Market analysis

AUSTRALIAN ENERGY REGULATOR

28 AUG – 3 SEPT 2005

Prices across the mainland were aligned for more than 90 per cent of the time, averaging $21/MWh in Queensland, $23/MWh in New South Wales, $24/MWh in Victoria and $28/MWh in South Australia.

In Tasmania average spot prices increased by 18 per cent to $96/MWh. Sustained spot prices of almost $800/MWh occurred on Friday morning. High demand, low reserves late in the week, and no capacity priced between $145/MWh and $795/MWh during this period contributed.

Turnover in the energy market for the mainland was $103 million, with a total cost of ancillary services for the week of around $286,000 or 0.3 per cent of turnover. Turnover in Tasmania was $19 million, with ancillary services totaling $813,000 or four per cent of turnover. Prices for raise ancillary services reached $10,000 on Monday and Thursday and accounted for two-thirds of the cost. These services are funded by generators.

Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in a quarter of all trading intervals across the market. In South Australia demand errors occurred in around two thirds of all trading intervals on the same basis. Demand was up to 440 MW or almost 40 percent higher than forecast 30 minutes ahead on Saturday afternoon. Significant variations between forecast and actual prices occurred in 57 or 17 per cent of all trading intervals.

Energy prices

Figure 1 compares the volume weighted average price with the averages for the previous week, the same quarter last year and for the financial year up to the end of the week. Figure 2 sets out national demand and spot prices in each region for each trading interval. Figure 3 compares the weekly price volatility index with the averages for the previous week and the same quarter last year.

Figure 1: volume weighted average spot price for energy market ($/MWh)

	QLD	NSW	VIC	SA	TAS
Last week	21	23	24	28	96
Previous week	19	28	31	34	82
Same quarter last year	27	31	28	36	-
Financial year to date	20	28	30	34	113
% change from previous week	▲9%	▼17%	▼22%	▼18%	▲18%
% change from same quarter last year	▼21%	▼26%	▼15%	▼23%	-
% change from last financial year	▼21%	▼14%	▲4%	▼11%	-

Figure 2: national demand and spot prices

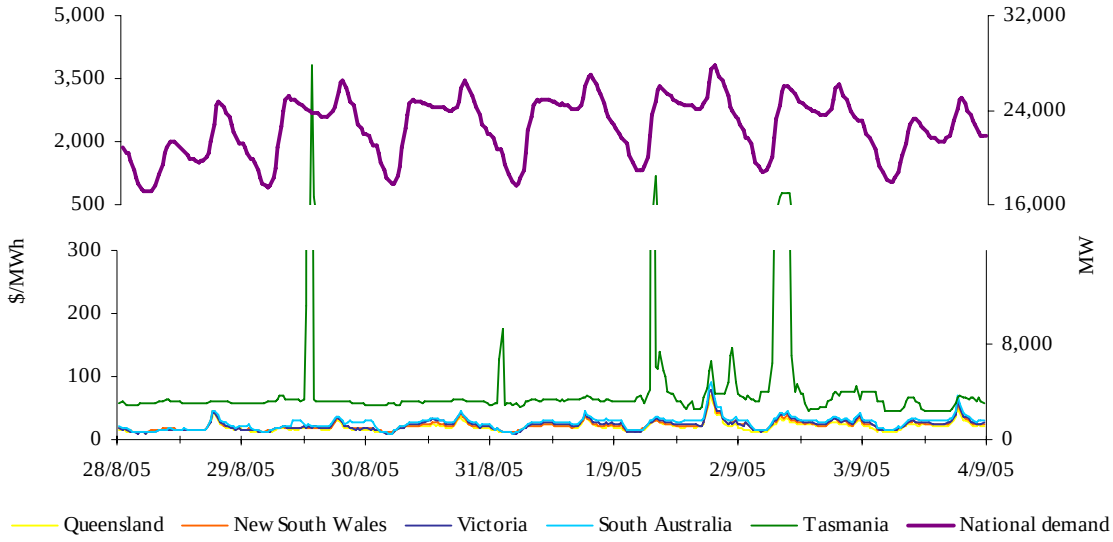


Figure 3: volatility index during peak periods

	QLD	NSW	VIC	SA	TAS
Last week	0.50	0.56	0.57	0.44	0.59
Previous week	0.61	0.97	0.87	0.79	1.39
Same quarter last year	0.64	0.74	0.71	0.56	-

Figures 4 to 8 show the weekly correlation between spot price and demand.

