Market analysis

AUSTRALIAN ENERGY REGULATOR

7 October – 13 October 2007

Summary

Spot prices for the week averaged $122/MWh in Queensland. High energy prices occurred on three days as lightning impacted on the dispatch of generation in southern Queensland and flows across the Queensland to New South Wales interconnector. Prices elsewhere in the market averaged around $35/MWh.

Turnover in the energy market in the week ended 13 October was $223 million. The total cost of ancillary services for the week was $8 million or 3.6 per cent of energy market turnover. Of this cost, 87 per cent resulted from a requirement to source those services locally in Queensland.

Significant variations between actual prices and those forecast 4 and 12 hours ahead occurred in 146, or 43 per cent, of all trading intervals. Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in 15 per cent of all trading intervals across the market. These variations were most frequent in Tasmania, occurring in over a third of 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

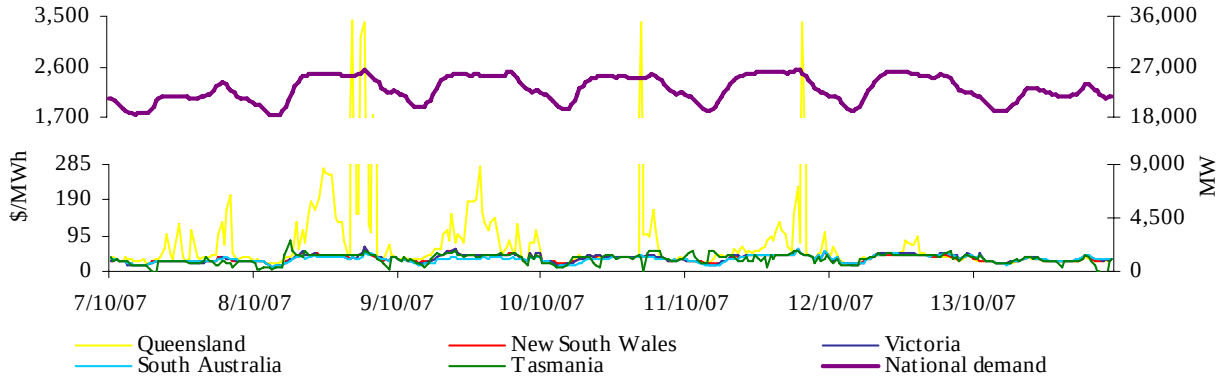


Figure 2: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	122	36	36	34	34
Previous week	50	38	35	34	30
Same quarter last year	23	27	29	40	37
Financial year to date	61	57	58	58	62
% change from previous week*	▲146%	▼5%	▲1%	0%	▲14%
% change from same quarter last year**	▲429%	▲30%	▲23%	▼15%	▼7%
% change from year to date***	▲139%	▲53%	▲53%	▲41%	▲51%

*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

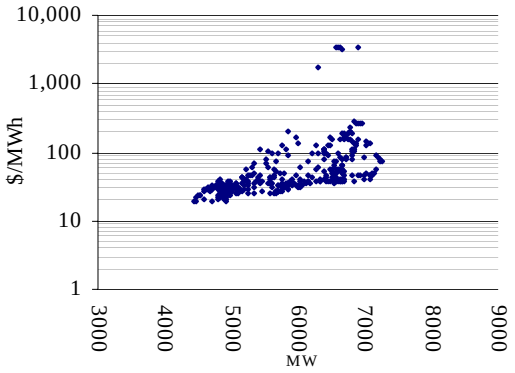


Figure 4: New South Wales

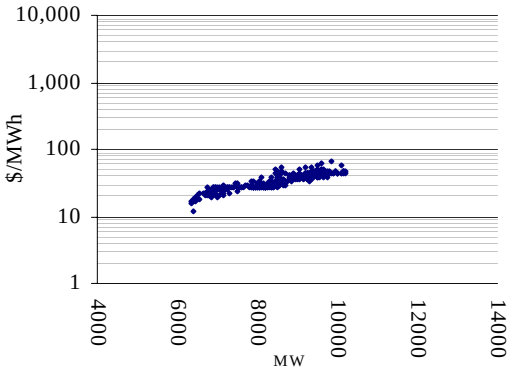


Figure 5: Victoria

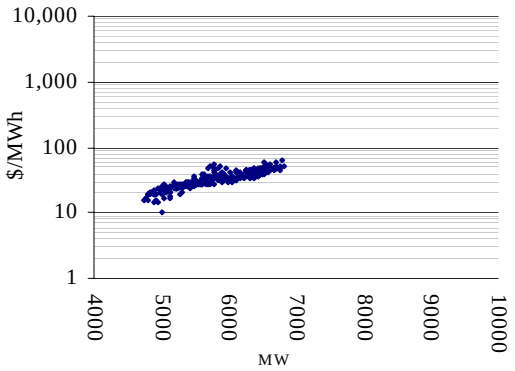


Figure 6: South Australia

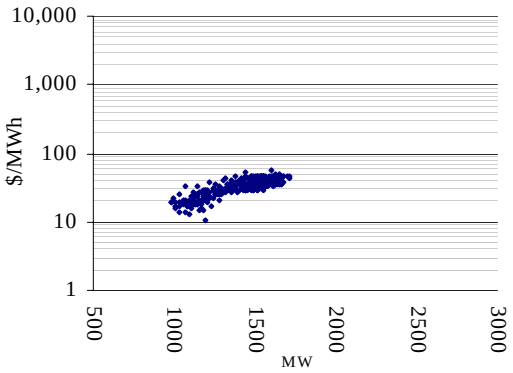
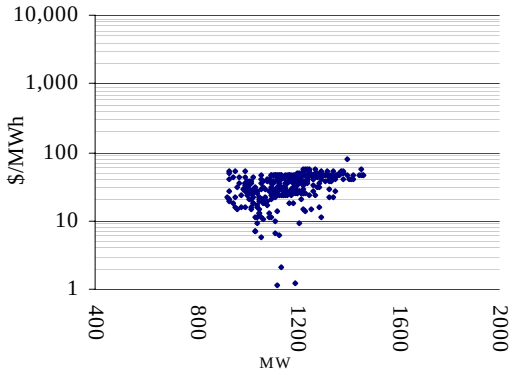


Figure 7: Tasmania



Maximum spot prices for the week ranged from $58/MWh in South Australia to $3440/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	2.23	0.28	0.29	0.30	0.39
Previous week	0.75	0.48	0.43	0.36	1.03
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

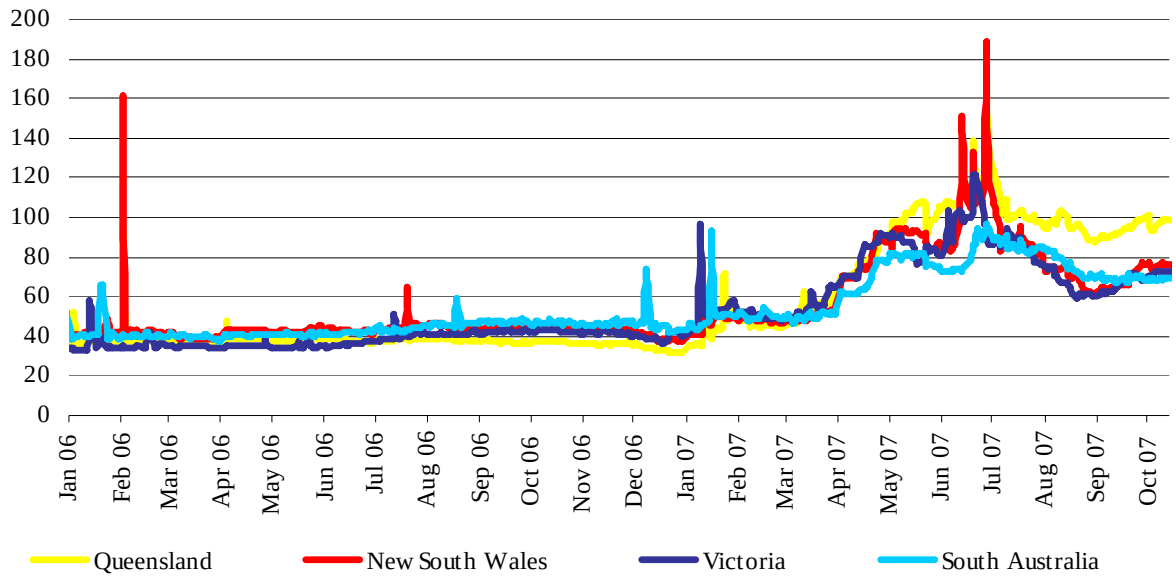
Figure 9 sets out the d-cyphaTrade wholesale electricity price index (WEPI)* for each region throughout the week excluding Tasmania. Figure 10 sets out the WEPI since 1 January 2006.

Figure 9: d-cyphaTrade WEPI for the week

	Monday	Tuesday	Wednesday	Thursday	Friday
Queensland	97.23	97.76	97.54	98.72	72.49
New South Wales	76.37	76.98	75.95	76.58	99.32
Victoria	70.15	69.92	70.74	70.81	68.81
South Australia	69.08	69.10	68.48	69.73	68.81

* 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

Low reserves were forecast in Queensland on Tuesday afternoon. These conditions were removed ahead of time following the earlier than expected return of equipment that was subject to a network outage in northern New South Wales.

NEMMCO directed three participants on Wednesday to maintain power system security as lightning impacted on the secure dispatch of the market.

