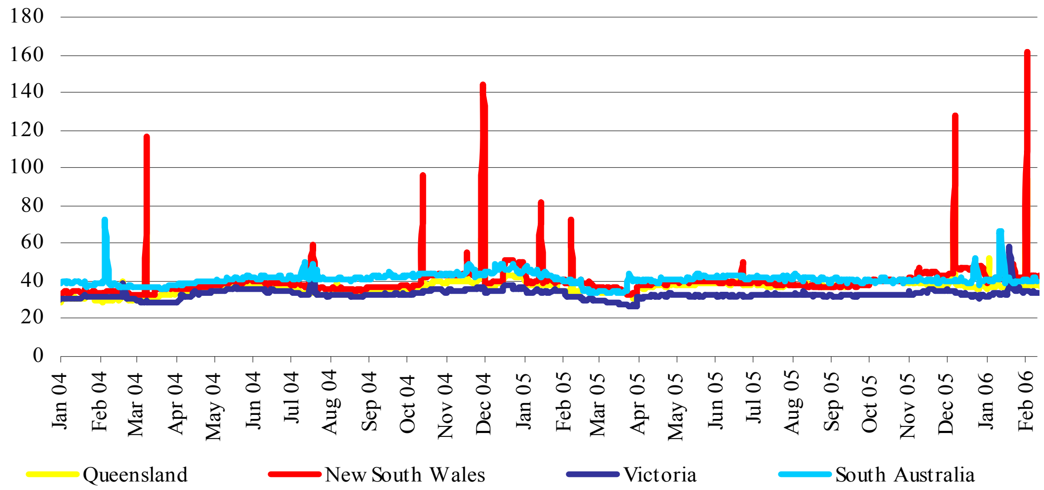
Maximum spot prices during the week reached $88/MWh in Queensland, $93/MWh in New South Wales and $102/MWh in Victoria, early on Friday afternoon. In South Australia the maximum spot price of $208/MWh occurred at 1.30pm on Thursday. In Tasmania, the highest price for the week, of $77/MWh, was recorded at 6.00am on Thursday.

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	37.36	37.03	37.30	37.33	37.67
New South Wales	42.55	41.70	41.97	42.03	42.71
Victoria	34.11	34.19	34.24	34.79	34.91
South Australia	39.68	39.89	40.55	41.53	39.44

Figure 10: d-cyphaTrade WEPI



Reserve

There were no low reserve conditions forecast for the week. Directions were issued to Directlink on Monday, Tuesday, Wednesday, Thursday, Friday and Sunday to manage network issues associated with the Gold Coast area and northern New South Wales. 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

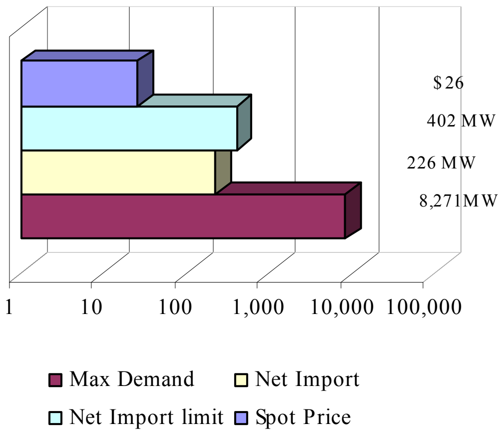


Figure 12: New South Wales

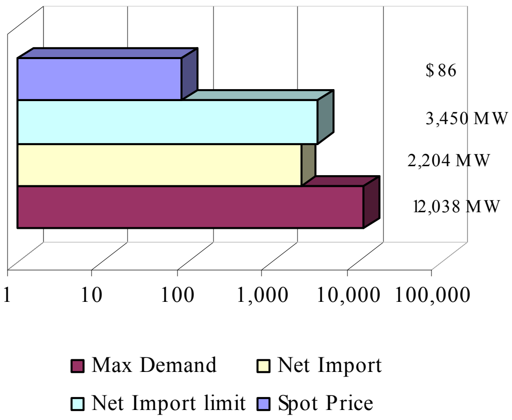


Figure 13: Victoria

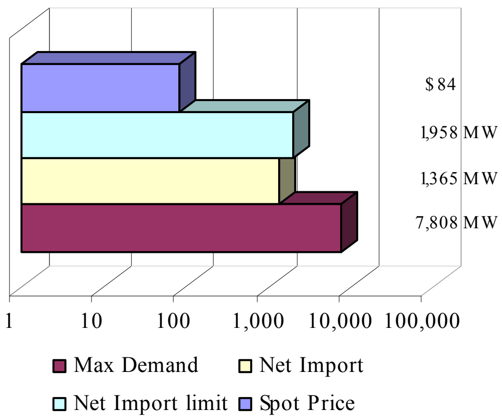
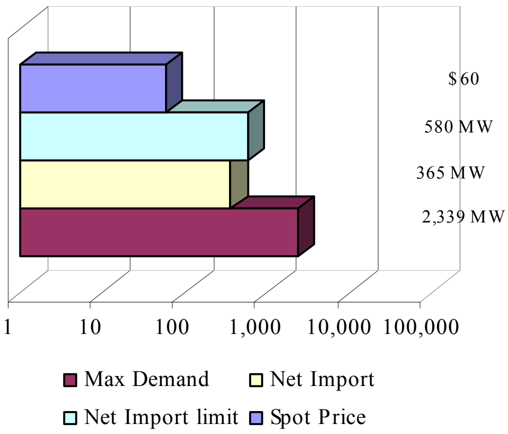


Figure 14: South Australia



In Tasmania, demand reached a maximum of 1255 MW at 7.30am on Thursday morning. The spot price at that time was $36/MWh.

Price variations

There were 40 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

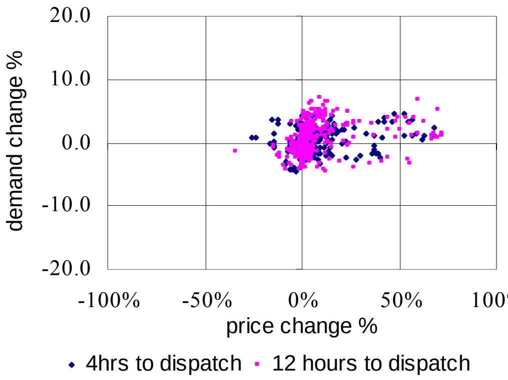


Figure 16: New South Wales

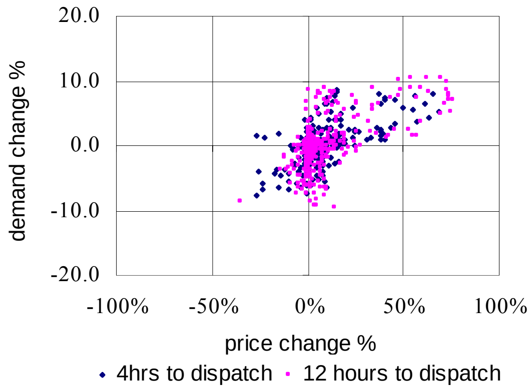


Figure 17: Victoria

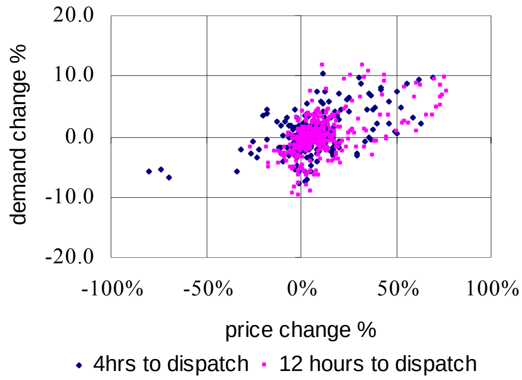


Figure 18: South Australia

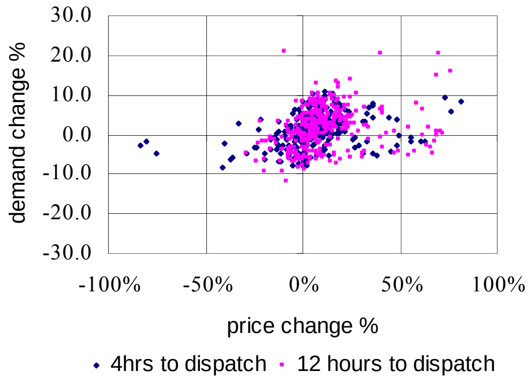


Figure 19: Tasmania

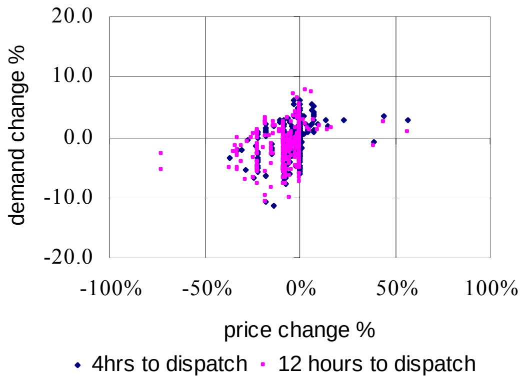
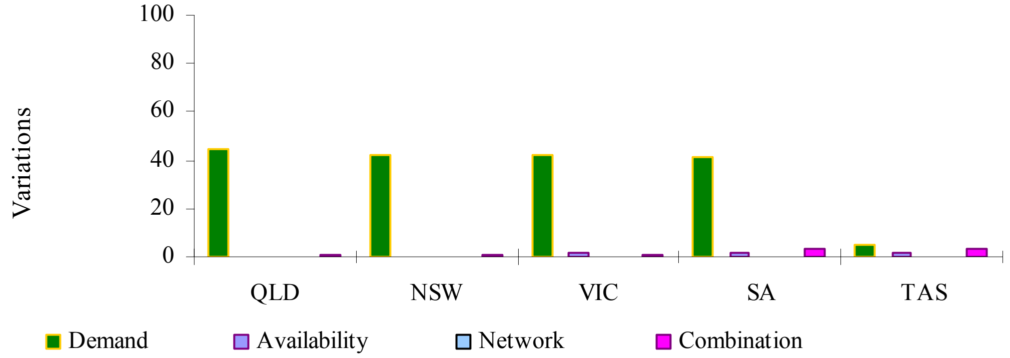


Figure 20 summarises the number and most probable reason for variations between forecast and actual prices.