Figure 4: Queensland

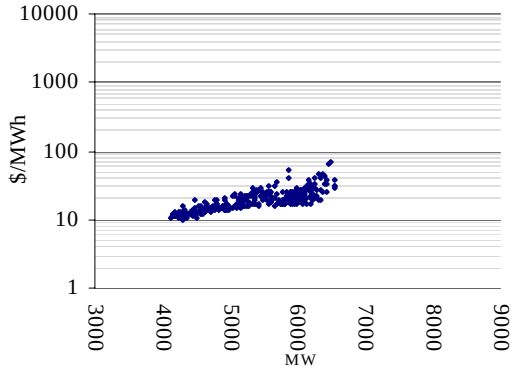


Figure 5: New South Wales

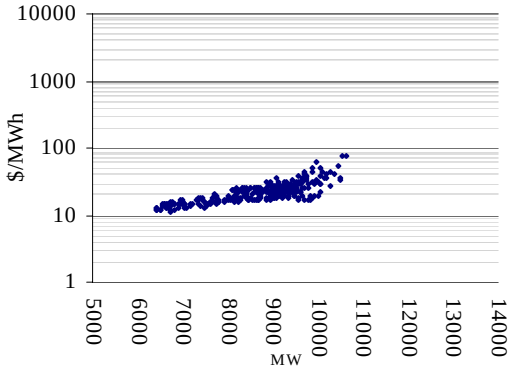


Figure 6: Victoria

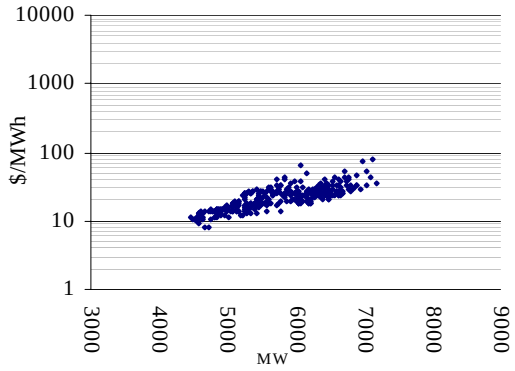


Figure 7: South Australia

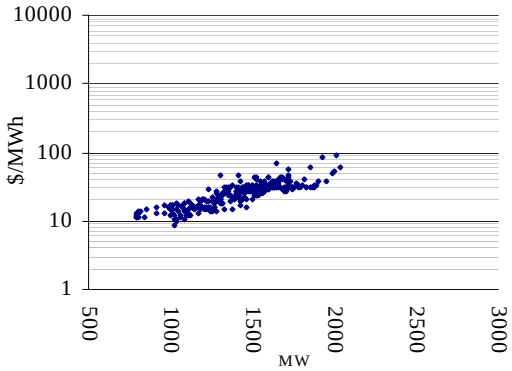
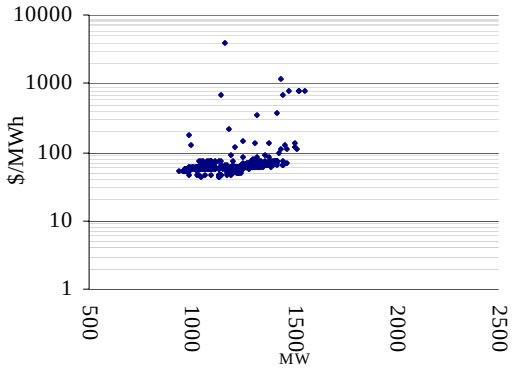


Figure 8: Tasmania



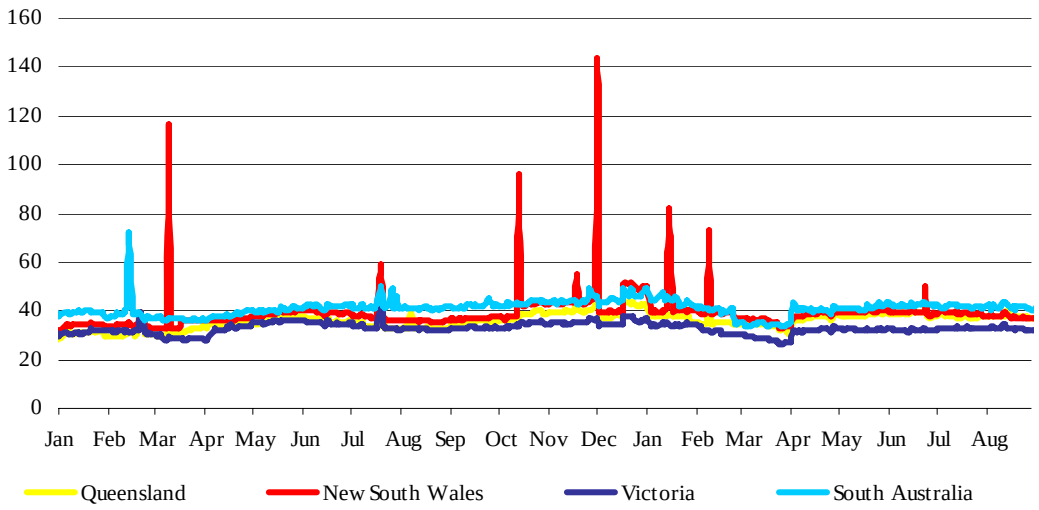
The maximum spot prices for the week across the mainland ranged from $70/MWh in Queensland to $90/MWh in South Australia - all occurring at 7pm on Thursday. In Tasmania, the spot price reached $3,806/MWh at 1pm on Monday. The interaction of energy and ancillary services resulted in prices for 6 second raise services of $10,000/MW at the same time.

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	36.87	37.29	37.16	37.31	37.24
New South Wales	36.64	36.93	37.00	37.37	37.04
Victoria	31.82	32.33	32.59	32.35	31.90
South Australia	40.26	41.20	41.69	42.16	40.43

Figure 10: d-cyphaTrade WEPI



Reserve

There were no low reserve conditions forecast throughout the week for the mainland. There were, however forecast and actual lack of reserve (LOR1) conditions on Thursday and Friday in Tasmania. Figures 11 to 14 show spot price, net imports and limits at the time of weekly maximum demand.

Figures 11 to 14: spot price, net import and limit at time of weekly maximum demand

