Market analysis

AUSTRALIAN ENERGY REGULATOR

24 June – 30 June 2007

Summary

Spot prices for the week averaged between $129/MWh and $386/MWh across all regions with another new record demand in New South Wales on Wednesday. Prices in New South Wales exceeded $5000/MWh during the evening peak on three consecutive days, with the extreme prices reflected into Queensland and the Snowy region.

The $5000/MWh events throughout June resulted in some of the highest prices since the start of the NEM in 1998. June averaged prices were $274/MWh in New South Wales, $216/MWh in Queensland, $157/MWh in Victoria and $111/MWh in South Australia. By comparison prices in June 2006 ranged from $26/MWh to $42/MWh.

The price events also contributed to the highest annual prices in New South Wales and Victoria since the start of the NEM. The average price for the 2006-07 financial year was $67/MWh in New South Wales and $61/MWh in Victoria compared to the previous highest prices of $46/MWh and $49/MWh respectively.

The AER has published a separate report detailing the circumstances leading to the spot price exceeding $5000/MWh throughout June.

Turnover in the energy market in the week ended 30 June was $1.3 billion, exceeding the previous high of $1.1 billion reached two week earlier. The total cost of ancillary services for the week was $621 000, or 0.05 per cent of energy market turnover.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 266, or 79 per cent of all trading intervals. Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in a fifth of all trading intervals across the market. These variations were most frequent in South Australia, occurring in over 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 previous financial year.

Figure 1: national demand and spot prices

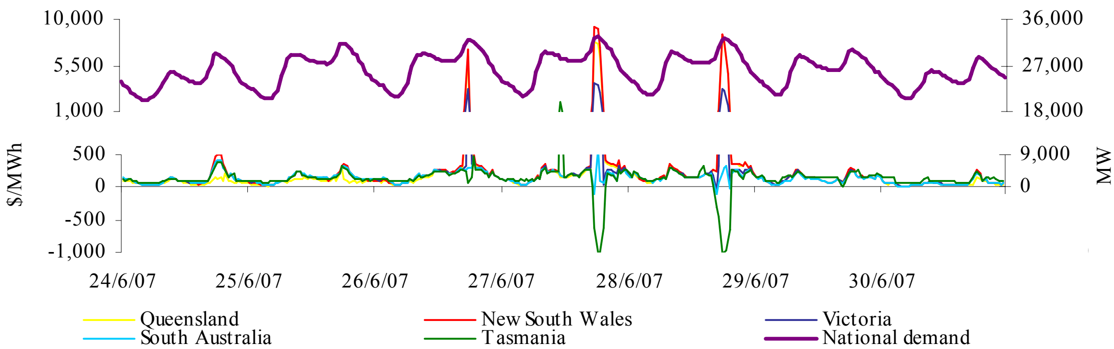


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	327	386	226	152	129
Previous week	242	260	181	158	129
Same quarter last year	25	28	30	38	38
Financial year 2006-07	57	67	61	59	51
% change from previous week*	▲35%	▲49%	▲25%	▼4%	0%
% change from same quarter last year**	▲1218%	▲1294%	▲651%	▲300%	▲238%
% change from FY 2005-06***	▲82%	▲56%	▲68%	▲34%	▼14%

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

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

Figure 3: Queensland

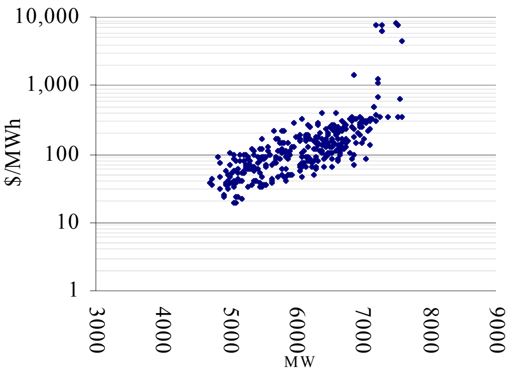


Figure 4: New South Wales

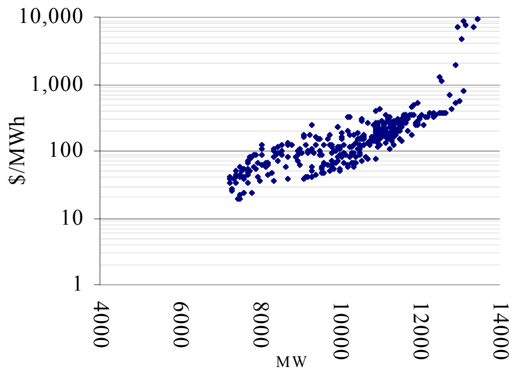


Figure 5: Victoria

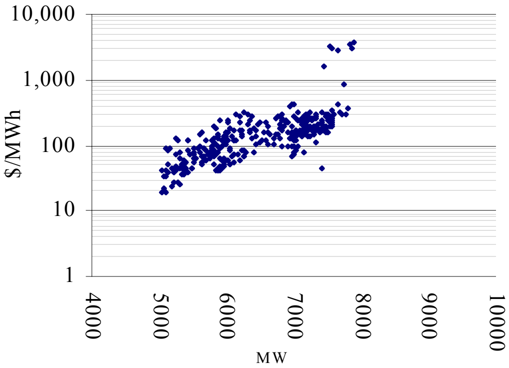


Figure 6: South Australia

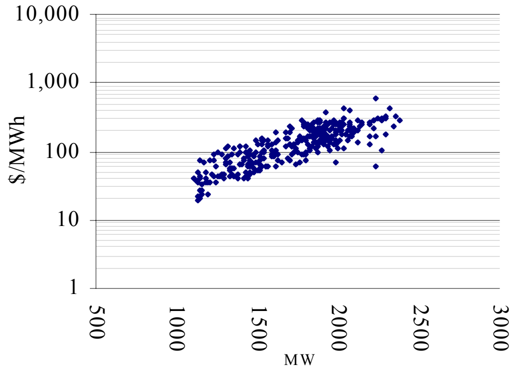
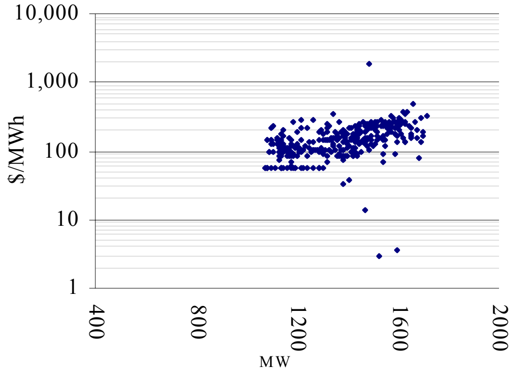


Figure 7: Tasmania



Maximum spot prices for the week ranged from $595/MWh in South Australia to $9176/MWh in New South Wales. Figure 8 compares the weekly price volatility index with the averages for the previous week and the same quarter last year. It highlights the increase in spot price volatility.

Figure 8: volatility index during peak periods

	QLD	NSW	VIC	SA	TAS
Last week	1.40	1.17	0.87	0.89	0.84
Previous week	1.15	1.07	1.04	1.05	1.27
Same quarter last year	1.07	0.96	0.96	0.94	0.29

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

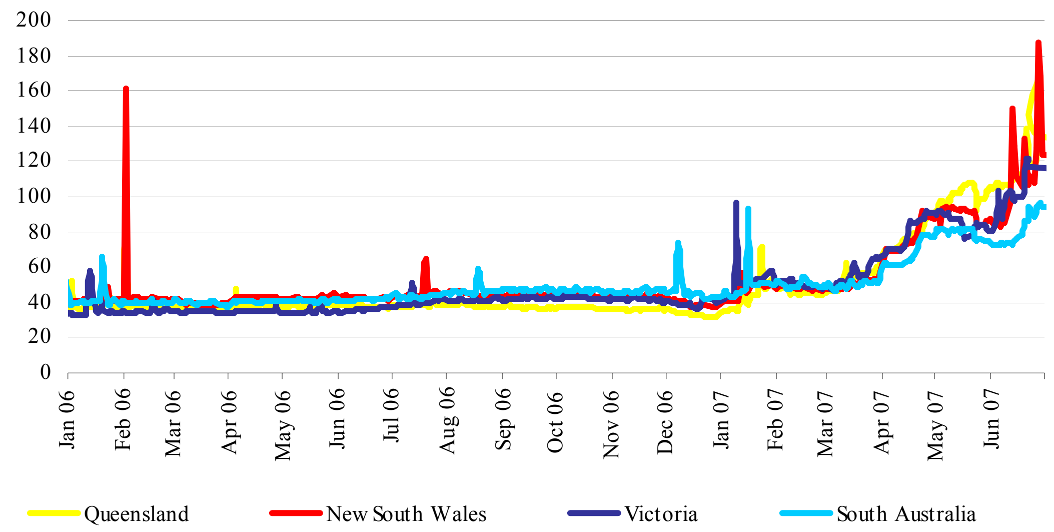
Figure 9 sets out the d-cyphaTrade wholesale electricity price index (WEPI)* for each region throughout the week excluding Tasmania. Figure 10 sets out the WEPI since 1 January 2004.