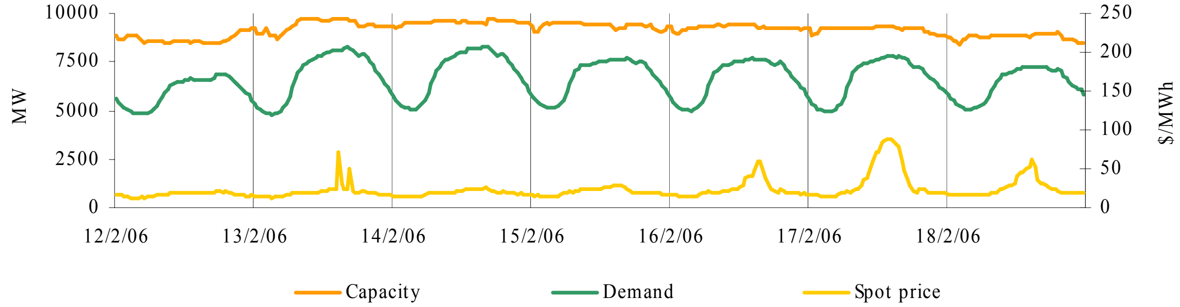
Figure 20: reasons for variations between forecast and actual prices

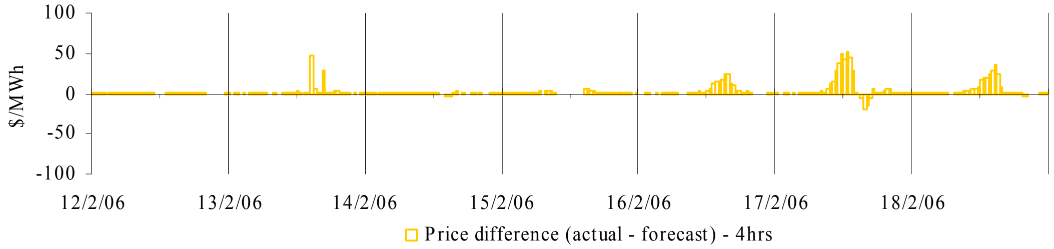


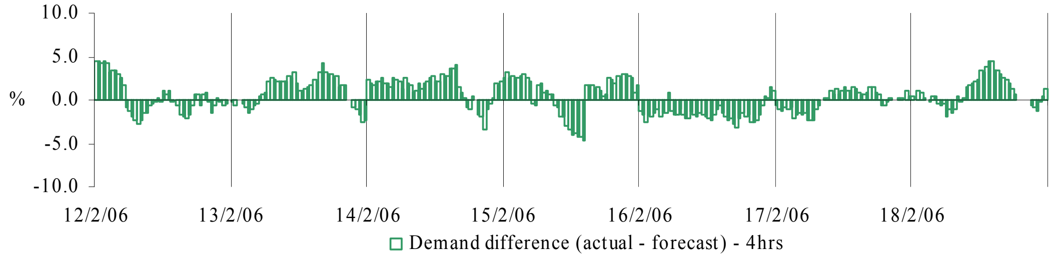
Price and demand

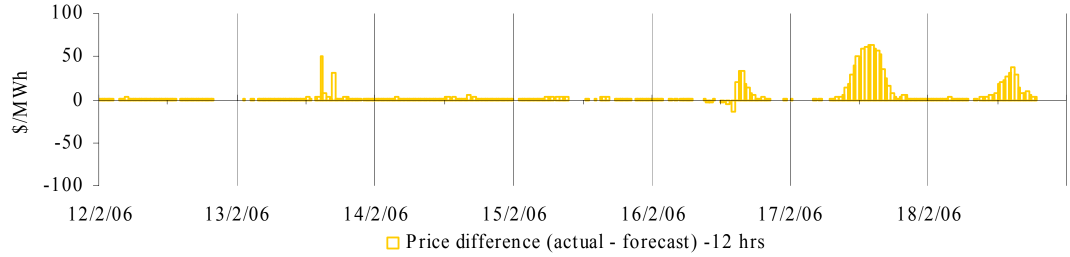
Figures 21 - 50 set out details of spot prices and demand on a regional basis. They include the actual spot price, actual demand outcomes and variation from forecasts made 4 and 12 hours ahead of dispatch on a daily basis. The differences between the maximum temperature and the temperature forecast at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

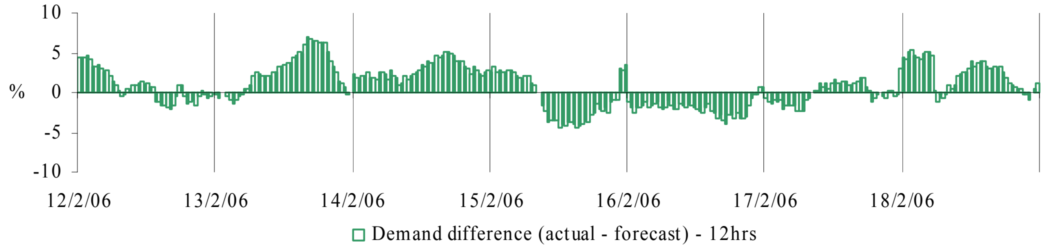
Figures 21-26: Queensland actual spot price, demand and forecast differences

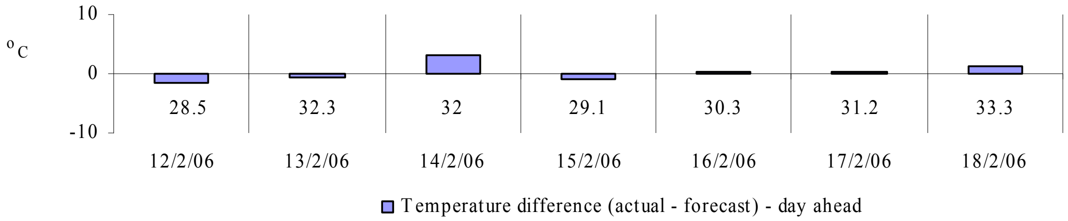












There were 7 occasions in Queensland where the spot price was greater than three times the weekly average price of $24/MWh. These occurred on Friday afternoon.

Friday, 17 February

1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	82.43	30.31	22.84
Demand (MW)	7678	7594	7594
Available capacity (MW)	9350	9303	9311
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	85.60	40.74	23.87
Demand (MW)	7711	7634	7633
Available capacity (MW)	9343	9265	9273
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	88.29	59.30	24.39
Demand (MW)	7778	7664	7664
Available capacity (MW)	9346	9361	9298
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	87.91	86.58	24.40
Demand (MW)	7789	7682	7682
Available capacity (MW)	9348	9361	9303
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	85.31	87.05	25.30
Demand (MW)	7787	7716	7717
Available capacity (MW)	9343	9366	9303
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	80.71	85.69	24.79
Demand (MW)	7739	7693	7666
Available capacity (MW)	9268	9366	9298
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	79.47	98.00	25.99
Demand (MW)	7778	7721	7681
Available capacity (MW)	9199	9348	9298

During this period demand was higher than forecast by up to 100 MW. Demand across the mainland throughout the afternoon was around 1500 MW higher than the forecasts made during the morning. Prices were aligned across the mainland throughout this period and close to forecast for much of this period.