Figure 11: Queensland

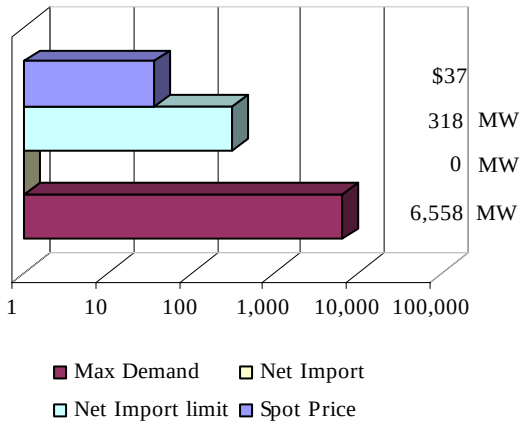


Figure 12: New South Wales

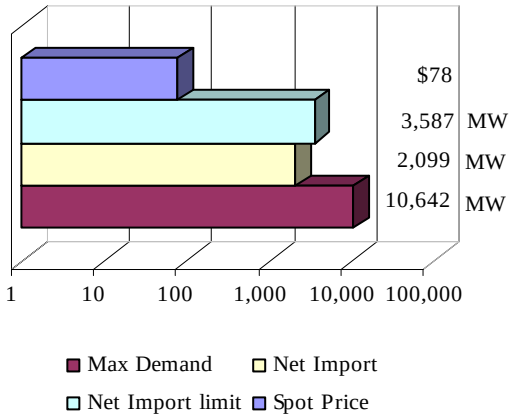


Figure 13: Victoria

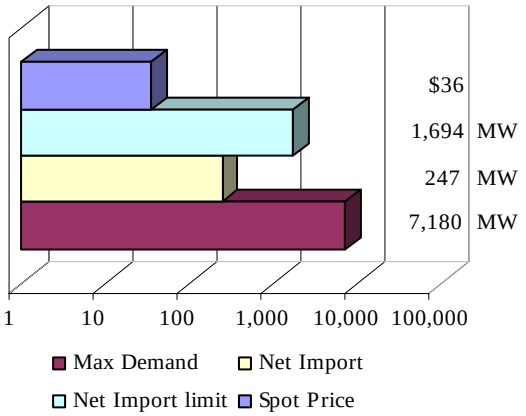
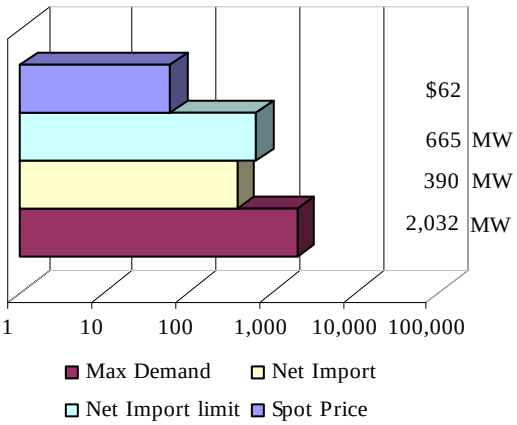


Figure 14: South Australia



In Tasmania, the demand reached a maximum of 1,549MW at 8.30am on Friday. The spot price at the time was $795/MWh.

Price variations

There were 57 trading intervals where significant variations between forecast and actual prices occurred, calculated 4 and 12 hours ahead of despatch. Figures 15 to 18 set out the correlation between the actual price and demand and those forecast. The information is presented in terms of the percentage difference from actual. Price differences beyond 200 per cent have been capped.

Figure 15: Queensland

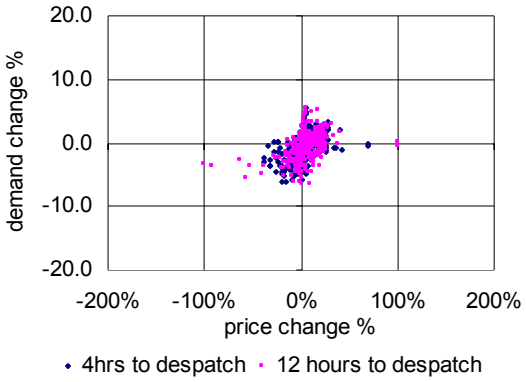


Figure 16: New South Wales

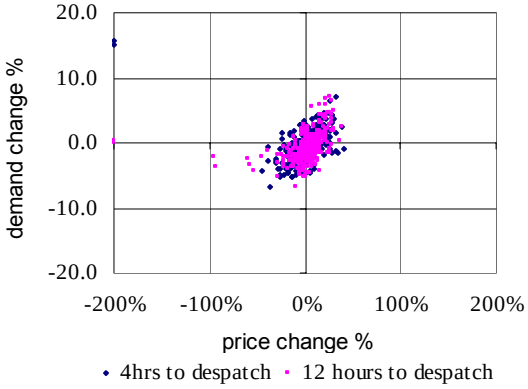


Figure 17: Victoria

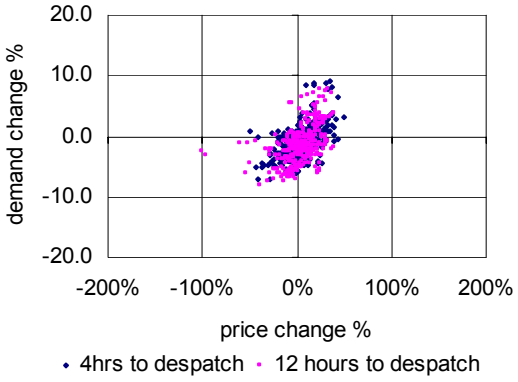


Figure 18: South Australia

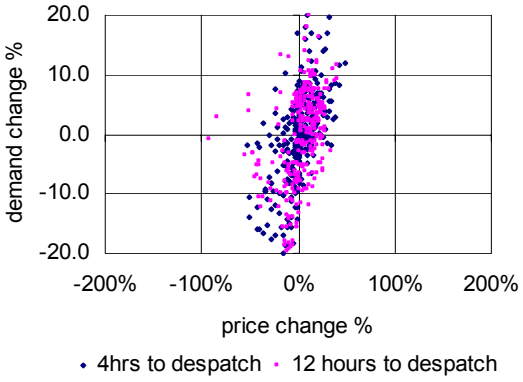


Figure 19: Tasmania

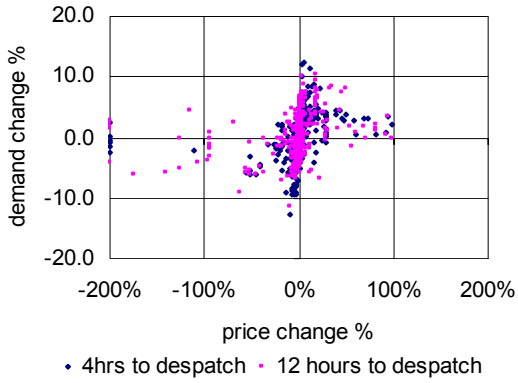
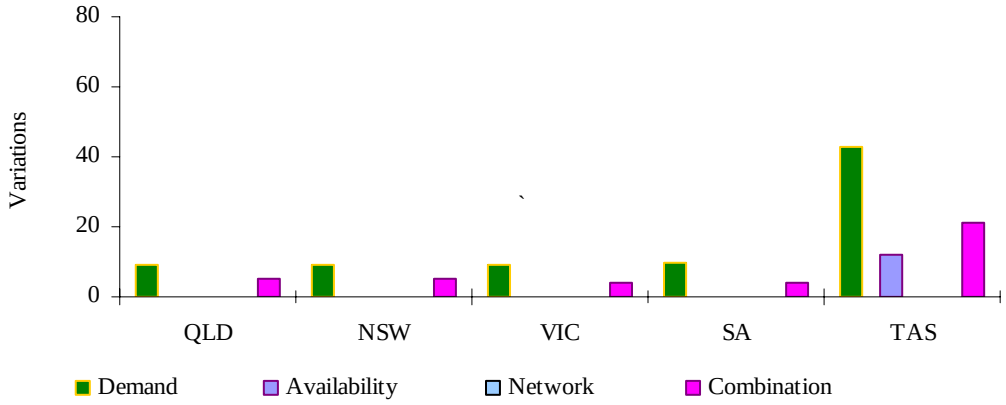


Figure 20 summarises the number and most probable reason for variations between forecast and actual prices.

