Market analysis

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2 JULY – 8 JULY 2006

Spot prices for the week averaged between $24/MWh in Queensland and $49/MWh in South Australia. These prices were consistent with the previous week.

Turnover in the energy market was $153 million. The total cost of ancillary services for the week was $413 000, or 0.3 per cent of energy market turnover.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 121, or a third of all trading intervals. Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in 10 per cent of all trading intervals across the market. These variations were most frequent in South Australia, occurring in around a third 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 financial year to date.

Figure 1: national demand and spot prices

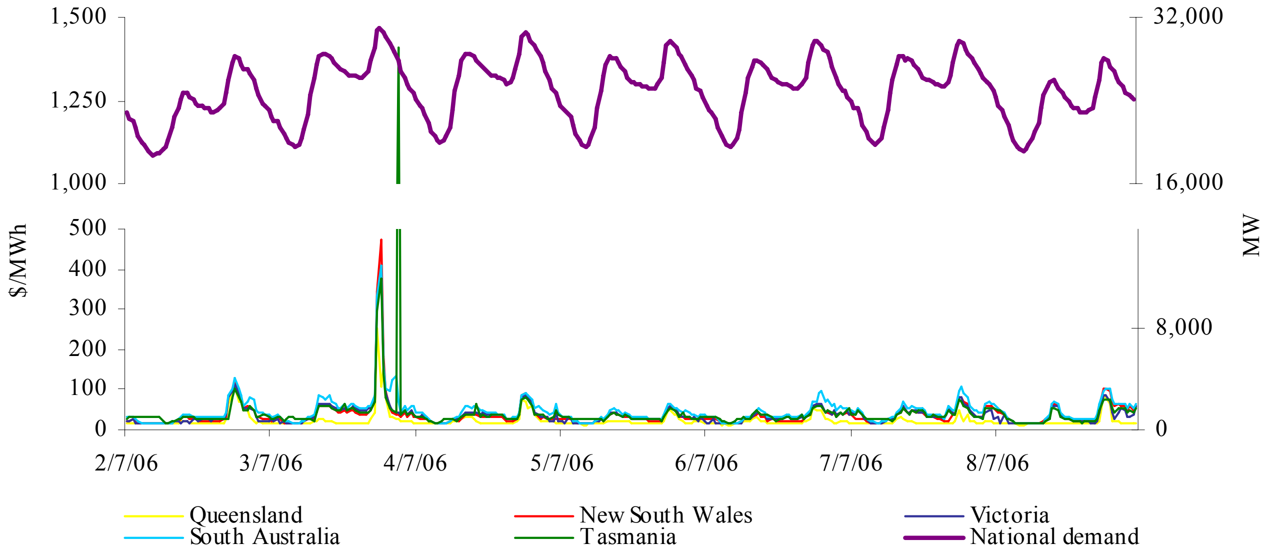


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	24	39	39	49	45
Previous week	30	37	39	43	45
Same quarter last year	22	29	30	34	100
Financial year 2005 - 06	31	43	36	44	59
% change from previous week*	▼17%	▲5%	▼1%	▲14%	▼2%
% change from same quarter last year**	▲13%	▲36%	▲29%	▲45%	-
% change from 2004 - 05***	▲3%	▼5%	▲25%	▲12%	-

*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 2005 – 06 financial year and the average spot price over the previous financial year.

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

Figure 3: Queensland

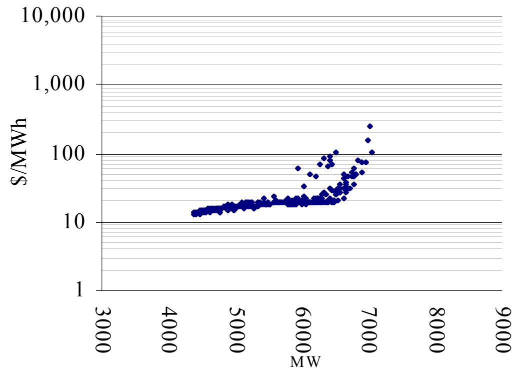


Figure 4: New South Wales

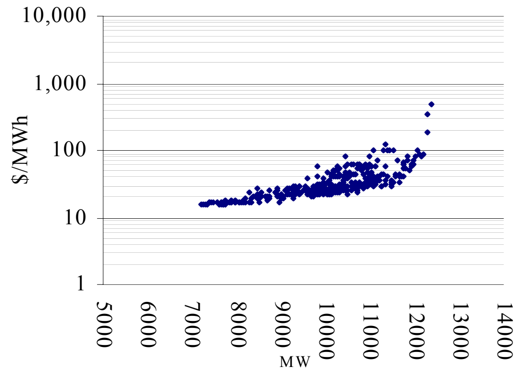


Figure 5: Victoria

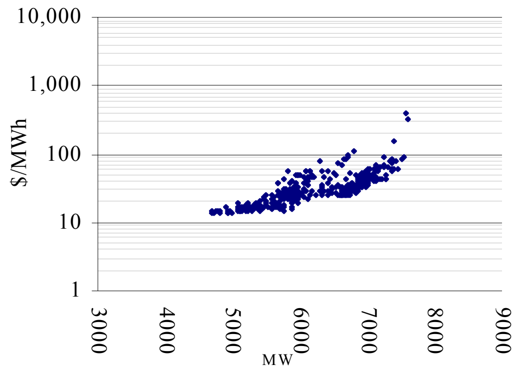


Figure 6: South Australia

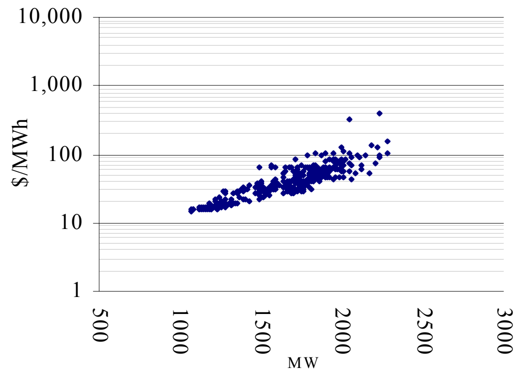
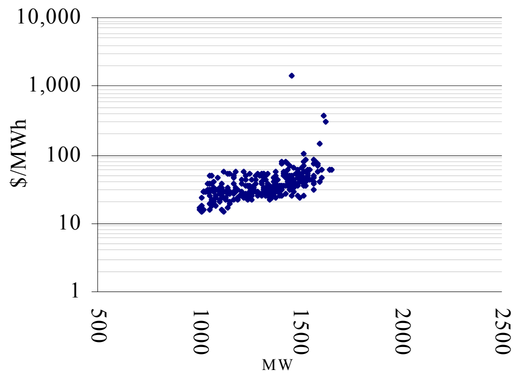


Figure 7: Tasmania



Maximum spot prices for the week were $253/MWh in Queensland, $471/MWh in New South Wales, $410/MWh in Victoria and $409/MWh in South Australia, all occurring on Monday during the evening peak. The maximum spot price was $1409/MWh in Tasmania at 9.30 pm on Monday evening. 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	0.66	1.02	0.90	0.96	0.84
Previous week	1.34	1.07	0.78	0.62	0.83
Same quarter last year	0.64	0.86	0.86	0.83	0.81

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

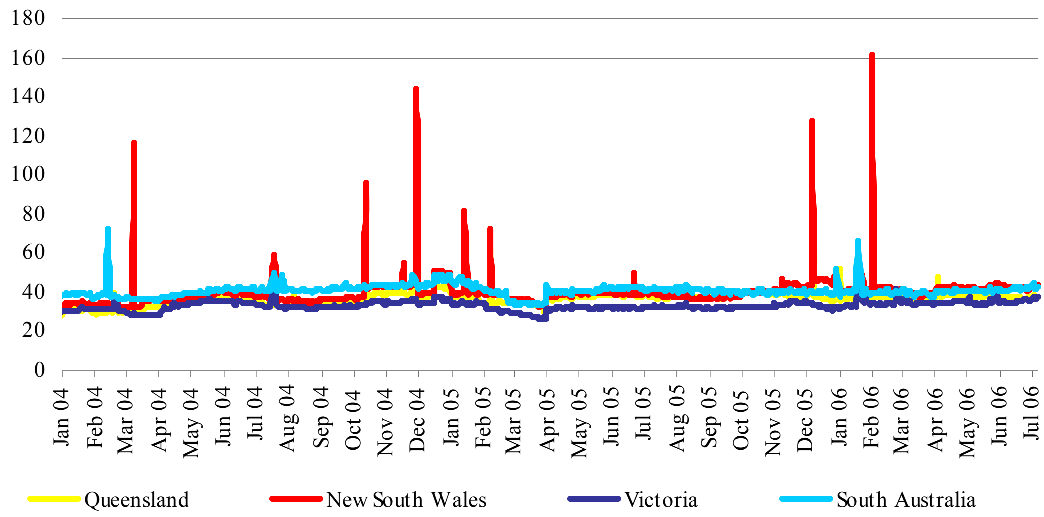
Figure 9 sets out the d-cyphaTrade wholesale electricity price index (WEPI)* for each region throughout the week excluding Tasmania. Figure 10 sets out the WEPI since 1 January 2004.

Figure 9: d-cyphaTrade WEPI for the week

	Monday	Tuesday	Wednesday	Thursday	Friday
Queensland	38.89	38.01	37.97	37.98	37.66
New South Wales	44.09	43.65	42.95	43.09	43.59
Victoria	37.88	37.12	37.12	37.44	37.90
South Australia	45.16	42.40	42.01	42.88	43.06

* A 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

Figure 10: d-cyphaTrade WEPI



Reserve

There were no low reserve conditions forecast.