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

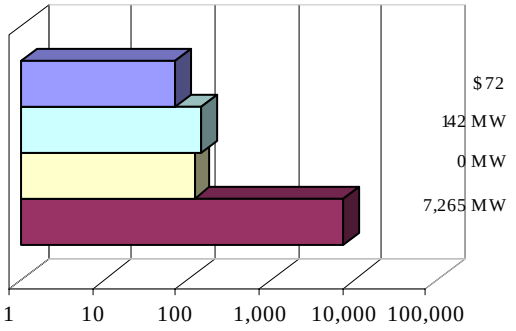


Figure 12: New South Wales

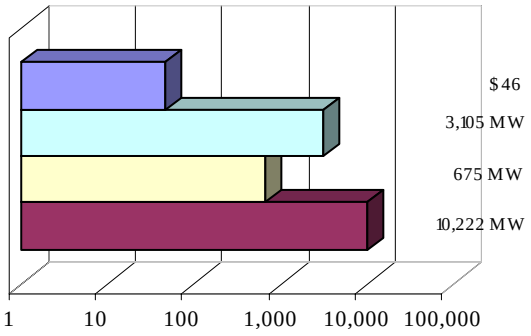


Figure 13: Victoria

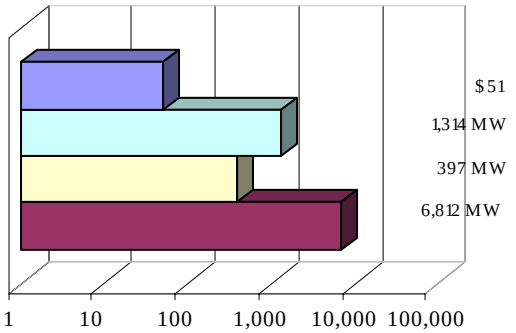


Figure 14: South Australia

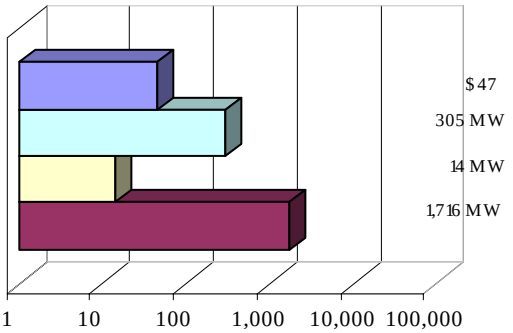
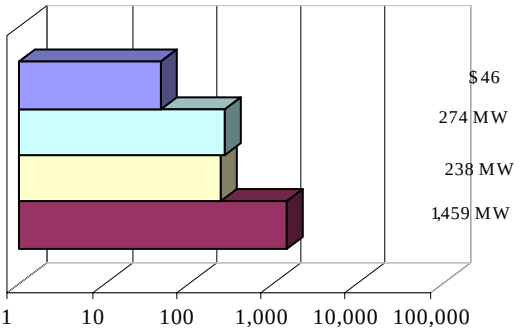


Figure 15: Tasmania



Price variations

There were 146 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

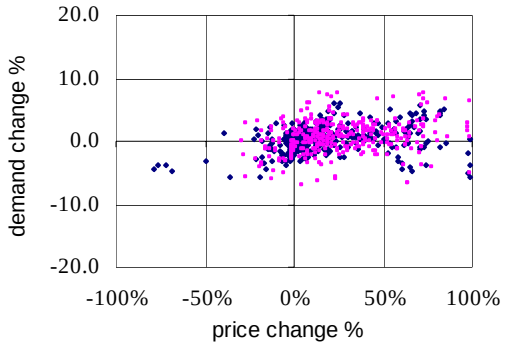


Figure 17: New South Wales

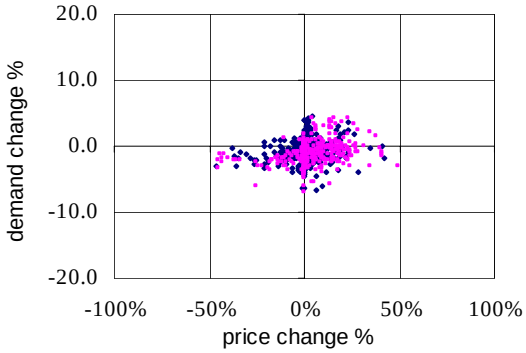


Figure 18: Victoria

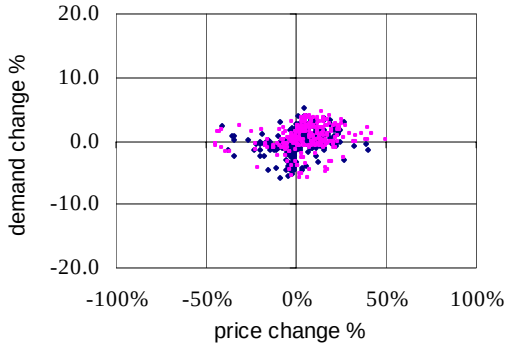


Figure 19: South Australia

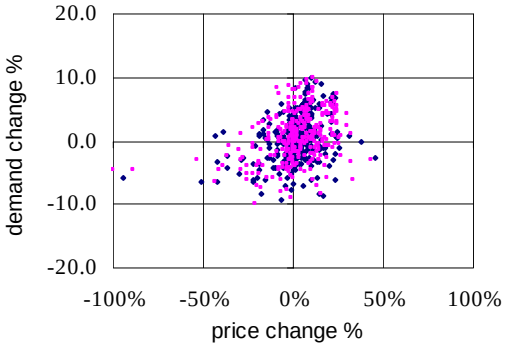
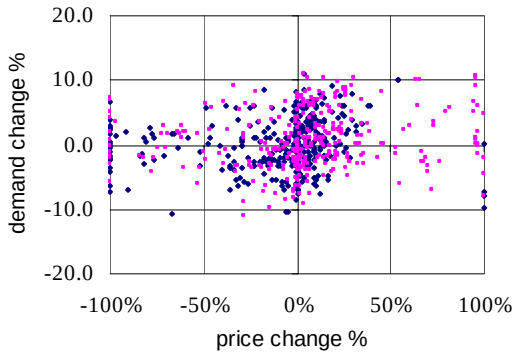


Figure 20: Tasmania



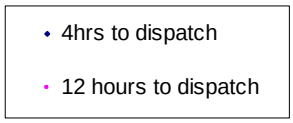
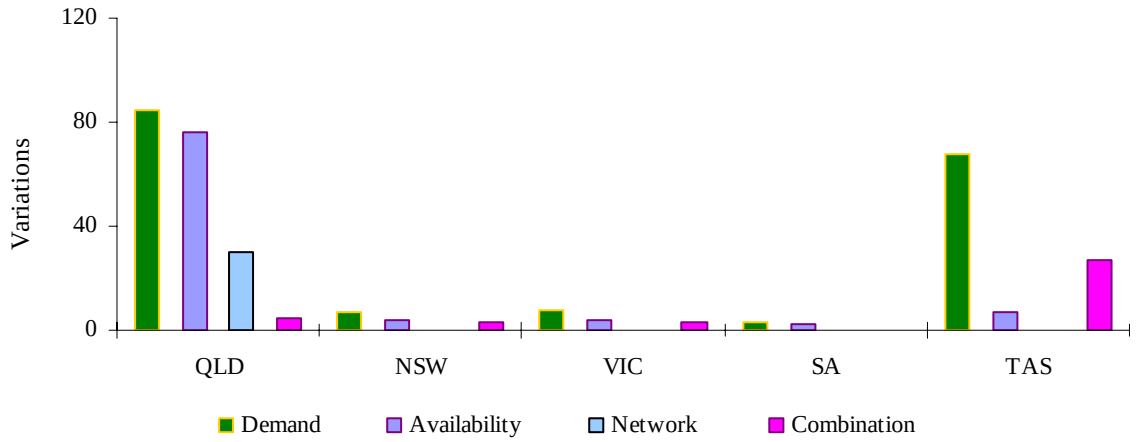


Figure 21 summarises the number and most probable reason for variations between forecast and actual prices.

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.