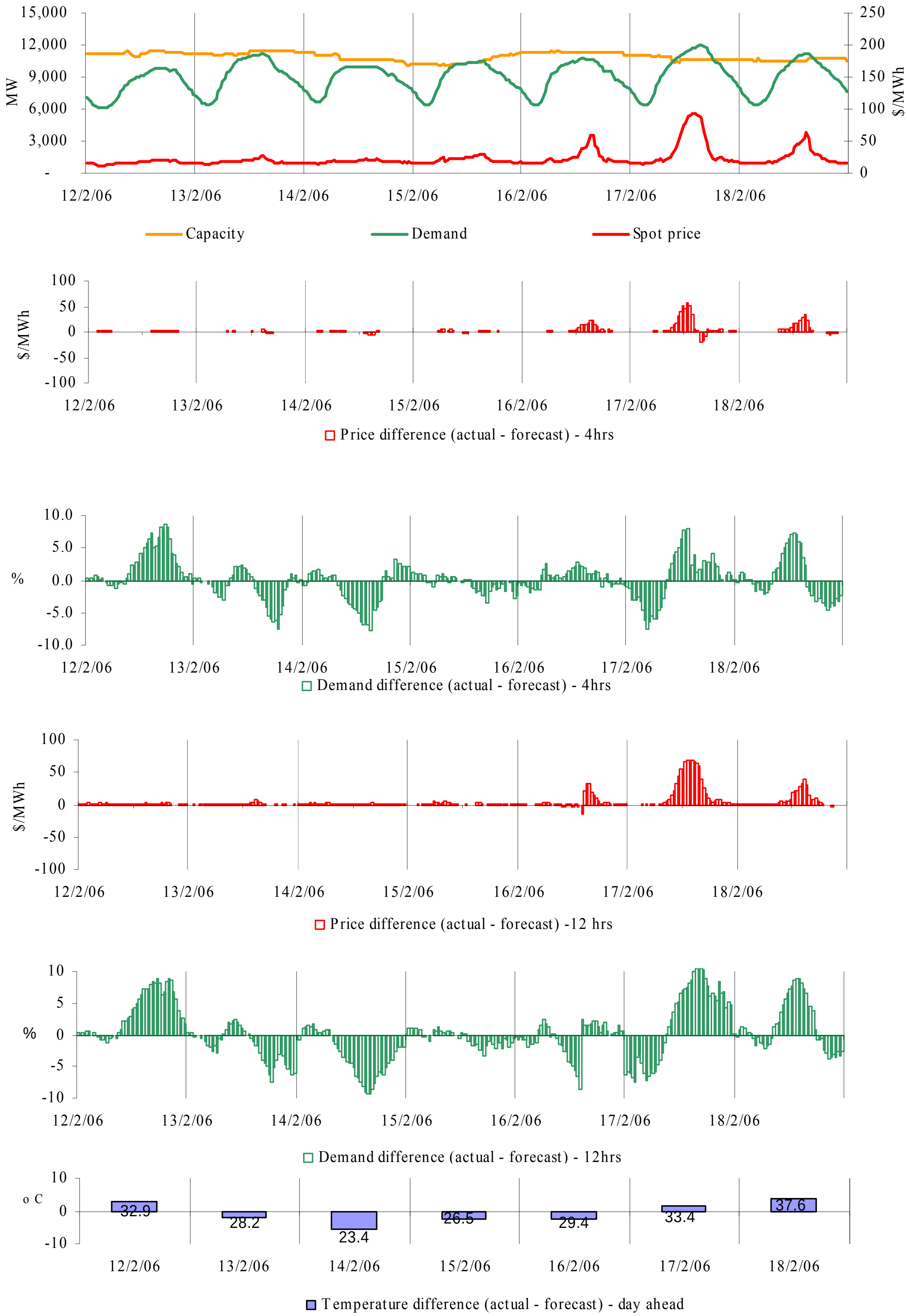
At 10.57 am, Tarong Energy shifted 90 MW of capacity at Tarong from prices of less than $20/MWh to around $171/MWh. At the same time, 185 MW of capacity at Wivenhoe was shifted from prices of $89/MWh and above $9000/MWh to $57/MWh. The rebid reason given was “F Change in PD::Adjust profile”.

At 11.19 am Origin Energy shifted 58 MW of capacity at Roma from prices above $9000/MWh down to $1/MWh, the rebid reason was “est(n) change in PDS”.

At 11.46 am Enertrade shifted 110 MW of capacity at Gladstone from prices of $81/MWh to $28/MWh. The rebid reason was “material change in market conditions::change MW distribution”

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 $25/MWh. These occurred on Friday afternoon.

Friday, 17 February

12:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	75.00	23.25	19.13
Demand (MW)	11 135	10 563	10 563
Available capacity (MW)	10 678	10 968	11 088
12:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	76.54	30.00	21.56
Demand (MW)	11 337	10 602	10 604
Available capacity (MW)	10 656	10 968	11 088
1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	88.21	30.26	21.70
Demand (MW)	11 502	10 598	10 684
Available capacity (MW)	10 674	10 968	11 088
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	91.19	40.38	23.49
Demand (MW)	11 599	10 705	10 764
Available capacity (MW)	10 647	10 968	11 090
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	93.30	58.34	24.00
Demand (MW)	11 684	10 763	10 799
Available capacity (MW)	10 634	10 468	11 090
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	93.25	87.36	24.00
Demand (MW)	11 720	11 511	10 776
Available capacity (MW)	10 617	10 718	11 090
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	91.59	89.77	24.71
Demand (MW)	11 869	11 579	10 838
Available capacity (MW)	10 614	10 718	11 090
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	88.07	89.18	24.40
Demand (MW)	12 016	11 544	10 820
Available capacity (MW)	10 614	10 718	11 338
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	85.52	105.05	25.56
Demand (MW)	12 038	11 890	10 777
Available capacity (MW)	10 614	10 718	11 338

Conditions at the time saw demand as much as 900 MW higher than forecast four hours ahead. Demand across the mainland throughout the afternoon was around 1500 MW higher than the forecasts made during the morning. Prices were aligned across the mainland throughout this period and close to forecast for much of this period. Available capacity was a much as 450 MW lower than forecast 12 hours ahead.

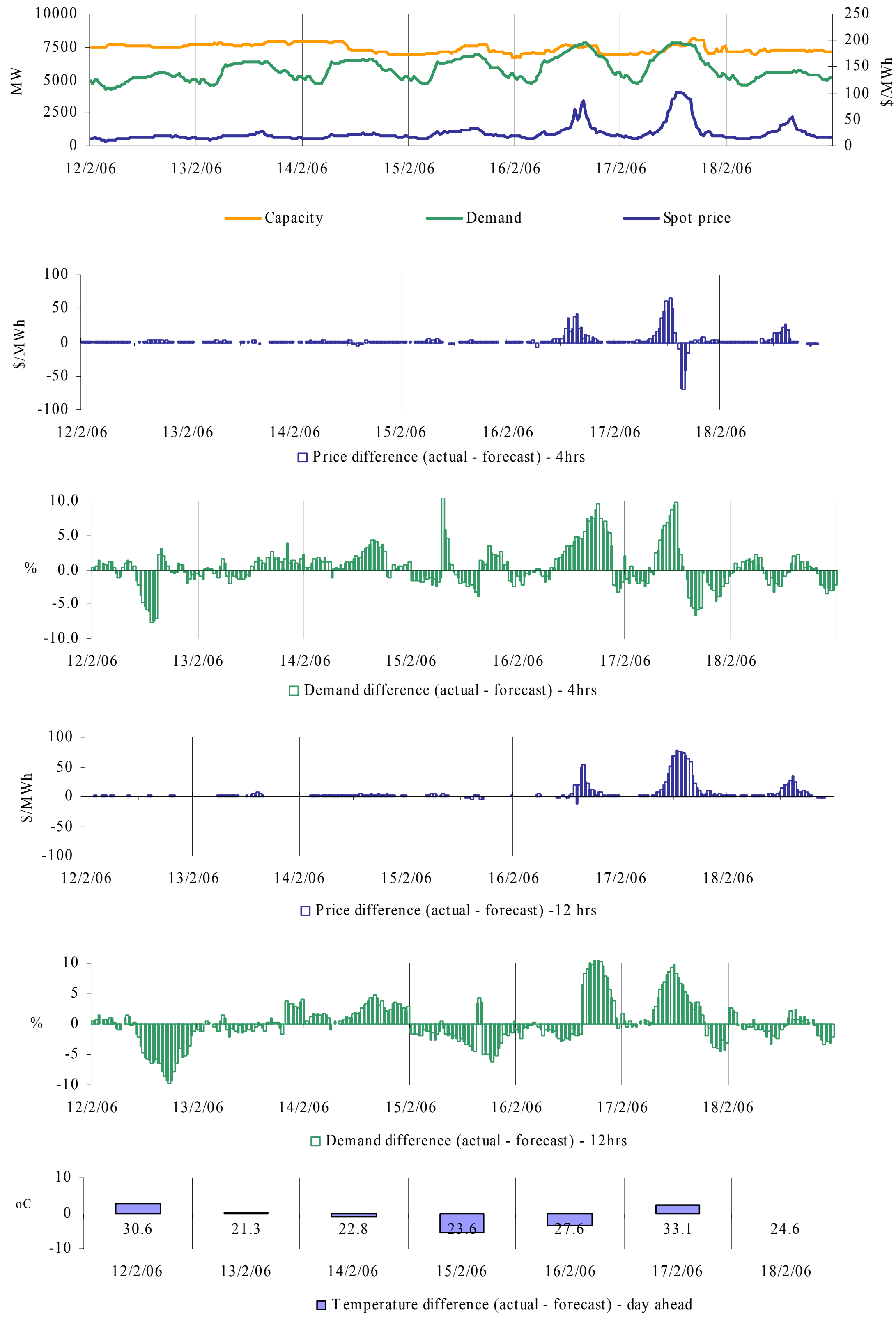
At 9.06 am, following the loss of Wallerawang unit 7 from 480MW, Delta Electricity reduced its availability by 500 MW to zero. Almost all of this capacity was priced at less than $20/MWh. The rebid reason given was “Unit trip::Capacity limit change”. Following this, and over a number of rebids, Delta Electricity shifted a total of 250 MW of capacity from prices above $5000/MWh to below $50/MWh. The rebid reasons given included “Rebid due to WW7::Band shift”, “Precip recalled::capacity limit change”, “Rebid due to WW7::Capacity limit change” and “Precip::capacity limit change”.