Figure 9: d-cyphaTrade WEPI for the week

	Monday	Tuesday	Wednesday	Thursday	Friday
Queensland	117.45	127.15	143.68	168.16	134.05
New South Wales	107.73	127.67	187.03	168.51	123.60
Victoria	99.82	106.84	121.81	121.82	117.45
South Australia	89.06	92.73	93.98	96.87	94.86

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

Figure 10: d-cyphaTrade WEPI



Reserves

There were two periods of low reserves forecast for New South Wales. These occurred on Tuesday and Wednesday evening.

Imports at time of maximum demand

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

Figure 11: Queensland

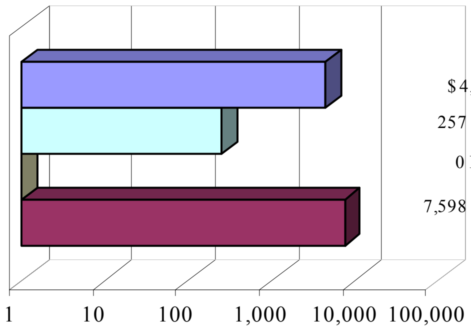


Figure 12: New South Wales

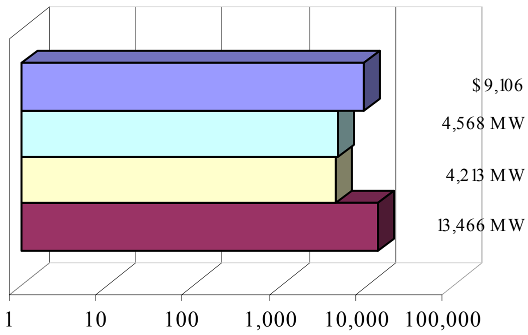


Figure 13: Victoria

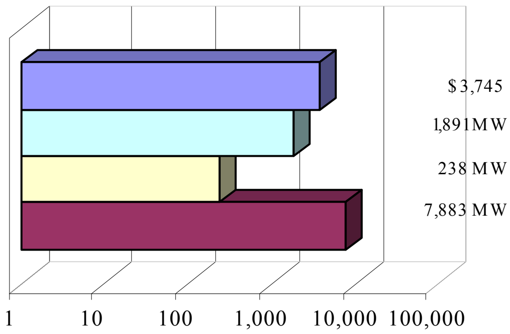


Figure 14: South Australia

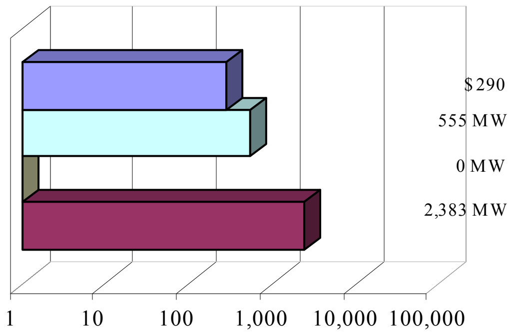
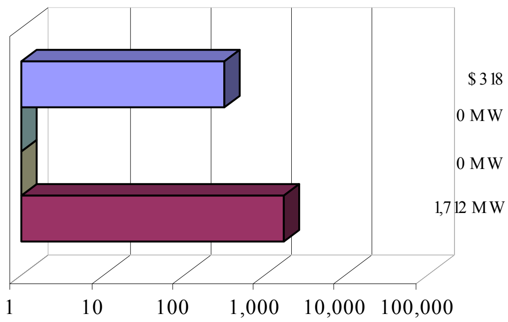
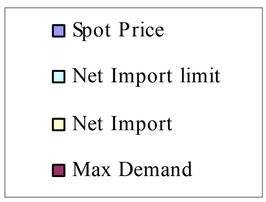


Figure 15: Tasmania





Price variations

There were 266 trading intervals where actual prices significantly varied from forecasts made 4 and 12 hours ahead of dispatch. Figures 16 to 20 show the difference in actual and forecast price against the difference in actual and forecast demand. The figures highlight the relationship between price variation and demand forecast error. The information is presented in terms of the percentage difference from actual. Price differences beyond 100 per cent have been capped.

Figure 16: Queensland

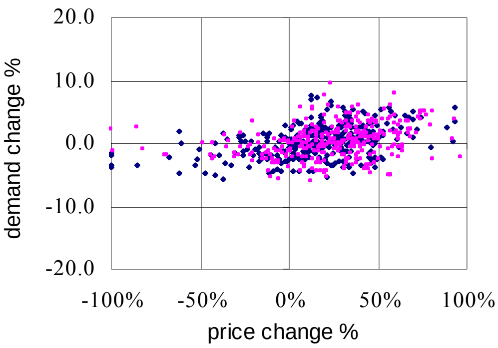


Figure 17: New South Wales

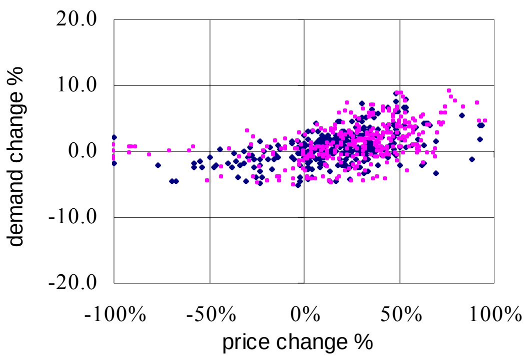


Figure 18: Victoria

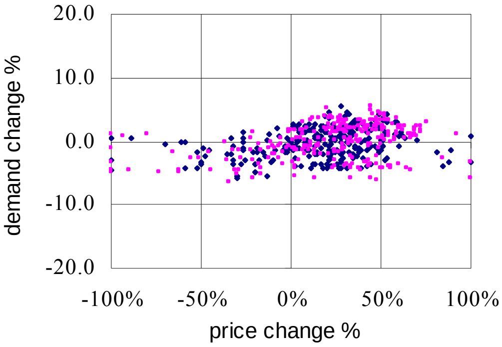


Figure 19: South Australia

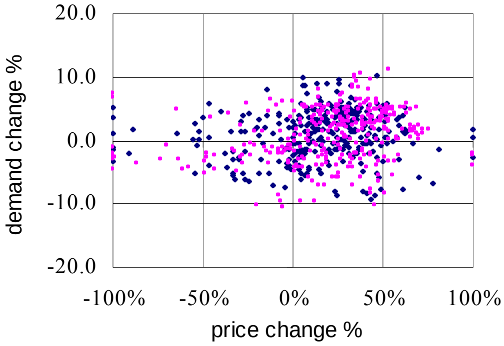
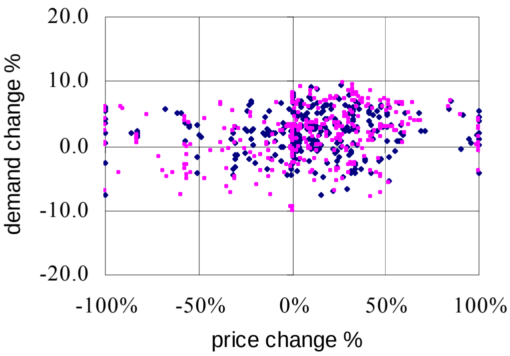


Figure 20: Tasmania



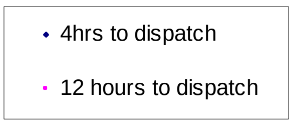
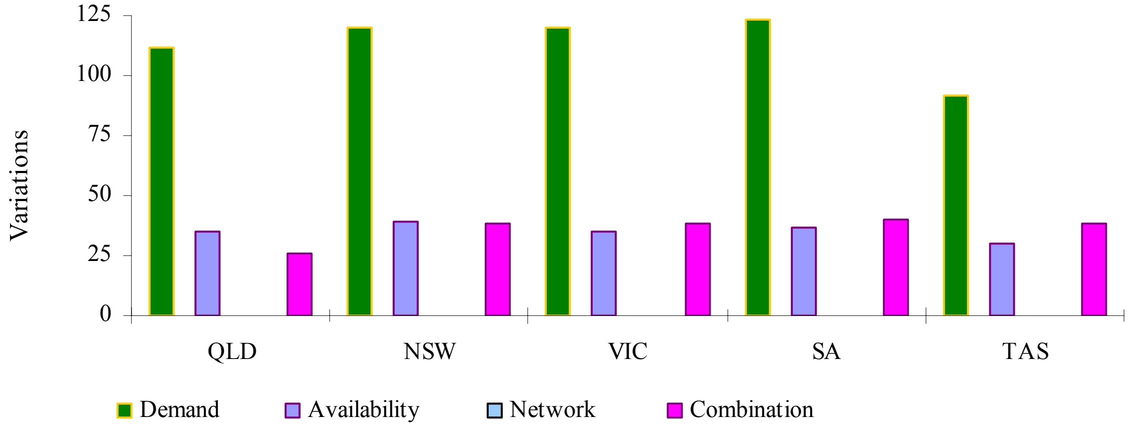


Figure 21 summarises the number and most probable reason for variations between forecast and actual prices.

