Market analysis

AUSTRALIAN ENERGY REGULATOR

17 June – 23 June 2007

Summary

Spot prices for the week averaged between $129/MWh in Tasmania and $260/MWh in New South Wales with new record demand occurring in both regions. Record winter demands also occurred in Victoria and Queensland. National demand reached a new high of 32 688 MW on Thursday. Prices in New South Wales exceeded $5000/MWh during the evening peak on two consecutive days, with those extreme prices reflected into Queensland and the Snowy region.

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 ended 23 June was $971 million. The total cost of ancillary services for the week was $785 000, or 0.1 per cent of energy market turnover.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 276 instances or 82 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.

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

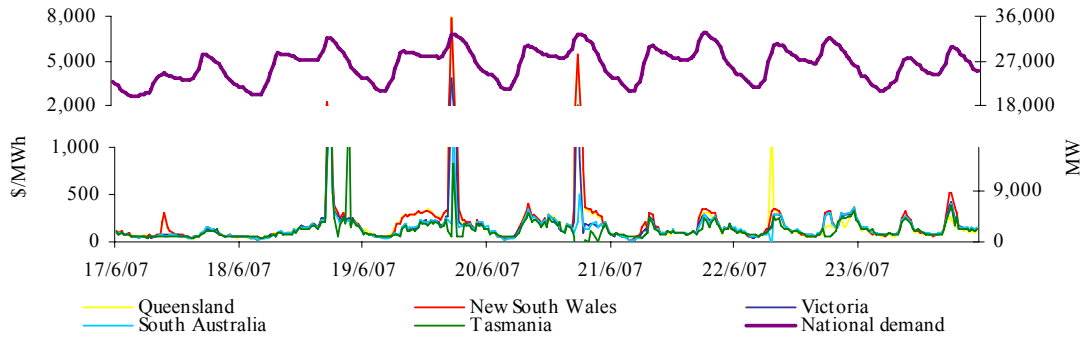


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	242	260	181	158	129
Previous week	255	417	179	89	13
Same quarter last year	25	28	30	38	38
Financial year to date	52	60	57	57	49
% change from previous week*	▼5%	▼38%	▲1%	▲77%	▲896%
% change from same quarter last year**	▲877%	▲837%	▲502%	▲316%	▲238%
% change from year to date***	▲64%	▲39%	▲58%	▲29%	▼18%

*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

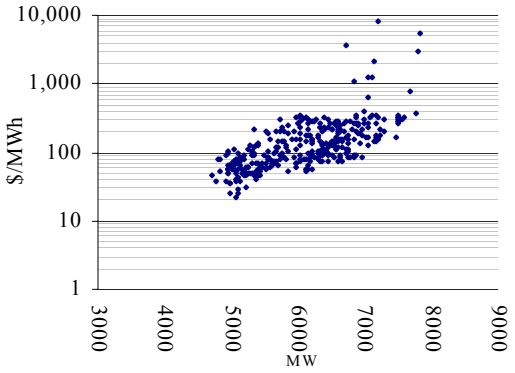


Figure 4: New South Wales

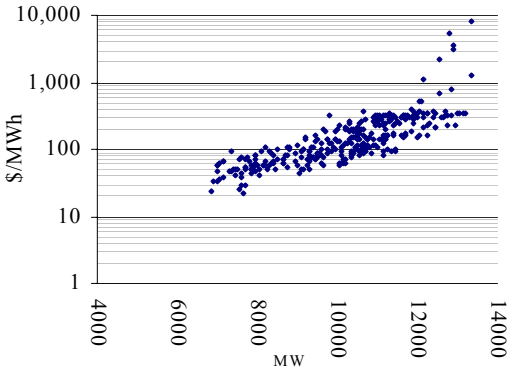


Figure 5: Victoria

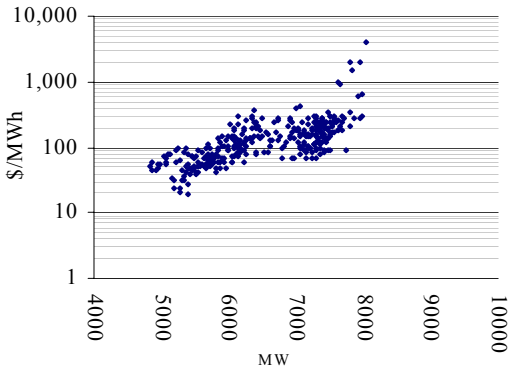


Figure 6: South Australia

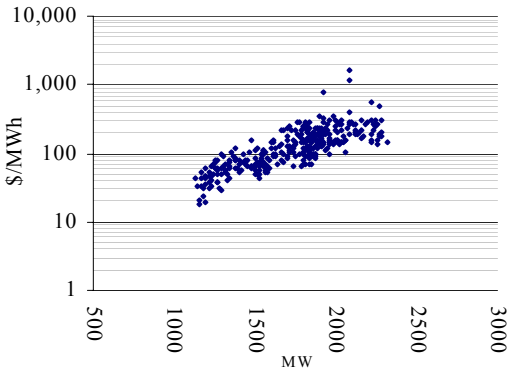
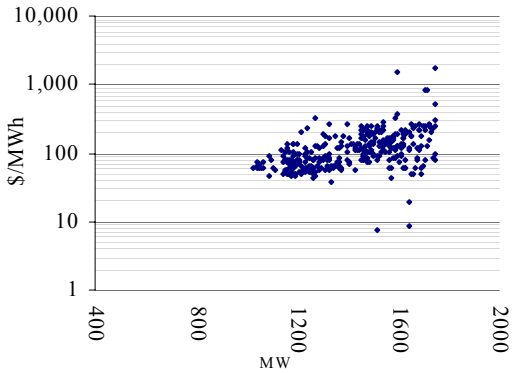


Figure 7: Tasmania



Maximum spot prices for the week ranged from $1681/MWh in South Australia to $8086/MWh in Queensland. 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	1.15	1.07	1.04	1.05	1.27
Previous week	1.53	1.85	1.31	1.33	1.30
Same quarter last year	1.07	0.96	0.96	0.94	0.29

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

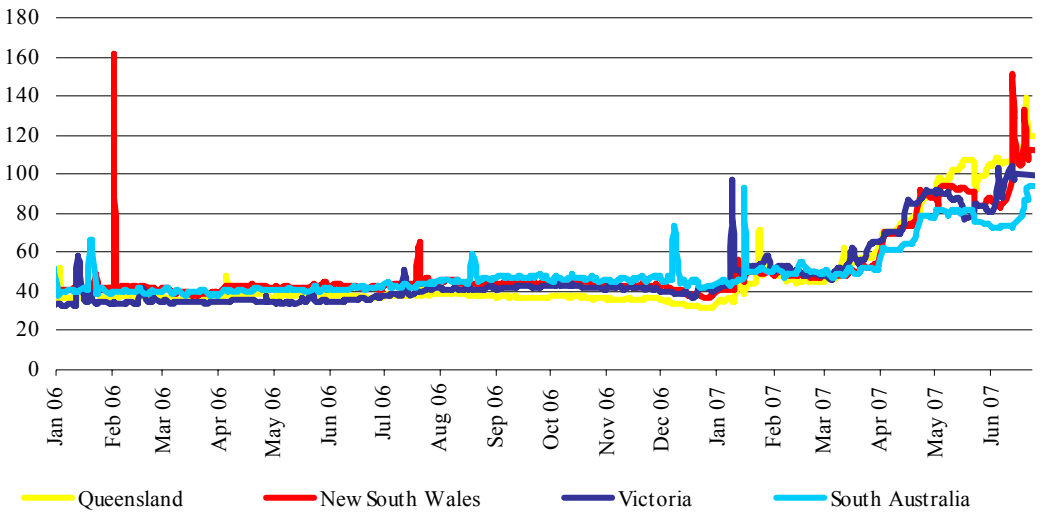
Figure 9 sets out the d-cyphaTrade wholesale electricity price index (WEPI)* for each region throughout the week excluding Tasmania. Figure 10 sets out the WEPI since 1 January 2004.

Figure 9: d-cyphaTrade WEPI for the week

	Monday	Tuesday	Wednesday	Thursday	Friday
Queensland	113.61	121.31	138.68	119.68	120.00
New South Wales	105.37	132.84	118.76	107.01	112.19
Victoria	96.10	103.83	100.42	97.51	99.81
South Australia	78.45	86.44	86.64	86.49	94.31

* 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



Reserves

At around 6.30 pm on Tuesday evening, NEMMCO issued a notice forecasting low reserves for New South Wales for the trading intervals ending 6.30 pm and 7.00 pm.