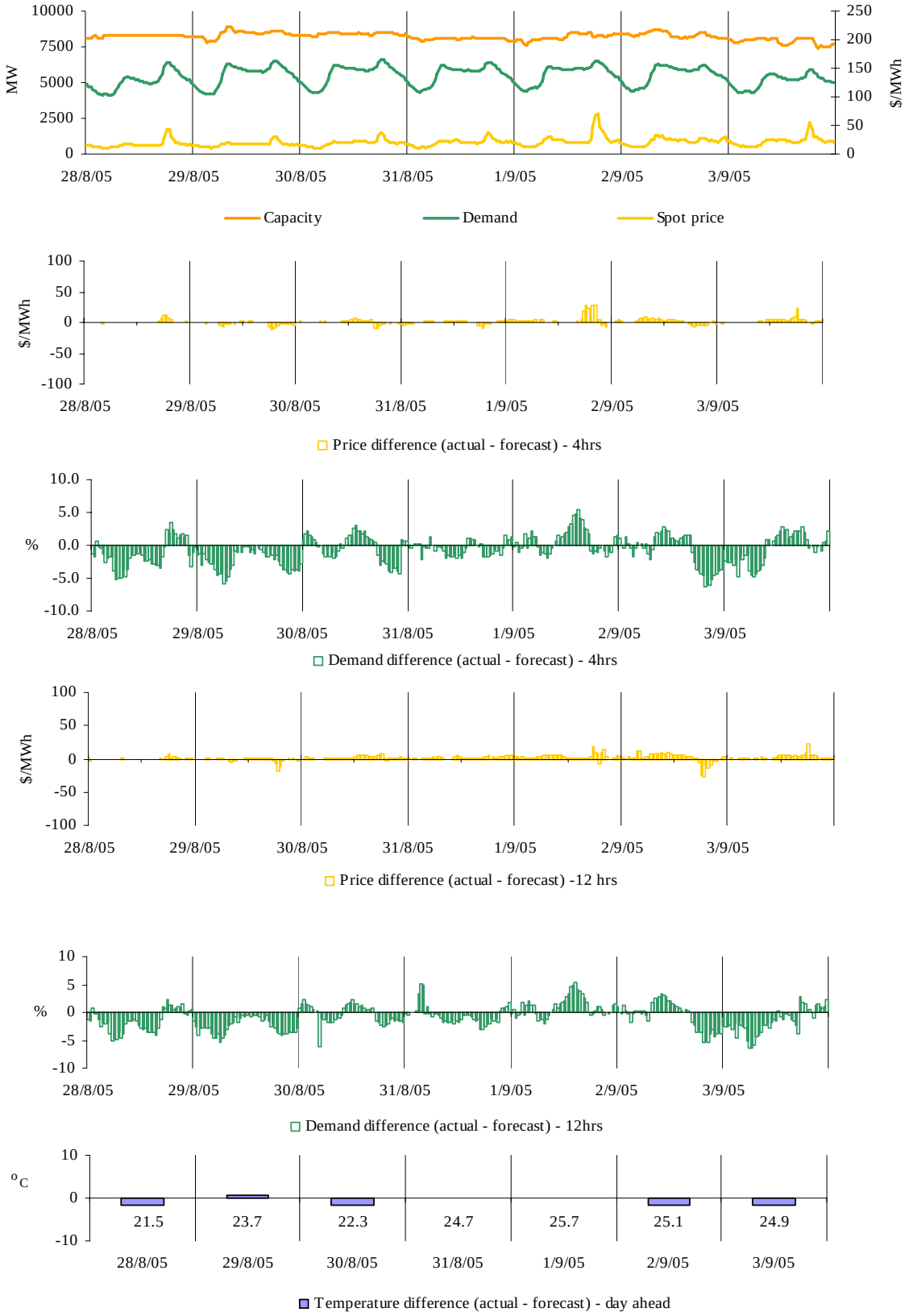
Figure 20: reasons for variations between forecast and actual prices



Price and demand

Figures 21 - 50 set out details of spot prices and demand on a regional basis. They include the actual spot price and demand outcomes and difference graphs both four and twelve hours ahead of despatch on a daily basis. The differences between the maximum temperature and the temperature forecast at around 6.00 pm the day before are also included. Figures 51 - 55 set out, for each region, the extent of capacity offered into the market within a series of price thresholds. Actual price and generation despatched in a region are overlaid.

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



There were 2 occasions in Queensland where the spot price was greater than three times the weekly average price of $21/MWh. These occurred at 6.30pm and 7pm on Thursday.