Figure 21: reasons for variations between forecast and actual prices



Price and demand

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

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

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

National Market

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

Figures 22-26: National market outcomes

There were nine occasions where the spot prices aligned nationally and the New South Wales price was greater than three times the New South Wales weekly average price of $386/MWh.

Tuesday, 26 June

6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	7023.72	7950.51	259.82
Demand (MW)	31 981	31 834	31 361
Available capacity (MW)	35 854	36 180	37 491

Conditions at the time saw demand at high levels, close to that forecast four hours ahead but 620 MW higher than forecast 12 hours ahead. Available capacity was around 1640 MW lower than forecast 12 hours ahead.

At 4.18 am CS Energy reduced available capacity at Swanbank B unit one by 120 MW, the majority of which was priced below $300/MWh. The reason given was “Swan B1 econ leak”. At 10.07 am the available capacity at Kogan Creek was reduced by 600 MW all priced at zero and below due to commissioning requirements.

At 9.32 am Delta Electricity delayed the return to service of unit four at Munmorah, following an outage earlier that day. This had the effect of reducing its available capacity by 290 MW. All of this capacity was priced below $20/MWh. The reason given was “RTS delay::Capacity limit change”. From 1 pm, the return of Wallerawang unit seven to service was also delayed following a long term outage, reducing available capacity by a total of 470 MW. All of this capacity was priced below $300/MWh. The reasons provided for these rebids were “RTS delay::Capacity change” and “Turbine Expansion::Capacity limit change”.

At 11.20 am Snowy Hydro reduced the available capacity of Laverton North by 170 MW to zero. All of this capacity was priced at zero. The reason given was “Plant outage:Dcrse max avail hydro-gas bid to follow”.

From 2.26 pm, over two rebids, Macquarie Generation reduced the available capacity of unit three at Liddell by 200 MW, 140 MW of which was priced below $30/MWh. The rebid reasons given were “Milling limit” and “Mill feeder trip”.

There was no other significant rebidding.

Wednesday, 27 June

5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1869.08	314.75	300.00
Demand (MW)	31 129	30 392	30 343
Available capacity (MW)	36 377	36 584	36 634
6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	9176.17	646.23	4839.50
Demand (MW)	32 274	31 817	31 706
Available capacity (MW)	36 444	36 678	36 645
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	9106.18	534.05	6646.71
Demand (MW)	32 514	31 911	31 841
Available capacity (MW)	36 473	36 702	36 664
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	7264.44	516.35	503.86
Demand (MW)	32 203	31 775	31 508
Available capacity (MW)	36 493	36 726	36 639

Conditions at the time saw National demand 170 MW short of the record and up to 750 MW higher than forecast four and 12 hours ahead. Available capacity was close to that forecast four hours ahead.

At 7.53 am Tarong Energy shifted 30 MW of available capacity at Tarong unit three to prices above $4500/MWh and a further 55 MW to above $9500/MWh. All 85 MW of this capacity had been priced below $50/MWh. The rebid reason given was “Mnge contracts/water::Volume profile change”.

Over several rebids Macquarie Generation reduced the available capacity of Liddell units one, three and four by 245 MW, with 120 MW of this capacity priced below $30/MWh. The rebid reasons given were “milling limit”, “Mill RTS”, “Milling limit and FCAS LR”.

Over several rebids from 1.24 pm, Enertrade rebid 175 MW of capacity at Oakey from prices above $8000/MWh to below $500/MWh. The rebid reasons given included “Inter/intra connector constraint::change MW distrib” and “Material change in market conditions::change MW distrib”.

Over several rebids from 2.45 pm, Delta Electricity reduced the available capacity at Wallerawang unit seven by 190 MW, all of which was priced below $300/MWh. The rebid reason given was “Pump::capacity limit change”.

At 3.19 pm Origin Energy rebid 360 MW of capacity across Mt Stuart and Roma from prices above $9000/MWh to below zero, this included a slight increase in available capacity. The rebid reason given was “Change in PDS”.

There was no other significant rebidding.

Thursday, 28 June

5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1235.10	372.53	357.89
Demand (MW)	30 623	31 015	30 584
Available capacity (MW)	36 581	36 873	37 081
6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	8524.85	8666.01	9350.00
Demand (MW)	31 932	32 220	32 192
Available capacity (MW)	36 616	36 876	37 081
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	7839.88	7310.25	9351.22
Demand (MW)	32 203	32 299	32 366
Available capacity (MW)	36 647	36 907	37 144
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	4685.68	554.90	8976.52
Demand (MW)	32 012	32 071	32 123
Available capacity (MW)	36 643	37 093	37 134

Conditions at the time saw demand at high levels but close to that forecast four and 12 hours ahead. Available capacity was up to 450 MW lower than forecast four and 12 hours ahead.

At 12.50 pm CS Energy delayed commissioning tests at Kogan Creek, reducing the available capacity by 600 MW.

At 2.31 pm Origin Energy rebid 360 MW of capacity across Mt Stuart and Roma from prices above $9000/MWh to below zero. This rebid also slightly increased the available capacity. The rebid reason given was “Change in PDS.”

From 2.43 pm Macquarie Generation reduced the available capacity of Liddell units one, two and three by a total of 445 MW, with 220 MW of this capacity priced below $30/MWh. The rebid reasons given were “Milling limit” and “Revised Milling limit”.

There was no other significant rebidding.

Queensland

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

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

There were 10 occasions where the spot prices in Queensland was greater than three times the Queensland weekly average price of $327/MWh. Nine of these occurred when prices were generally aligned across all regions and are detailed in the national market outcomes section. The remaining one occasion is presented below.

Tuesday, 26 June

5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1057.65	325.08	79.99
Demand (MW)	7237	7174	7198
Available capacity (MW)	9416	9444	10 079

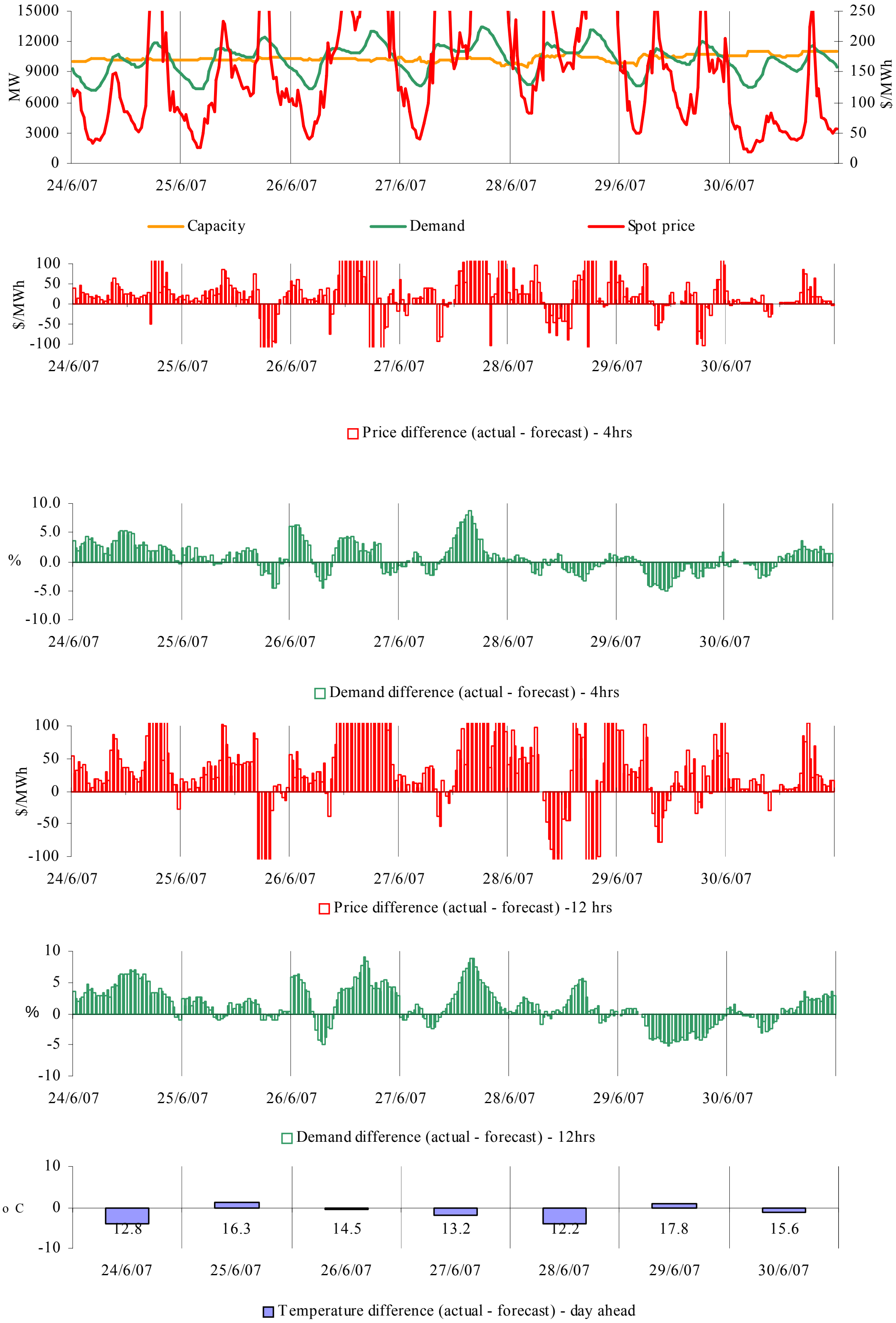
Conditions at the time saw demand close to that forecast four and 12 hours ahead. Available capacity was 650 MW lower than forecast 12 hours ahead.