Figures 11 to 15: spot price, net import and limit at time of weekly maximum demand

Figure 11: Queensland

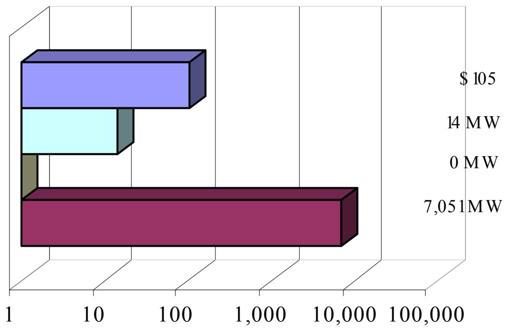


Figure 12: New South Wales

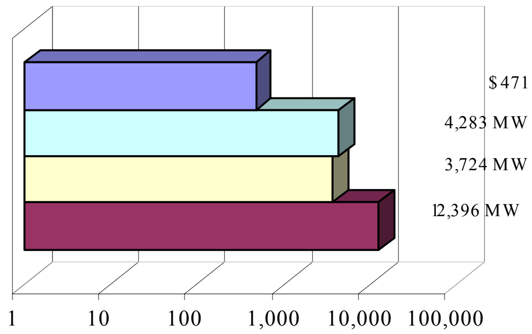


Figure 13: Victoria

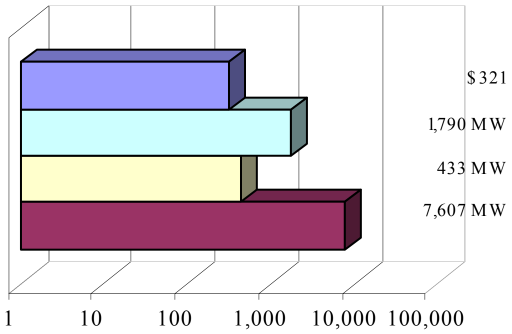


Figure 14: South Australia

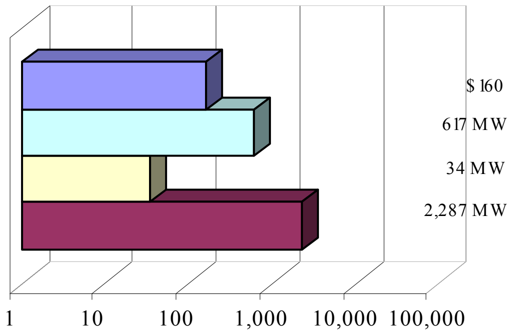
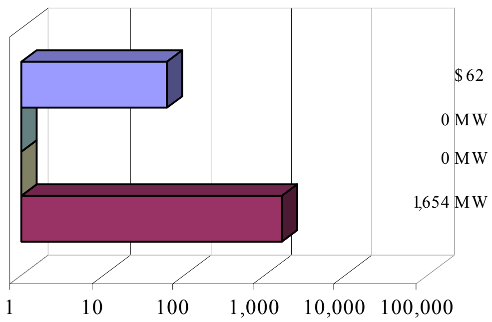
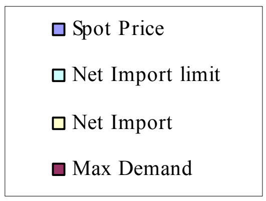


Figure 15: Tasmania





Price variations

There were 121 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 versus 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

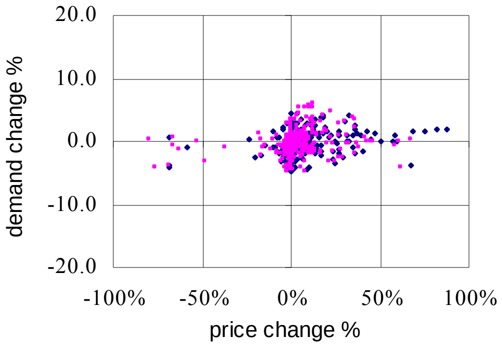


Figure 17: New South Wales

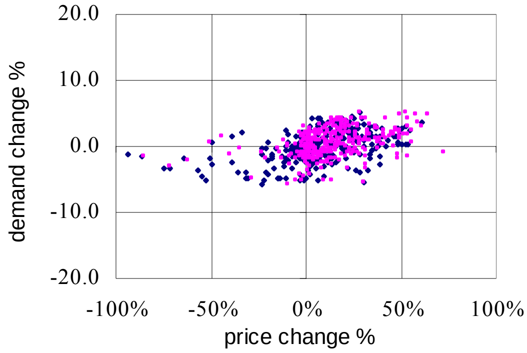


Figure 18: Victoria

Figure 19: South Australia

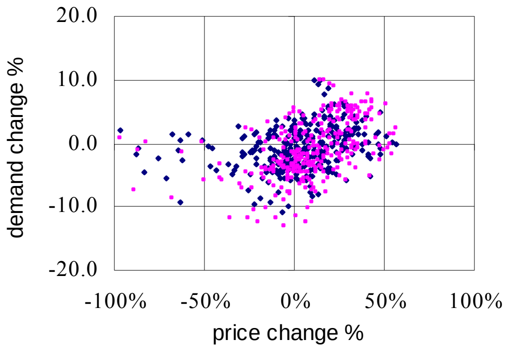


Figure 20: Tasmania

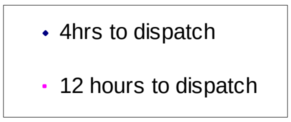
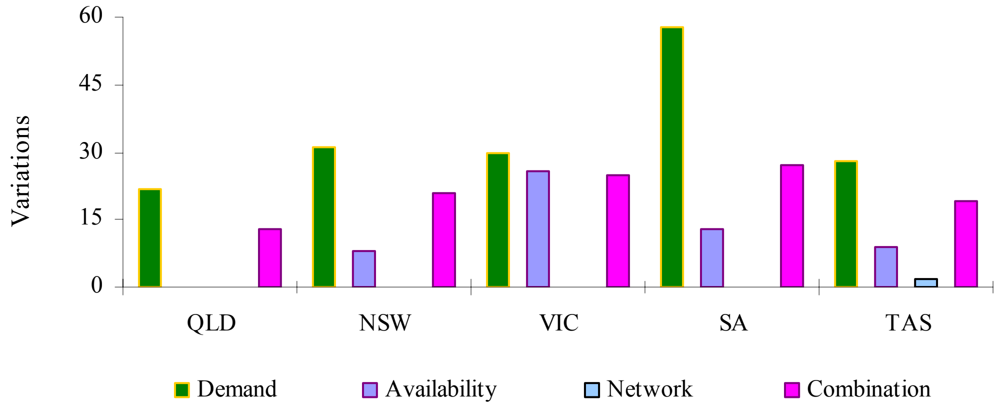


Figure 21 summarises the number and most probable reason for variations between forecast and actual prices.

Figure 21: reasons for variations between forecast and actual prices



Price and demand

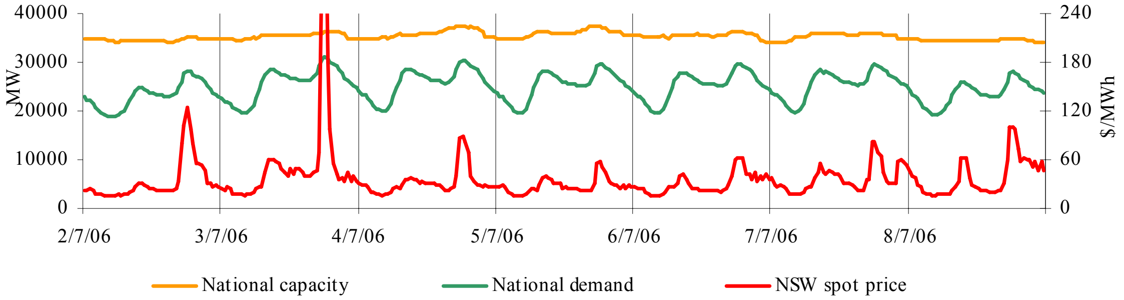
Figures 22 – 56 set out details of spot prices and demand on a national and regional basis. They include the actual spot price, actual demand and variation from forecasts made 4 and 12 hours ahead of dispatch.

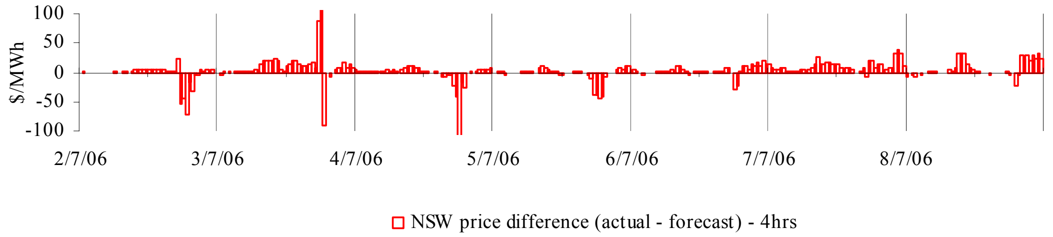
The regions within the national market are regularly aligned, with conditions in one region reflected across all others. The national market outcomes section highlights pricing events that occurred when spot prices were generally aligned across all regions of the national electricity market – the New South Wales spot price has been used to represent a pseudo national price under these conditions.

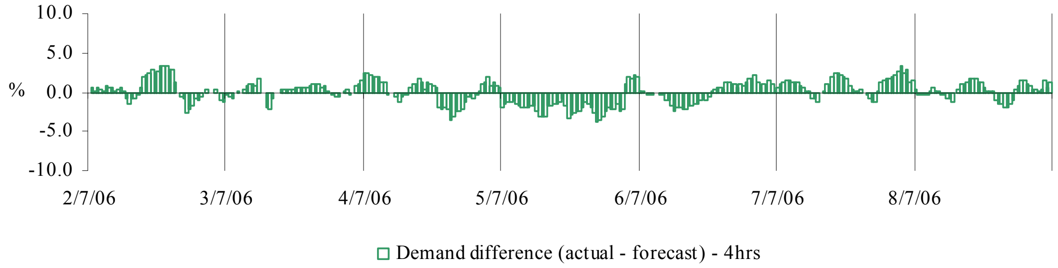
On a regional basis the differences between the maximum temperature and the temperature forecast at around 6.00 pm the day before are also included.