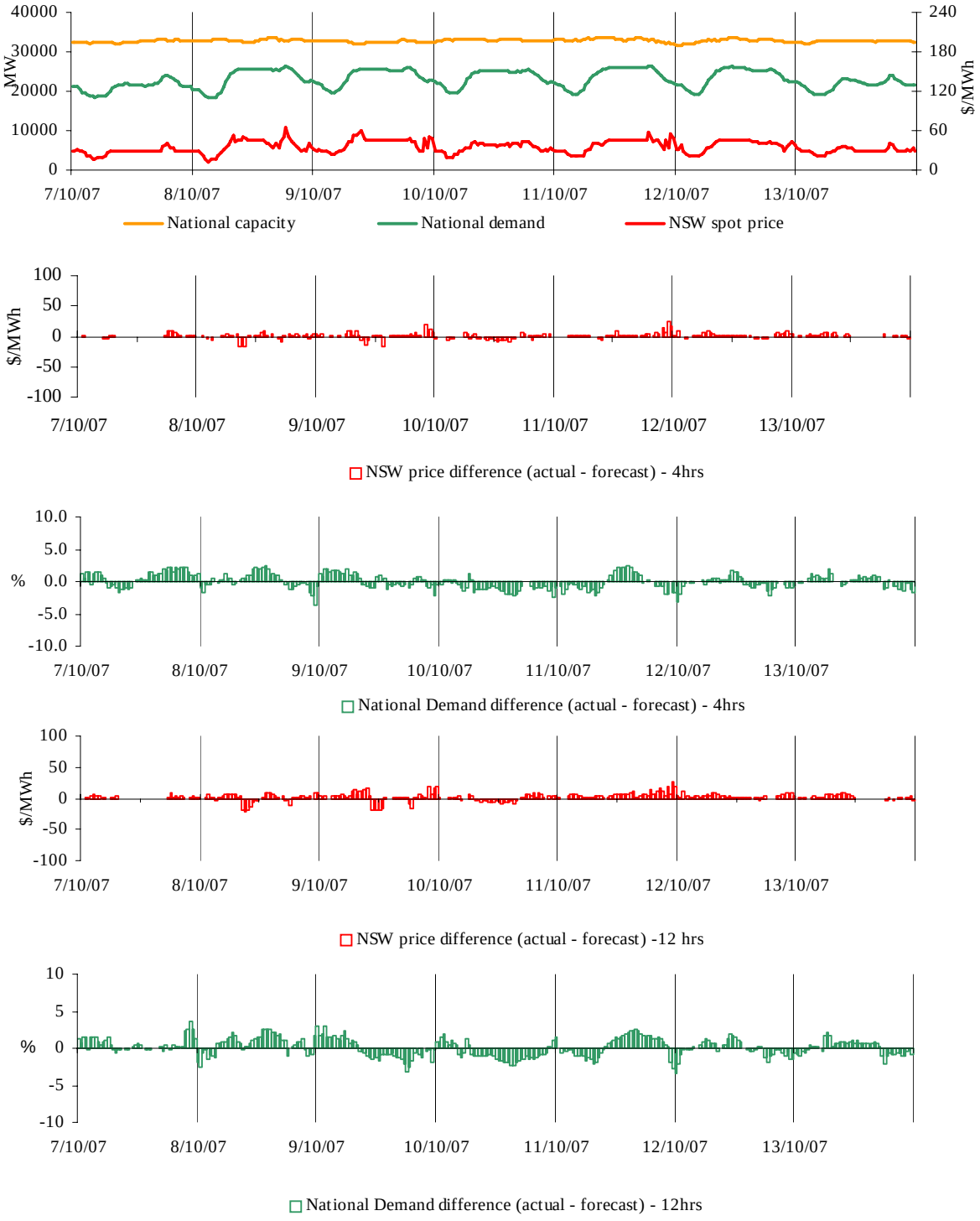
On a regional basis the differences between the maximum temperature and the temperature forecast at around 6.00 pm the day before are also included.

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

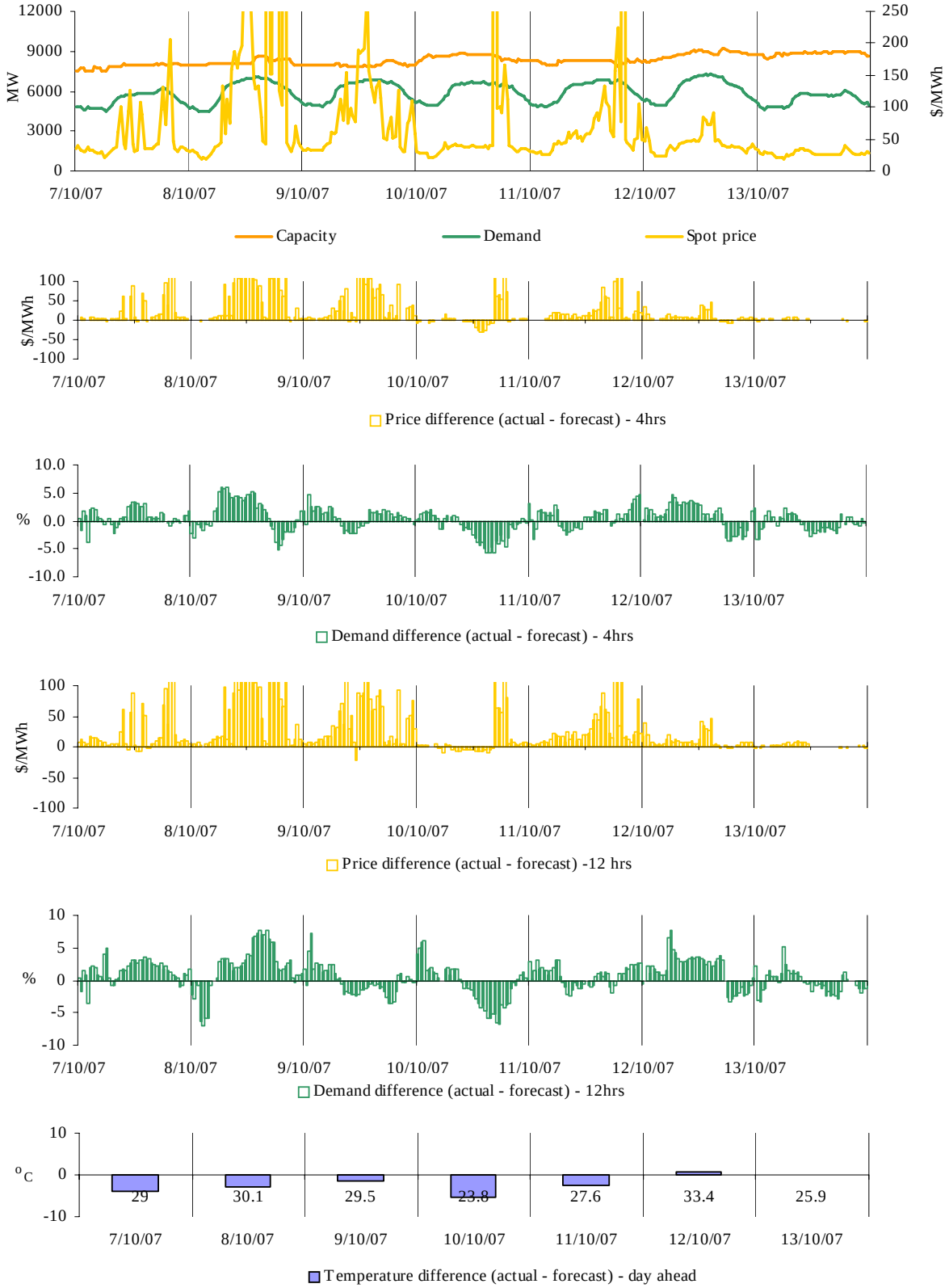


There were no occasions where the spot prices aligned nationally and the New South Wales price was greater than three times the New South Wales weekly average price of $36/MWh.

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 six occasions where the spot price in Queensland was greater than three times the Queensland weekly average price of $122/MWh.

Monday, 8 October

5:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3439.83	44.94	36.09
Demand (MW)	6914	6887	6481
Available capacity (MW)	8512	8806	8853
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3141.69	52.27	60.08
Demand (MW)	6655	6915	6466
Available capacity (MW)	8294	8743	8778
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3402.59	64.06	62.46
Demand (MW)	6635	6974	6522
Available capacity (MW)	8384	8736	8776
8:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1734.93	38	36.17
Demand (MW)	6299	6422	6163
Available capacity (MW)	8458	8805	8781

Conditions at the time saw demand up to 340 MW lower than that forecast four hours ahead. Available capacity was up to 450 MW lower than that forecast on the same basis. A number of price spikes occurred over the evening as a result of rapid changes to flows on the interconnector and rebidding by generators in Queensland.

From 4 pm, over several rebids, Callide Power Trading reduced the availability of Callide C unit four by 240 MW priced below $30/MWh. The reasons given were “Fabric filter high DPS” and “SCC jammed”.

From 4.15 pm, over several rebids CS Energy reduced the availability of Kogan Creek by 250 MW to 500 MW. The reason given was “Kogan commissioning”.

At 4.49 pm, effective 5 pm, Origin Energy reduced the availability of Mount Stuart by 288 MW to avoid an uneconomical start.

From 4.45 pm, lightning in south east Queensland led to an increased risk of the loss of multiple lines through the area. Constraints invoked to manage these conditions led to a step change on flows across the Queensland to New South Wales interconnector, forcing flow south into New South Wales. Generation in the area was also constrained off. As a result the five-minute price spiked to $10 000/MWh at 4.50 pm for two dispatch intervals, before stabilising and returning to previous levels at 5 pm.

An unplanned outage of the Terranora interconnector occurred at 5.10 pm, limiting flows into Queensland. The line returned to service at 9 pm.

At 6.20 pm, Tarong Energy shifted 160 MW of capacity at Wivenhoe unit one from prices of less than $30/MWh to above $9000/MWh. The reason given was “Manage energy use::Volume profile change”. At the same time, the five-minute price increased to above $4000/MWh, reaching $10 000/MWh between 6.30 pm and 6.40 pm, before returning to previous levels at 6.45 pm. This rebid partially reversed previous bids by Tarong Energy which had shifted as much as 400 MW of capacity into prices below $50/MWh for the evening peak.

At 8.10 pm, NEMMCO invoked a constraint which increased the flow into New South Wales by a further 100 MW to 200 MW. At the same time the price spiked to $9840/MWh for one dispatch interval.

There was no other significant rebidding.

Wednesday, 10 October

5:00 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	3407.42	44.94	38
Demand (MW)	6567	6937	6908
Available capacity (MW)	8678	8737	9269

Conditions at the time saw demand up to 370 MW lower than that forecast four hours ahead. Available capacity was up to 600 MW lower than that forecast 12 hours ahead.