Thursday, 1 September

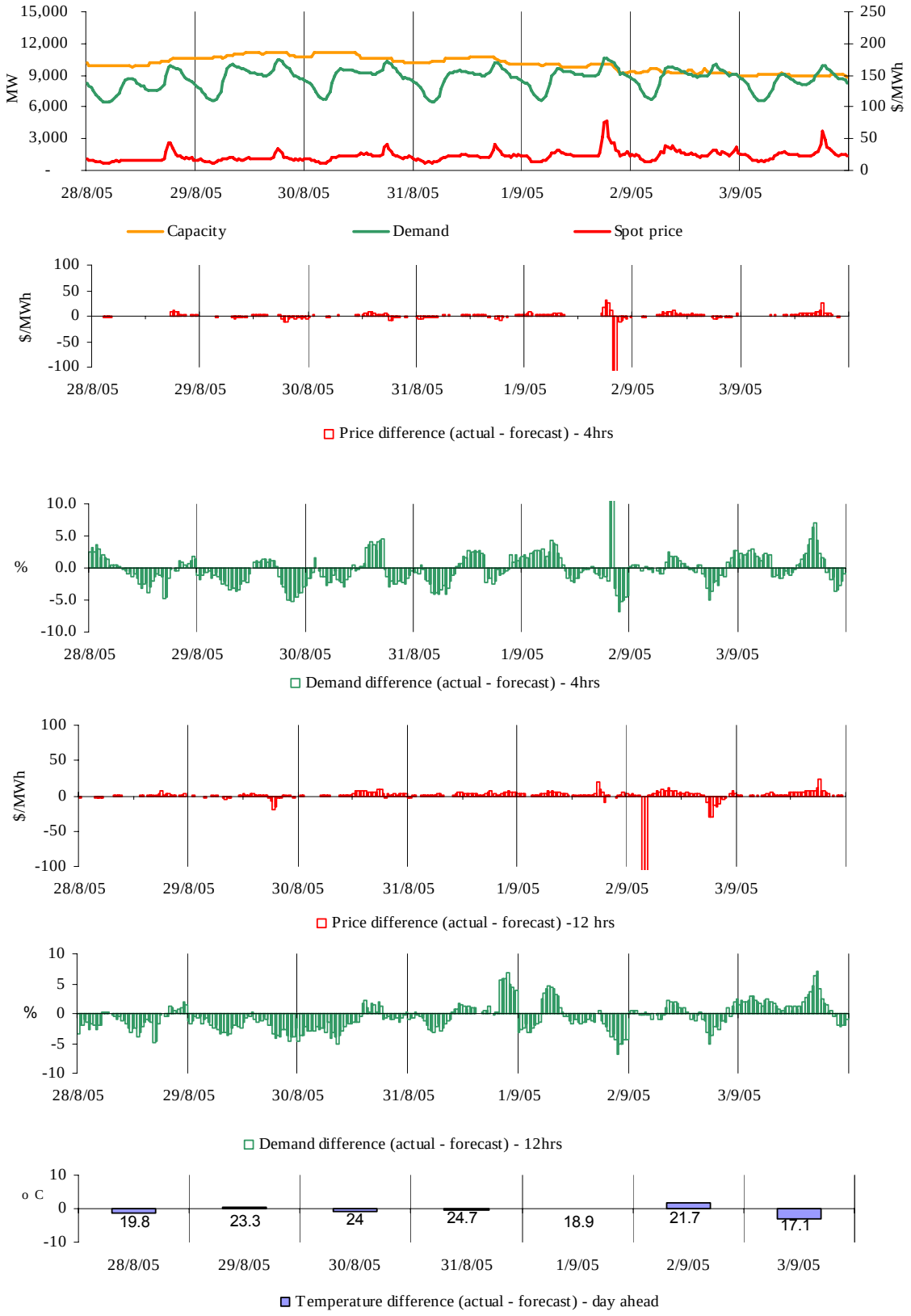
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	66.74	38.14	57.42
Demand (MW)	6,463	6,541	6,495
Available capacity (MW)	8,250	8,522	8,514
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	69.54	46.03	62.64
Demand (MW)	6,485	6,539	6,502
Available capacity (MW)	8,290	8,522	8,514

Conditions at the time saw demand close to forecast. Prices were aligned across the mainland throughout this period and close to forecast.

At 5.22pm, Callide Power reduced the availability at Callide C unit 3 from 405MW to zero. The unit had returned to service earlier in the day following a 6 day outage. All of this capacity had been priced below $10/MWh. The rebid reason given was “Plant failure”. An earlier rebid, at 4.42pm, saw Callide C unit 4 increase its availability at prices of less than $10/MWh by 105MW. The rebid reason given was “Support reason for the other unit rebid”.

There was no other significant rebidding.

Figures 27-32 New South Wales actual spot price, demand and forecast differences



There were 2 occasions in New South Wales where the spot price was greater than three times the weekly average price of $23/MWh. These occurred at 6.30pm and 7pm on Thursday.

Thursday, 1 September

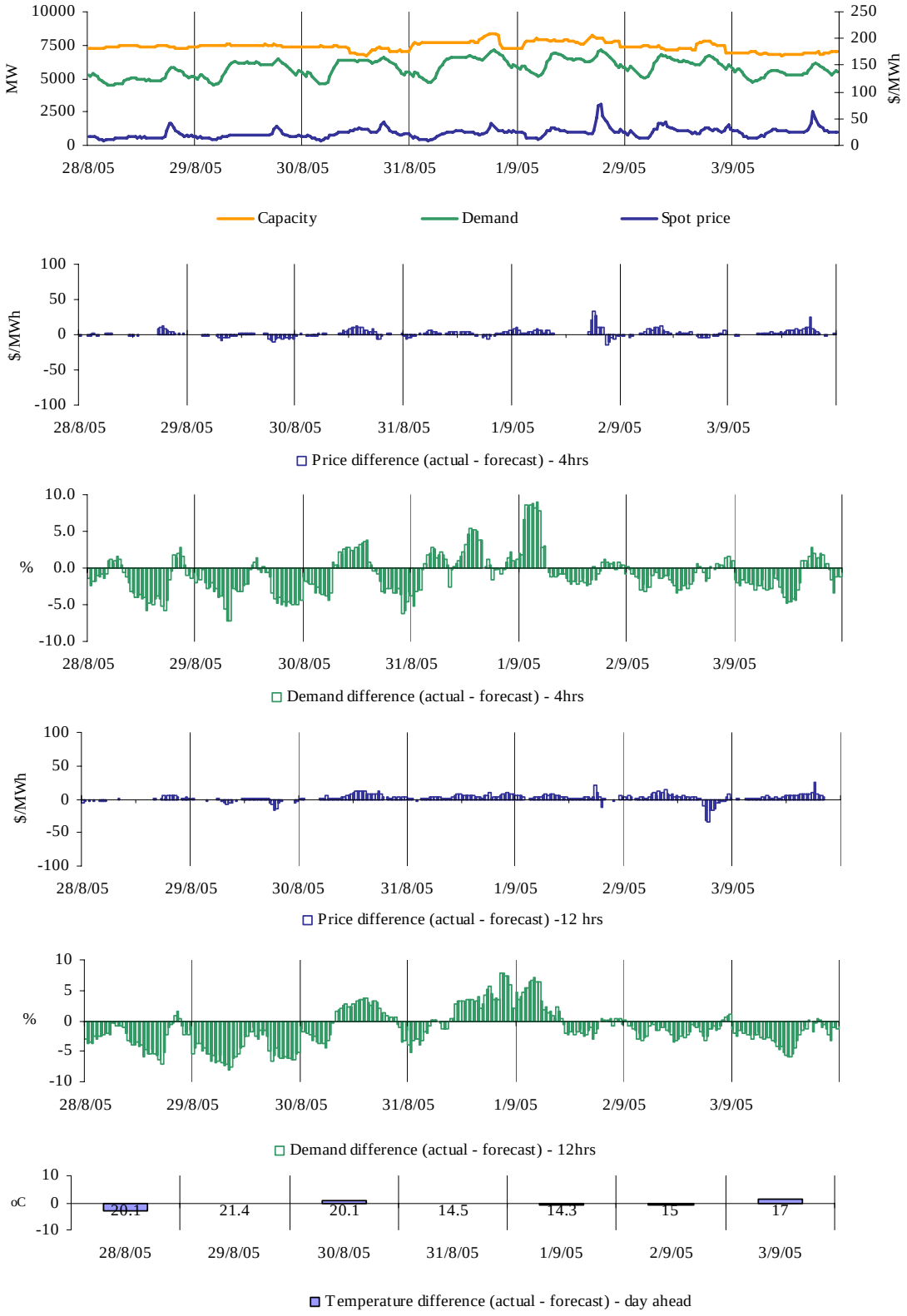
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	74.79	43.59	65.18
Demand (MW)	10,558	10,657	10,684
Available capacity (MW)	10,078	9,958	10,075
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	78.02	53.06	73.41
Demand (MW)	10,642	10,785	10,825
Available capacity (MW)	10,078	10,078	10,075