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

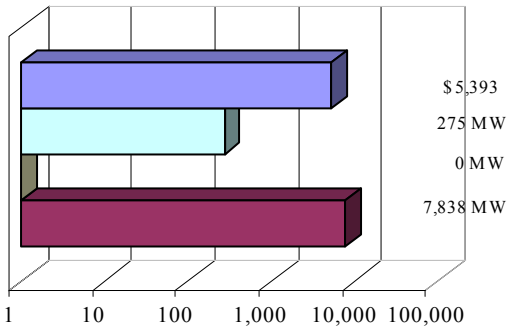


Figure 12: New South Wales

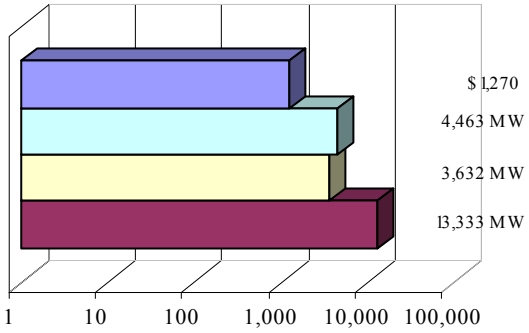


Figure 13: Victoria

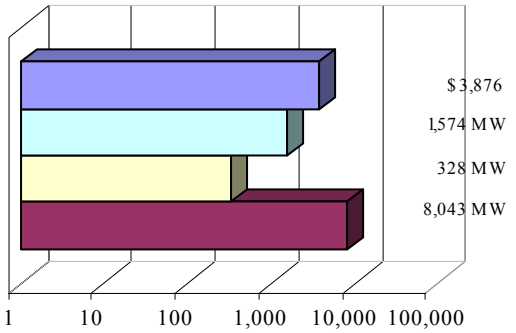


Figure 14: South Australia

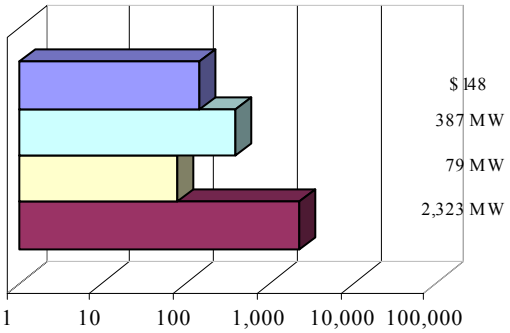
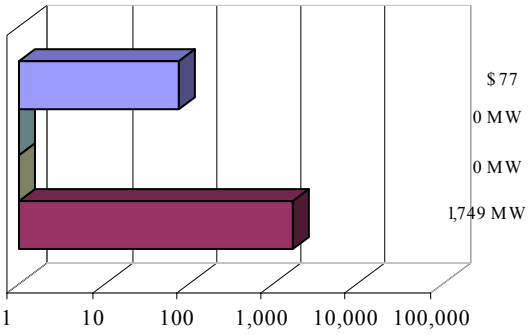


Figure 15: Tasmania



Price variations

There were 276 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

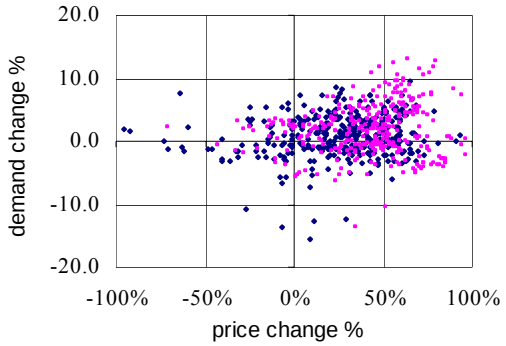


Figure 17: New South Wales

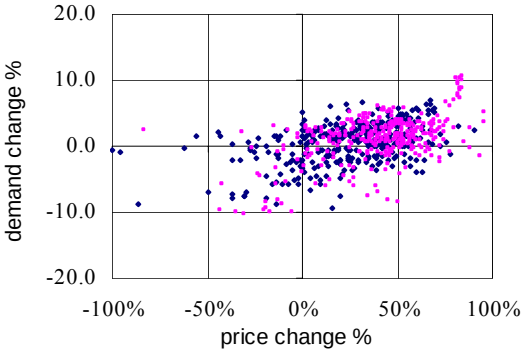
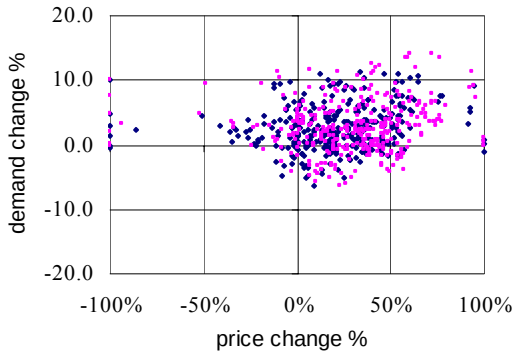


Figure 18: Victoria

Figure 19: South Australia

Figure 20: Tasmania



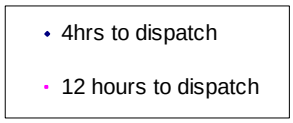
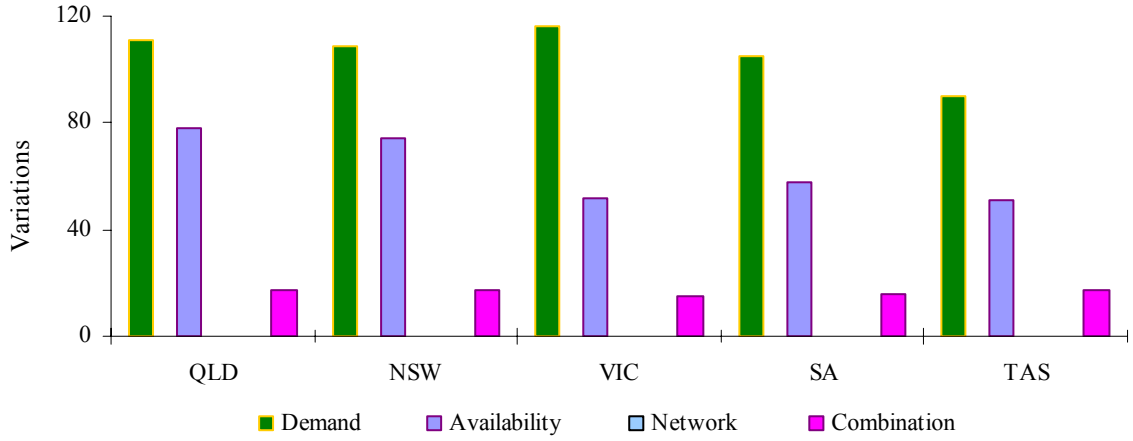


Figure 21 summarises the number and most probable reason for variations between forecast and actual prices.

Figure 21: reasons for variations between forecast and actual prices



Price and demand

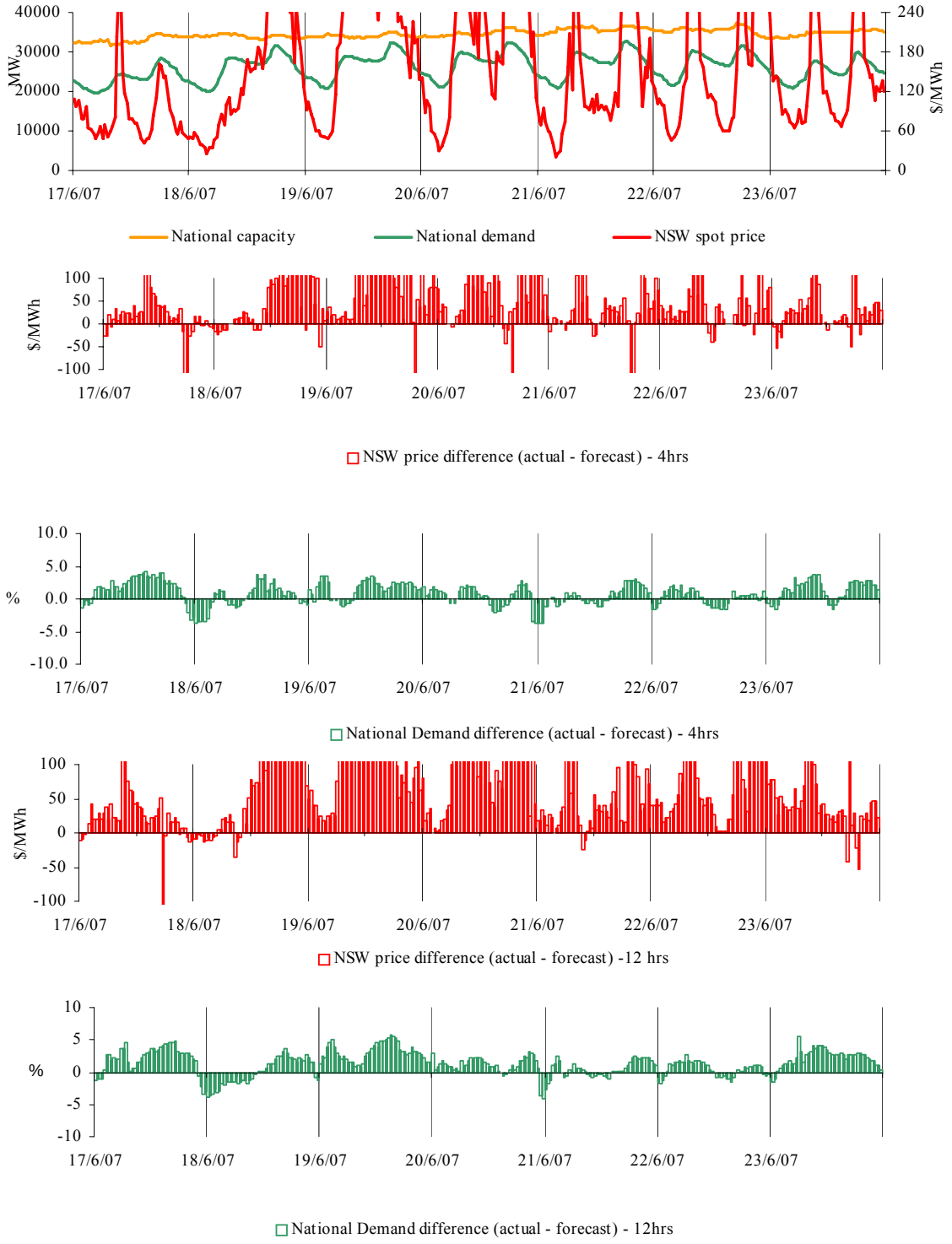
Figures 22 – 56 set out details of spot prices and demand on a national and regional basis. They include the actual spot price, actual demand and variation from forecasts made 4 and 12 hours ahead of dispatch. On a regional basis the differences between the maximum temperature and the temperature forecast 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 show 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 seven 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 $260/MWh.