From 4.40 pm, lightning in south east Queensland led to an increased risk of the loss of multiple lines through the area. Constraints invoked to manage these conditions led to a step change on flows across the Queensland to New South Wales interconnector, forcing flow south into New South Wales. Generation in the area was also constrained off. Constraints were violated during this period, with the five-minute dispatch price increasing to $10 000/MWh at 4.45 pm and 4.50 pm. The large counter price flows into New South Wales led to a significant increase in the requirement for locally sourced lower frequency control ancillary services in Queensland. These requirements at times could not be met with prices for lower contingency services reaching $10 000/MW for an hour. NEMMCO directed three participants between 5.06 pm and 6 pm to manage power system security.

There was no significant rebidding.

Thursday, 11 October

8:00 pm	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	3405.88	43.82	36.22
Demand (MW)	6606	6578	6562
Available capacity (MW)	8118	8615	9061

Conditions at the time saw demand close to forecast. Available capacity was up to 500 MW lower than that forecast four hours ahead and 950 MW lower than forecast 12 hours ahead.

At 7.30 pm, lightning in south east Queensland led to an increased risk of the loss of multiple lines through the area. Constraints invoked to manage these conditions led to a step change on the limit and flows on the Queensland to New South Wales interconnector, forcing flow south into New South Wales. Generation in the area was also constrained off. Constraints were violated during this period, with the five-minute dispatch price increasing to $10 000/MWh at 7.35 pm and 7.40 pm.

At 5.04 pm CS Energy reduced the availability of Kogan Creek by 150 MW priced below zero. The reason given was “Kogan commissioning”.

Over several rebids from 6.23 pm Callide Power Trading delayed the return to service of unit four reducing availability by 152 MW. It also reduced availability at Callide C unit three by 110 MW. The reason given was “Mill O/S”.

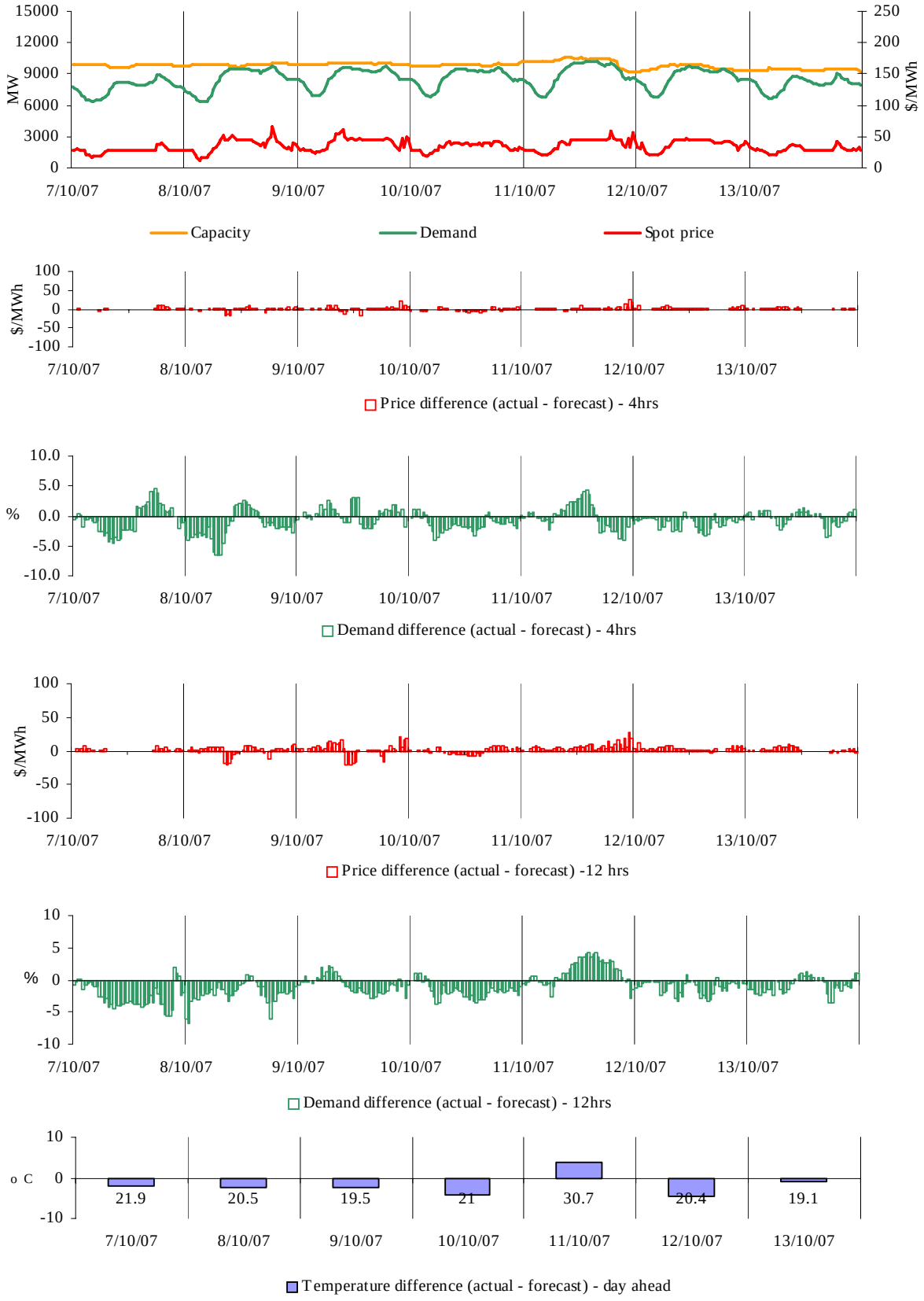
At 7.34 pm Origin Energy reduced the availability of Mount Stuart unit one by 144 MW to zero. The reason given was “Avoid uneconomical start”.

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

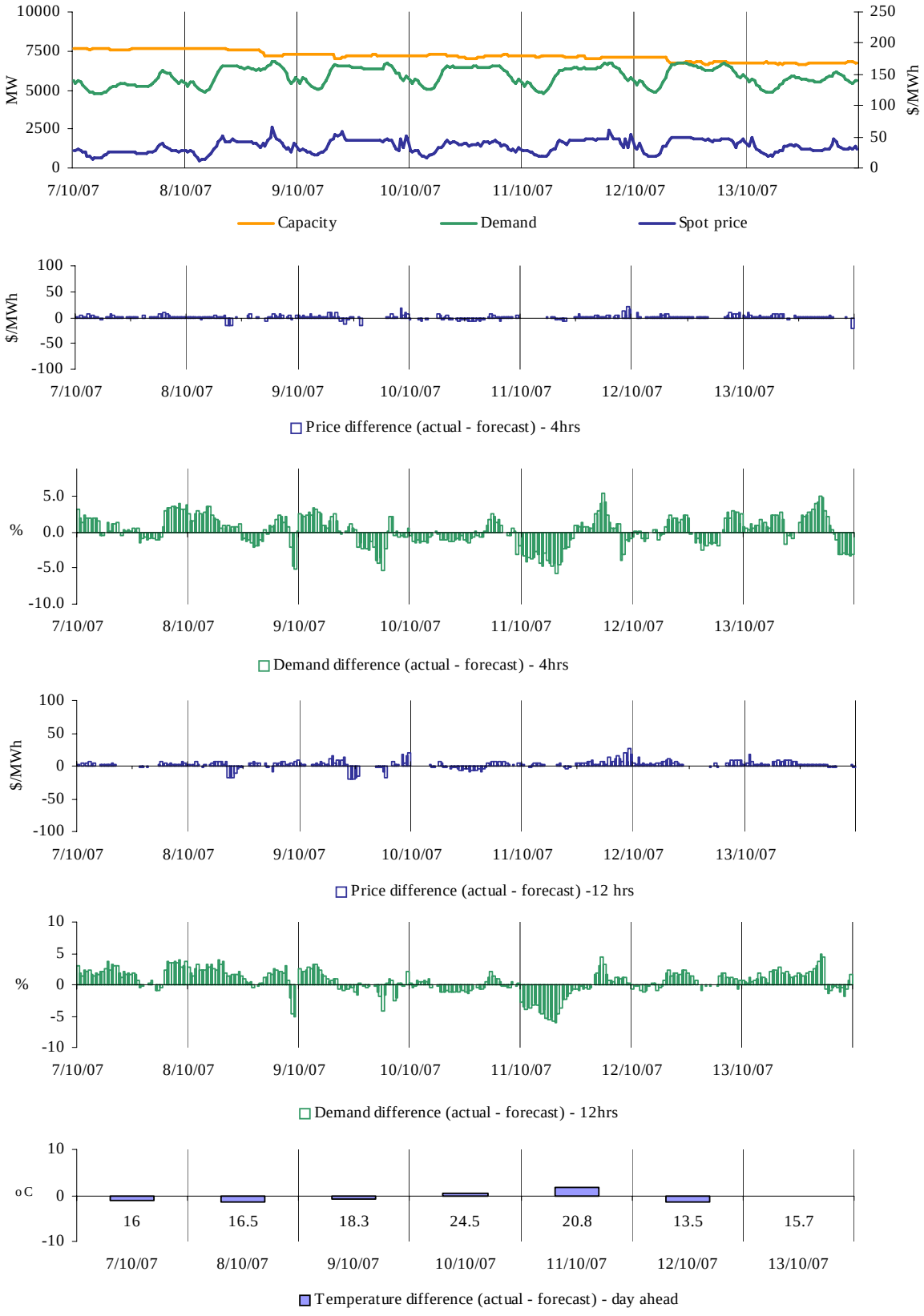


There were no occasions where the spot price in New South Wales was greater than three times the New South Wales weekly average price of $36/MWh.