At 10.33 am Macquarie Generation shifted 200 MW of capacity at Bayswater from $16/MWh to prices above $9000/MWh. The rebid reason given was “load expected to vary from forecast”. This rebid was effective until 12.30 pm. At 11.36 am, effective from 1 pm, 410 MW of capacity at Bayswater was shifted from prices of less than $20/MWh to around $900/MWh. The rebid reason given was “Manage Snowy/Vic constraint”.

At 11.36am, Snowy Hydro shifted more than 1100 MW of capacity at Murray from prices of less than $30/MWh to prices of $80/MWh, $90/MWh, $225/MWh and $7500/MWh. At the same time a similar amount of capacity was shifted from higher to lower prices at Tumut. Across the portfolio there was little net change. The rebid reason given was “M:Higher than exp and F/C Vic d – conserv M water. No chge”, or demand in Victoria higher than forecast - conserve water at Murray – no net change.

There was no other significant rebidding.

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



There were 11 occasions in Victoria where the spot price was greater than three times the weekly average price of $26/MWh. These occurred on Thursday and Friday.

Thursday, 16 February

3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	81.06	43.70	32.74
Demand (MW)	7740	7302	7234
Available capacity (MW)	7518	7618	7708
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	84.48	41.97	31.18
Demand (MW)	7808	7217	7157
Available capacity (MW)	7516	7628	7708

Conditions at the time saw demand, as much as 600 MW higher than forecast four hours ahead. The temperature reached 28 degrees, which was around three degrees lower than forecast the previous day.

Plant issues at International Power's Hazelwood power station led to around 90 MW of reduced availability. Almost all of this capacity was priced at less than $20/MWh. The rebid reasons given included "firing plant limits" and "draft plant limits".

From 1 pm, Alinta shifted 80 MW of capacity at Bairnsdale from above $9000/MWh to $35/MWh. The rebid reasons given were "market conditions – price/demand expectation".

From midday, Ecogen shifted 75 MW of capacity at Jeeralang B from prices above $280/MWh to $1/MWh. The rebid reasons given were "capacity adjustment due to ambient temperature" and "band adjustment due to plant test".

There was no other significant rebidding.

Friday, 17 February

12:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	88.70	27.11	21.20
Demand (MW)	7806	7049	7046
Available capacity (MW)	7660	8218	8594
12:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	91.07	37.21	23.78
Demand (MW)	7786	7544	7134
Available capacity (MW)	7698	7673	8624
1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	102.30	37.75	23.83
Demand (MW)	7793	7623	7207
Available capacity (MW)	7719	7698	8624
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	100.73	49.93	25.96
Demand (MW)	7769	7731	7243
Available capacity (MW)	7696	7698	8602
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	101.92	87.00	26.52
Demand (MW)	7762	7774	7262
Available capacity (MW)	7592	7698	8602

Friday, 17 February (cont)

2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	100.00	100.20	26.82
Demand (MW)	7687	7790	7290
Available capacity (MW)	7562	7684	8588
3:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	96.66	106.27	27.48
Demand (MW)	7689	8009	7330
Available capacity (MW)	7573	7689	8588
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	90.48	157.24	27.61
Demand (MW)	7706	8117	7429
Available capacity (MW)	7739	7694	8588
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	86.68	156.39	29.09
Demand (MW)	7715	8152	7452
Available capacity (MW)	7982	7679	8398

Conditions at this time saw demand more than 750 MW higher at midday than forecast four hours ahead and more than 400 MW lower at 4 pm than forecast four hours ahead. The temperature reached 33 degrees, two degrees high than forecast the previous evening. Demand across the mainland throughout the afternoon was around 1500 MW higher than the forecasts made during the morning. Prices were aligned across the mainland throughout this period and close to forecast for much of this period.

Available capacity was as much as 1000 MW lower than forecast 12 hours ahead. Delays in the return of LYMMCO's Loy Yang A unit 1 saw up to 580 MW less capacity available. This capacity was all priced at less than $20/MWh. The rebid reasons given included "unit run up delayed", "unit run up profile" and "unit run up".

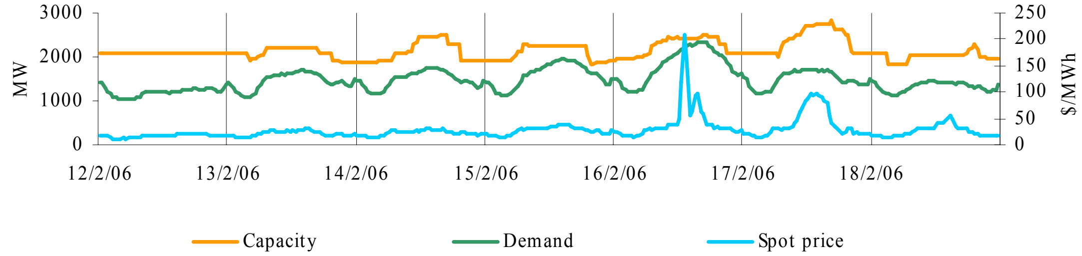
From 8.45 am, International Power shifted as much as 210 MW of capacity at Hazelwood from prices below $20/MWh to prices ranging from $51/MWh to more than $9000/MWh. The rebid reasons given included "Change in PD forecast", "change in VIC PD demand/cap forecast" and change in NSW demand/cap". From 1pm through a number of rebids, Hazelwood unit 4 was shutdown from around 160MW. All of this capacity was priced at less than $20/MWh. The rebid reasons given included "boiler leak" and "revised unit-off time". The unit had returned to service that morning following a short notice outage on Tuesday.

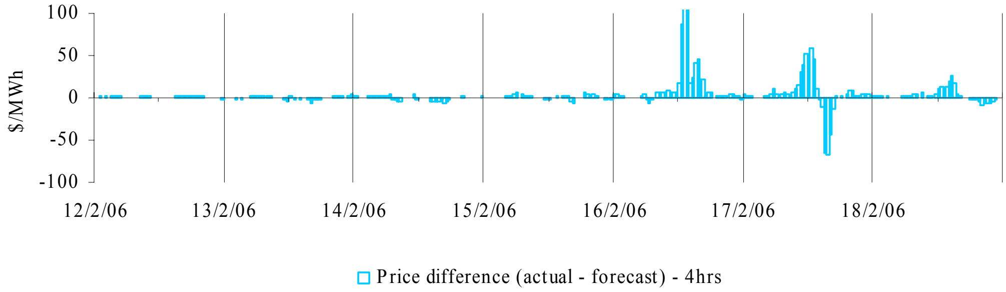
From 10 am Alinta shifted 80 MW of capacity at Bairnsdale from prices above $9000/MWh to $35/MWh. The rebid reason given was "market conditions – price/demand expectation".

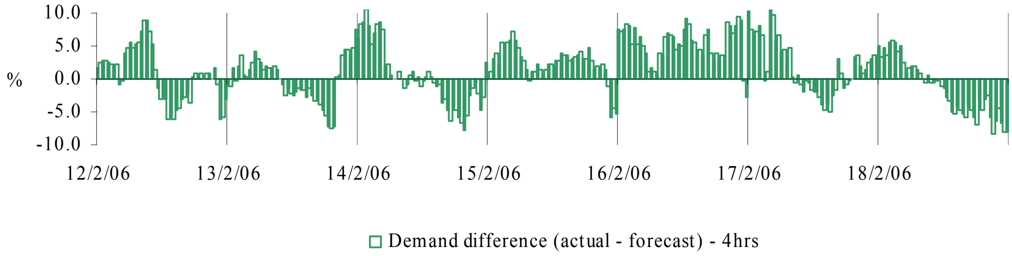
From 11 am AGL shifted as much as 130 MW of capacity at Somerton from prices above $9000/MWh to zero. The rebid reason given was "predispatch:forecast price increase:commit".

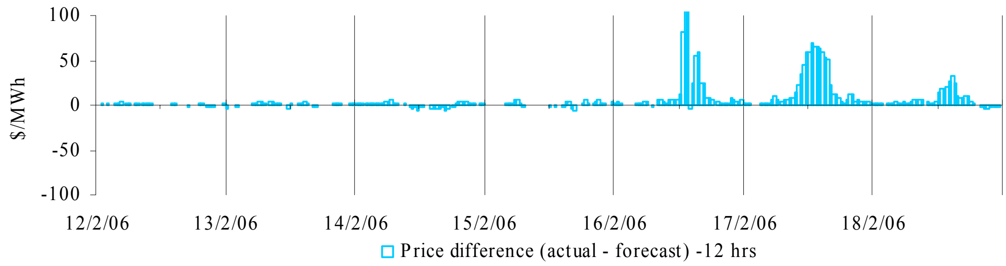
There was no other significant rebidding.