Prices were generally aligned across all regions during this period. Significant rebids made during the day are presented in the national section above.

New South Wales

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

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

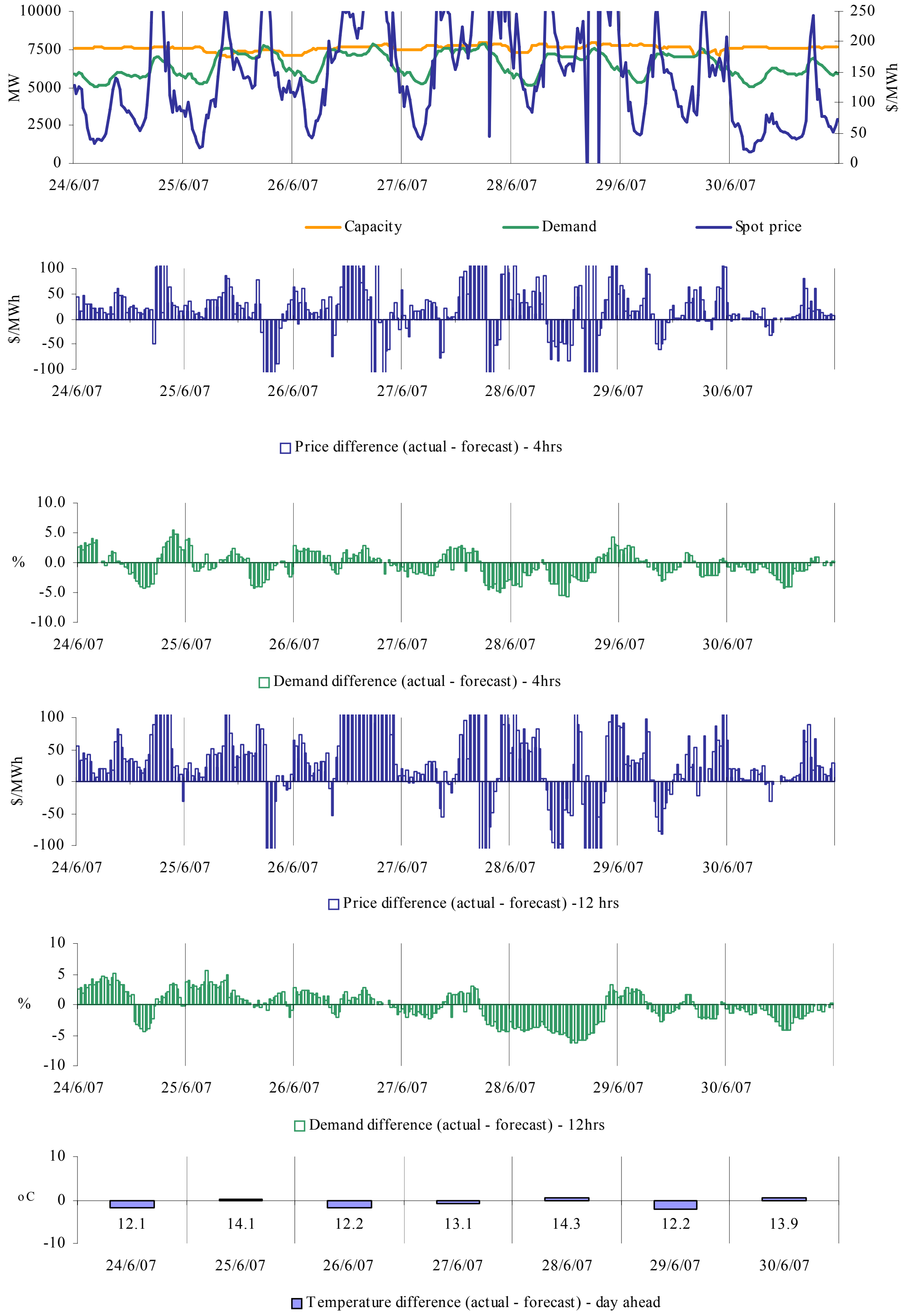


There were nine occasions where the spot prices in New South Wales were greater than three times the New South Wales weekly average price of $386/MWh. All of these occurred when prices were generally aligned across all regions and are detailed in the national market outcomes section.

Victoria

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

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

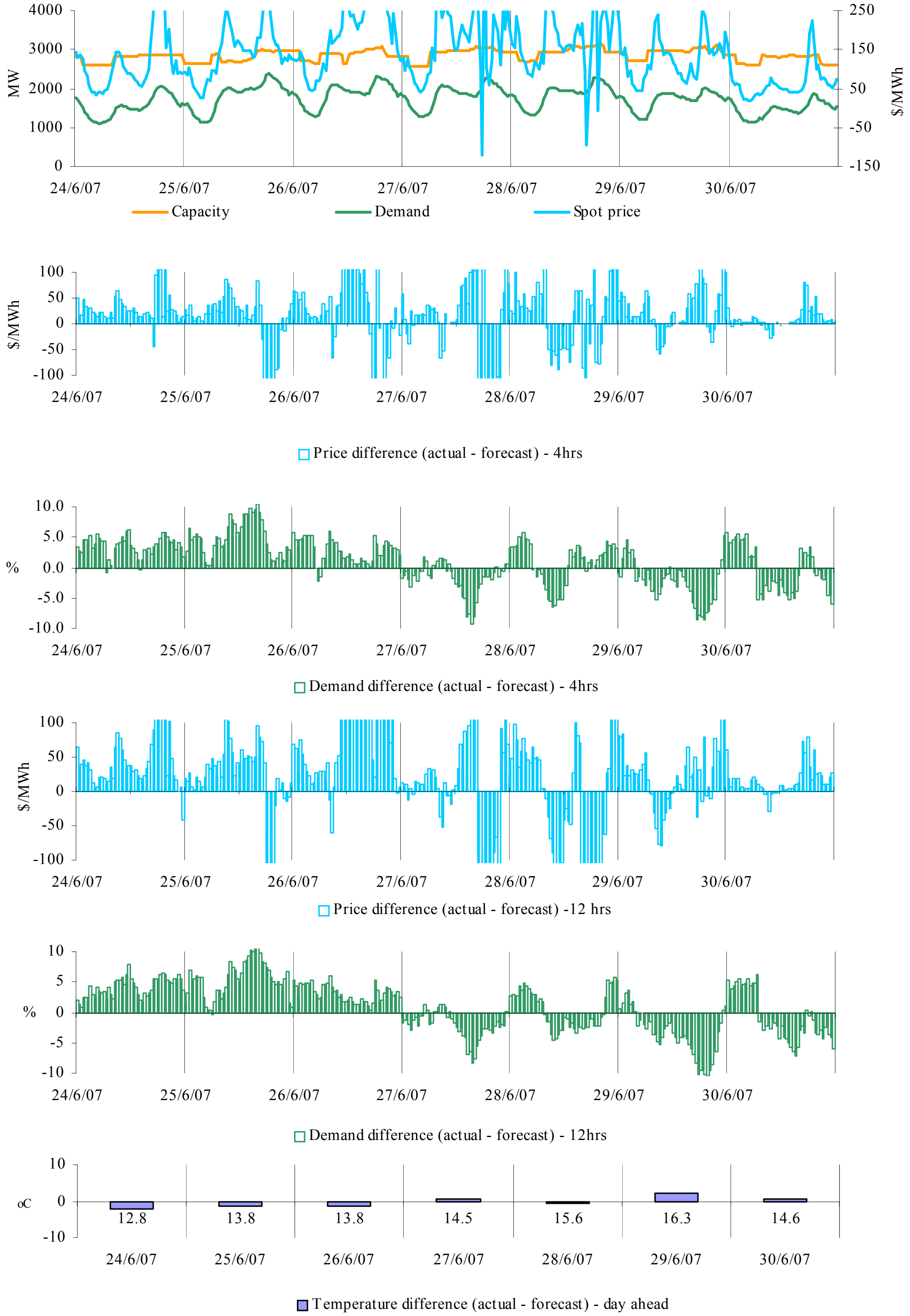


There were eight occasions where the spot prices in Victoria were greater than three times the Victoria weekly average price of $226/MWh. All of these occurred when prices were generally aligned across all regions and are detailed in the national market outcomes section.