Monday, 18 June

5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1131.67	309.98	129.98
Demand (MW)	30 254	29 808	29 371
Available capacity (MW)	34 201	35 207	36 072
6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	2197.81	608	331.82
Demand (MW)	31 513	31 008	30 776
Available capacity (MW)	34 245	35 209	36 078

Conditions at the time saw national demand up to 500 MW higher than forecast four hours ahead and up to 740 MW higher than forecast 12 hours ahead. Available capacity was around 1000 MW lower than forecast four hours ahead and 1850 MW lower than forecast 12 hours ahead.

Delta Electricity delayed the return of unit six at Vales Point on several occasions following a long term outage. This reduced capacity by 470 MW, compared to the night before with the majority of the capacity priced below zero. The rebid reasons given were “Return to Service” and “RTS delay::Capacity limit change”. The unit returned to service at around 10 pm.

At 9.22 am, CS Energy altered its commissioning tests at Kogan Creek, reducing capacity by 300 MW. The reason given was “Commissioning delays”. The unit remained offline for the rest of the day.

From 9.29 am, over several rebids, Tarong Energy rebid a total of 90 MW of capacity from prices of less than $500/MWh to above $4000/MWh. The rebids included a 50 MW increase in the available generation at Wivenhoe. The rebid reasons given included “Tarong water conservation::Volume profile change”, “Cover contract position::Volume profile change”, “Portfolio optimisation::Volume profile change” and “Portfolio water optimisation::Volume profile change”.

At 9.35 am, Millmerran Energy Trader reduced capacity at Millmerran unit one by 200 MW, all of which was priced below $10/MWh. The reason given was “Changed plant conditions”. At 5 pm a further rebid was made to reduce available capacity at Millmerran unit one by a further 285 MW, all priced below zero, on account of a unit trip.

At 11.43 am, LYMMCO’s Loy Yang A unit three tripped reducing capacity by 580 MW. All of this capacity was priced below $10/MWh. The return of the unit was delayed until the next morning.

At 4.45 pm Stanwell Corporation shifted 150 MW of capacity across its four Stanwell units from prices below $150/MWh to above $9000/MWh. The rebid reason given was “Manage transmission constraint”. A transmission outage between Gladstone and Gin Gin saw the central to south Queensland constraint limiting generation availability to 1650 MW over the evening peak.

There was no other significant rebidding.

Tuesday, 19 June

5:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3643.83	340.36	162.99
Demand (MW)	31 046	30 477	29 972
Available capacity (MW)	35 013	35 491	36 838
6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	7912.3	6993.99	342.12
Demand (MW)	32 407	31 553	31 358
Available capacity (MW)	34 939	35 442	36 779
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1269.64	549.64	343.62
Demand (MW)	32 407	31 619	31 367
Available capacity (MW)	35 098	35 473	36 865

National demand reached a new high of 32 407 MW coinciding with a new record in New South Wales of 13 333 MW. Demand exceeded 8000 MW in Victoria for the first time in winter. Demand was up to 1000 MW higher than forecast four and 12 hours ahead while available capacity was up to 1800 MW lower on the same basis.

At 7.09 am Millmerran Energy Trader reduced capacity at Millmerran unit one by 250 MW priced below $10/MWh. The rebid reason given was “Changed plant conditions”.

Over two rebids from 10.08 am CS Energy reduced the capacity at Kogan Creek by 400 MW priced below zero due to commissioning. At 5.43 pm, effective at 5.50 pm the unit increased available capacity by 150 MW priced below zero.

At 11.57 am Enertrade delayed the return to service of Gladstone unit two after a six day outage. This reduced capacity by 280 MW all which was priced below $100/MWh. The reason given was “Rearrangement pre/post outage:Change MW distrib”. At 12.29 pm Callide Power Trading delayed the return to service of Callide C unit four after a trip the previous night. This saw a reduction of available capacity by 450 MW priced below $30/MWh.

Over two rebids at 12.37 pm and 3.16 pm Origin rebid 356 MW of capacity at Roma and Mt Stuart from prices above $9000/MWh to below zero. The rebid reason given was “change in PDS”.

From 4.06 pm Stanwell Corporation shifted 140 MW of capacity across Stanwell units one, two and four from prices below $150/MWh to above $9000/MWh. The reason given was “Changed predispatch”.

At 3.41 pm Macquarie Generation rebid 210 MW of capacity across its portfolio from prices above $8000/MWh to below $500/MWh. The rebid reasons given were “Coal management” and “Adjustments due to LD”.

There was no other significant rebidding.

Wednesday, 20 June

6:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	5367.37	4327.86	340.55
Demand (MW)	32 251	32 518	32 119
Available capacity (MW)	36 230	36 805	37 341
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3091.52	688.79	343.86
Demand (MW)	32 323	32 511	32 073
Available capacity (MW)	36 236	36 604	37 117

Conditions at the time saw demand up to 250 MW below forecast four hours ahead and up to 250 MW higher than forecast 12 hours ahead. Demand was within 100 MW of the NEM record set the previous night. Available capacity was up to 600 MW lower than forecast four hours ahead and 1100 MW lower than forecast 12 hours ahead.

At 3.43 am Millmerran Energy Trader reduced the available capacity of Millmerran unit two by 115 MW due to coal issues. At 8.39 am the unit's remaining capacity of 320 MW was bid unavailable with the rebid reason of "forced outage". All of this capacity was priced at less than zero.

From 8.06 am, Snowy Hydro rebid 575 MW of capacity at Tumut unit three from prices below $450/MWh to above $7400/MWh. Rebid reasons given included "Demand & Disp higher then fcast:Bandshift up" and "Amend hydro bid to account for gas".

Bayswater unit 1 attempted to come online following a long term outage. The unit initially synchronised at 6 pm before tripping, reducing capacity by 210 MW. All of this capacity was priced below zero. The unit successfully return to service at around 11 pm.

Over two rebids at 11.54 am and 5.44 pm Delta Electricity reduced the available capacity of unit six at Vales Point by 220 MW. All of this capacity was priced below $20/MWh. The rebid reasons given were "FF performance tuning::capacity limit change" and "Blocked dust hoppers".

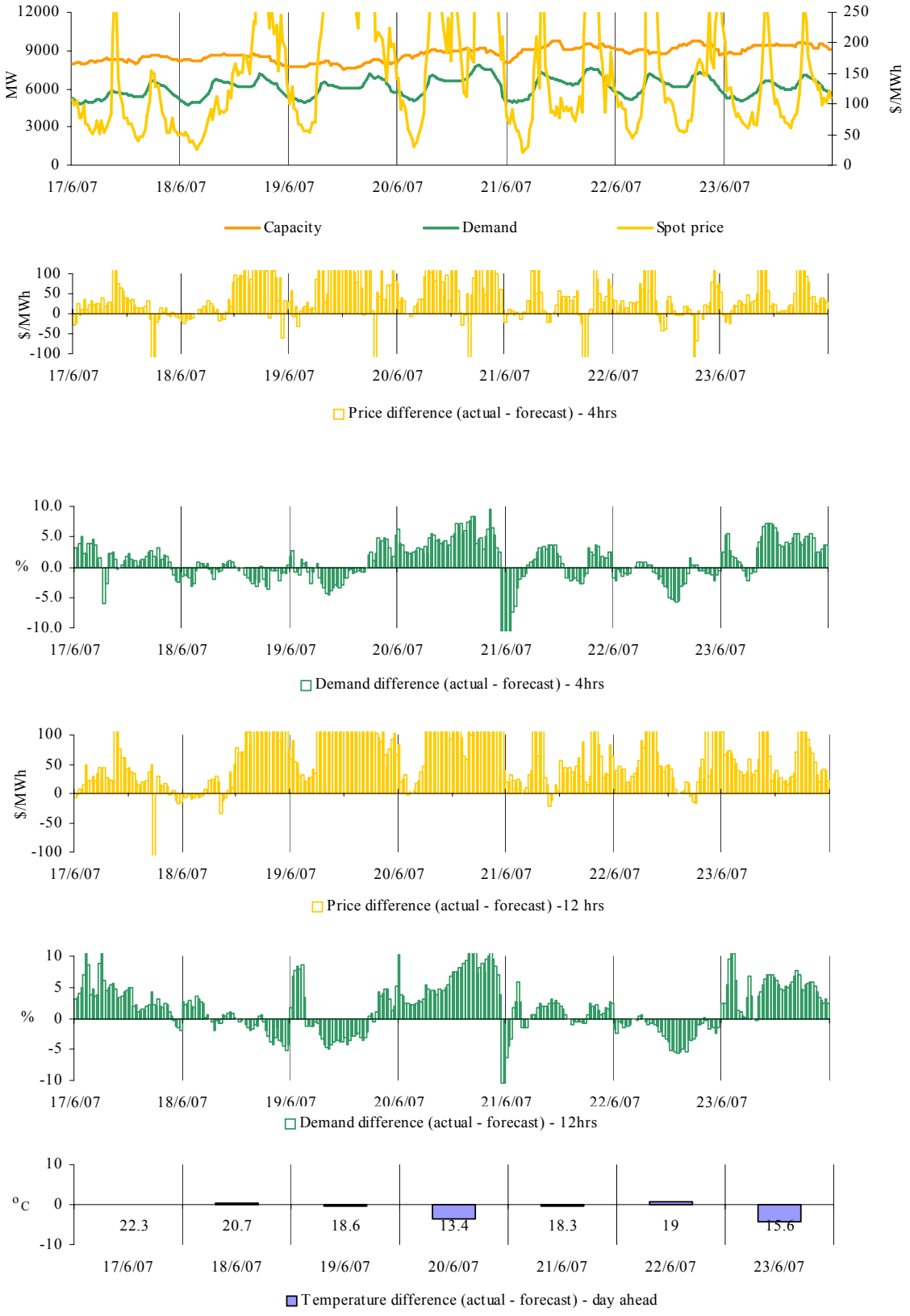
At 4.18 pm CS Energy reduced the capacity at Kogan Creek by 500 MW, all which was priced below zero. This reduction related to the commissioning of the unit.