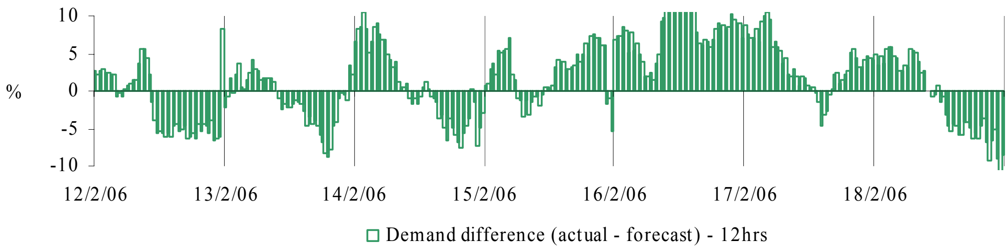
Figures 39-44: South Australia actual spot price, demand and forecast differences

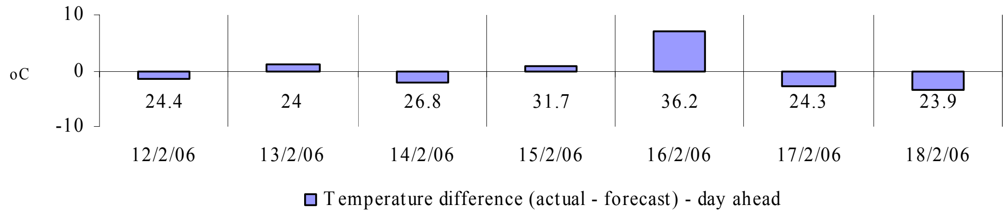












There were 9 occasions in South Australia where the spot price was greater than three times the weekly average price of $31/MWh. These occurred on Thursday and Friday.

Thursday, 16 February

1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	117.67	31.00	36.93
Demand (MW)	2180	1978	1851
Available capacity (MW)	2437	2485	2485
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	208.31	38.00	48.62
Demand (MW)	2227	2041	1874
Available capacity (MW)	2434	2485	2485
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	162.85	38.00	47.89
Demand (MW)	2256	2127	1790
Available capacity (MW)	2422	2485	2485
3:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	92.37	51.01	38.00
Demand (MW)	2306	2205	2127
Available capacity (MW)	2431	2480	2485
4:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	95.98	49.71	36.95
Demand (MW)	2317	2234	2172
Available capacity (MW)	2431	2480	2485

Conditions at the time saw demand as much as 200 MW higher than forecast four hours ahead, and up to 350 MW higher than forecast 12 hours ahead. The temperature reached 36 degrees, 7 degrees higher than forecast the previous day.

NRG Flinders' Playford was forecast to return to service the previous evening with a rebid at 8 pm. This rebid increased the availability to 110 MW – all at negative prices - and reduced the unit's ramp rates to zero. After two failed unit starts over the evening, the unit was online from around 3am. Through a number of rebids close to dispatch, ramp rates remained at zero for most of the day. As a result, at times, the output from Playford was significantly lower than forecast.

From 2pm, over a number of rebids, AGL shifted as much as 100 MW of capacity at Hallet from prices above $9000/MWh to zero. The rebid reasons given were "predispatch forecast price increase::increase" and "plant limitations::additional units available".

There was no other significant rebidding

Friday, 17 February

1:00 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	96.86	38.00	27.32
Demand (MW)	1713	1747	1704
Available capacity (MW)	2727	2727	2527
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	95.08	49.24	29.60
Demand (MW)	1708	1755	1710
Available capacity (MW)	2727	2724	2527
2:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	95.94	85.80	30.24
Demand (MW)	1705	1771	1731
Available capacity (MW)	2732	2724	2527
2:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	93.67	96.00	30.90
Demand (MW)	1684	1766	1764
Available capacity (MW)	2735	2721	2527

Conditions at the time saw demand lower than forecast, with prices aligned across the mainland. Demand across the mainland throughout the afternoon, however, was around 1500 MW higher than the forecasts made during the morning. Prices were aligned across the mainland throughout this period and close to forecast for much of this period.

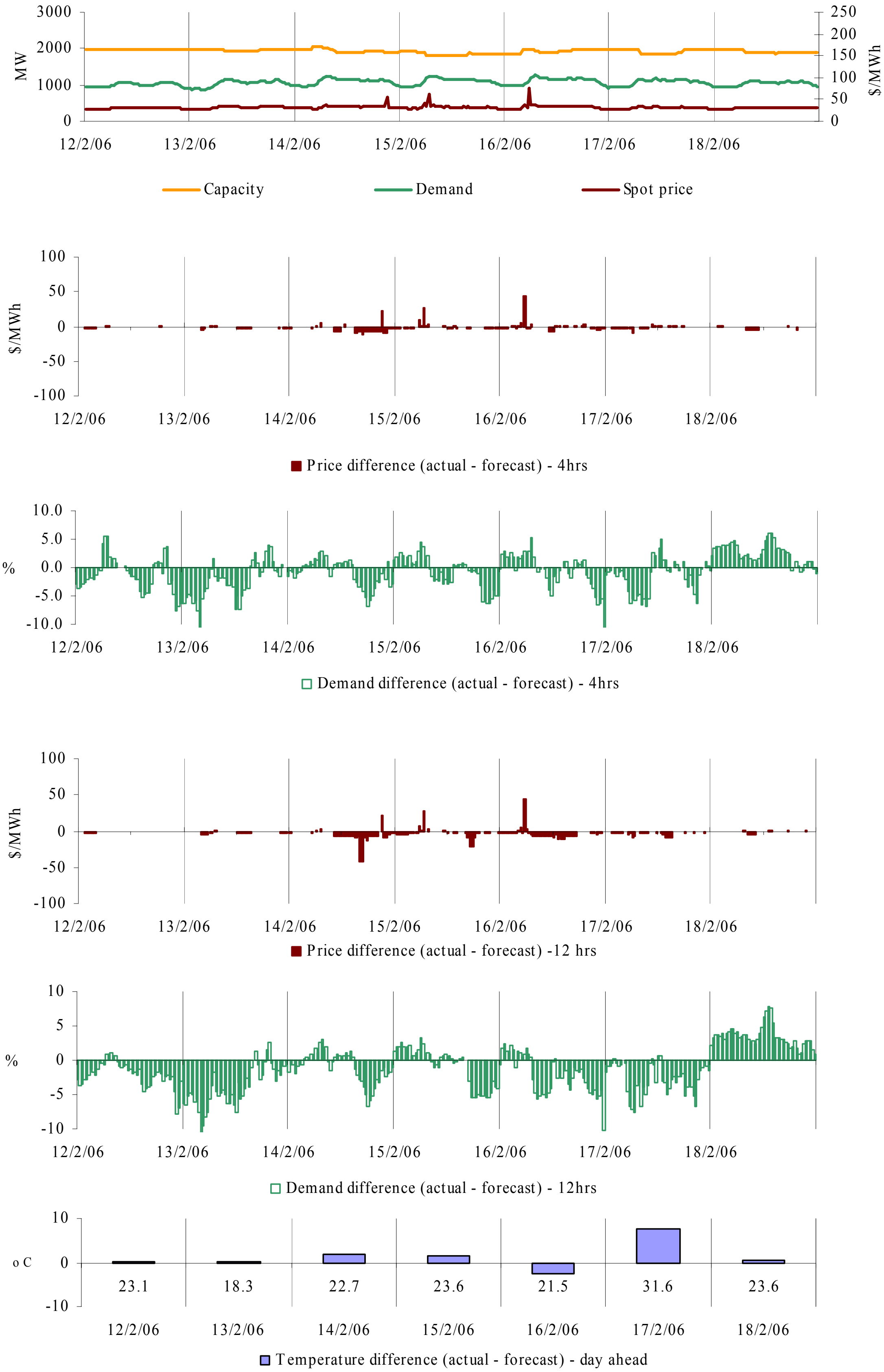
At 8.16 am, International Power increased the available capacity at Pelican Point by 210 MW, with 170 MW of this capacity at negative prices. The remainder was priced at $9992/MWh. At the same time 80 MW of capacity priced around $30/MWh was shifted to $100/MWh and $1000/MWh. The rebid reason given was “switching gts”, or gas turbines. At 10.12am, 40 MW of capacity was shifted from prices around $100/MWh to around $5000/MWh. The rebid reason given was “Change in NSW Demand forecast”.

At 9.33 am TRUenergy shifted 80 MW of capacity at Torrens Island from $150/MWh to below $40/MWh. The rebid reason given was “market conditions – gen response to act vs pd”.

At midday Origin shifted 23 MW of Quarantine’s capacity from $9000/MWh to zero, the rebid reason being “est (n) change in pds”.

There was no other significant rebidding.