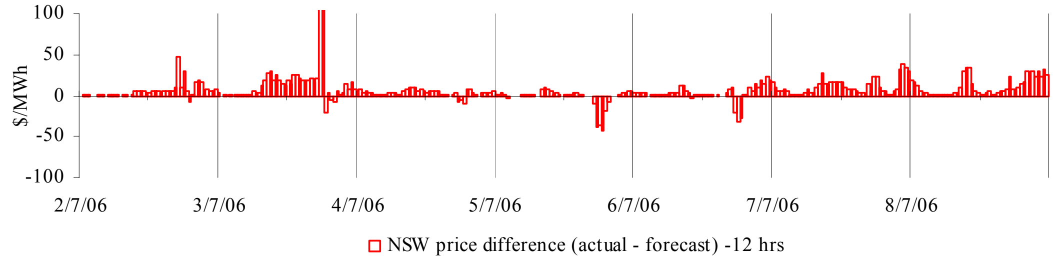
In each section, the occurrences of all prices for the week greater than three times the average have been presented. The price forecast is compared to the demand and availability forecasts made 4 and 12 hours ahead, with significant changes to these forecasts explained.

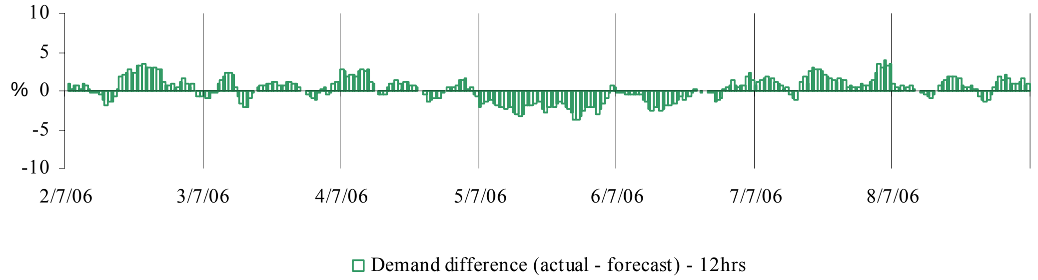
Figures 22-26: National market outcomes











There were three occasions where spot prices were aligned nationally and the New South Wales price[1] was greater than three times the New South Wales weekly average price of $39/MWh. A further trading interval at 6.30pm on 3 July is included in this section, as prices were aligned across all of the regions except Queensland.

[1] The New South Wales spot price has been used to represent a pseudo national price under these conditions.

Sunday, 2 July

6:30 pm	Actual	4 hr forecast	12 hr forecast
NSW price ($/MWh)	123.38	168.18	93.34
National demand (MW)	28234	28695	28050
Available capacity (MW)	35139	35120	35390

Conditions at the time saw national demand and price close to forecast.

There were no significant rebbiding.

Monday, 3 July

6:00 pm	Actual	4 hr forecast	12 hr forecast
NSW price ($/MWh)	346.30	258.00	94.96
National demand (MW)	30 670	30 639	30 669
Available capacity (MW)	35 992	36 184	36 651
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
NSW price ($/MWh)	471.03	288.88	219.29
National demand (MW)	30 949	30 986	31 100
Available capacity (MW)	36 320	36 215	36 653
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
NSW price ($/MWh)	181.04	273.07	203.00
National demand (MW)	30 618	30 724	30 847
Available capacity (MW)	36 294	36 305	36 573

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

Delays in the return to service of Eraring Energy's unit two following a three day outage, saw a reduction of 640 MW of available capacity through a rebid at 8.55 am for the evening peak. Most of this capacity was priced at less than $30/MWh. The rebid reason given was "Bid rearrangement due to delay in ER02 RTS". A further rebid at 1.56 pm removed the remaining capacity, all of which was priced at less than zero. The unit returned to service the following morning.

Delays in the return of International Power's Hazelwood unit 8, following a month long outage, saw a reduction of 220 MW of available capacity through a rebid at 9.39 am for the evening peak. All of this capacity was priced at less than $15/MWh. The rebid reason given was "Delay in unit RTS" or "delay in unit return to service".

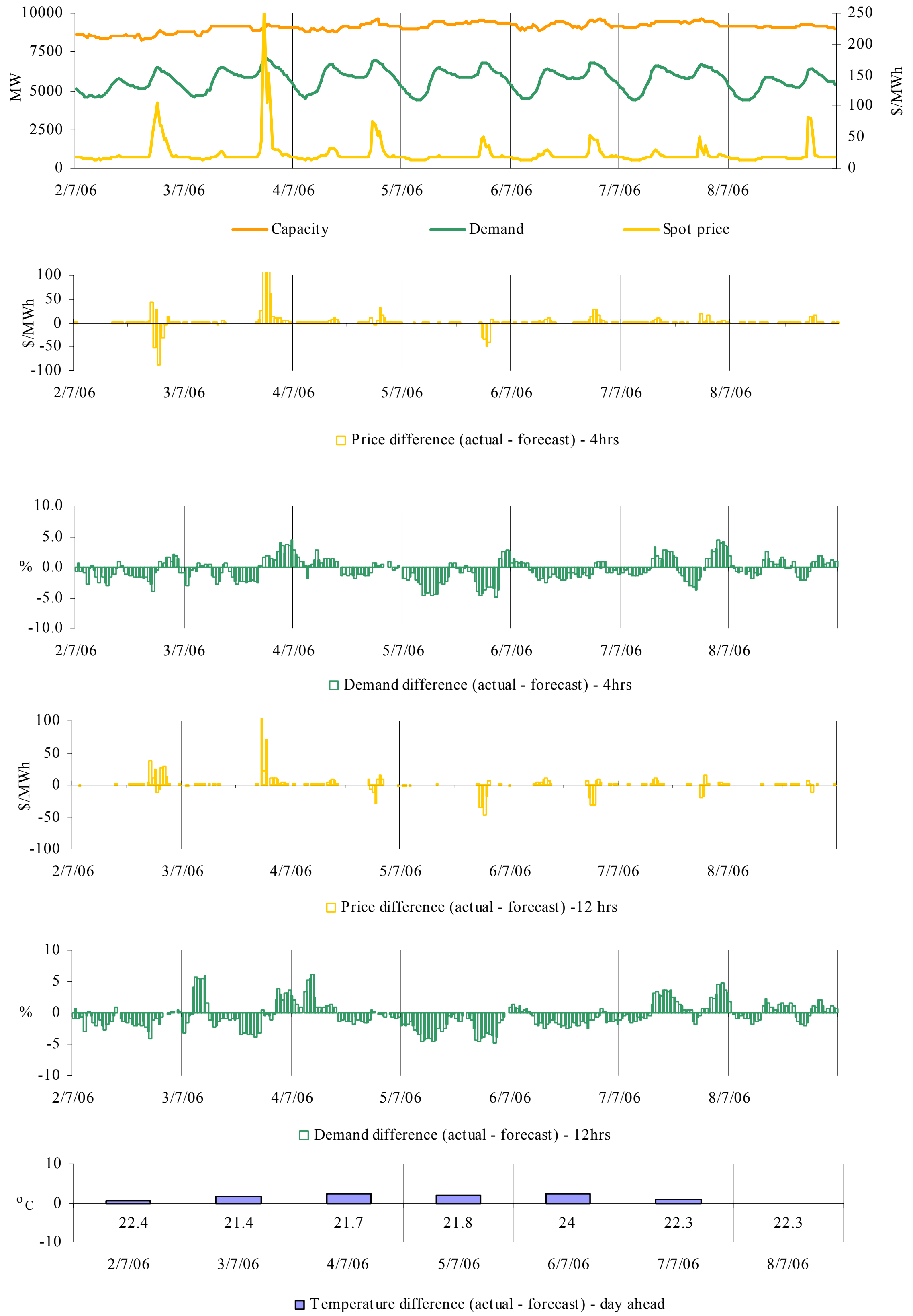
At 2.15 pm LYMMCO shifted 125 MW of capacity at Loy Yang A from prices below $15/MWh to above $8200/MWh across its portfolio. The rebid reason given was "Change in PD at 14:03". At 5.41 pm it rebid another 50 MW of capacity from prices below $90/MWh to above $4000/MWh, the rebid reason given was "Change in 5-min PD at 1736".

At 5.12 pm Macquarie Generation shifted 1070 MW of available capacity from prices of less than $200/MWh to above $6500/MWh across its portfolio. The rebid reason given was "Load expected to vary from forecast".

At 6.10 pm Millmerran Energy shifted 110 MW of available capacity at Millmerran from a price of $5/MWh to above $9500/MWh. The rebid reason given was "Financial optimisation – changed predispatch".

There was no other significant rebidding.

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



There were nine occasions where the spot price in Queensland was greater than three times the weekly average price of $24/MWh. Four of these price events occurred when prices were aligned nationally and are detailed in the national market section. The remaining five occurred when the spot price in Queensland was greater than three times the weekly average price of $24/MWh and the prices were aligned nationally, but were less than three times the weekly average price in the other regions.

Sunday, 2 July

6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	89.77	142.56	79.63
Demand (MW)	6409	6474	6474
Available capacity (MW)	8560	8837	9065

Conditions at the time saw demand and price close to forecast, with prices aligned across the mainland.