South Australia

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

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

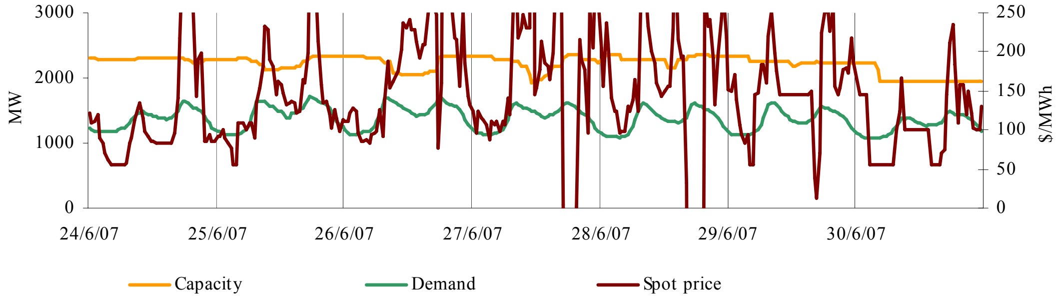


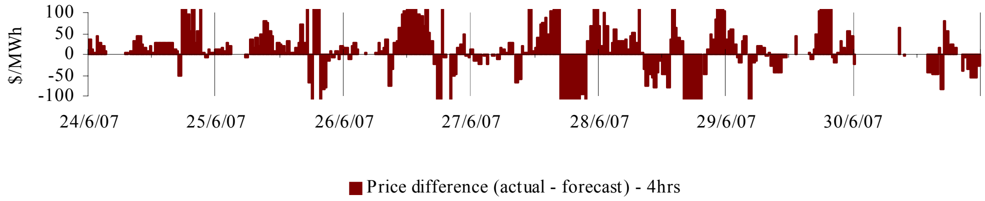
There was one occasion where the spot price in South Australia was greater than three times the South Australia weekly average price of $152/MWh. It occurred when prices were generally aligned across all regions and is detailed in the national market outcomes section.

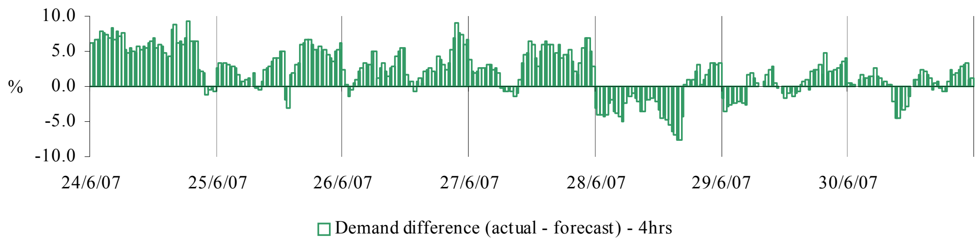
Tasmania

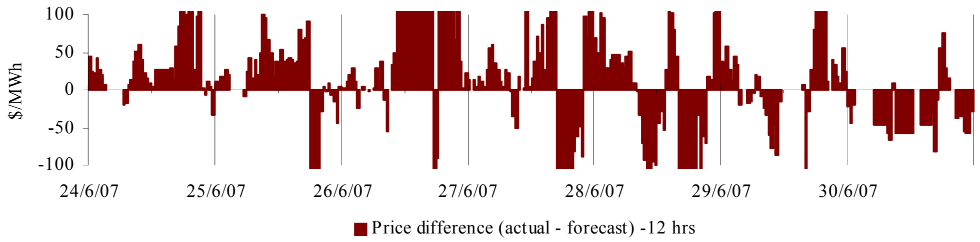
Figures 51-56 show spot market prices in Tasmania over the week along with actual demand and differences between actual and forecast demand and prices.

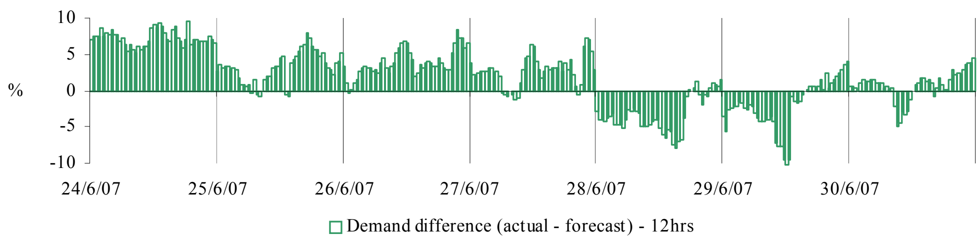
Figures 51-56: Tasmania actual spot price, demand and forecast differences

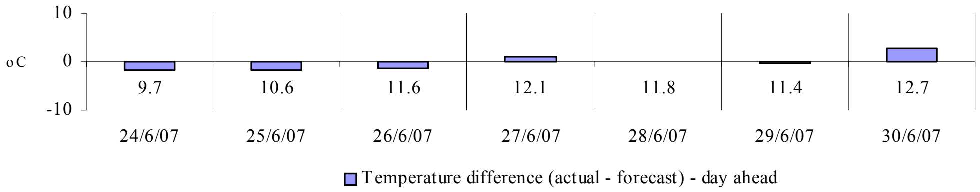












There were two occasions where the spot price in Tasmania was greater than three times the Tasmania weekly average price of $129/MWh.

Tuesday, 26 June

7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	479.84	281.94	195.08
Demand (MW)	1659	1596	1597
Available capacity (MW)	2342	2263	2263

Conditions at the time saw demand and available capacity close to that forecast four and 12 hours ahead.

A step change in Hydro Tasmania's bid profile at 6.35 pm which had seen 1970 MW of capacity priced at less than zero, reduced to 630 MW in one dispatch interval resulted in the 5-minute dispatch price increasing from $1.36/MWh to $658/MWh

There was no significant rebidding.

Wednesday, 27 June

11:30 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1907.50	159.68	183.84
Demand (MW)	1488	1418	1418
Available capacity (MW)	1920	1978	1978

Conditions at the time saw demand and available capacity close to that forecast four and 12 hours ahead.

A shortfall in the amount of raise 5-minute contingency services (FCAS) in Tasmania led to an over-constrained dispatch interval in the energy market. The 5-minute dispatch price was set to the price cap for that dispatch interval.

There was no significant rebidding.

Bidding patterns

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

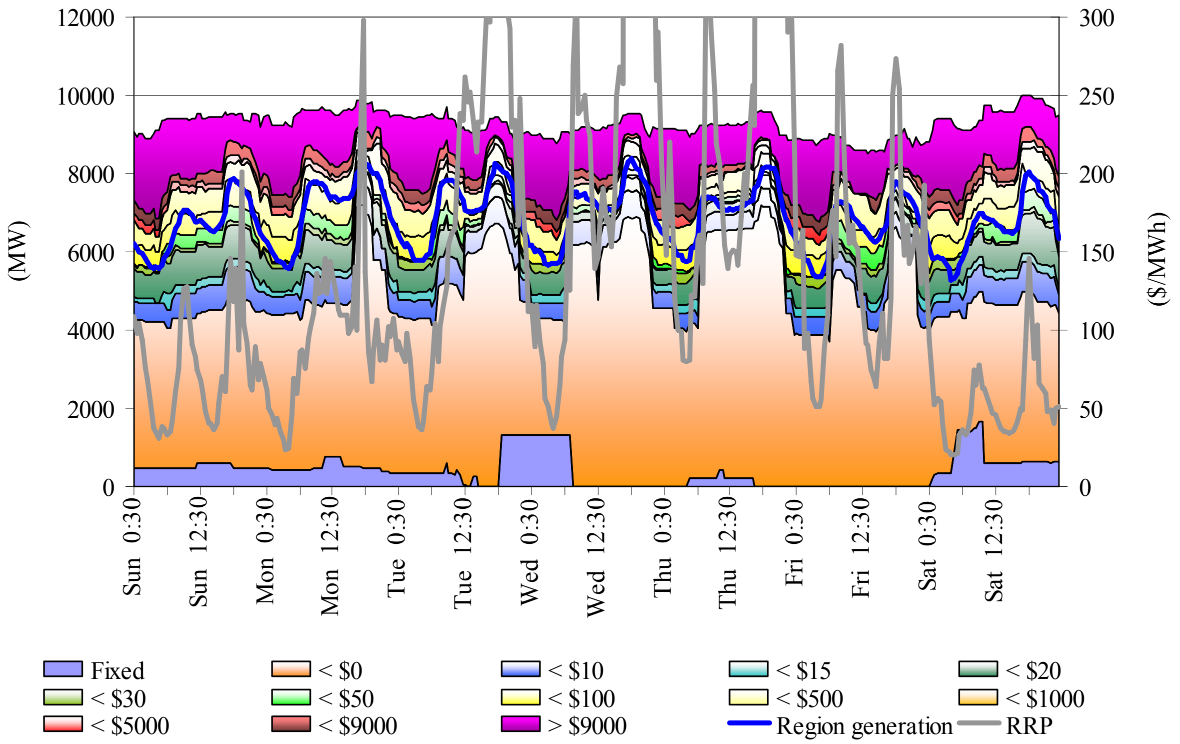


Figure 58: New South Wales closing bid prices, dispatched generation and spot price