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 nine occasions where the spot prices in Queensland was greater than three times the Queensland weekly average price of $242/MWh. Seven of these occurred when prices were generally aligned across all regions and is detailed in the national market outcomes section. The remaining two occasions are presented below.

Wednesday, 20 June

7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	759.43	312.56	267.09
Demand (MW)	7676	7307	6988
Available capacity (MW)	9205	9238	9684

Conditions at the time saw demand 350 MW higher than that forecast four hours ahead and 700 MW higher than that forecast 12 hours ahead. Available capacity was close to that forecast four hours ahead and 500 MW below forecast 12 hours ahead.

There was no significant rebidding.

Friday, 22 June

7:30 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1240.07	86.08	69.74
Demand (MW)	7046	6990	7080
Available capacity (MW)	8977	9132	9391

Conditions at the time saw demand close to that forecast. Available capacity was also close to that forecast four hours ahead and 400 MW lower than forecast 12 hours ahead.

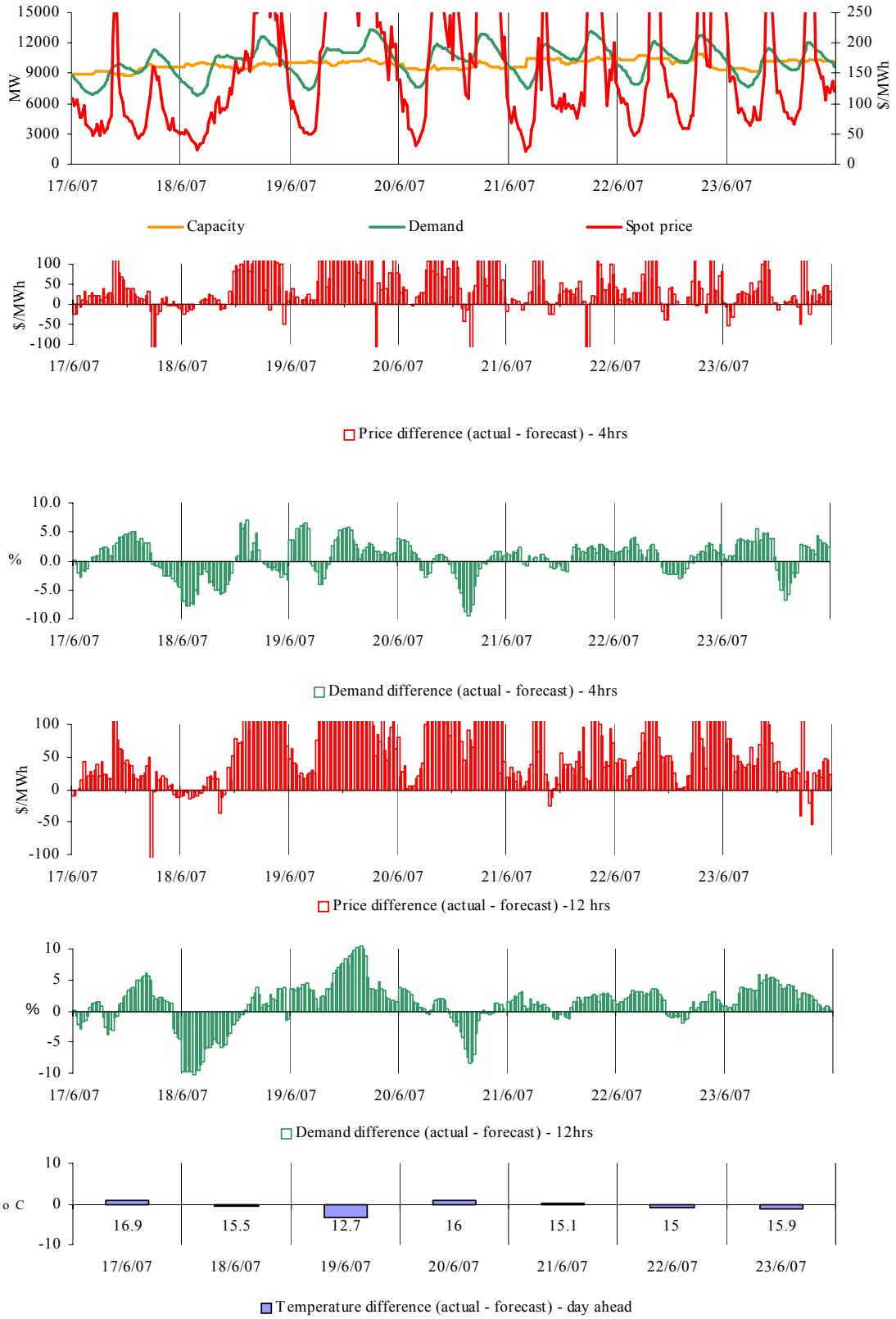
A constraint used to manage NSW to Qld Transient Stability Limit bound from 7.05 am to 7.15 am forcing flows into Queensland at up to 400 MW across the QNI Interconnector. This coincided with the loss of 280 MW at Gladstone. As a result the Queensland dispatch price increased from $156/MWh at 7.10 am to $6369/MWh at 7.15 pm. The dispatch price then settled at $263/MWh for the following dispatch interval.

There was no other significant rebidding.

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

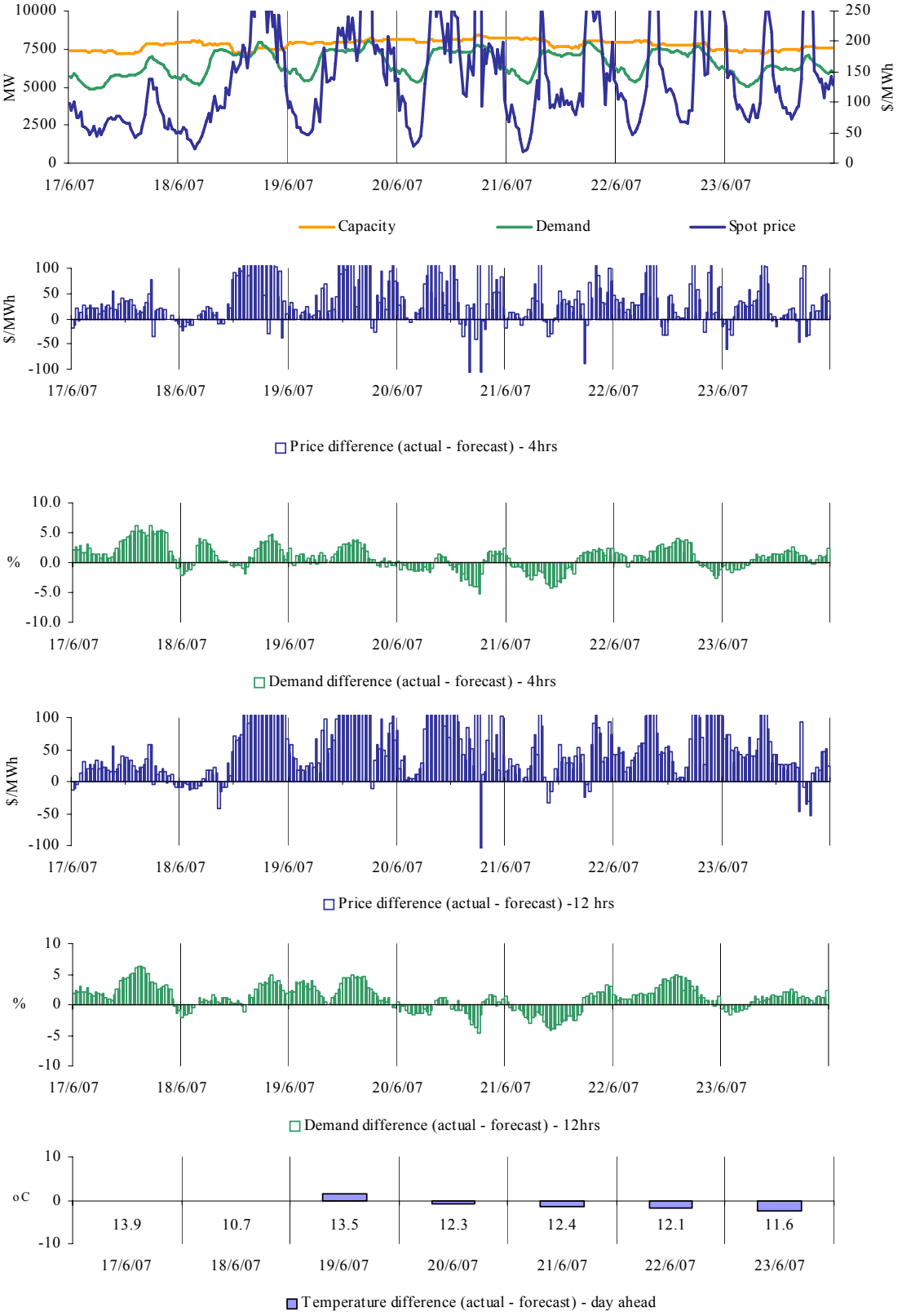


There were nine occasions where the spot prices in New South Wales were greater than three times the New South Wales weekly average price of $260/MWh. All of these occurred when prices were generally aligned across all regions and are detailed in the national market outcomes section.

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 was greater than three times the Victoria weekly average price of $181/MWh. Seven of these occurred when prices were generally aligned across all regions and are detailed in the national market outcomes section. The remaining occasion is presented below.

Monday, 18 June

6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	602.64	326.85	280.7
Demand (MW)	7923	7664	7664
Available capacity (MW)	7539	8028	8034

Conditions at the time saw demand 250 MW higher than forecasts four and 12 hours ahead. Available capacity was 500 MW lower than forecast.