At 2.24 pm, Tarong Energy's Tarong North tripped, reducing its available capacity by 443 MW to zero for the evening peak. All of this capacity was priced at less than zero. From 4.59 pm, the unit was rebid to return to service, with it commencing generation by 5.30 pm and reaching full output by 7 pm.

There was no other significant rebbiding.

Monday, 3 July

7:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	78.92	19.20	80.00
Demand (MW)	6852	6749	6879
Available capacity (MW)	9211	9227	9271

Conditions at the time saw demand and available capacity close to forecast four hours ahead. Prices were generally aligned across the mainland with five-minute prices reaching $560/MWh at 5.50 pm.

At 6.10 pm Millmerran Energy shifted 110 MW of available capacity at their two units from a price of $5/MWh to above $9500/MWh. The rebid reason given was "Financial optimisation – changed predispatch".

There was no other significant rebidding.

Tuesday, 4 July

6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	75.72	77.00	83.24
Demand (MW)	6914	6860	6883
Available capacity (MW)	9493	9461	9327

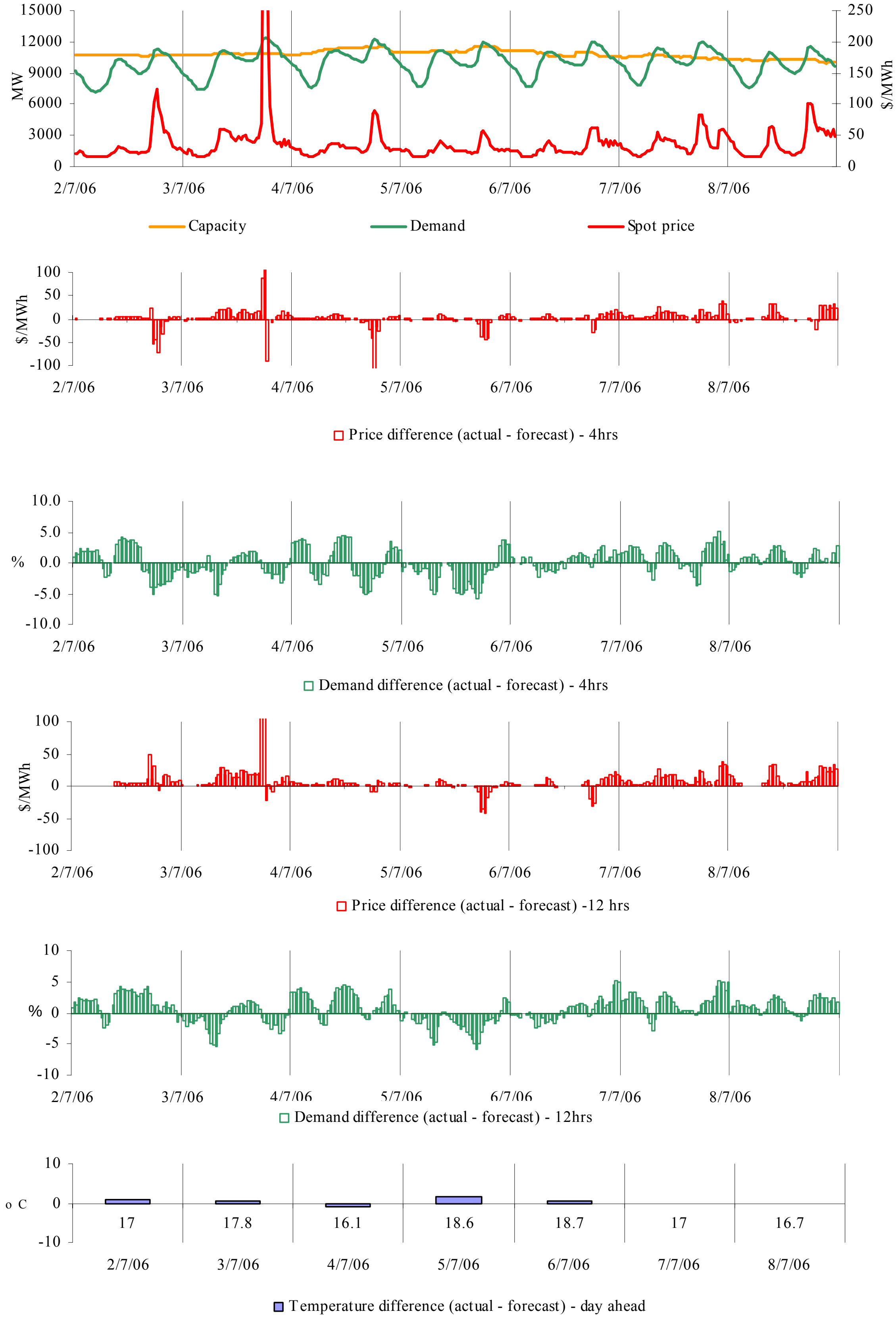
Conditions at the time saw demand, available capacity and price all close to forecast, with prices aligned across the mainland. There was no significant rebidding.

Saturday, 8 July

6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	83.55	69.05	77.00
Demand (MW)	6328	6375	6349
Available capacity (MW)	9233	9233	9229
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	80.66	68.30	77.50
Demand (MW)	6434	6393	6384
Available capacity (MW)	9235	9235	9231

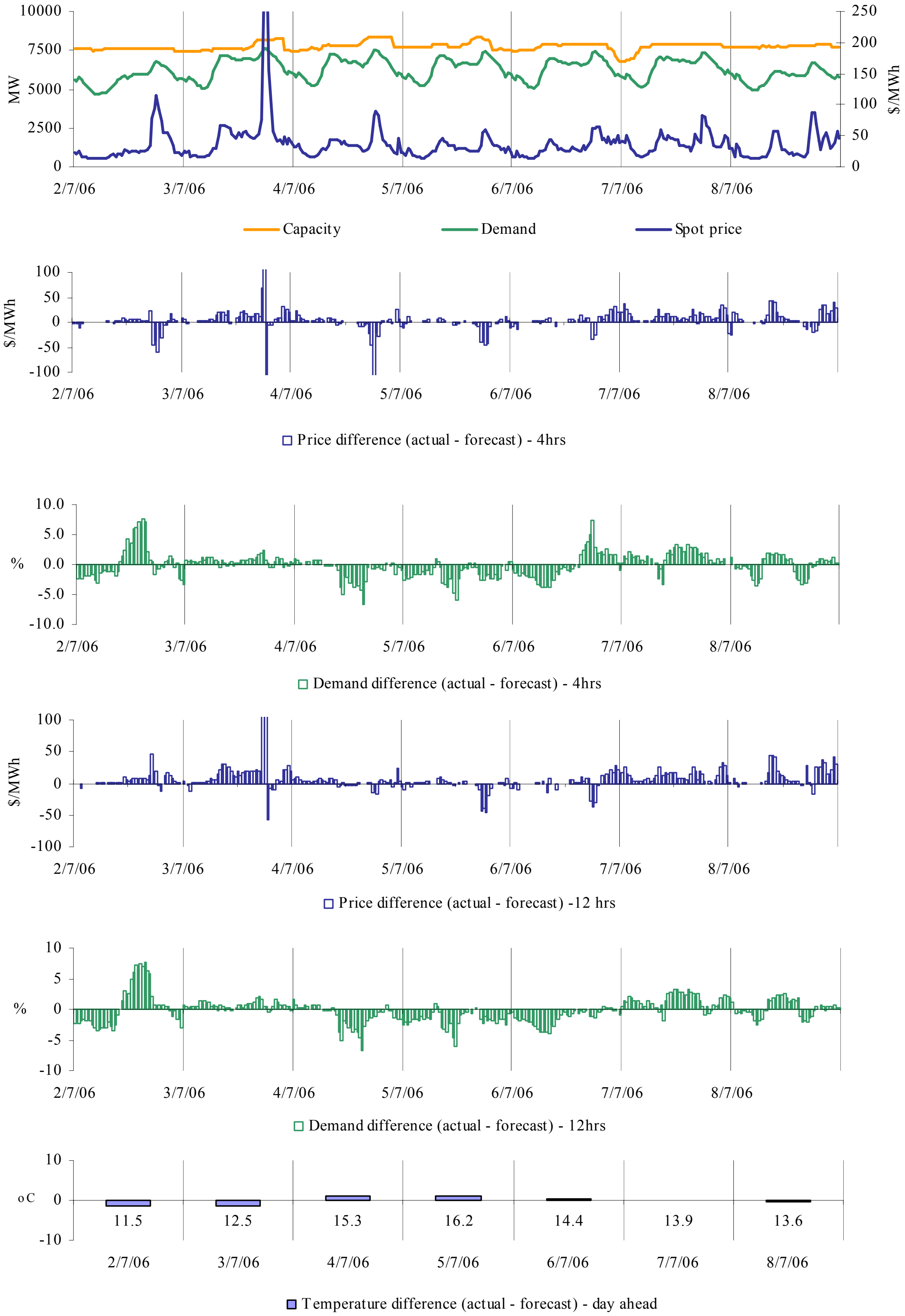
Conditions at the time saw demand, availability and prices close to forecast, with prices aligned across the mainland. There was no significant rebidding.