Conditions at the time saw demand around 100MW lower that forecast four hours earlier. Prices were higher than forecast but aligned across the mainland throughout this period.

At 2.48pm, Delta Electricity increased the availability at Vales Point unit 5 by 120MW and at the same time repriced 80MW of capacity from prices below $25/MWh to prices above $300/MWh. The rebid reason given was ‘Precip testing fixed load”.

There was no other significant rebidding.

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



There were 2 occasions in Victoria where the spot price was greater than three times the weekly average price of $24/MWh. These occurred at 6.30pm and 7pm on Thursday.

Thursday, 1 September

6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	74.90	41.82	64.95
Demand (MW)	6,983	7,007	7,084
Available capacity (MW)	8,055	8,255	7,887
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	78.01	51.14	75.24
Demand (MW)	7,125	7,063	7,139
Available capacity (MW)	8,025	8,250	7,805

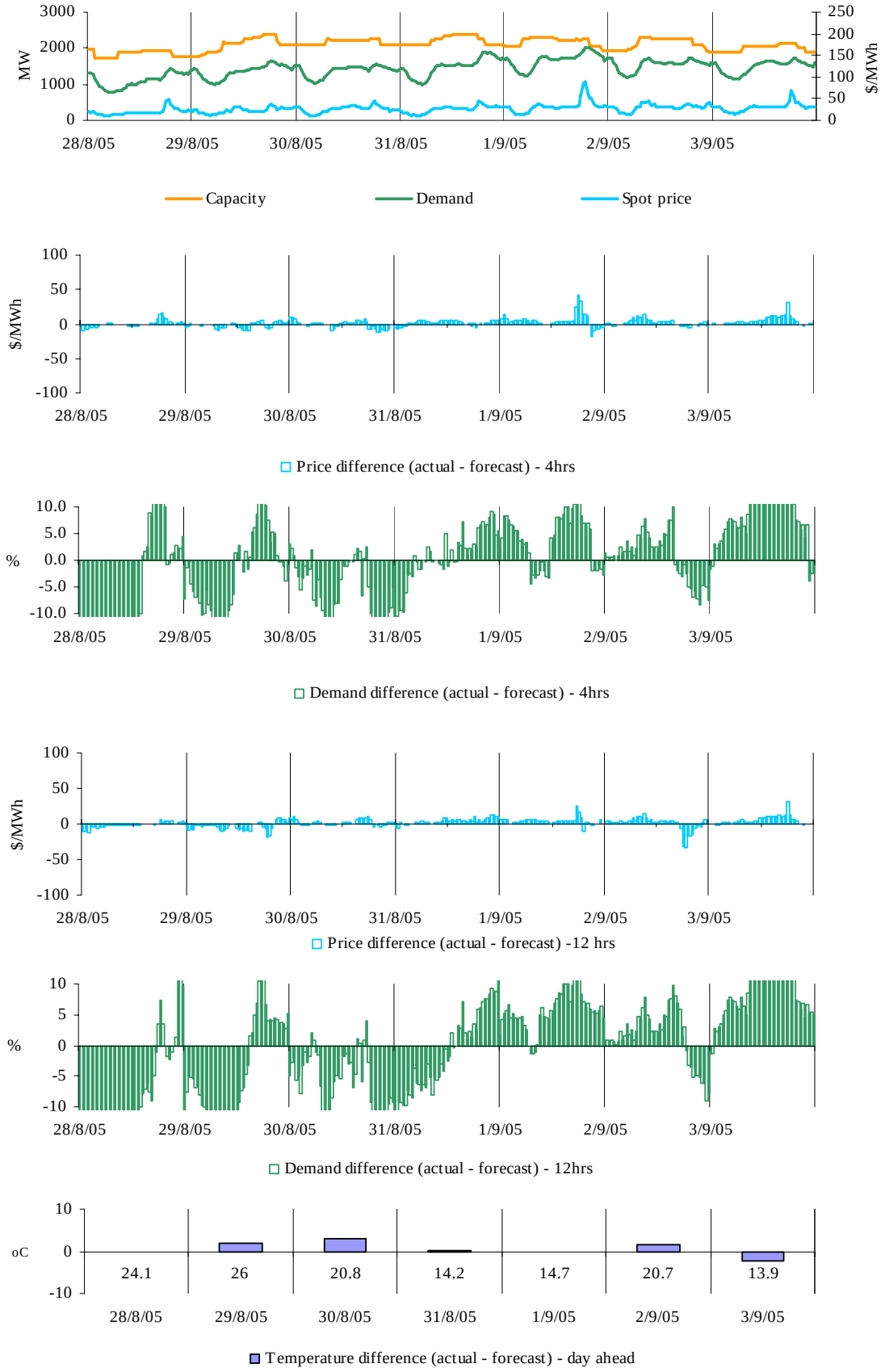
Conditions at the time saw demand close to forecast, with prices aligned across the mainland. Available capacity was around 200MW lower than forecast four hours to despatch, primarily as a result of a reduction by International Power at Hazelwood. Unit 4 was shutdown from 205MW at 4.58pm. The rebid reason given was “Unit trip tube leak”.