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



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

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

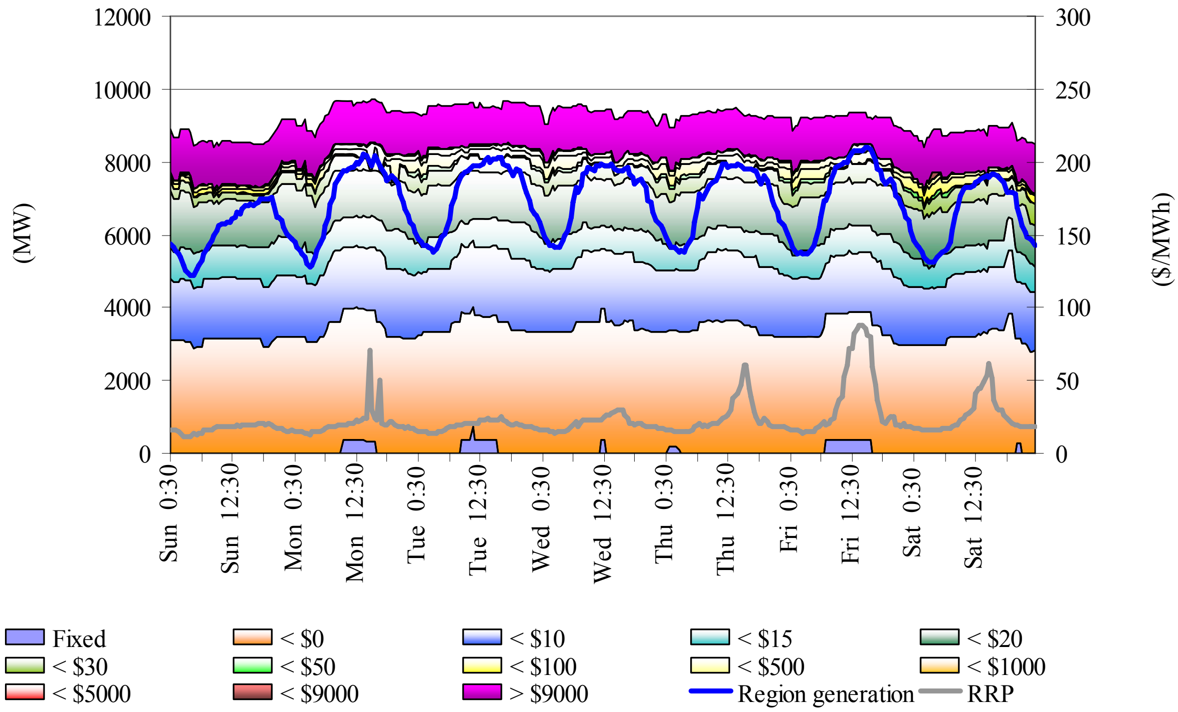


Figure 52: New South Wales closing bid prices, dispatched generation and spot price

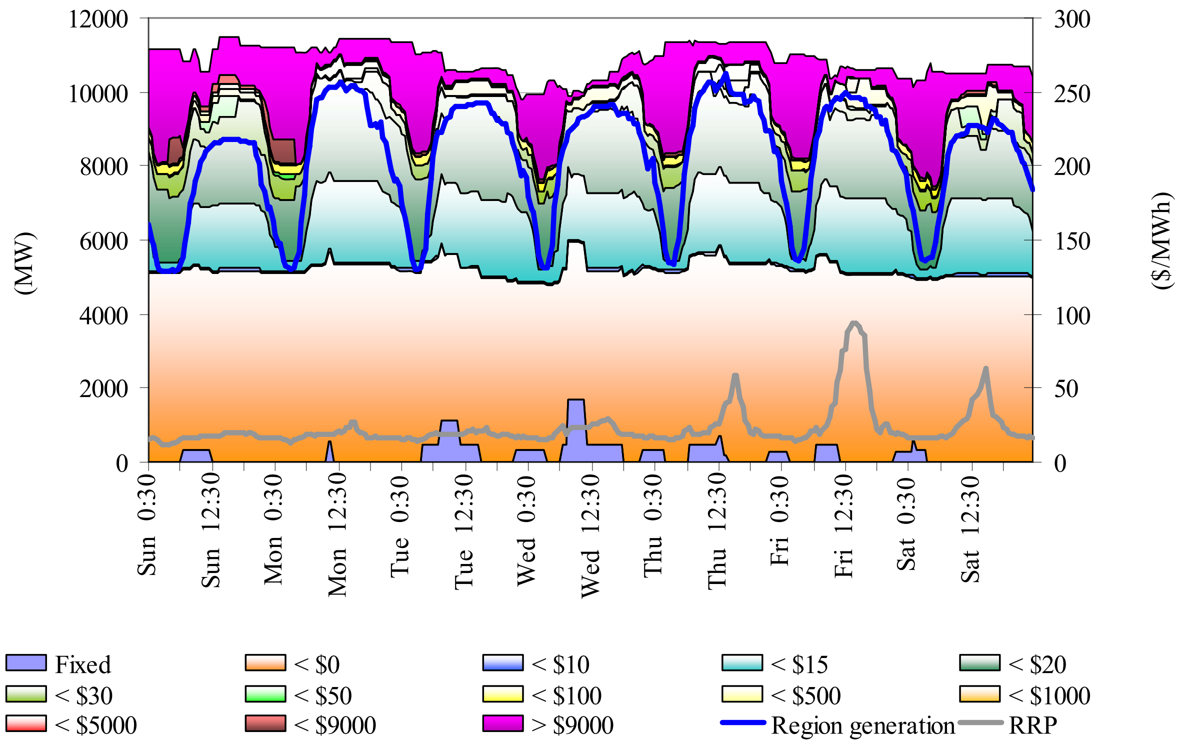


Figure 53: Victoria closing bid prices, dispatched generation and spot price

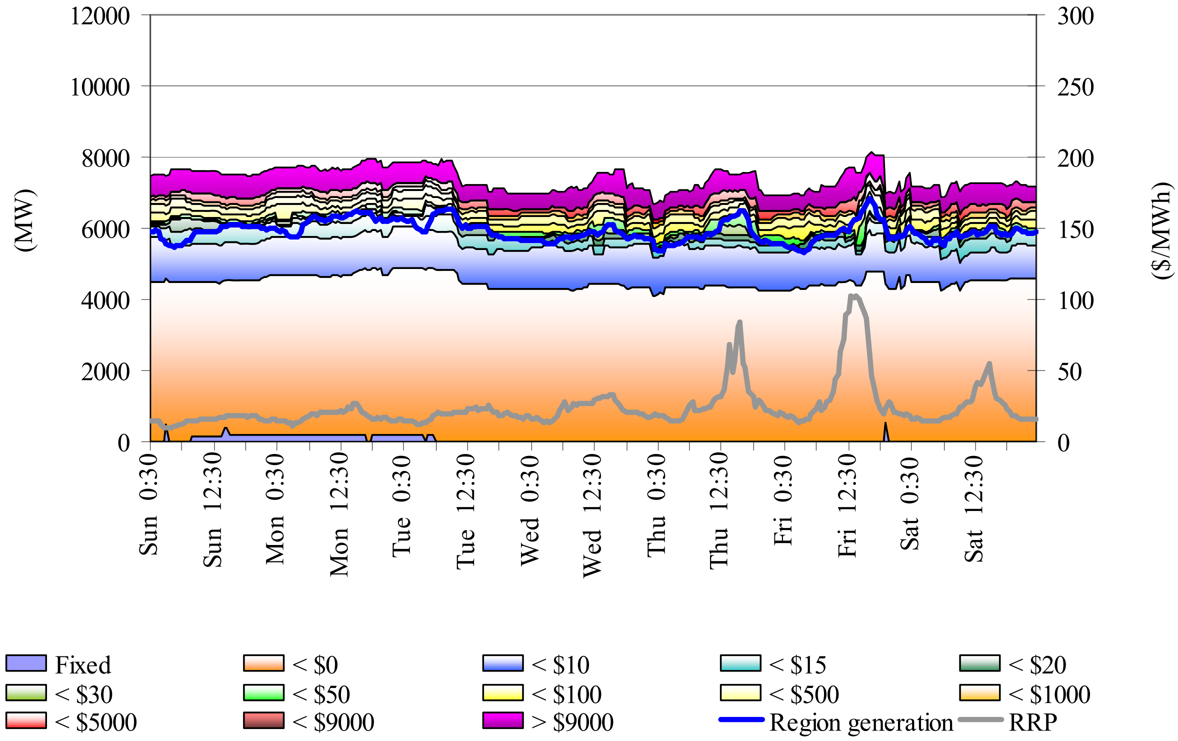


Figure 54: South Australia closing bid prices, dispatched generation and spot price