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



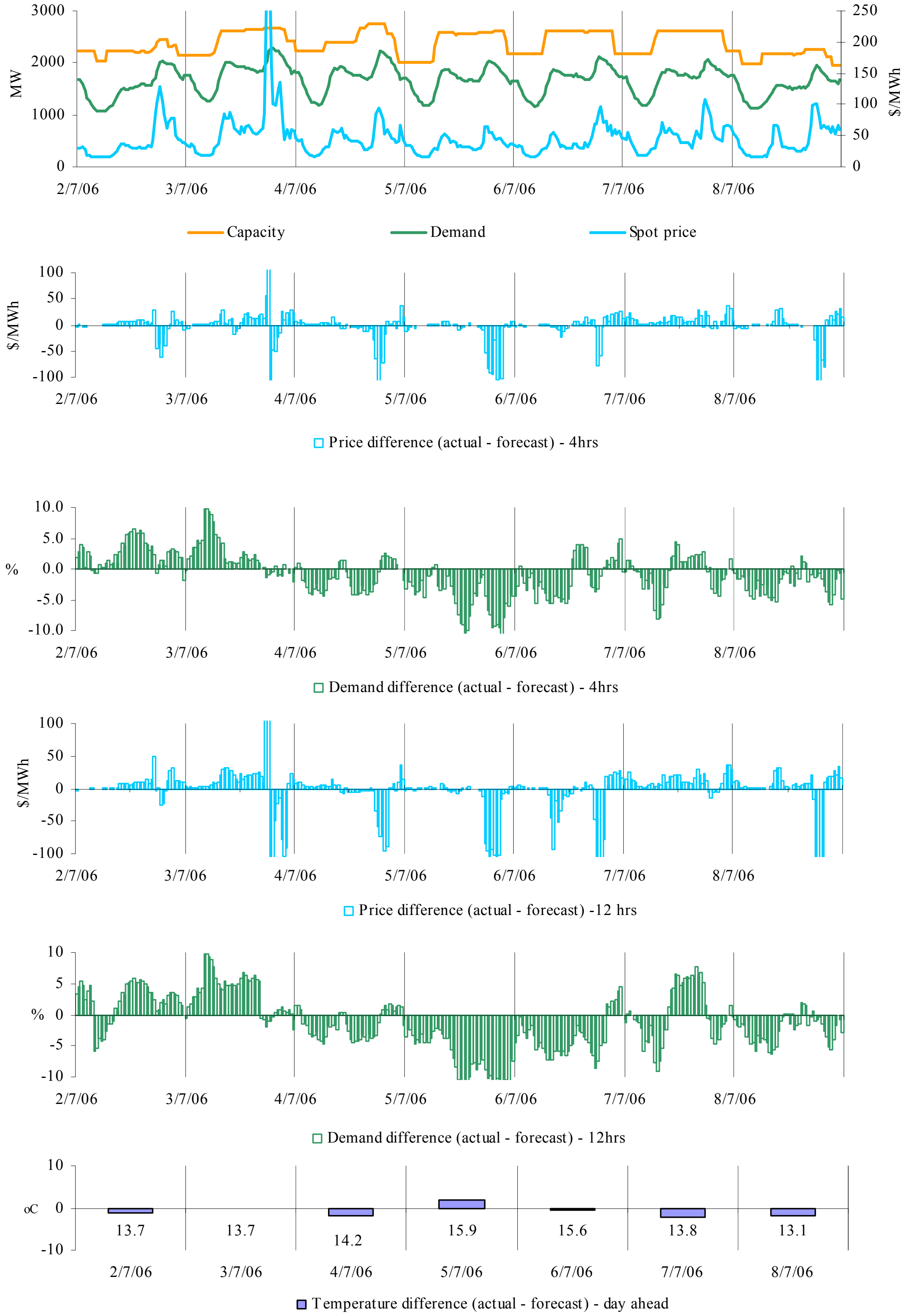
There were four occasions where the spot price in New South Wales was greater than three times the weekly average price of $39/MWh. All these prices occurred when prices were aligned across the mainland regions and are detailed in the national market section.

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



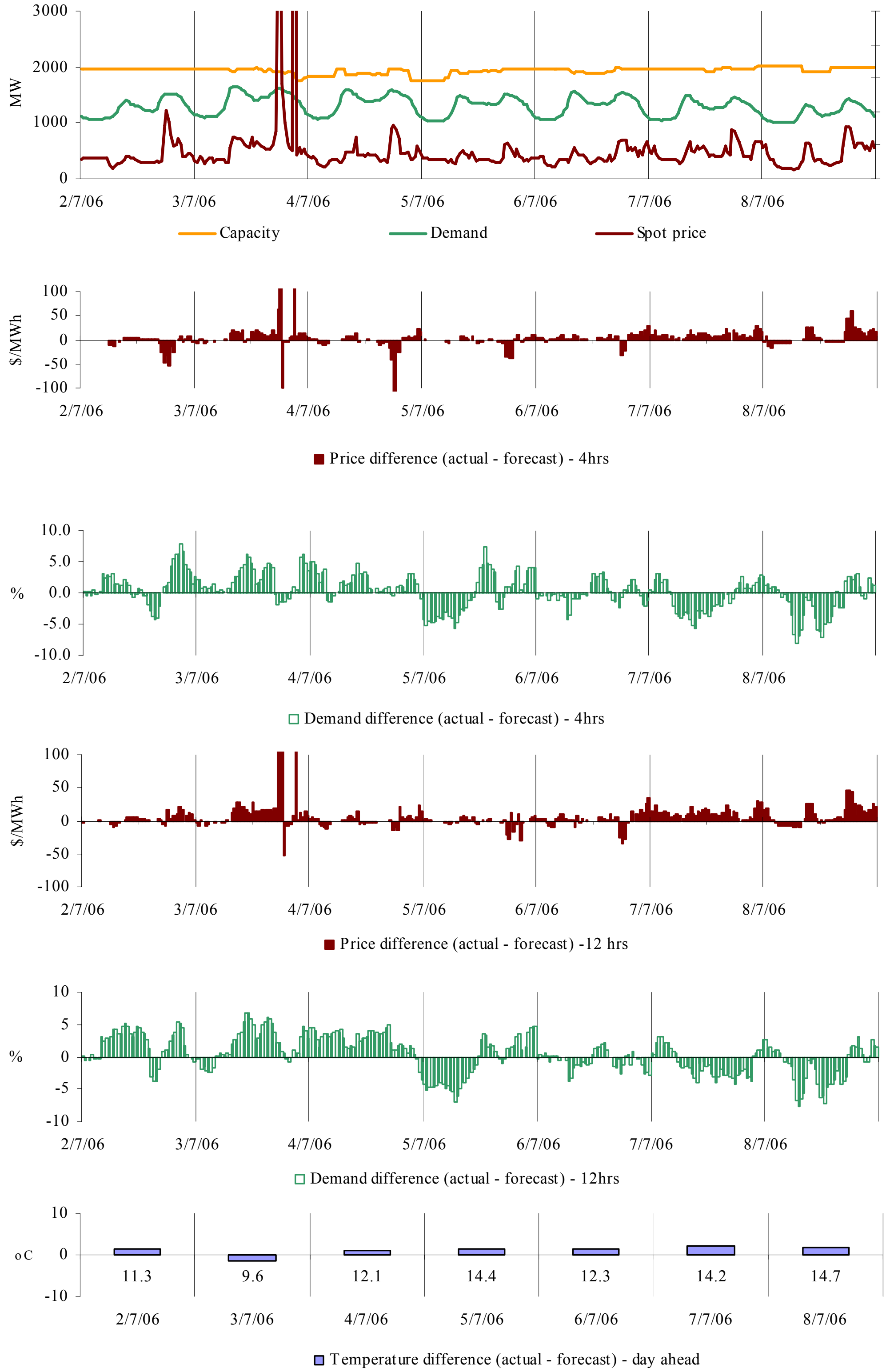
There were three occasions where the spot price in Victoria was greater than three times the weekly average price of $39/MWh. All these prices occurred when prices were aligned across the mainland regions and are detailed in the national market section.

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



There were three occasions where the spot price in South Australia was greater than three times the weekly average price of $49/MWh. All these prices occurred when prices were aligned across the mainland regions and are detailed in the national market section.

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



There were four occasions where the spot price in Tasmania was greater than three times the weekly average price of $45/MWh. Three of these prices occurred when prices were aligned across the market and are detailed in the national market section. There was one occasion where the spot price in Tasmania was greater than three times the weekly average price of $45/MWh and not aligned with the rest of the market.

Monday, 3 July

9:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1408.89	32.10	40.16
Demand (MW)	1464	1457	1455
Available capacity (MW)	1894	1837	1837

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

At 9.05 pm, the price of energy increased from $36/MWh to $7973/MWh. This was driven by a step change in Hydro Tasmania's offer profile[2] as detailed in the following table.

	9:00 pm	**9:05 pm**	***change***	**9:10 pm**	***change***	**9:15 pm**
Available generation	1917	1917	*0*	1889	*-28*	1889
Capacity offered at prices						
>$7000/MWh	49	239	*190*	179	*-60*	179
<$230/MWh	1868	1678	*-190*	1710	*32*	1710
<$65/MWh	1834	1570	*-264*	1602	*32*	1602
<$36/MWh	1647	1326	*-321*	1358	*32*	1358
Demand	1519	1507		1496		1466
export	109	79		50		-88
Demand + export (Hydro generation)	**1628**	**1587**		**1546**		**1377**
Price	**$36.46**	**$7,972.63**		**$303.74**		**$62.28**

Prior to this, BassLink was flowing northwards at greater than 100 MW. The change in offer prices led to a reduction in exports from Tasmania. However the no-go zone[3] and the interaction of the frequency and energy markets limited this reduction with flow remaining at 79 MW northwards for 9.05 pm. Generation was reduced from 1628 MW to 1587 MW. At the same time, a number of units were "trapped" in the ancillary service markets, further reducing the available capacity in the energy market priced at less than $220/MWh by 130 MW. The five-minute energy price was subsequently set at $7973/MWh while the prices for locally sourced raise regulation and raise 5 minute exceeded $4000/MWh.

[2] This change was as part of Hydro Tasmania's day-ahead bids and was not introduced through a rebid.