There was no significant rebidding.

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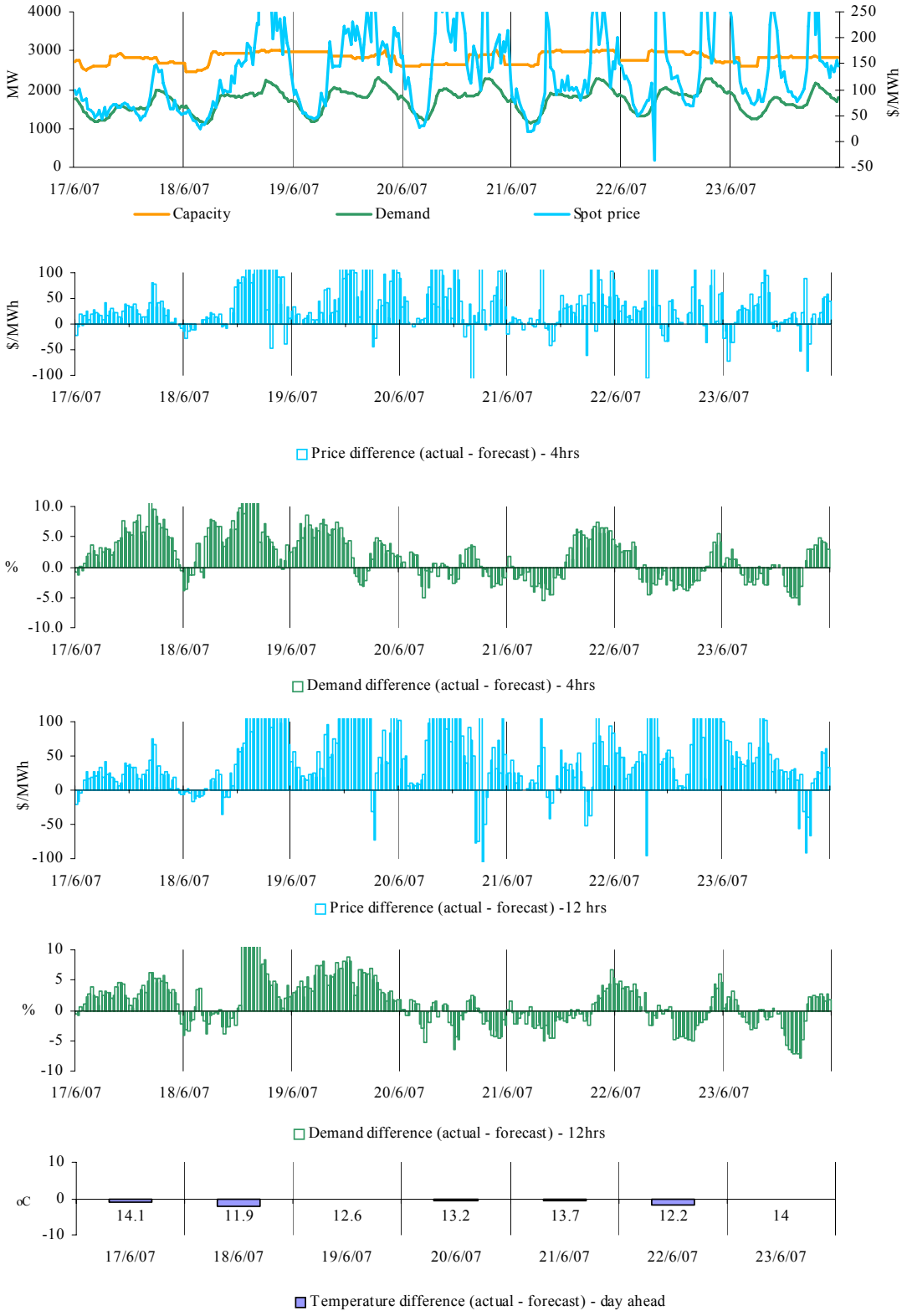
South Australia

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 were five occasions where the spot price in South Australia was greater than three times the South Australia weekly average price of $158/MWh. Four 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.

Monday, 18 June

	Actual	**4 hr forecast**	**12 hr forecast**
6:30 pm			
Price ($/MWh)	553.32	313	277.47
Demand (MW)	2222	2061	2034
Available capacity (MW)	2990	2986	3001

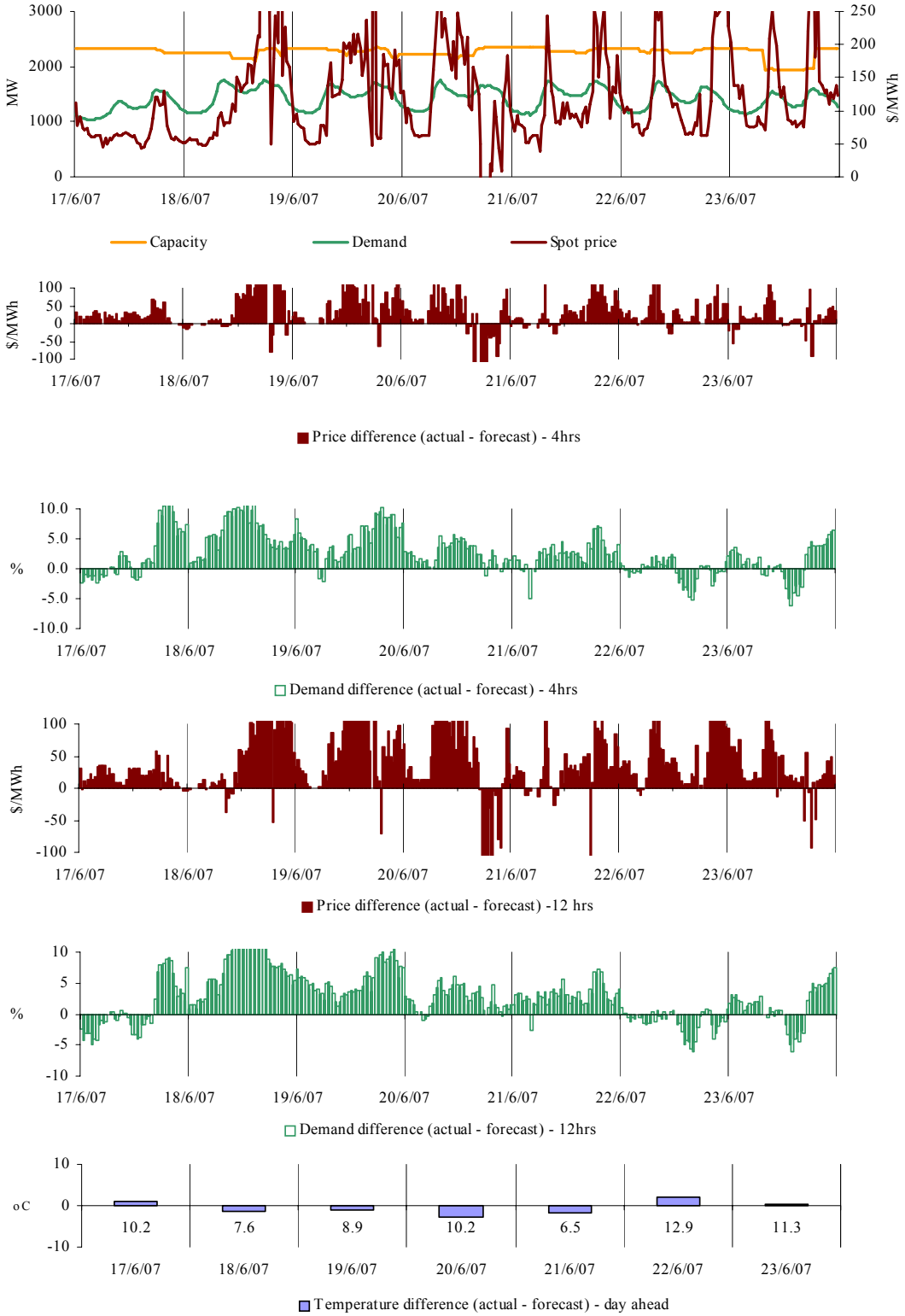
Conditions at the time saw demand around 160 MW higher than that forecast four and 12 hours ahead. In the main, conditions in South Australia around this time reflected those across the rest of the market.

There was no significant rebidding.

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 five occasions where the spot price in Tasmania was greater than three times the Tasmania weekly average price of $129/MWh. Three of these occurred when prices were generally aligned across all regions and are detailed in the national market outcomes section. The remaining two occasions are presented below.

Monday, 18 June

6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	524.89	285.34	241.18
Demand (MW)	1743	1671	1600
Available capacity (MW)	2319	2253	2253

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

At 6.30 pm conditions in Tasmania reflected those on the mainland with prices aligned across all regions.

9:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1518.72	126.17	58.31
Demand (MW)	1593	1539	1479
Available capacity (MW)	2205	2319	2253

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

At 7.14 pm Hydro Tasmania rebid around 500 MW of capacity from prices less than $210/MWh to above $7400MWh. The reason given was “Hydrological Opt/ change in price fcast”. At 9.05 pm the resulting step change led to a network constraint binding, affecting flows across Basslink. The dispatch price increased from $134/MWh at 9 pm to $8000/MWh at 9.05 pm. The price returned to $235/MWh for the following 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

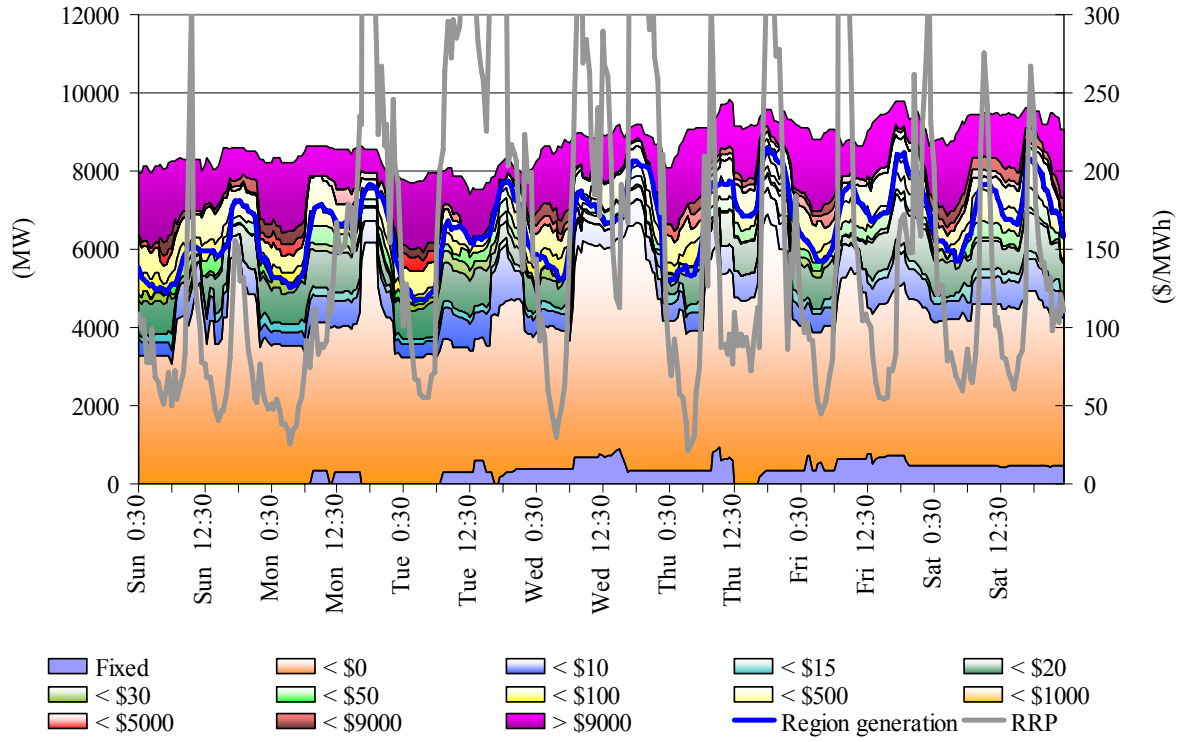


Figure 58: New South Wales closing bid prices, dispatched generation and spot price

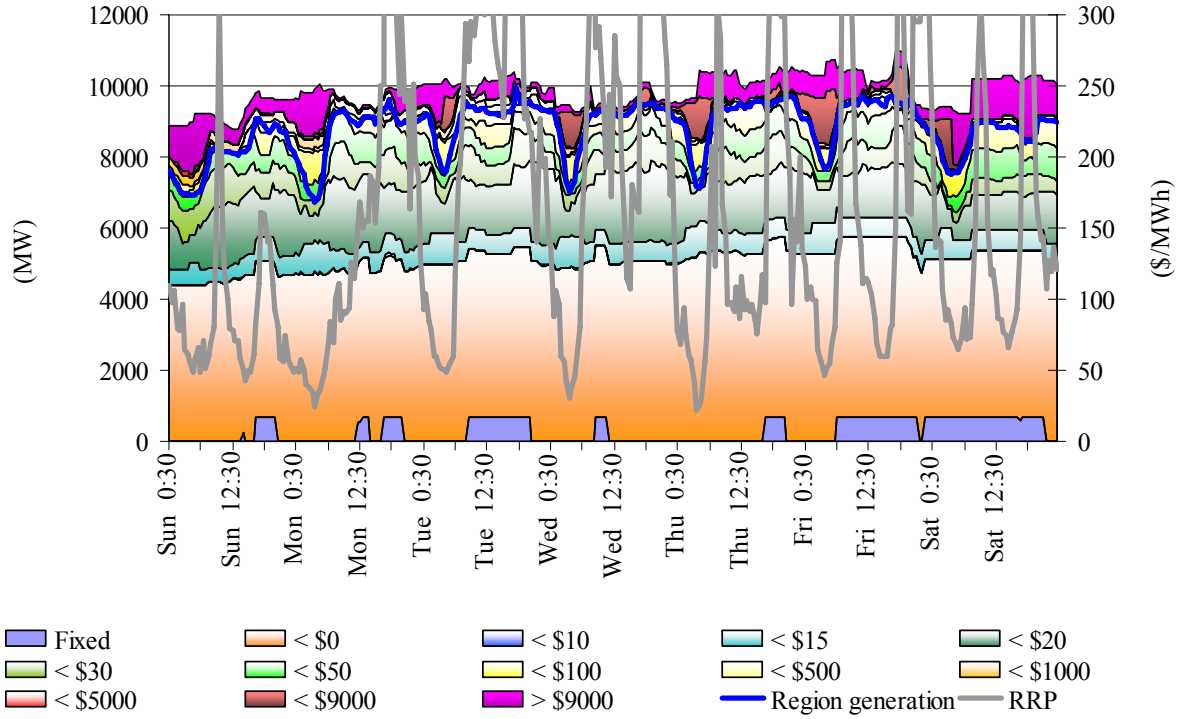


Figure 59: Victoria closing bid prices, dispatched generation and spot price

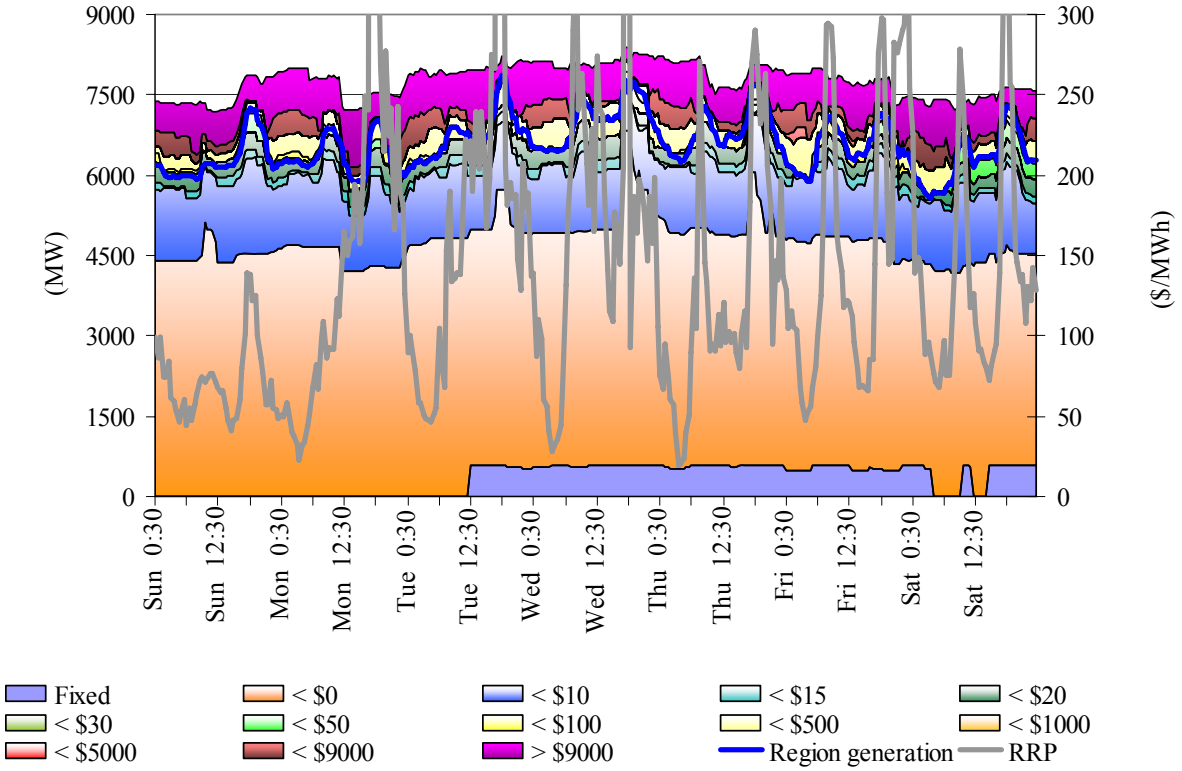


Figure 60: South Australia closing bid prices, dispatched generation and spot price