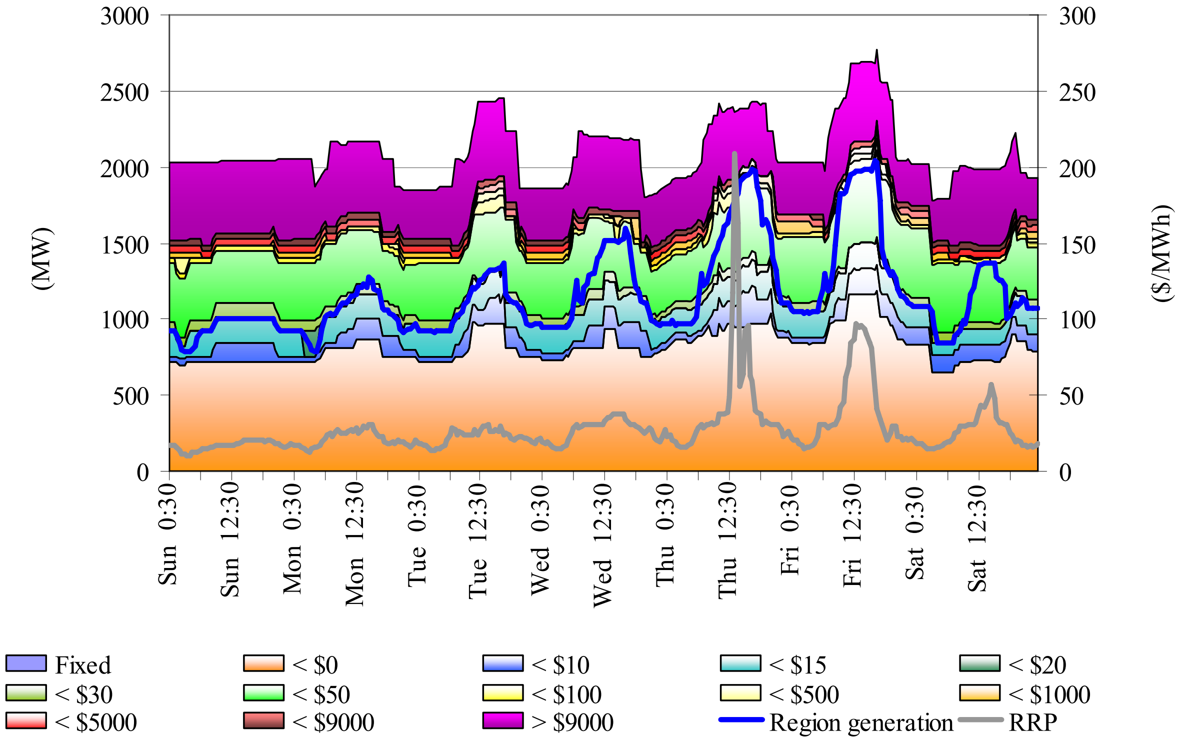
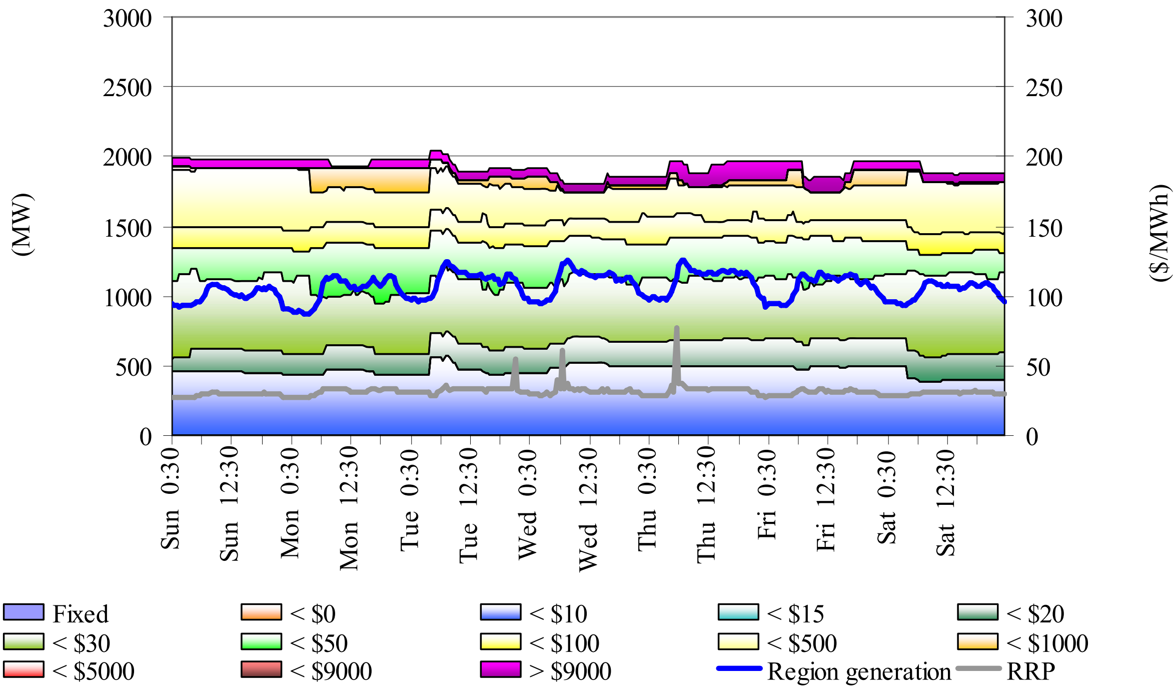


Figure 55: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was $203 000 or 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 ($/MW)	0.74	0.47	1.20	0.50	0.17	0.21	0.90	1.44
Previous week ($/MW)	0.47	0.41	0.99	0.45	0.15	0.19	0.71	1.57
Last quarter ($/MW)	1.76	0.73	1.15	1.54	0.39	2.28	5.00	1.93
Market Cost ($1000s)	35	23	79	11	1	1	21	31
% of energy market	0.04%	0.02%	0.08%	0.01%	0.00%	0.00%	0.02%	0.03%

The total cost of ancillary services in Tasmania for the week was around $40 000 or 0.7 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 ($/MW)	1.28	0.25	0.25	0.25	0.35	0.25	0.25	0.25
Previous week ($/MW)	18.60	0.25	0.25	9.39	0.25	0.25	0.25	15.66
Last quarter ($/MW)	7.89	1.05	1.05	1.58	4.43	1.06	1.06	1.97
Market Cost ($1000s)	10	3	3	2	6	8	6	2
% of energy market	0.18	0.04	0.04	0.04	0.10	0.14	0.11	0.04

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

Figure 58: daily frequency control ancillary service costs

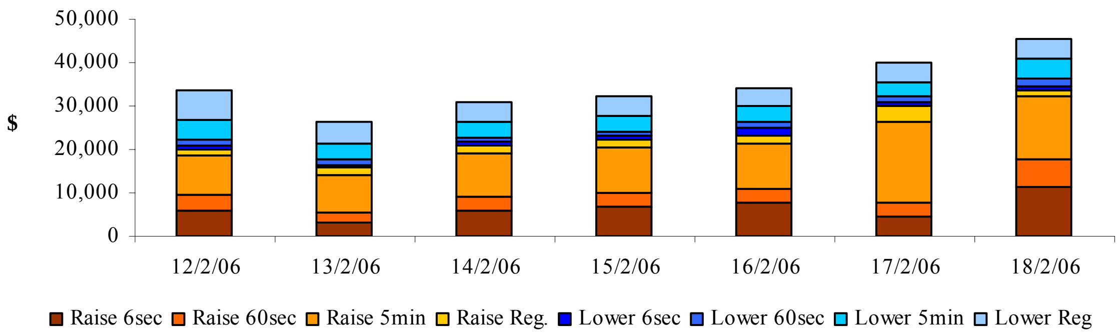
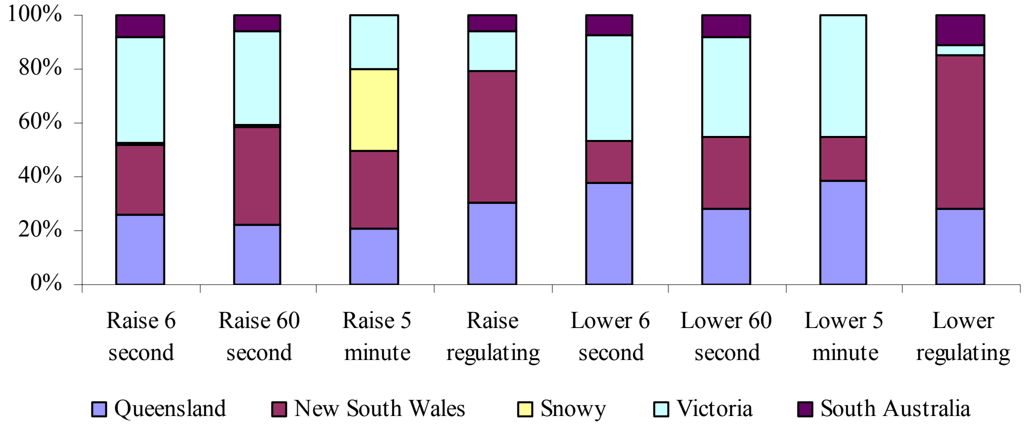