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

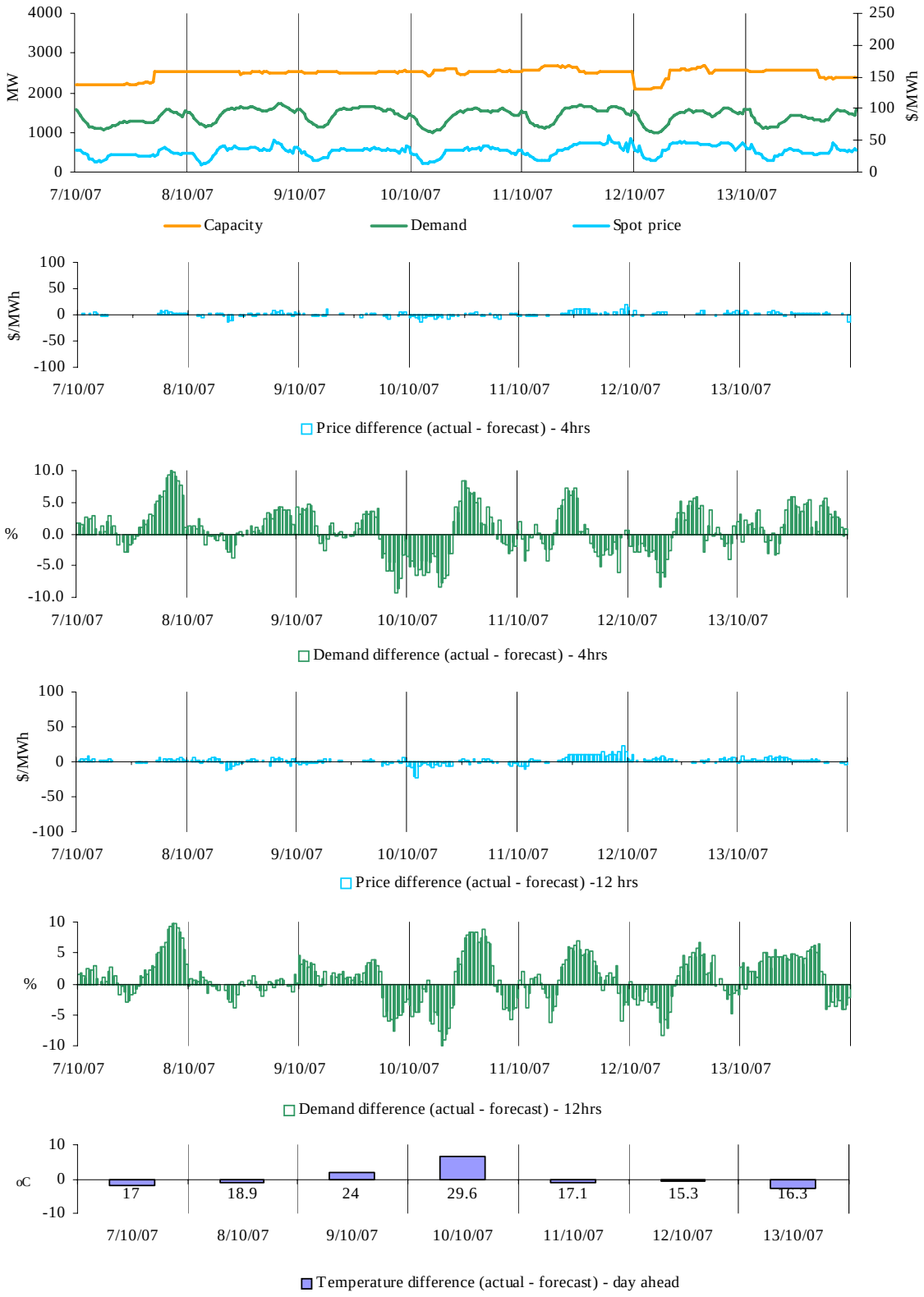


There were no occasions where the spot price in Victoria was greater than three times the Victoria weekly average price of $36/MWh.

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

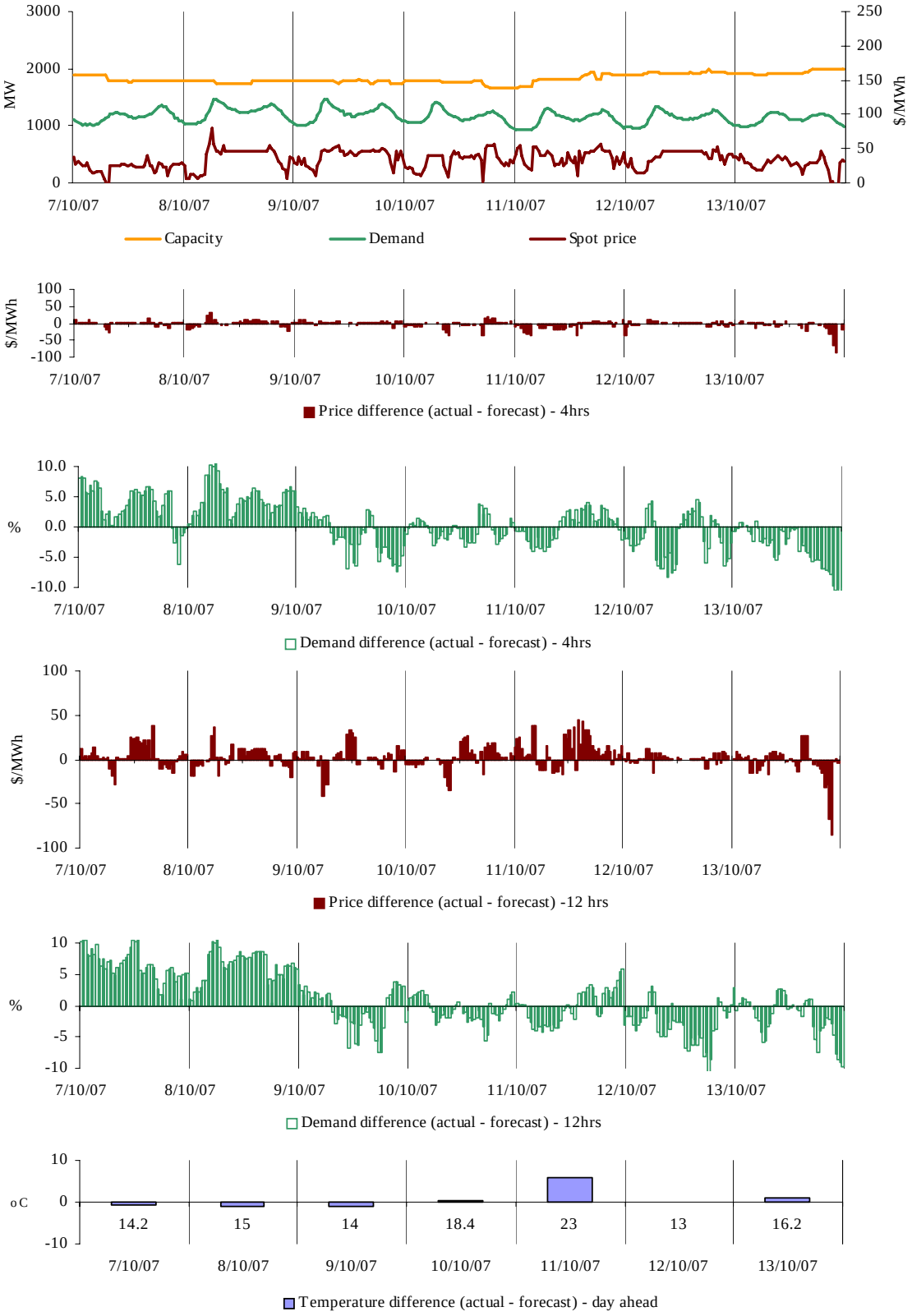


There were no occasions where the spot price in South Australia was greater than three times the South Australia weekly average price of $34/MWh.

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 no occasions where the spot price in Tasmania was greater than three times the Tasmania weekly average price of $34/MWh.

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

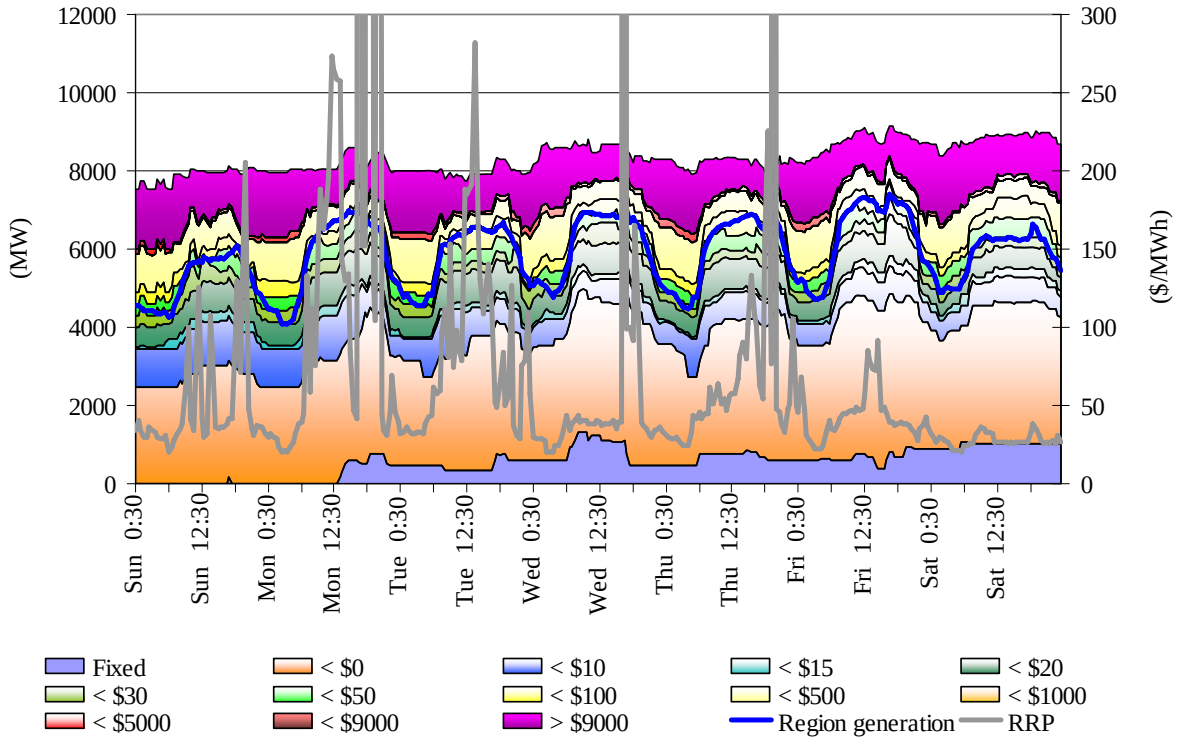


Figure 58: New South Wales closing bid prices, dispatched generation and spot price