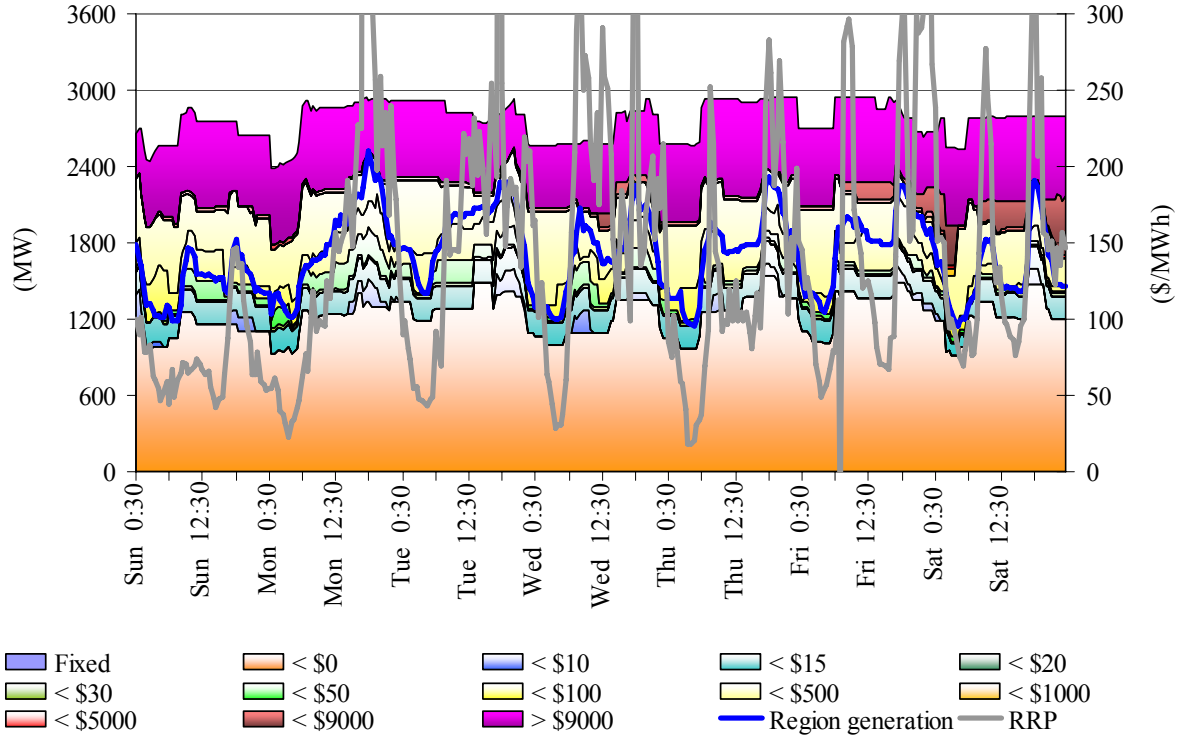
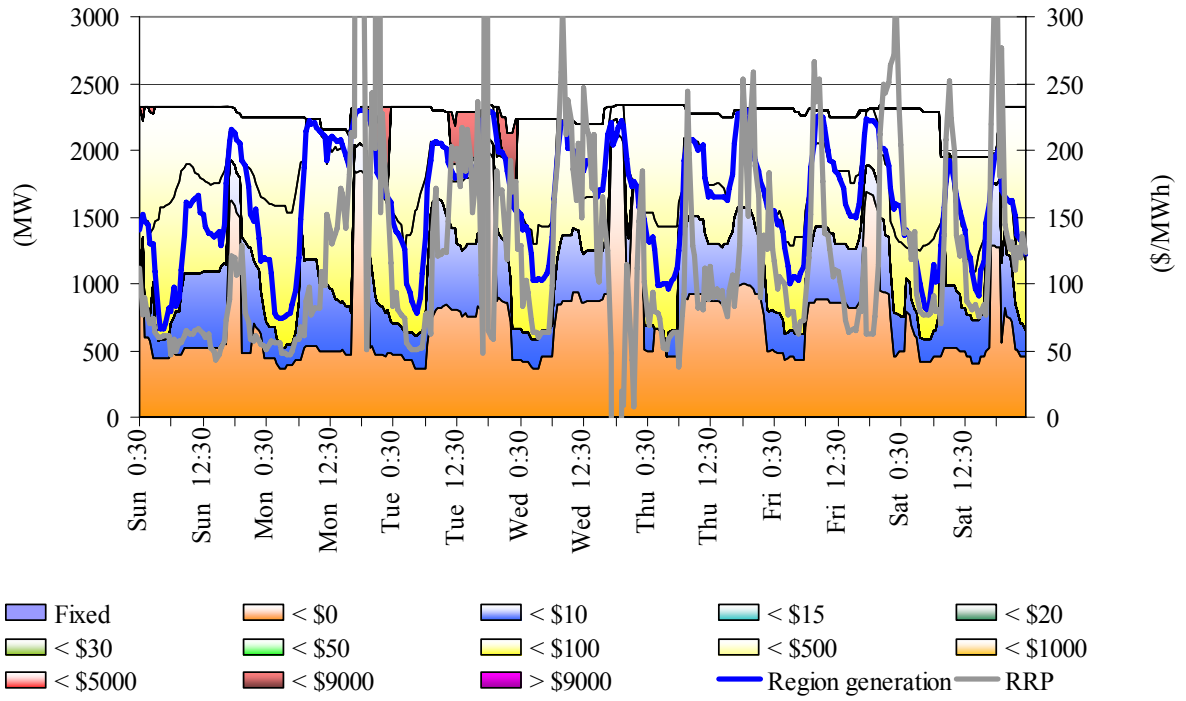


Figure 61: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was $386 000 or 0.04 per cent of 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 ($/MW)	0.93	0.44	1.83	8.00	0.09	0.16	0.53	1.74
Previous week ($/MW)	1.87	0.76	2.32	6.02	0.11	0.05	0.68	1.63
Last quarter ($/MW)	1.76	0.73	1.15	1.54	0.39	2.28	5.00	1.93
Market Cost ($1000s)	$37	$17	$112	$188	$0	$0	$4	$28
% of energy market	0.01%	0.01%	0.01%	0.02%	0.01%	0.01%	0.01%	0.01%

The total cost of ancillary services in Tasmania for the week was $399 000 or 1.3 per cent of the turnover in the Tasmanian energy market. On Tuesday, the price for the lower 6 second service reached $10 000 MW as a result of a shortfall for that service. This followed a step change in Basslink. Figure 63 summarises for Tasmania the prices and costs of 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 ($/MW)	13.97	1.85	2.14	7.90	22.42	2.07	1.98	1.69
Previous week ($/MW)	15.93	1.78	2.12	5.96	0.21	2.48	2.07	1.82
Last quarter ($/MW)	4.97	0.49	2.93	3.00	12.67	0.43	0.82	0.45
Market Cost ($1000s)	$22	$9	$16	$22	$188	$72	$63	$8
% of energy market	0.07%	0.03%	0.05%	0.07%	0.61%	0.23%	0.21%	0.02%

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

Figure 64: daily frequency control ancillary service cost

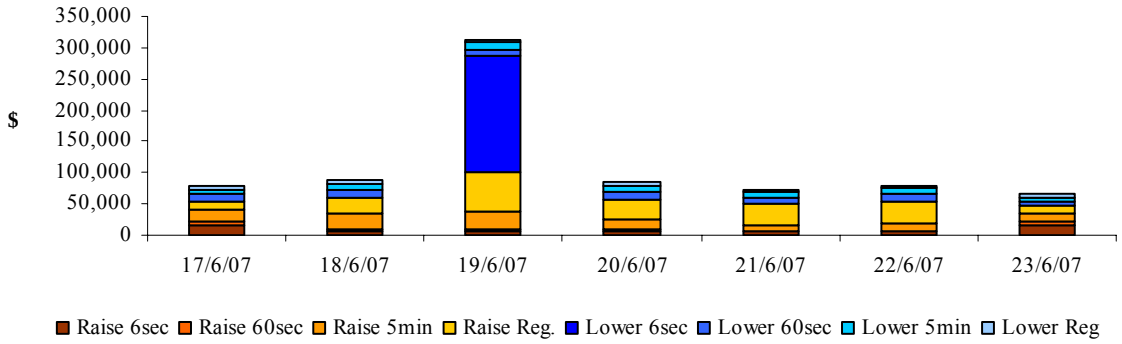
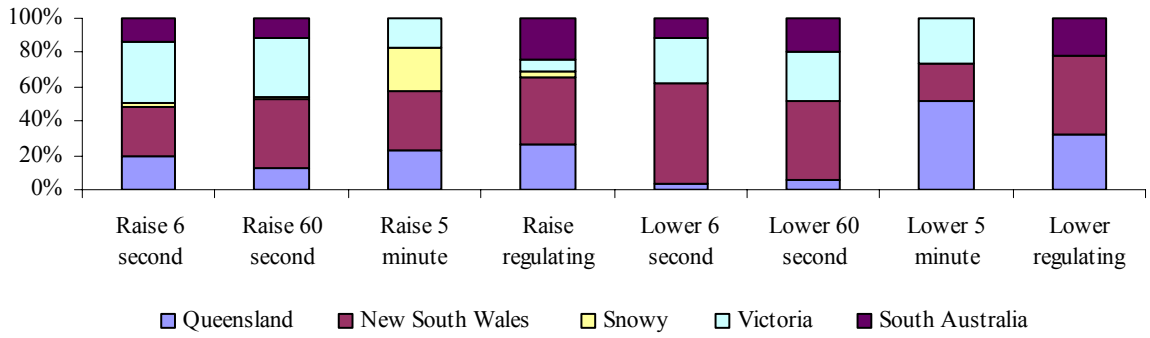