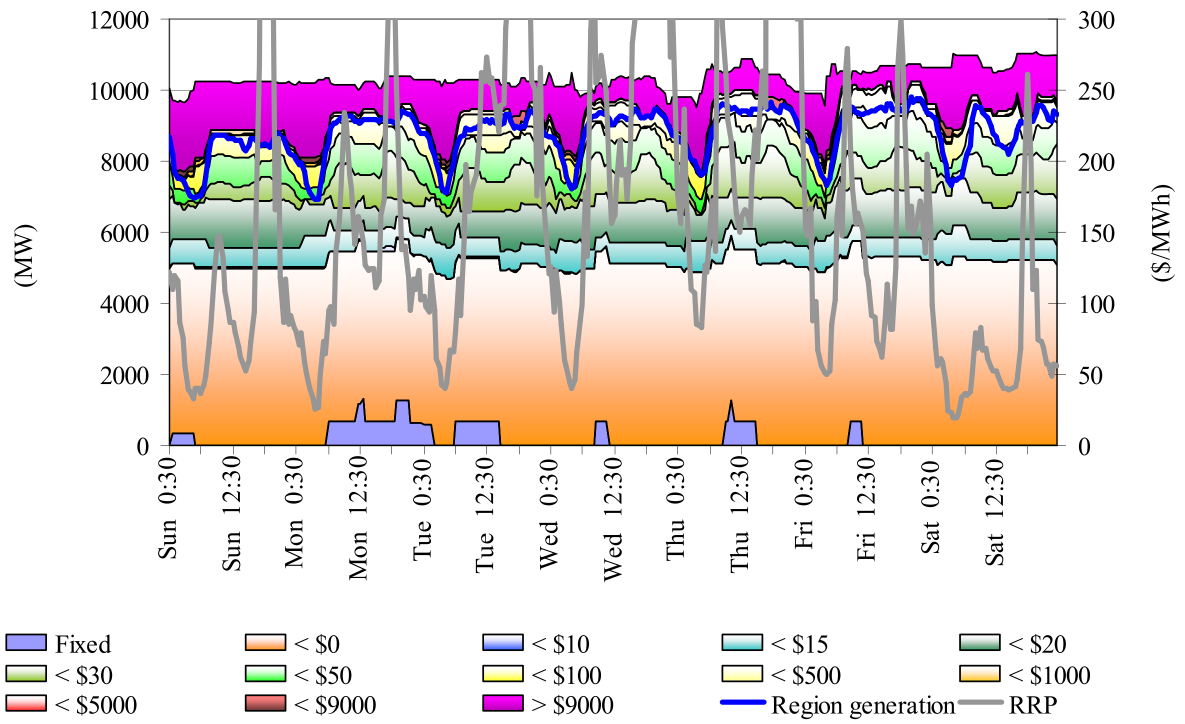


Figure 59: Victoria closing bid prices, dispatched generation and spot price

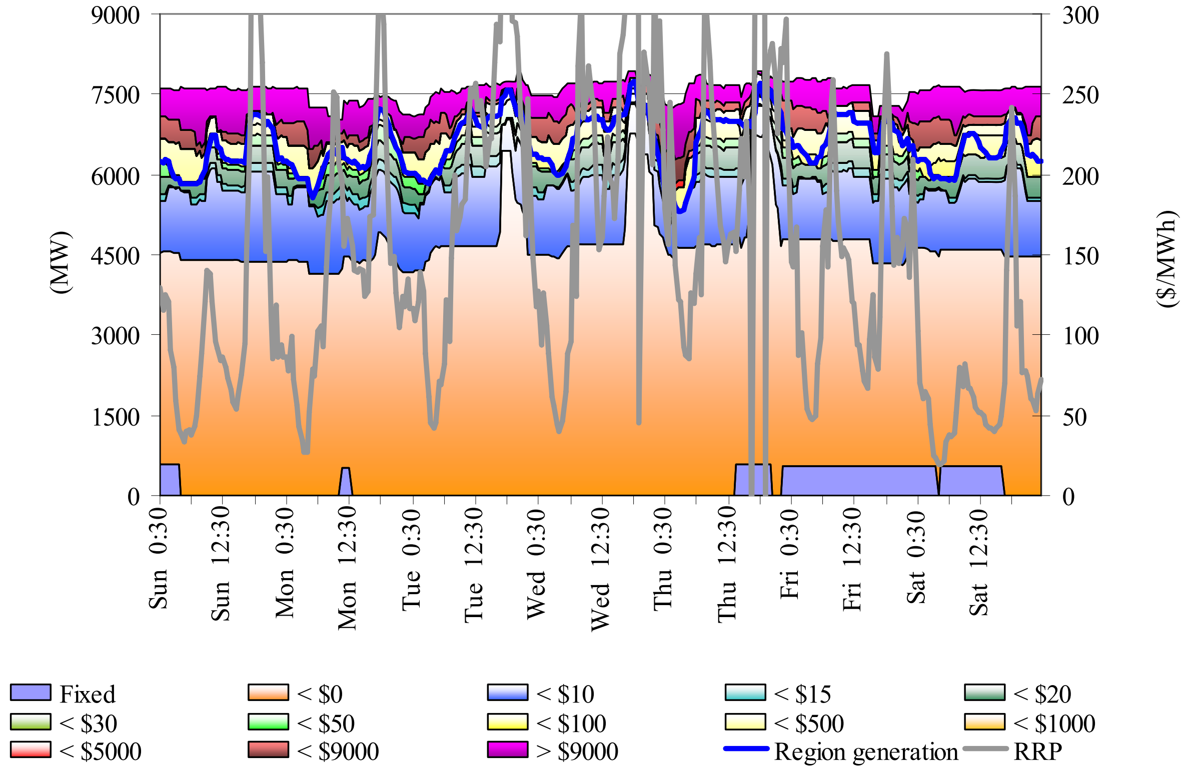


Figure 60: South Australia closing bid prices, dispatched generation and spot price

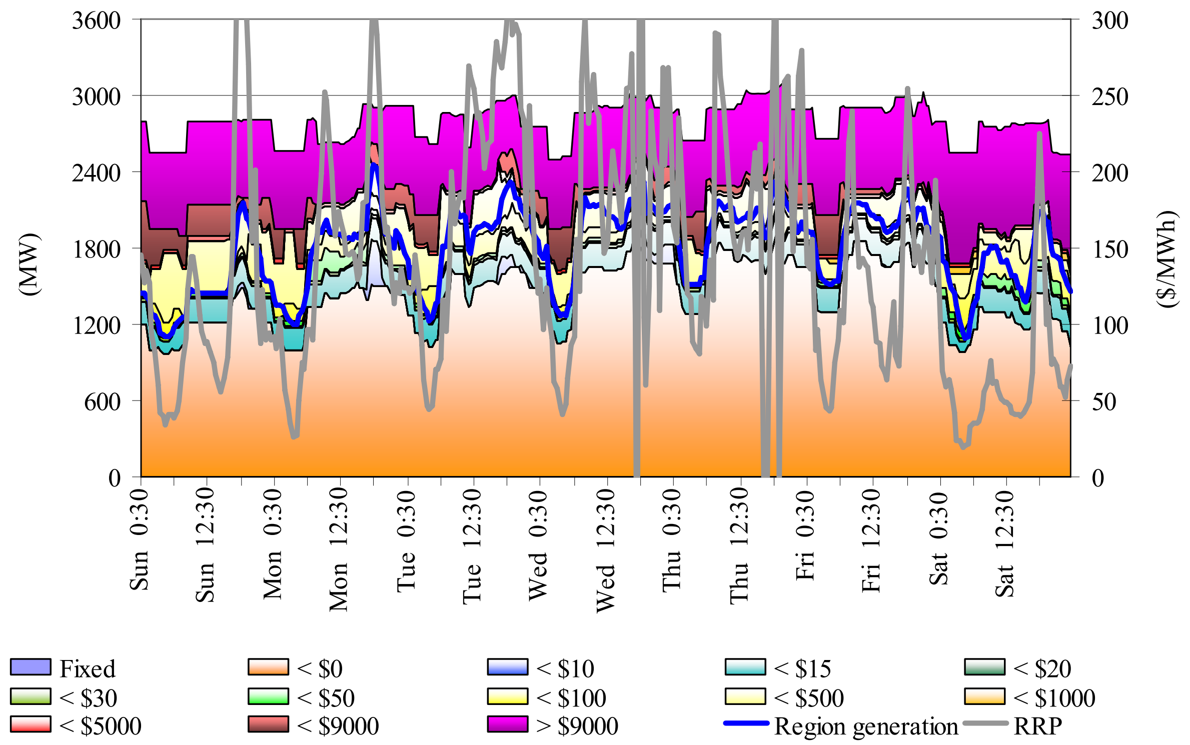
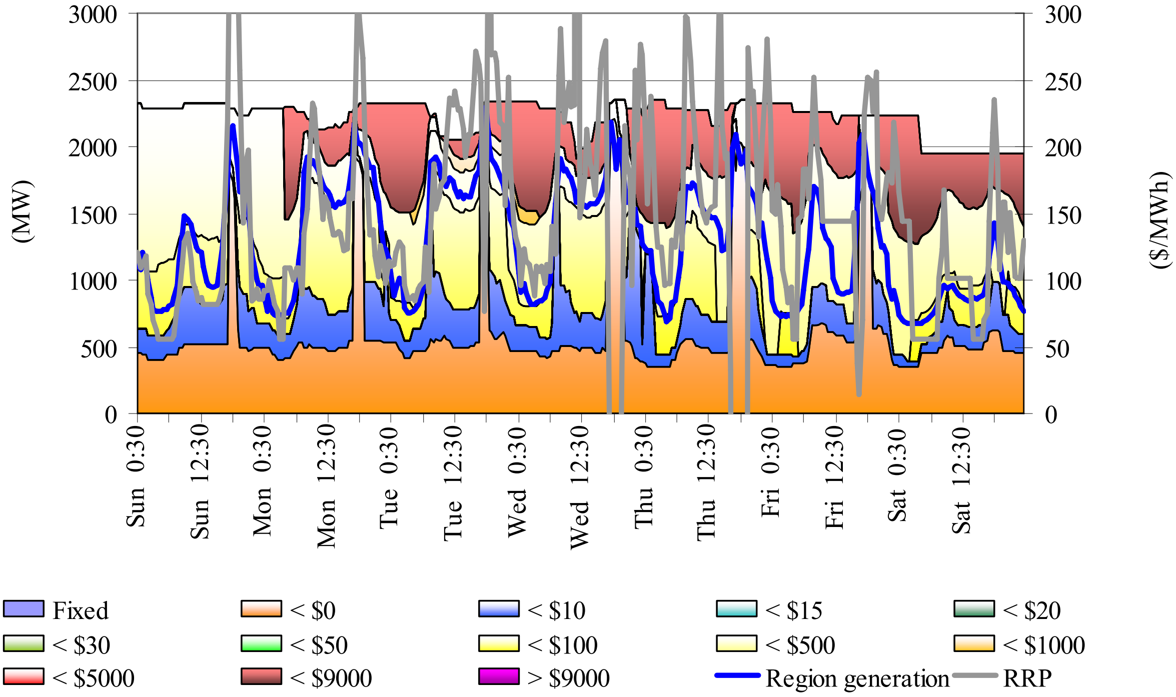