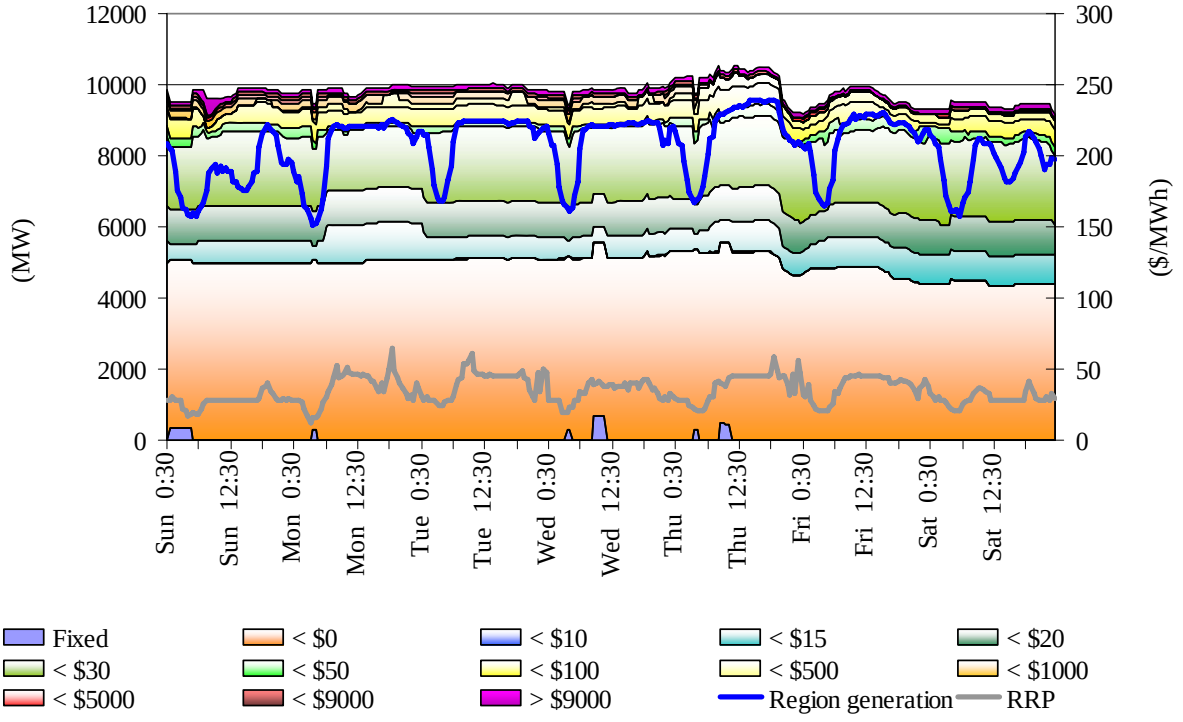


Figure 59: Victoria closing bid prices, dispatched generation and spot price

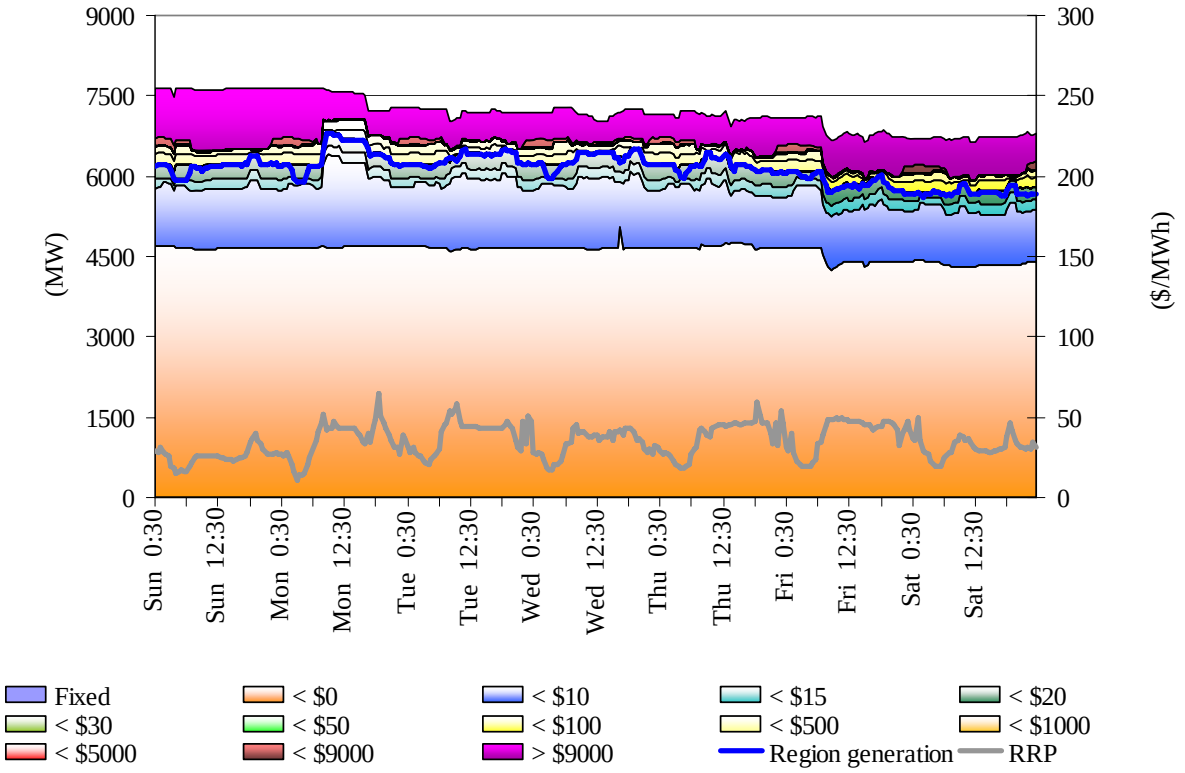


Figure 60: South Australia closing bid prices, dispatched generation and spot price