Figure 59 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

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

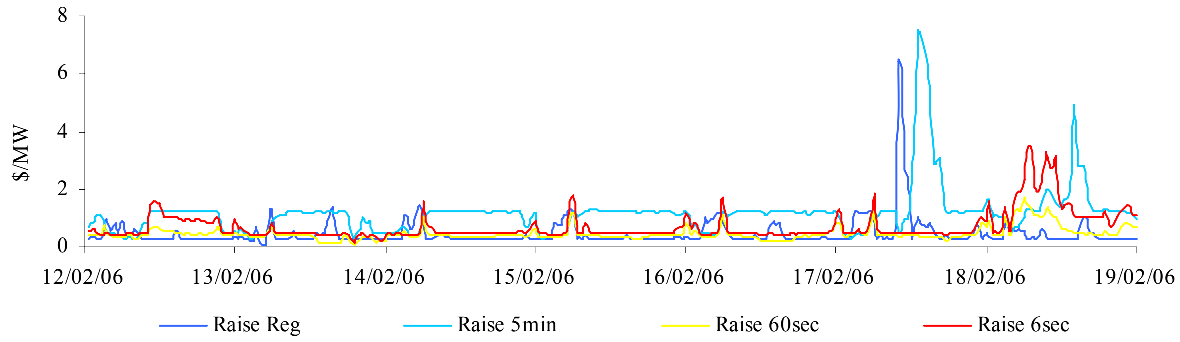


Figure 60A: prices for raise services - Tasmania

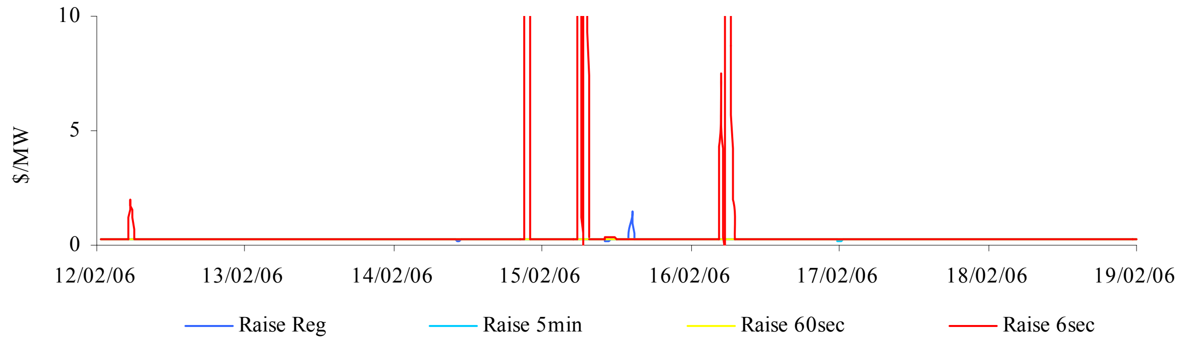


Figure 61: prices for lower services

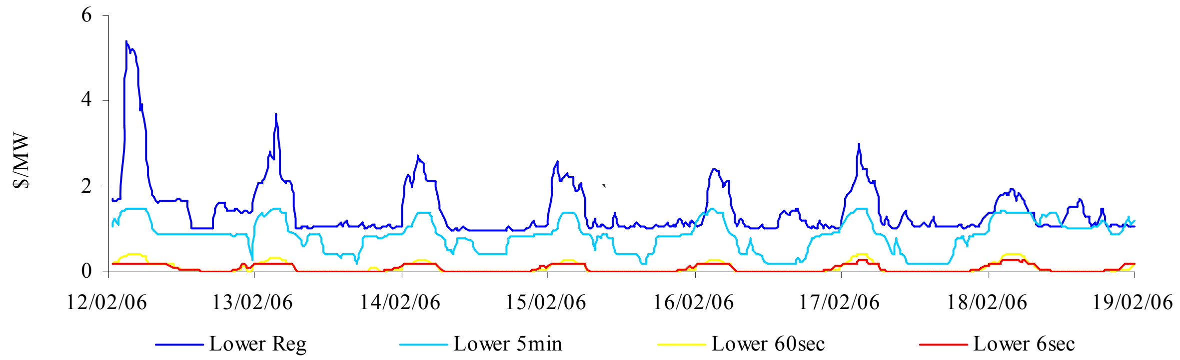
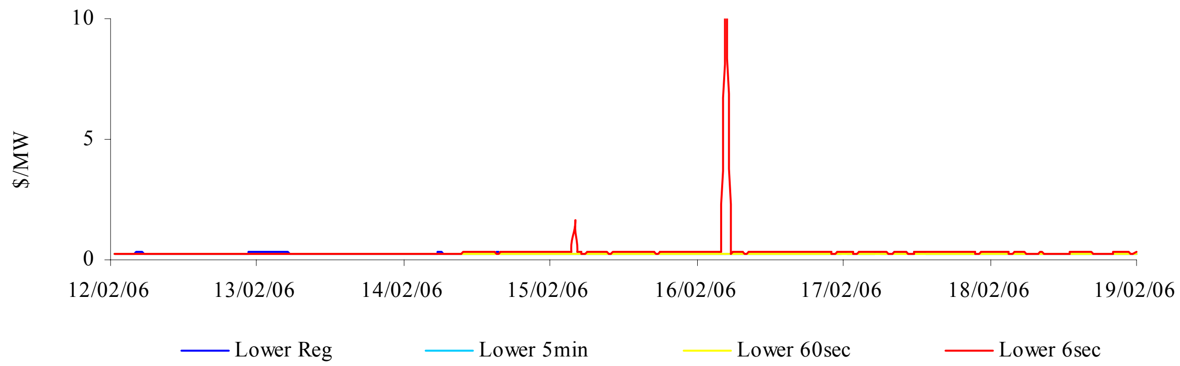


Figure 61A: prices for lower services - Tasmania



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

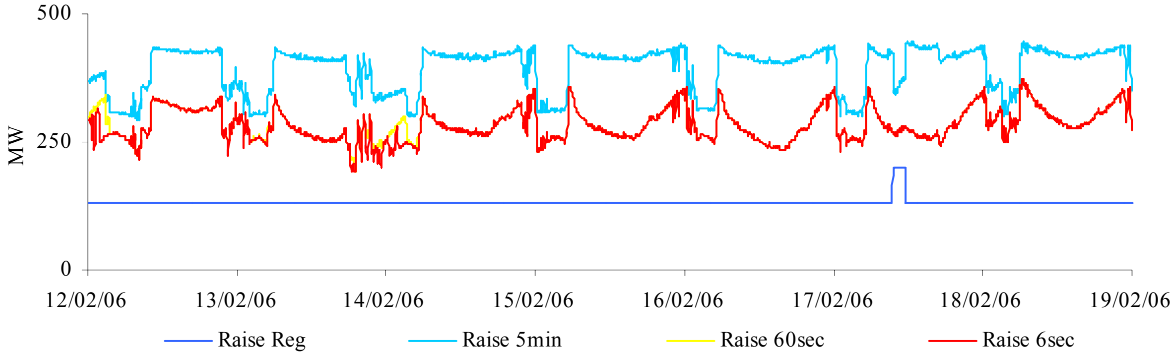


Figure 62A: raise requirements - Tasmania

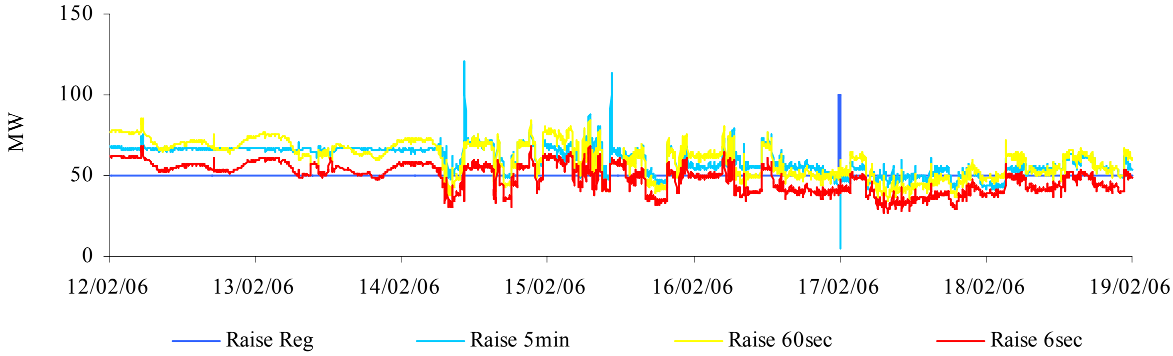


Figure 63: lower requirements

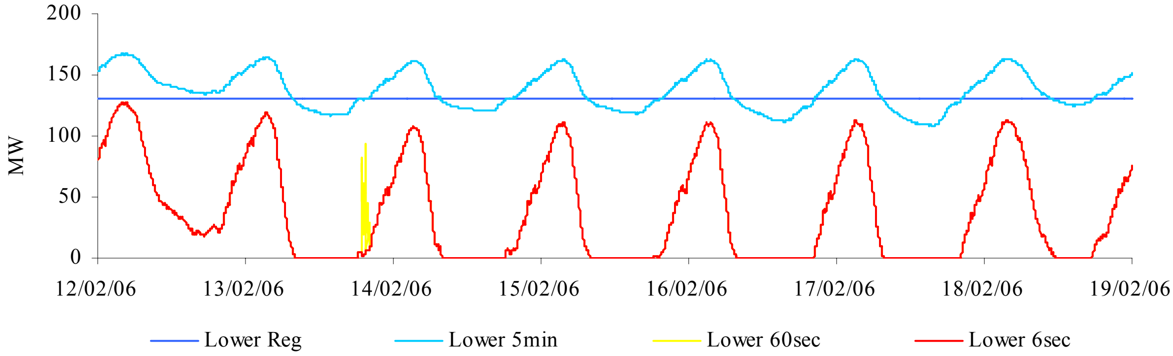
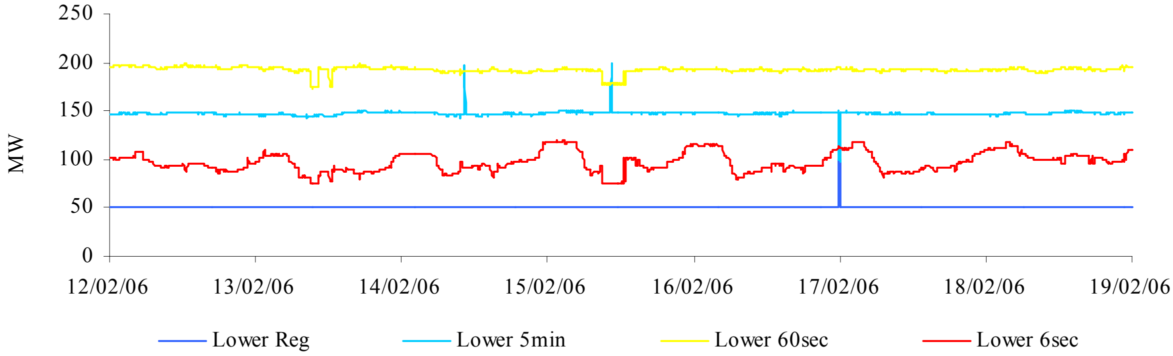


Figure 63A: lower requirements - Tasmania



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