Figure 61: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was $372 000 or 0.01 per cent of turnover in the energy market. The loss of a Queensland power station was deemed a credible contingency on Saturday 30 June. NEMMCO invoked a number of constraints to cover this risk resulting in the raise 6 second price increasing to above $1000/MW. 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 ($/MW)	3.08	0.31	0.93	6.96	0.08	0.17	0.72	2.19
Previous week ($/MW)	0.93	0.44	1.83	8.00	0.09	0.16	0.53	1.74
Last quarter ($/MW)	1.76	0.73	1.15	1.54	0.39	2.28	5.00	1.93
Market Cost ($1000s)	$110	$9	$53	$151	$0	$1	$12	$35
% of energy market	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%

The total cost of ancillary services in Tasmania for the week was $249 000 or 0.8 per cent of the turnover in the Tasmanian energy market. Figure 63 summarises for Tasmania the prices and costs for the eight frequency control ancillary services.

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

	Raise 6 sec	Raise 60 sec	Raise 5 min	Raise reg	Lower 6 sec	Lower 60 sec	Lower 5 min	Lower reg
Last week ($/MW)	22.14	1.95	4.75	7.78	0.50	1.92	2.09	2.11
Previous week ($/MW)	13.97	1.85	2.14	7.90	22.42	2.07	1.98	1.69
Last quarter ($/MW)	4.97	0.49	2.93	3.00	12.67	0.43	0.82	0.45
Market Cost ($1000s)	$68	$21	$45	$34	$2	$35	$35	$9
% of energy market	0.23%	0.07%	0.15%	0.12%	0.01%	0.12%	0.12%	0.03%

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

Figure 64: daily frequency control ancillary service cost

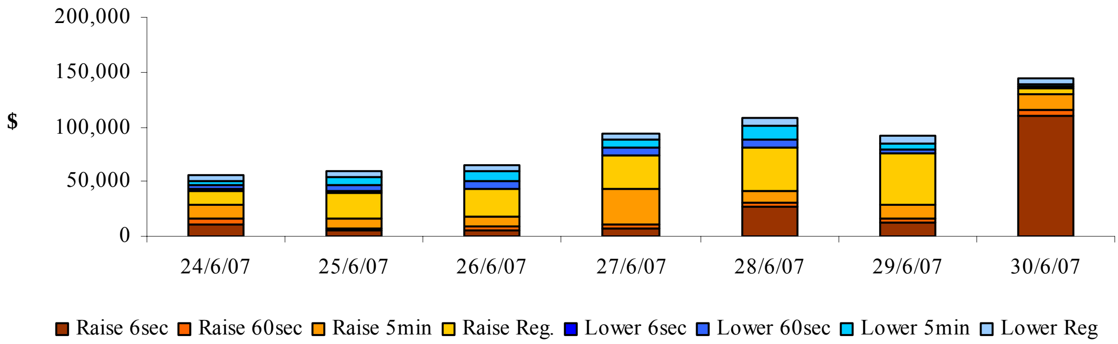
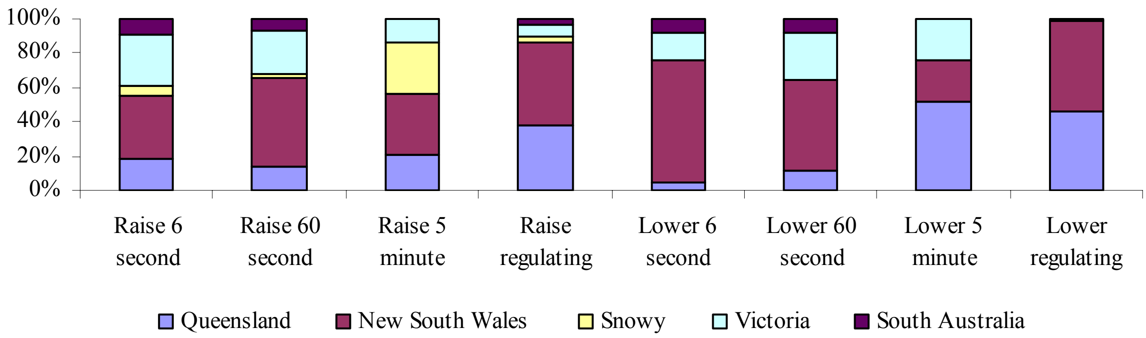