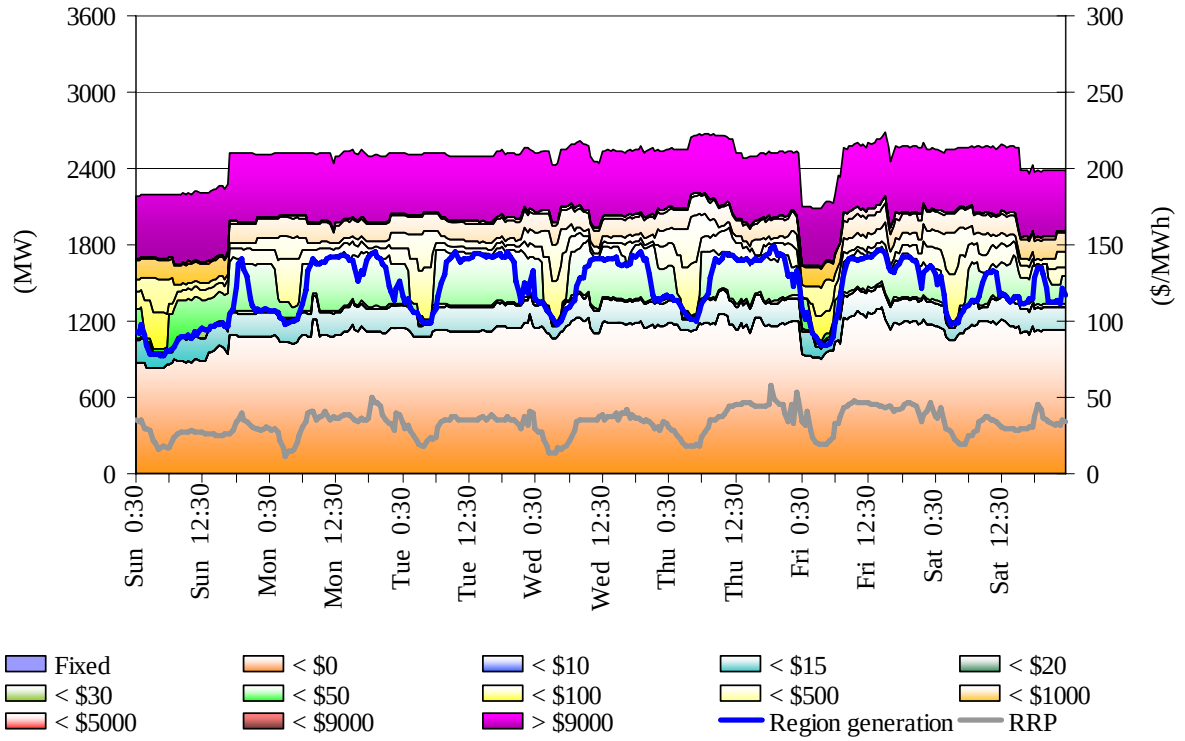
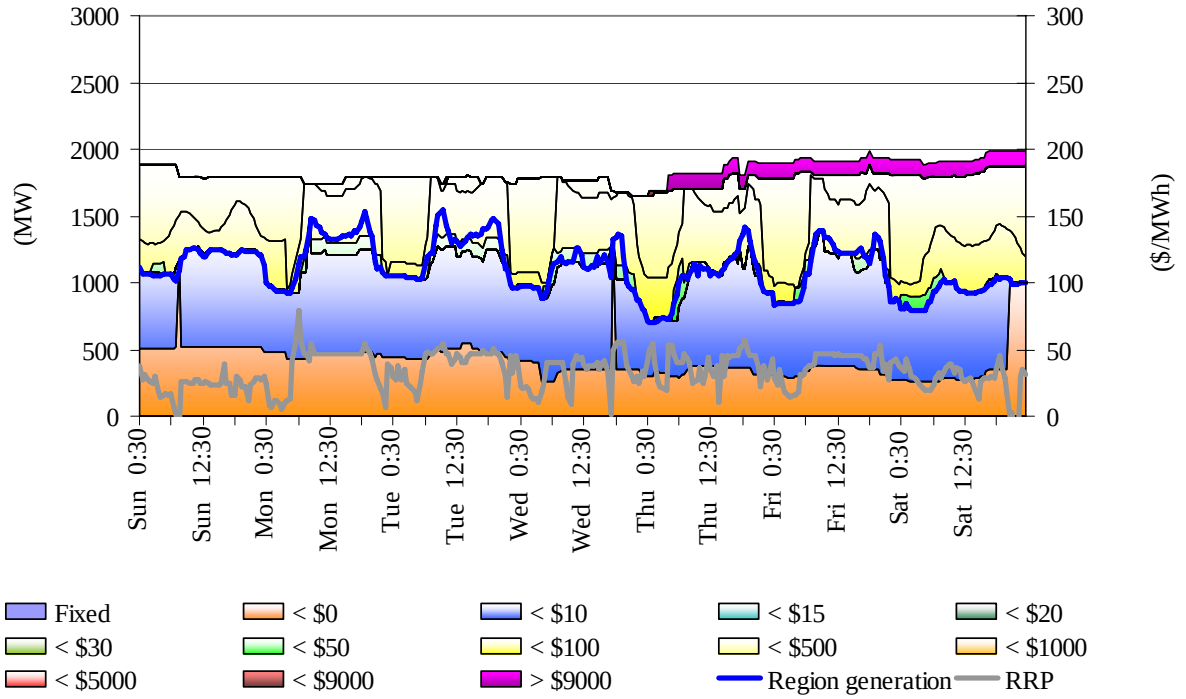


Figure 61: Tasmania closing bid prices, dispatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was $7.7 million or 3.6 per cent of turnover in the energy market. On Wednesday, lightning led to an increased risk in the loss of multiple lines in Queensland. NEMMCO invoked constraints to manage these conditions which forced flows south into New South Wales and increased the requirements for locally sourced lower contingency FCAS in Queensland. Local requirements peaked at 771 MW for lower 6 second and lower 60 second and 737 MW for lower 5 minute services. Prices for these services increased to $10 000/MW for around one hour. These requirements were not satisfied for some services between 4.50 pm and 5.20 pm, with further shortfalls occurring for the lower 6 second services until 5.35 pm. The cost of these services was $6.7 million during this period. 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 ($/MW)	5.71	6.96	4.85	4.11	452.60	551.65	125.53	1.72
Previous week ($/MW)	5.59	1.68	4.48	5.63	0.08	0.12	0.51	2.37
Last quarter ($/MW)	1.76	0.73	1.15	1.54	0.39	2.28	5.00	1.93
Market Cost ($1000s)	$282	$317	$307	$96	$2,040	$2,254	$2,405	$27
% of energy market	0.13%	0.15%	0.14%	0.04%	0.94%	1.04%	1.11%	0.01%

The total cost of ancillary services in Tasmania for the week was $184 000 or 2.8 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 ($/MW)	4.20	1.66	3.39	4.95	5.04	0.77	1.18	1.42
Previous week ($/MW)	7.51	1.21	3.33	7.18	22.48	1.58	2.69	3.05
Last quarter ($/MW)	4.97	0.49	2.93	3.00	12.67	0.43	0.82	0.45
Market Cost ($1000s)	$23	$21	$40	$26	$30	$16	$19	$9
% of energy market	0.35%	0.31%	0.60%	0.38%	0.45%	0.23%	0.29%	0.13%

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

Figure 64: daily frequency control ancillary service cost

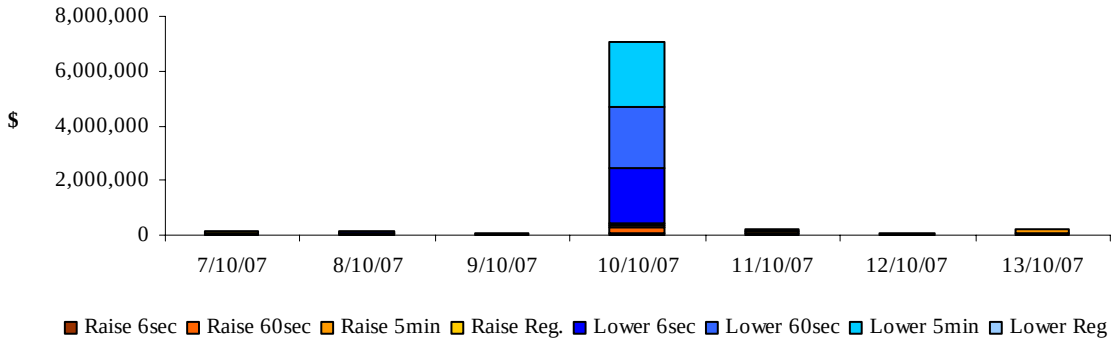
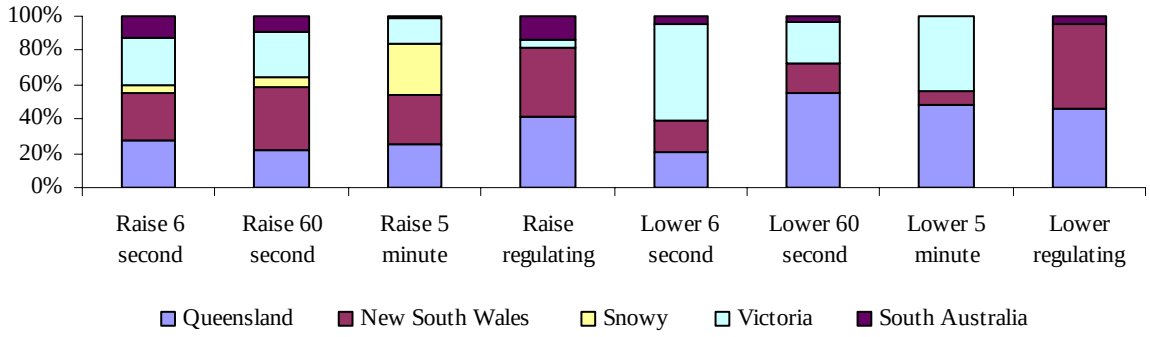


Figure 65 shows the contribution, on a percentage basis, that frequency control ancillary service providers are utilised (in each mainland region) to satisfy the total requirement for each service.