At around 1pm, Ecogen committed 500MW of capacity at Newport for the evening peak. This capacity was priced at less than $50/MWh.

Through rebids at 5.10pm and 5.46pm, Alinta committed a total of 94MW of capacity at Bairnsdale at prices of less than $35/MWh. The rebid reason given was ‘Market condition – price/demand expectation”.

There was no other significant rebidding.

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



There were 2 occasions in South Australia where the spot price was greater than three times the weekly average price of $28/MWh. These occurred at 6.30pm and 7pm on Thursday.

Thursday, 1 September

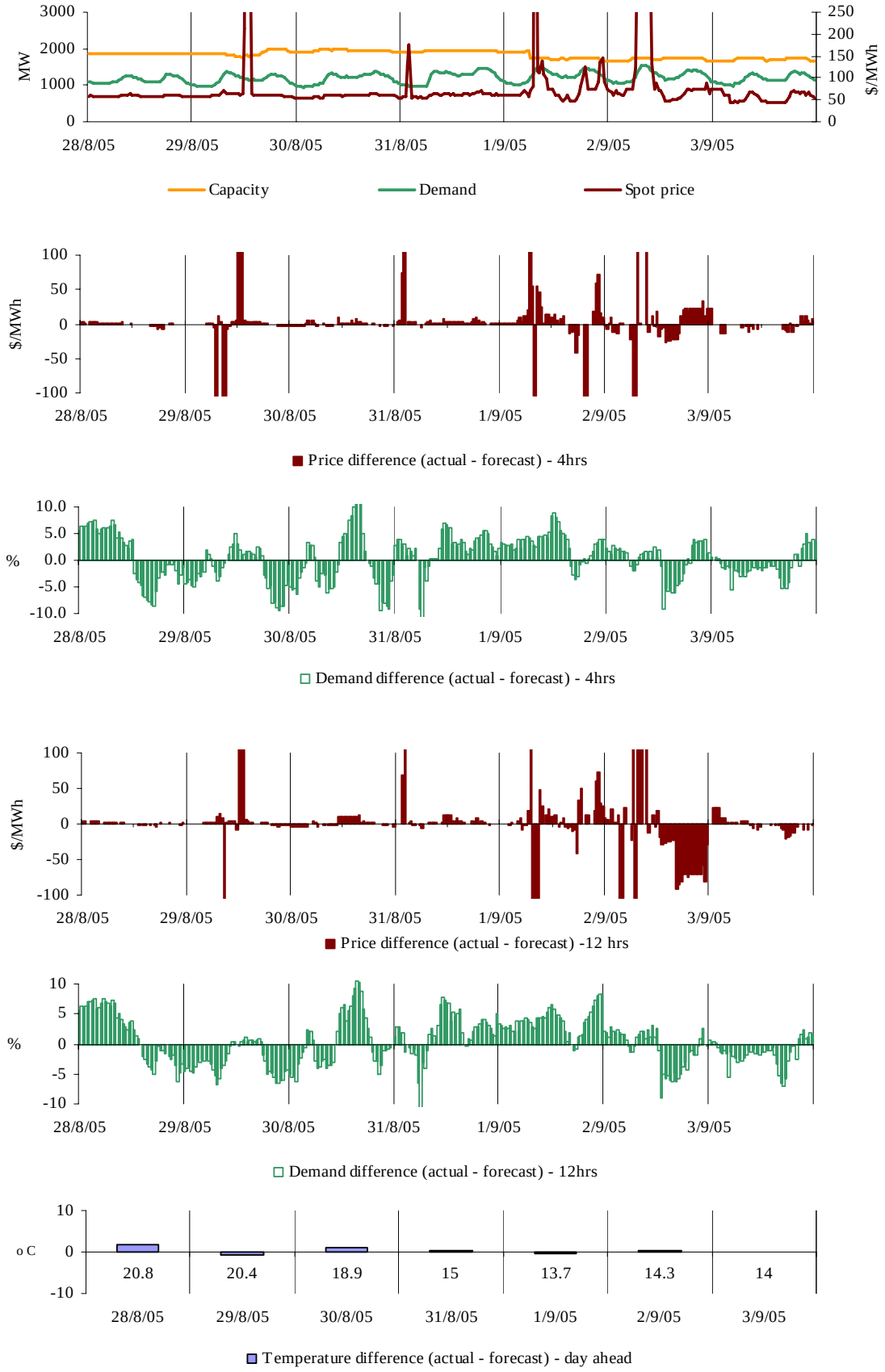
6:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	85.10	44.09	67.72
Demand (MW)	1,933	1,704	1,703
Available capacity (MW)	2,243	2,276	2,296
7:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	89.45	55.53	81.71
Demand (MW)	2,007	1,837	1,838
Available capacity (MW)	2,243	2,276	2,296

Conditions at the time saw demand as much as 230MW higher than forecast. Prices were aligned across the mainland throughout the period.

At 5.59pm, Origin Energy committed 46MW of capacity at Quarantine. This capacity had previously been priced at $9,000/MWh. The rebid reason given was ‘Est (N) change in PDS”.

There was no other significant rebidding.