Figure 65 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

Figure 65: regional participation in ancillary services on the mainland



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

Figure 66: prices for raise services

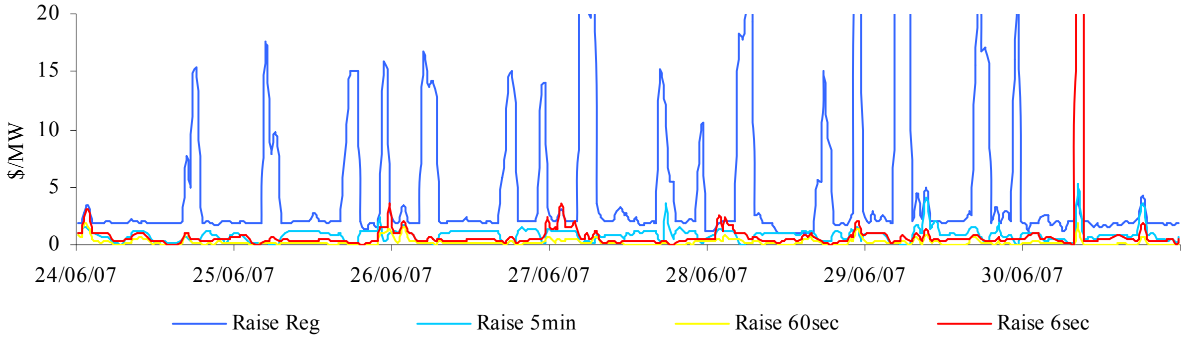


Figure 66A: prices for raise services – Tasmania

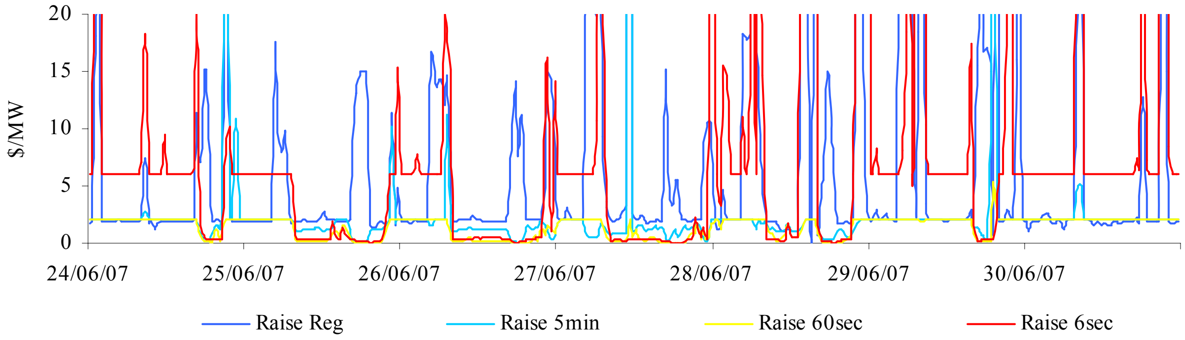


Figure 67: prices for lower services

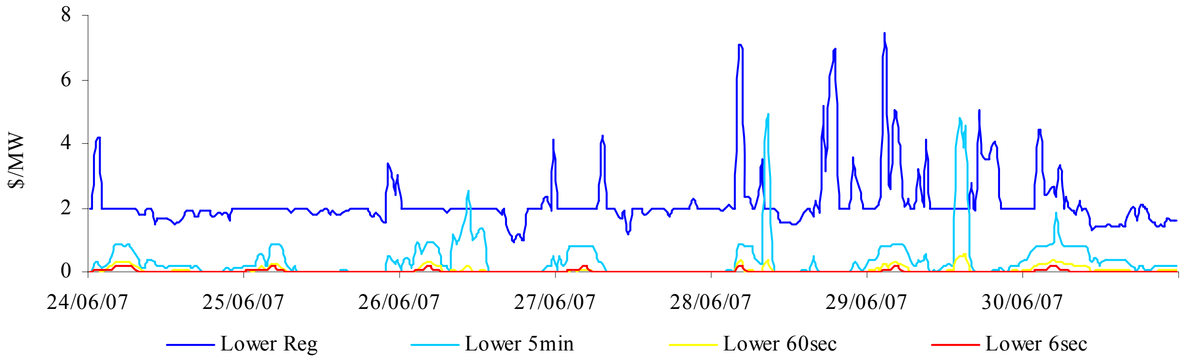
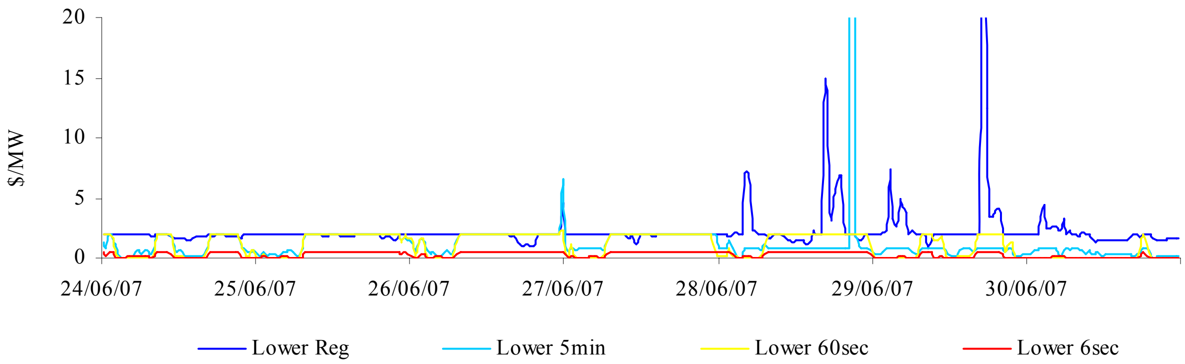


Figure 67A: prices for lower services – Tasmania



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

Figure 68: raise requirements

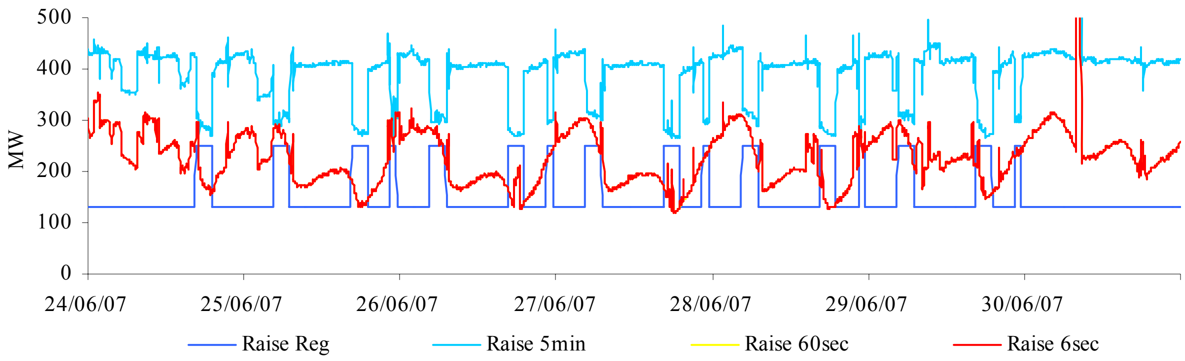


Figure 68A: raise requirements – Tasmania

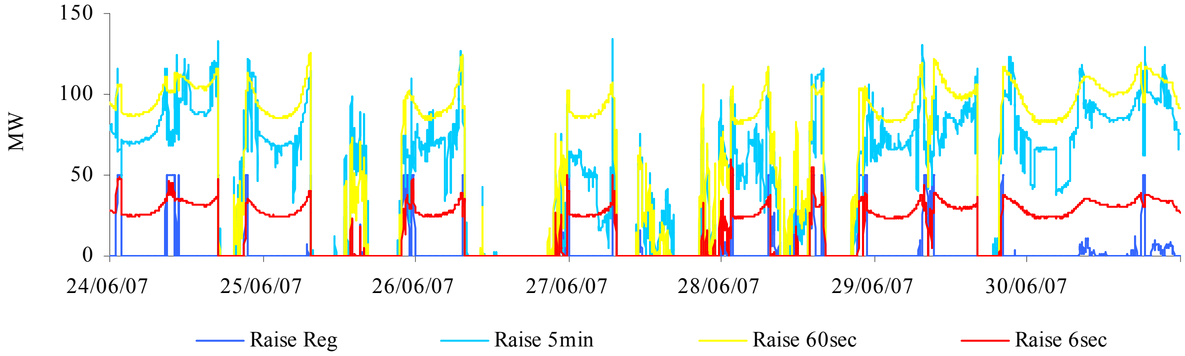


Figure 69: lower requirements

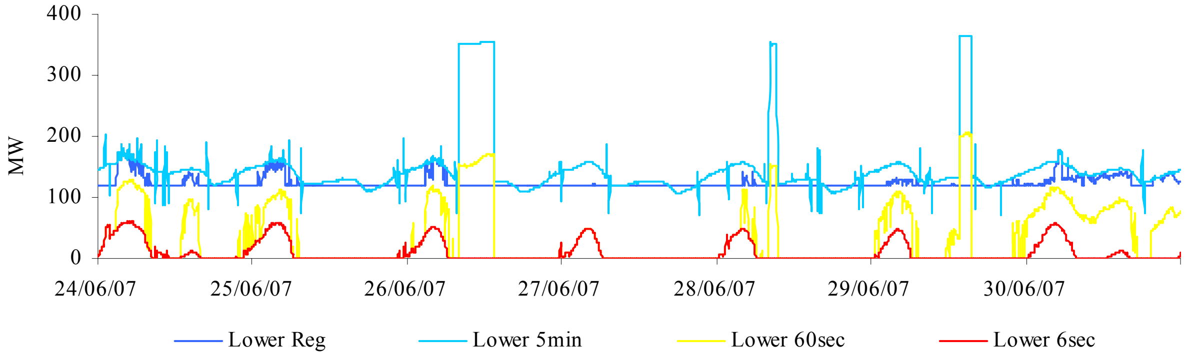
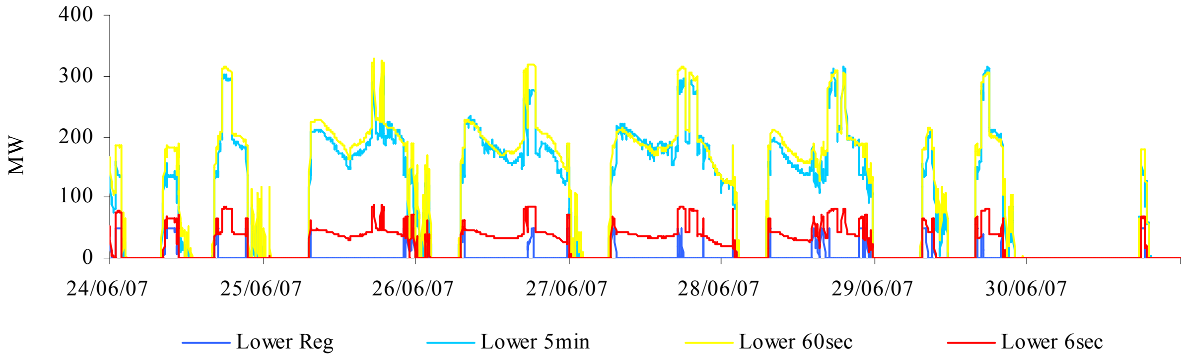


Figure 69A: lower requirements – Tasmania



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