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

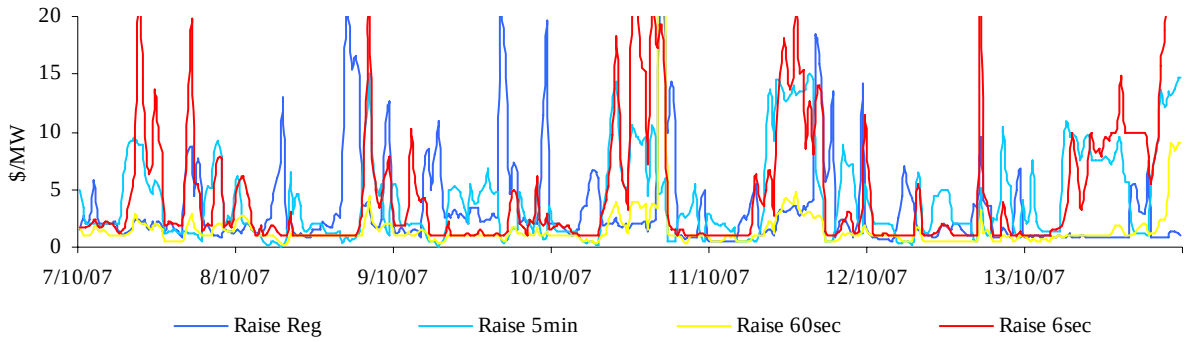


Figure 66A: prices for raise services – Tasmania

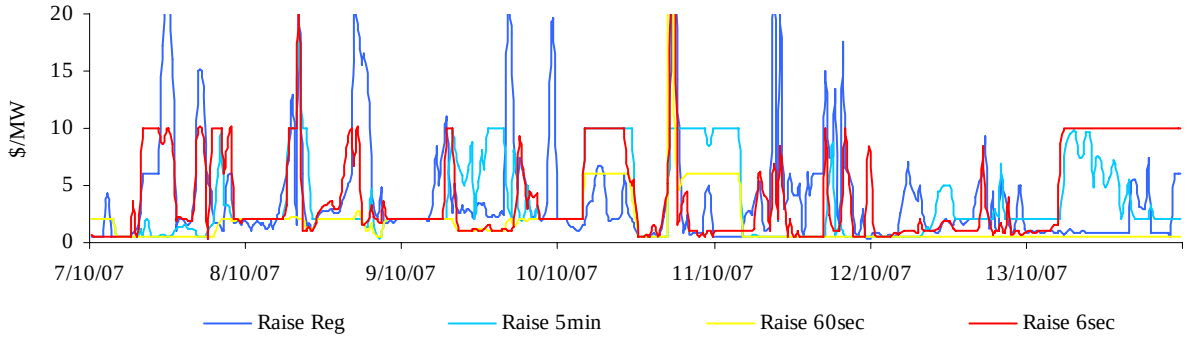


Figure 67: prices for lower services

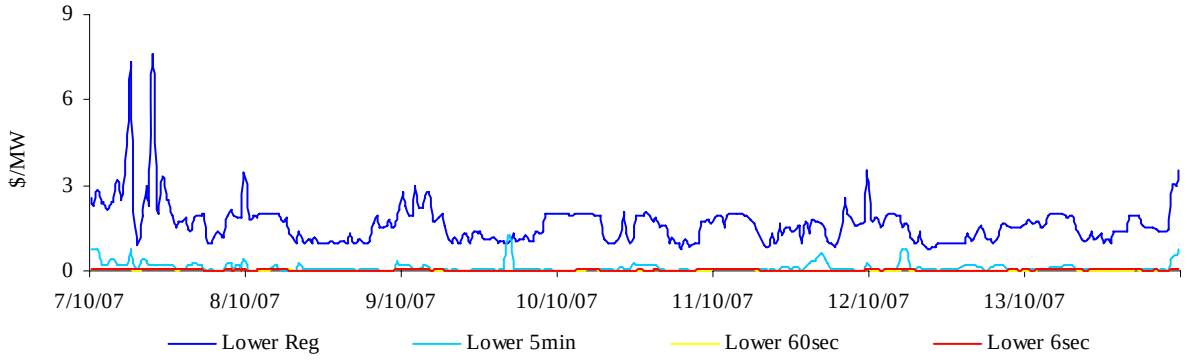
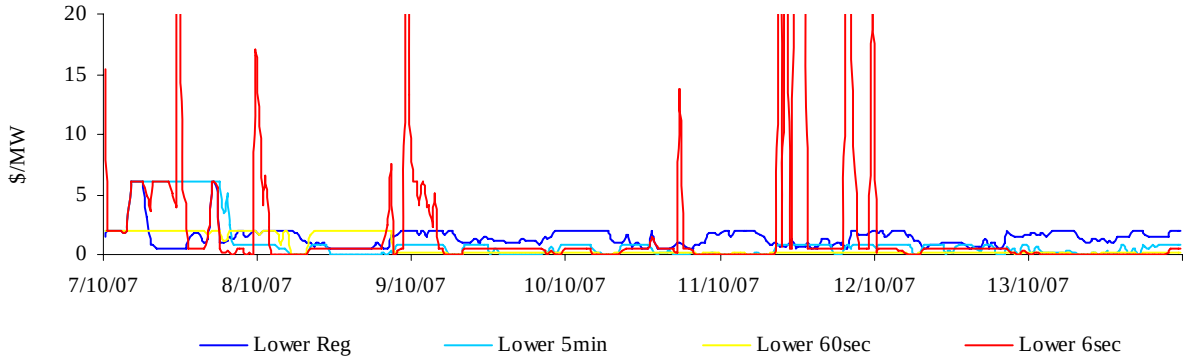


Figure 67A: prices for lower services – Tasmania



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

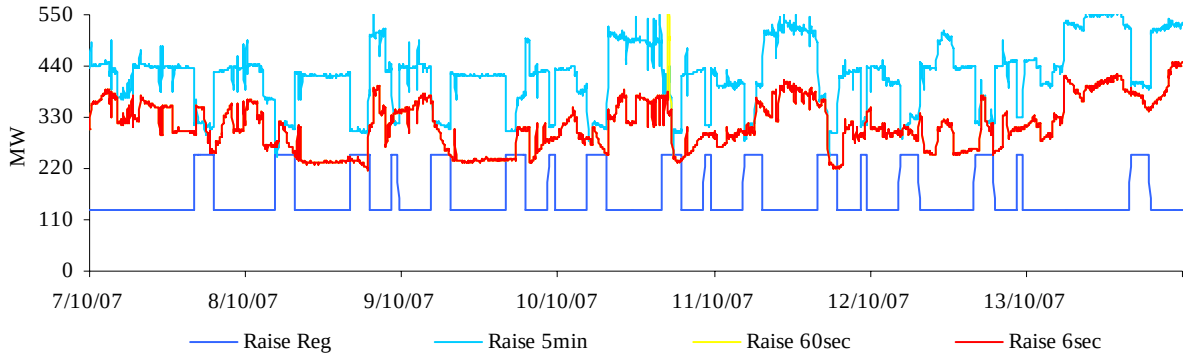


Figure 68A: raise requirements – Tasmania

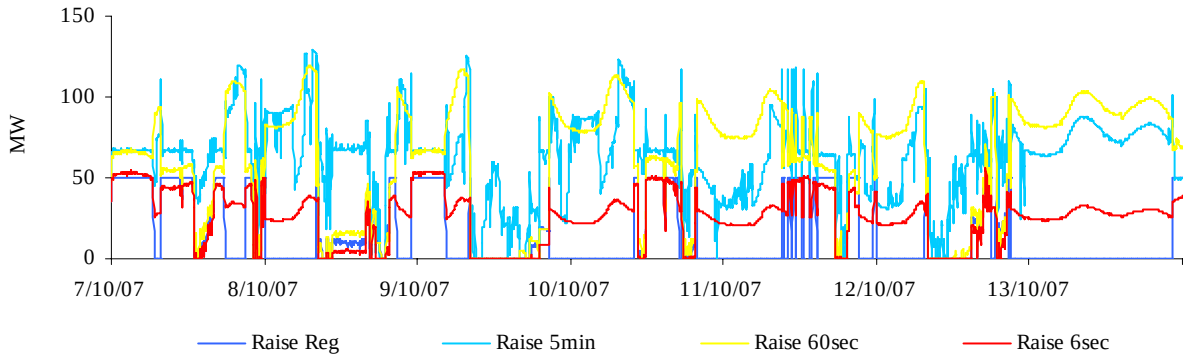


Figure 69: lower requirements

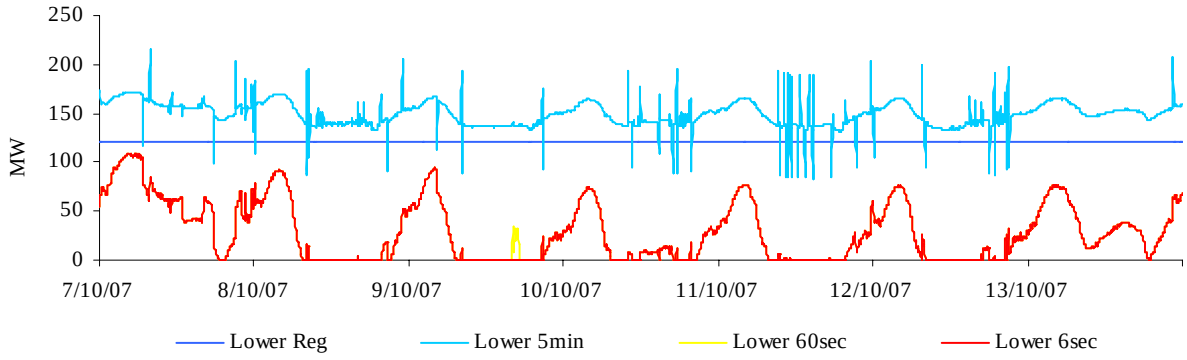
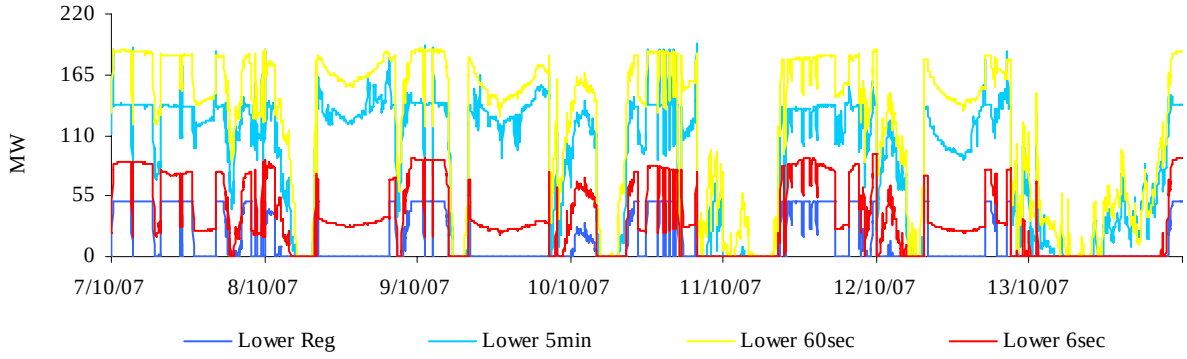


Figure 69A: lower requirements – Tasmania



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