Figure 65 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

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

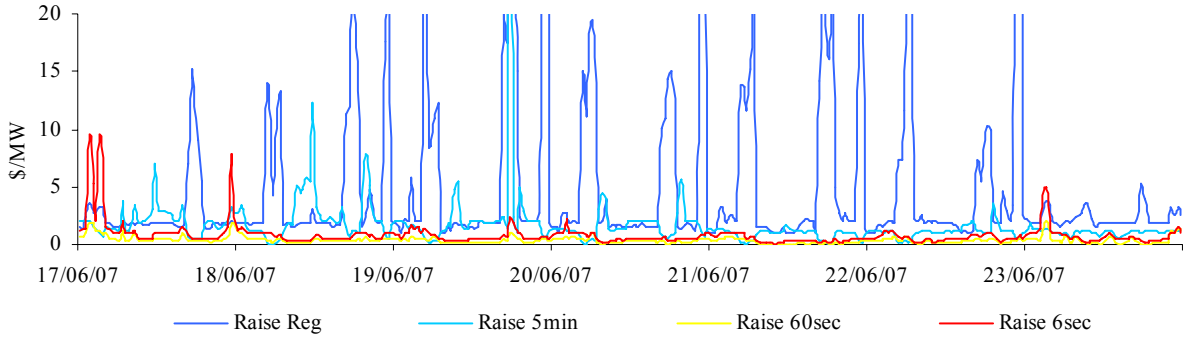


Figure 66A: prices for raise services – Tasmania

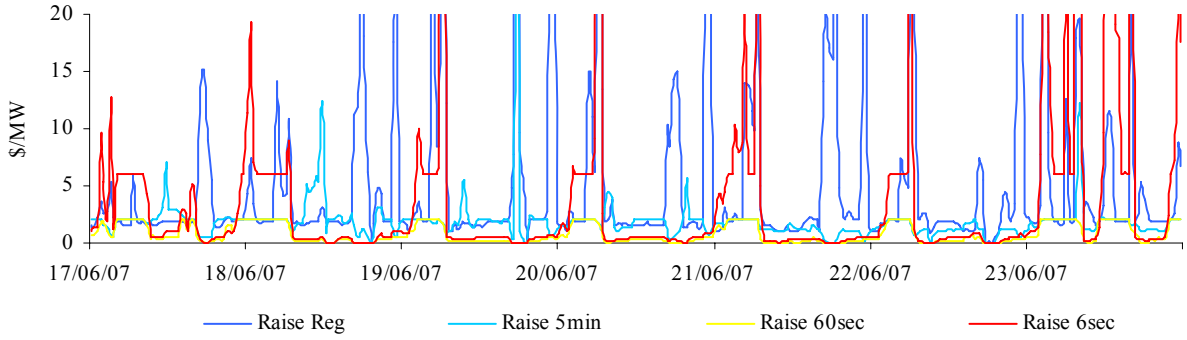


Figure 67: prices for lower services

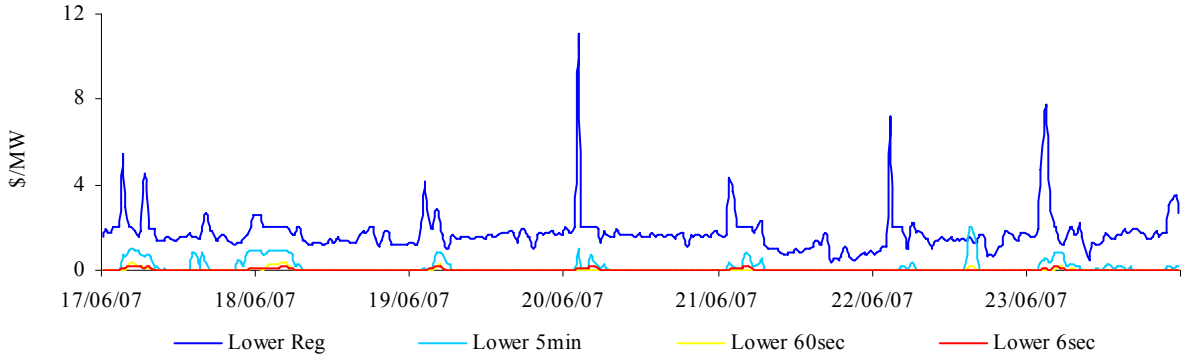
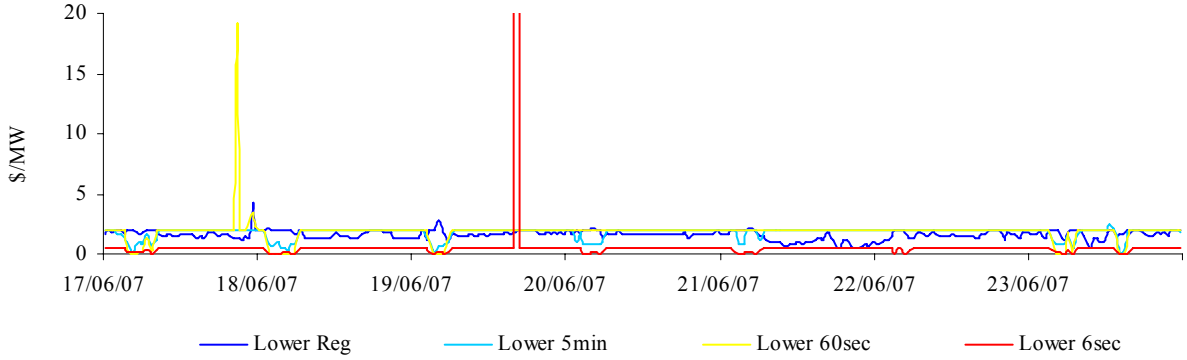


Figure 67A: prices for lower services – Tasmania



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

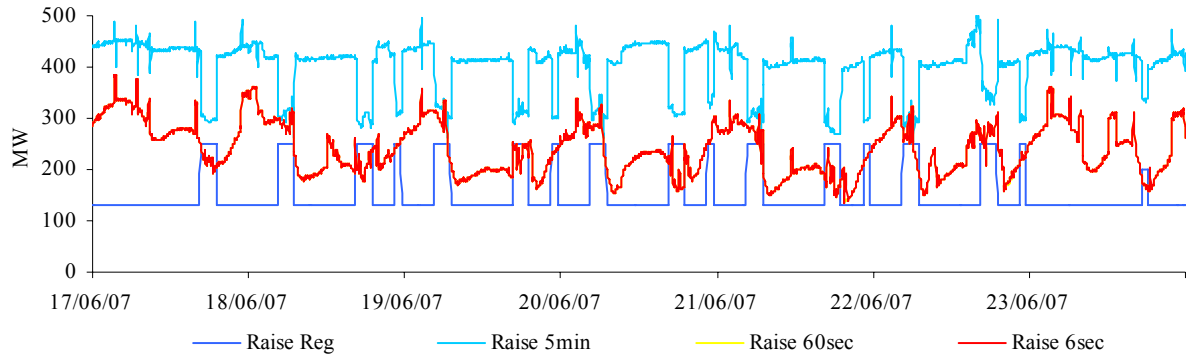


Figure 68A: raise requirements – Tasmania

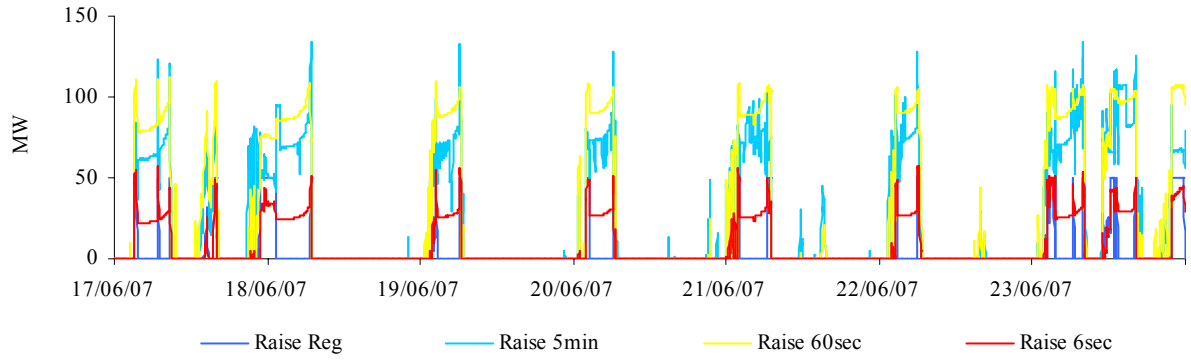


Figure 69: lower requirements

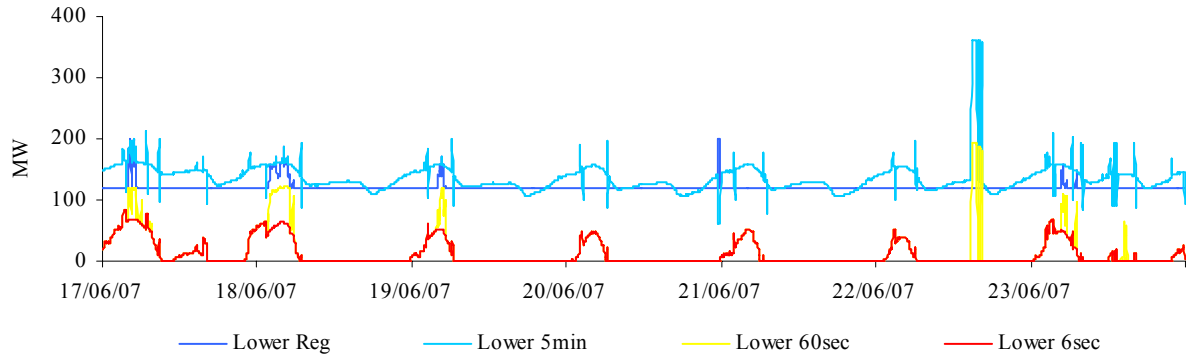
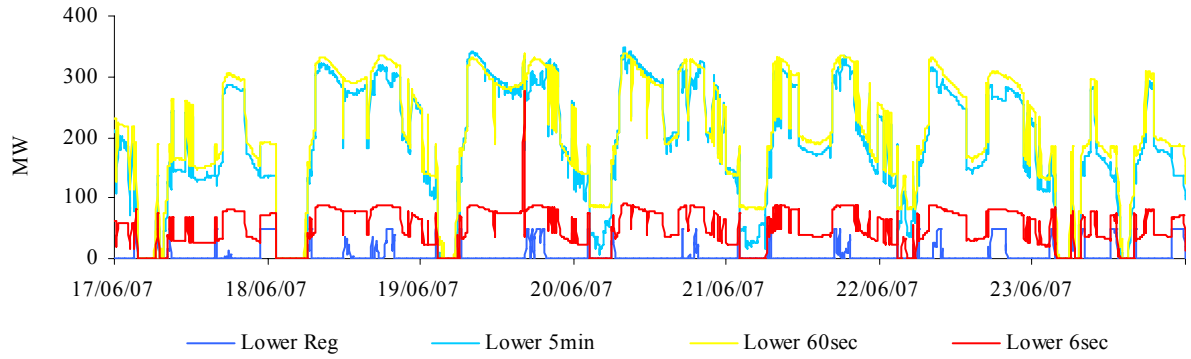


Figure 69A: lower requirements – Tasmania



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