[3] The BassLink interconnector is technically incapable of transitioning from northwards to southwards flows (or vice-versa) instantly. This restriction is implemented in the market systems through the concept of a no-go zone. This blocks the interconnector at 50 MW from zero (in either direction) for one dispatch interval. The interconnector is also prevented from transferring frequency control ancillary services in the no-go zone. This means moving towards the no-go zone, ahead of a transition from northward to southward flows, leads to an increase in the requirement for Tasmanian sourced raise frequency control ancillary services, which can reduce the availability of generation in the Tasmanian energy market. Once through the no-go zone, however, BassLink can again transfer frequency control ancillary services from the mainland.

The dispatch and pricing optimising algorithm considers the prices of energy and ancillary services concurrently – with the combined ancillary service price increases outweighing the energy price decrease. The flow did not reduce to 50MW (the minimum allowed by the no-go zone), because this would have led to a greater combined increase in ancillary services price compared to the reduction in energy price. This would not occur without the no-go zone.

At 9.10 pm, an increase in the availability of ancillary services saw their prices fall, allowing the interconnector to reduce to 50 MW northwards - the boundary of the no-go zone. A rebid by Hydro Tasmania at 9.01 pm, for this dispatch interval, reduced the availability of Trevallyn by 28 MW and shifted 60 MW of capacity at Gordon from prices of greater than $7000/MWh to less than $20/MWh. The rebid reasons given were "Unit trip: Trevalln". This rebid led to an additional 15 MW of raise 5 minute service.

By 9.15 pm, BassLink had changed direction and was flowing southwards at 88 MW, with the five-minute dispatch price falling to $62/MWh.

There was no other 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

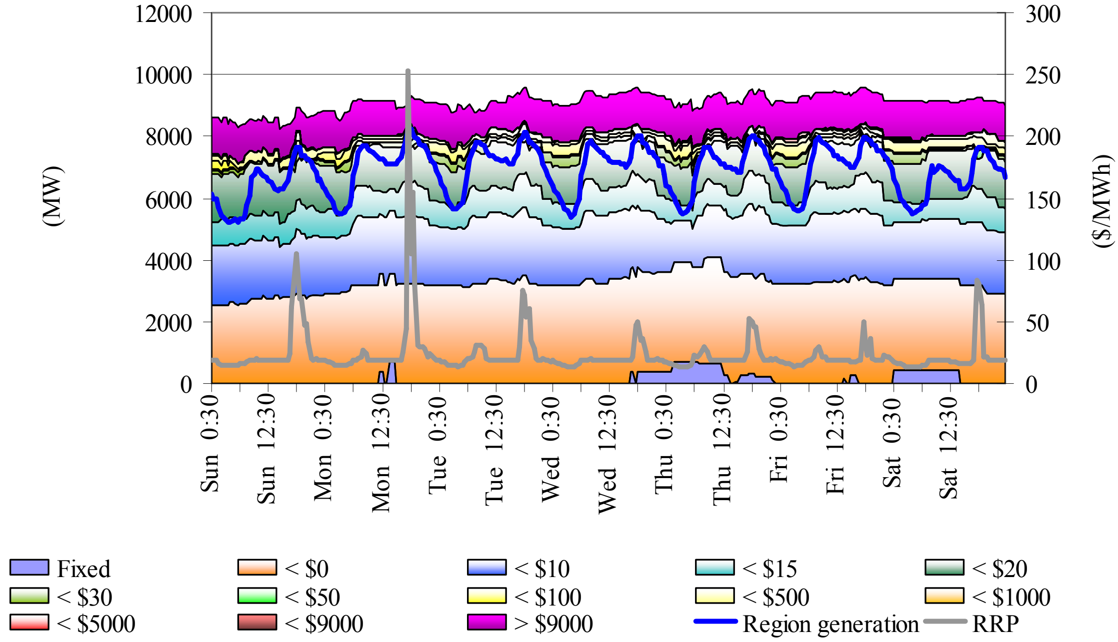


Figure 58: New South Wales closing bid prices, dispatched generation and spot price

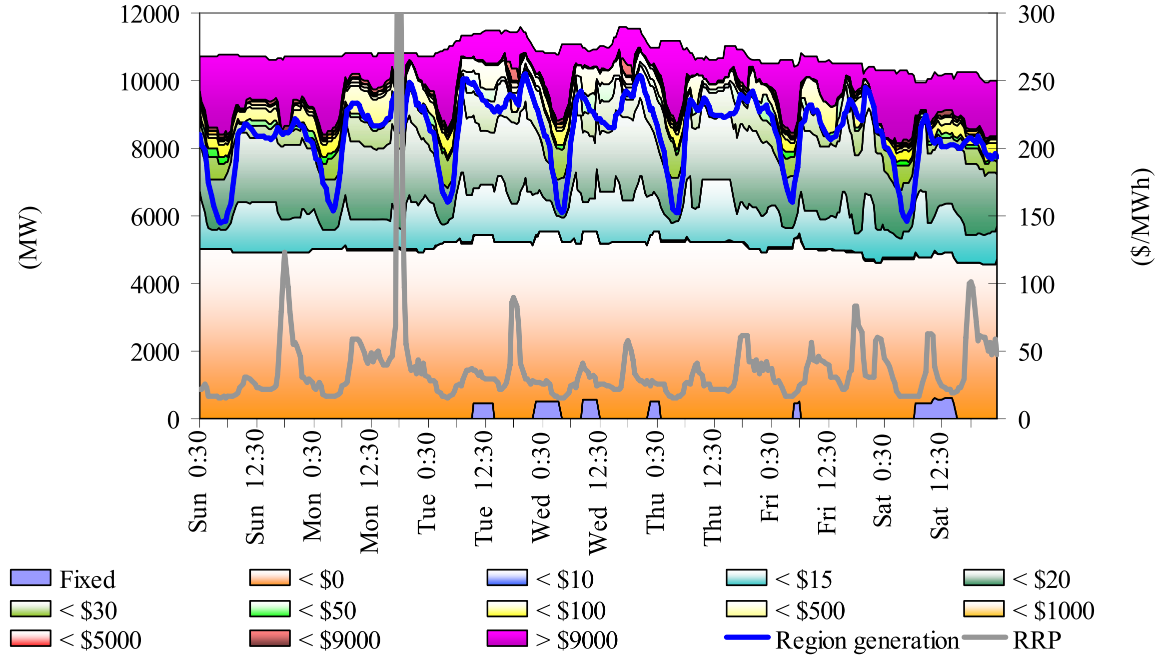


Figure 59: Victoria closing bid prices, dispatched generation and spot price

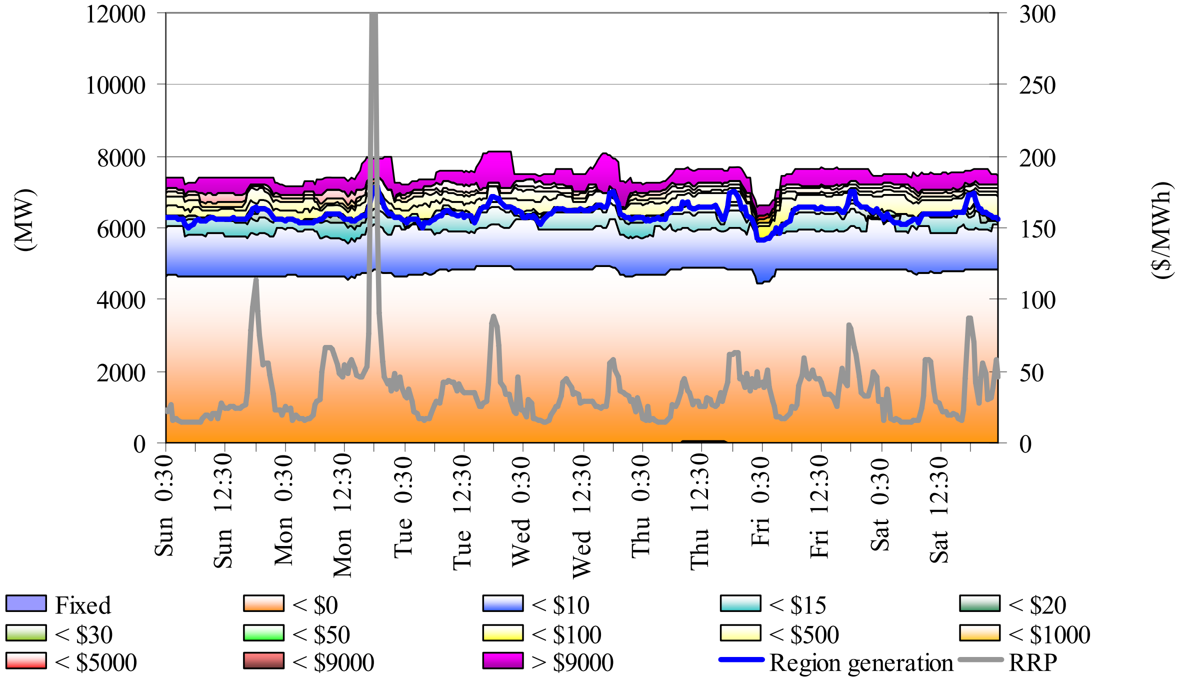


Figure 60: South Australia closing bid prices, dispatched generation and spot price

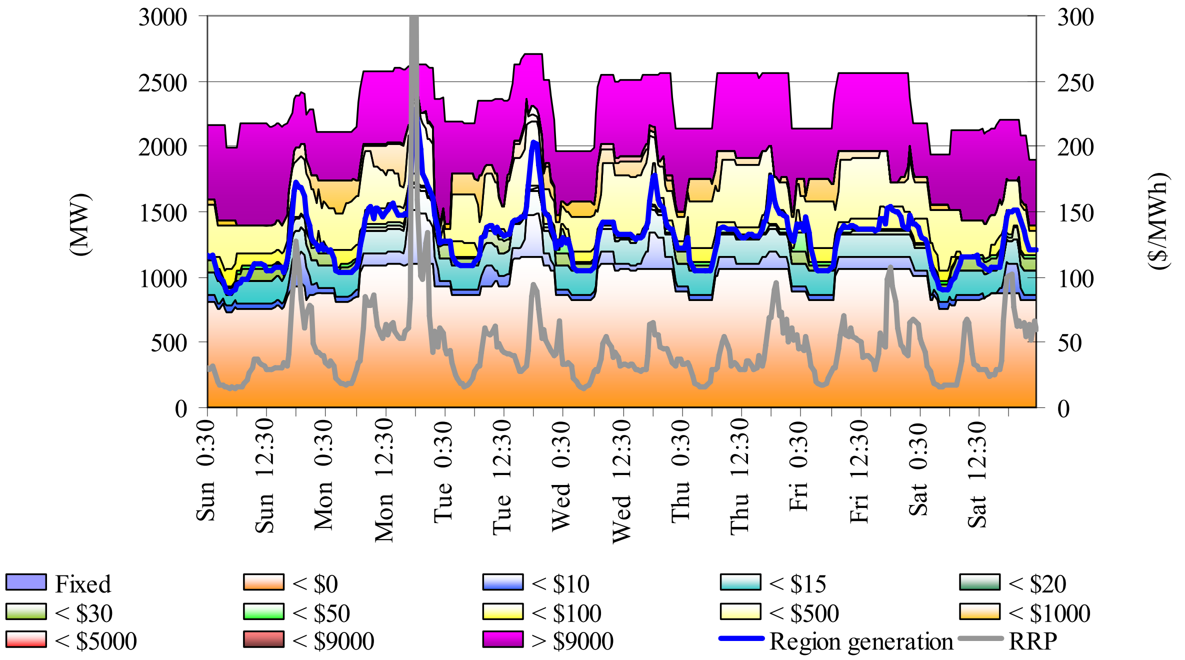
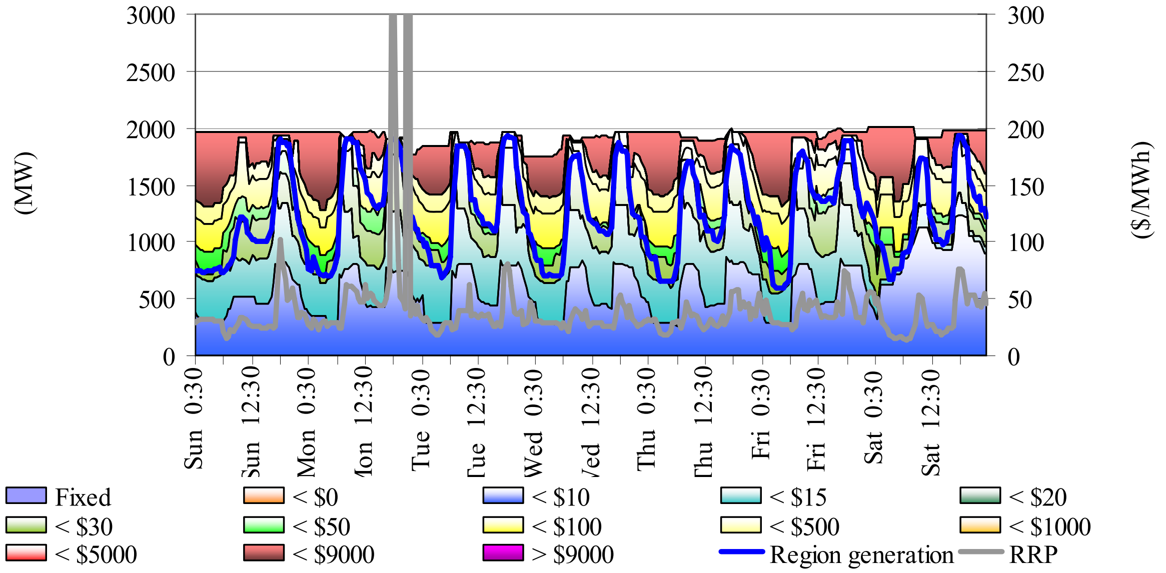


Figure 61: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was $184 000 or 0.1 per cent of the total 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 ($/MW)	0.68	0.14	0.96	3.04	0.15	0.21	0.50	0.95
Previous week ($/MW)	0.70	0.13	0.96	2.33	0.15	1.02	1.07	0.87
Last quarter ($/MW)	1.76	0.73	1.15	1.54	0.39	2.28	5.00	1.93
Market Cost ($1000s)	27	5	56	74	0.4	1	7	13
% of energy market	0.02%	0.00%	0.04%	0.05%	0.00%	0.00%	0.01%	0.01%

The total cost of ancillary services in Tasmania for the week was $230 000 or 2.4 per cent of the total turnover in the energy market in Tasmania. On Monday, the price of raise regulation and raise 5 minute services increased to around $4000/MW at 9.05 pm. This single high priced event contributed around $40 000 to the cost for the week. The cost of lower 6 second services contributed around half of the total cost for the week with the price regularly reaching around $100/MW over the evening energy peak. Figure 63 summarises for Tasmania the volume weighted average 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 ($/MW)	2.98	0.19	5.41	8.48	25.15	0.06	0.40	0.84
Previous week ($/MW)	2.19	0.30	2.01	2.24	27.83	0.16	0.40	0.83
Last quarter ($/MW)	7.89	1.05	1.05	1.58	4.43	1.06	1.06	1.97
Market Cost ($1000s)	12	2	67	16	119	1	8	5
% of energy market	0.12%	0.02%	0.69%	0.16%	1.23%	0.01%	0.08%	0.06%

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

Figure 64: daily frequency control ancillary service costs

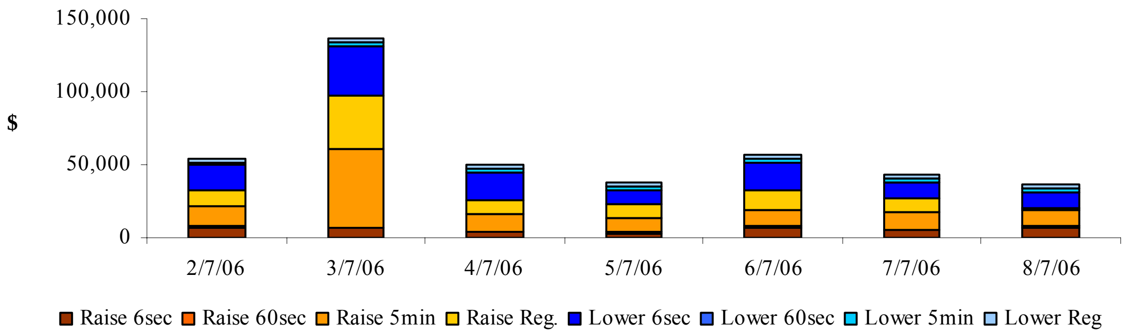
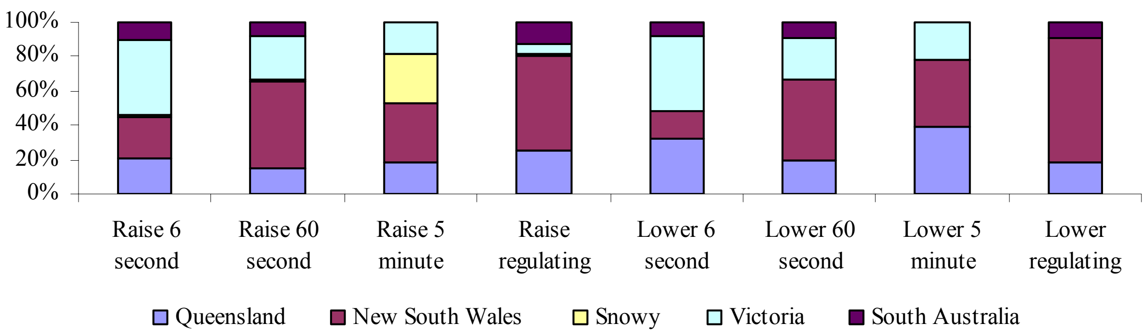


Figure 65 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

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 - mainland__

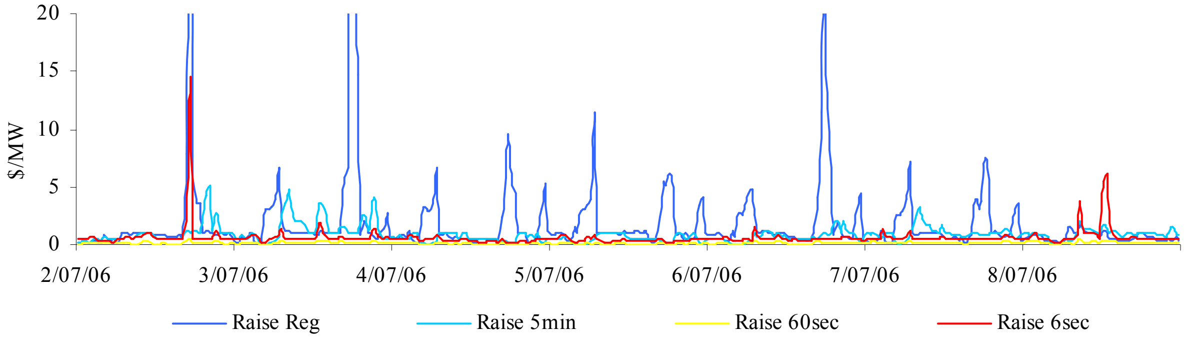


__Figure 66A: prices for raise services - Tasmania__

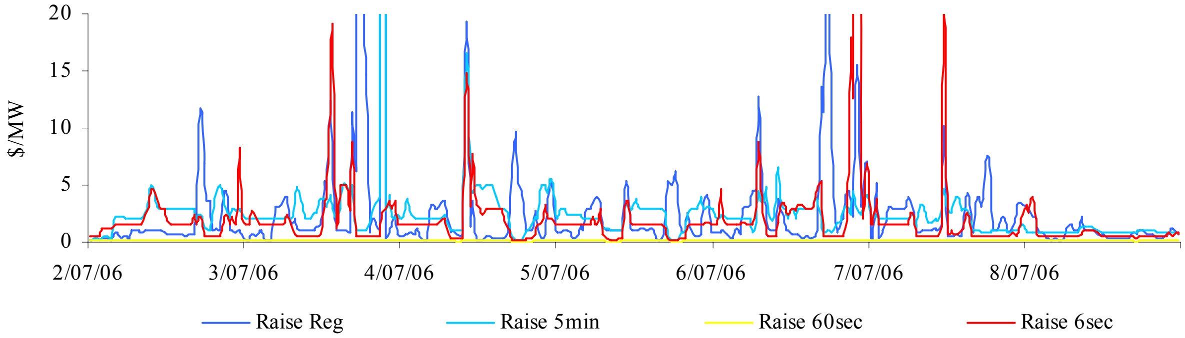


__Figure 67: prices for lower services - mainland__

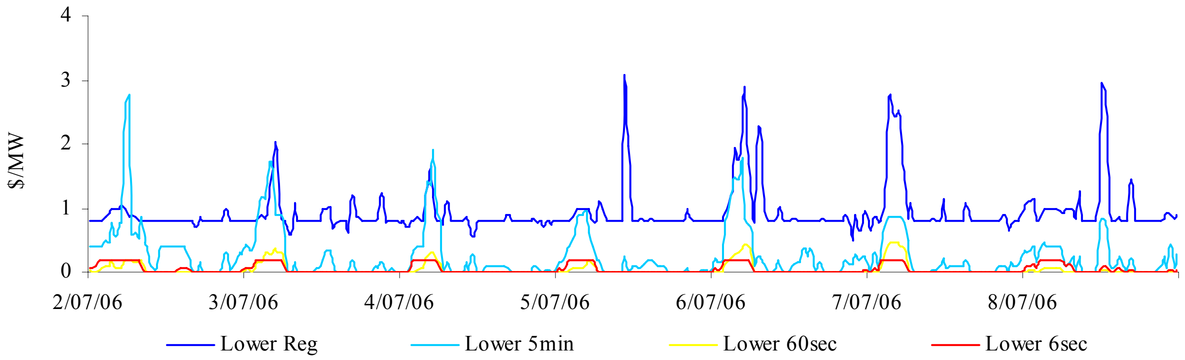
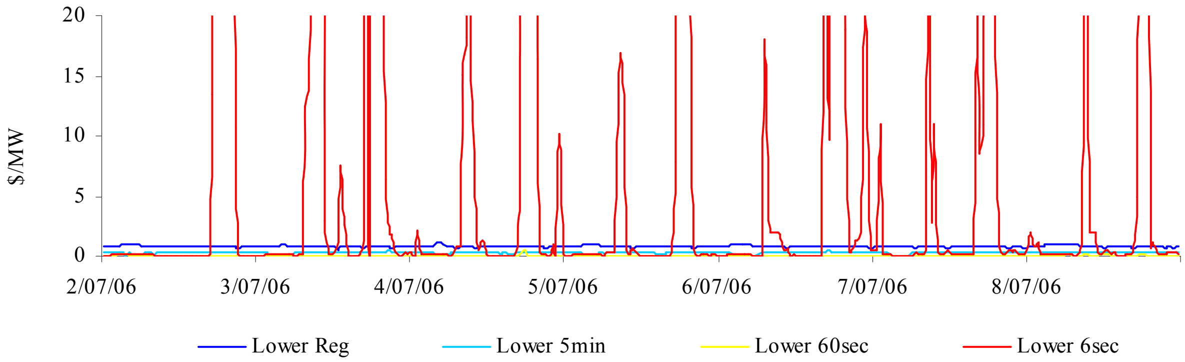


__Figure 67A: prices for lower services – Tasmania__



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 -mainland

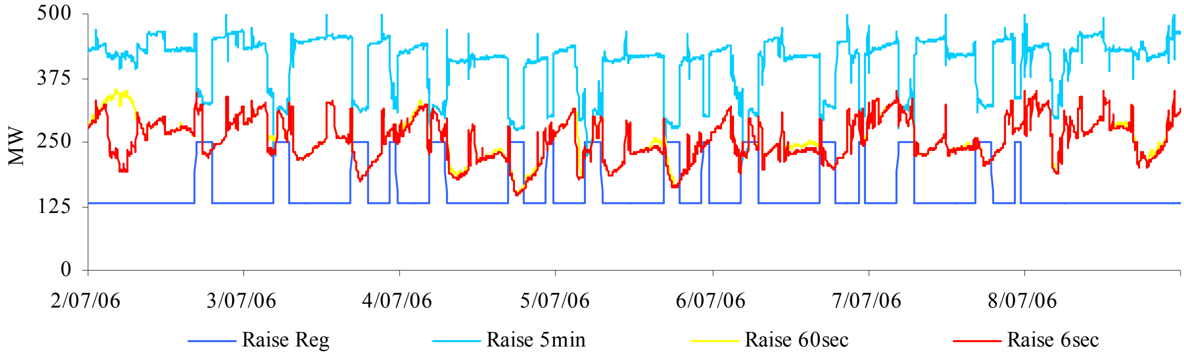


Figure 68A: raise requirements - Tasmania

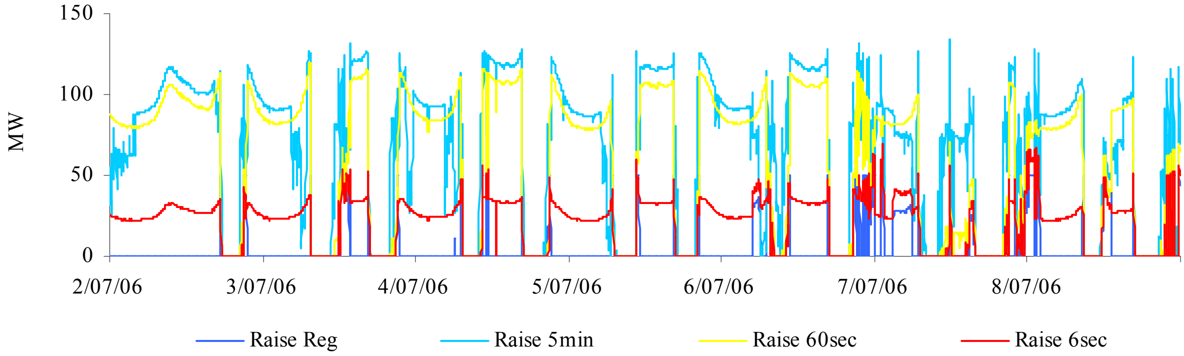


Figure 69: lower requirements - mainland

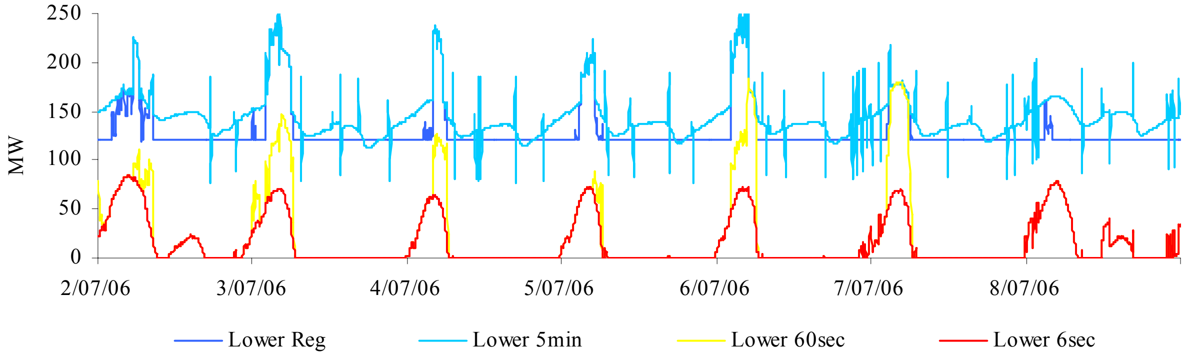
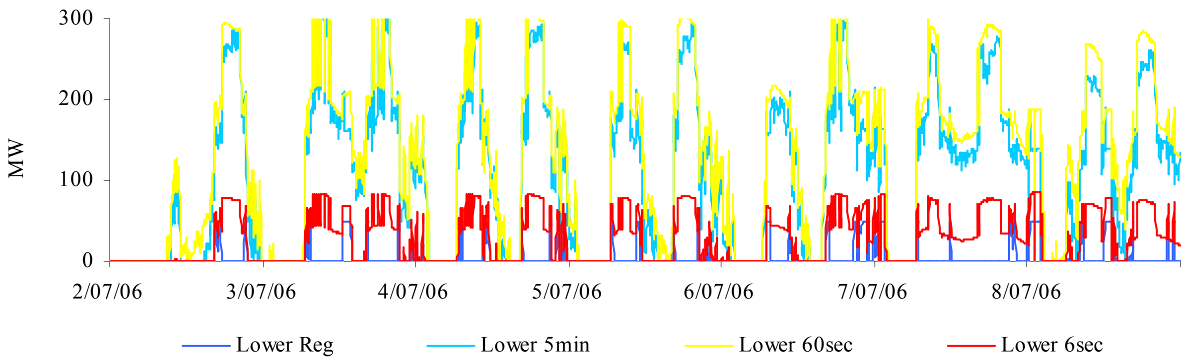


Figure 69A: lower requirements - Tasmania



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