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



There were 10 occasions in Tasmania where the spot price was greater than three times the weekly average price of $96/MWh. These prices occurred at 1pm and 1.30pm on Monday, at 7.30am on Thursday and between 7am and 10am on Friday.

Monday, 29 August

1:00 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	3806.02	57.53	59.50
Demand (MW)	1,164	1,140	1,167
Available capacity (MW)	1,810	1,886	1,886
1:30 pm	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	689.82	57.50	58.64
Demand (MW)	1,144	1,134	1,140
Available capacity (MW)	1,797	1,916	1,916

Conditions at the time saw demand close to forecast with the 5-minute price at around $3,800/MWh from 12.35pm to 1.05pm. At the same time, raise 6 second ancillary service prices were $10,000/MWh, with lower 6 second and raise regulation prices of around $1,300/MWh and $1,000/MWh respectively.

A planned network outage, for around one hour, interrupted supply from John Butters power station. Output from the station was reduced to zero in both the energy and ancillary service markets. The unit had been operating at around 70 MW in the energy market prior to this outage. At around the same time, a step change in the offer profile for lower and raise regulation services at Gordon, reduced to almost zero capacity priced at less than $1,000/MWh for the raise regulation service. Prior to these two events, Gordon and John Butters had been providing all the raise regulation within the region.

The coincident high prices in the energy and ancillary services markets resulted from trade-offs between energy and ancillary service offers and the scarce availability of some of these services. Water shortages affecting Gordon and Poatina, together with the unavailability of Bell Bay at this time – all major providers of these services – also contributed to the scarcity.

Thursday, 1 September

7:30 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1184.31	60.90	60.90
Demand (MW)	1,437	1,386	1,386
Available capacity (MW)	1,735	1,735	1,735

Conditions at the time saw demand around 50 MW higher than forecast. The 5 minute price increased from around $100/MWh for most of the trading interval, to $500/MWh at 7.25 am and then, to $6,198/MWh at 7.30 am. The raise 6 second price spiked to $10,000/MWh at the same time.

There was no significant rebidding.

Friday, 2 September

7:00 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	337.25	713.66	145.10
Demand (MW)	1,321	1,348	1,340
Available capacity (MW)	1,735	1,735	1,735
7:30 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	686.68	795.00	795.00
Demand (MW)	1,443	1,456	1,448
Available capacity (MW)	1,735	1,735	1,735
8:00 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	773.24	145.10	145.10
Demand (MW)	1,525	1,517	1,509
Available capacity (MW)	1,735	1,735	1,735
8:30 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	795.00	795.00	145.10
Demand (MW)	1,549	1,533	1,525
Available capacity (MW)	1,735	1,735	1,735
9:00 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	795.00	795.00	145.10
Demand (MW)	1,523	1,500	1,492
Available capacity (MW)	1,735	1,735	1,735
9:30 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	795.00	795.00	795.00
Demand (MW)	1,480	1,457	1,449
Available capacity (MW)	1,735	1,735	1,735
10:00 am	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	361.73	145.10	145.10
Demand (MW)	1,420	1,414	1,406
Available capacity (MW)	1,735	1,735	1,735

Conditions at the time saw demand close to forecast, with prices close to forecast for much of the period. There was no capacity priced between $145/MWh and $795/MWh. There was no significant rebidding.

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

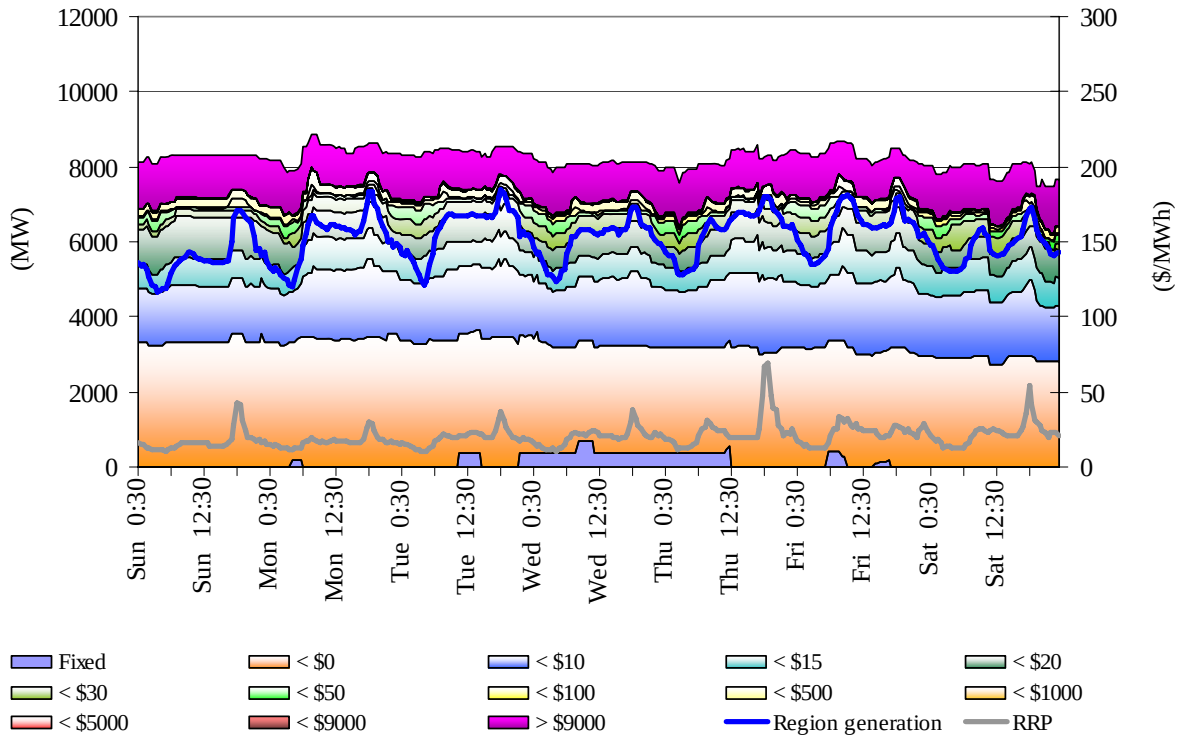


Figure 52: New South Wales closing bid prices, despatched generation and spot price

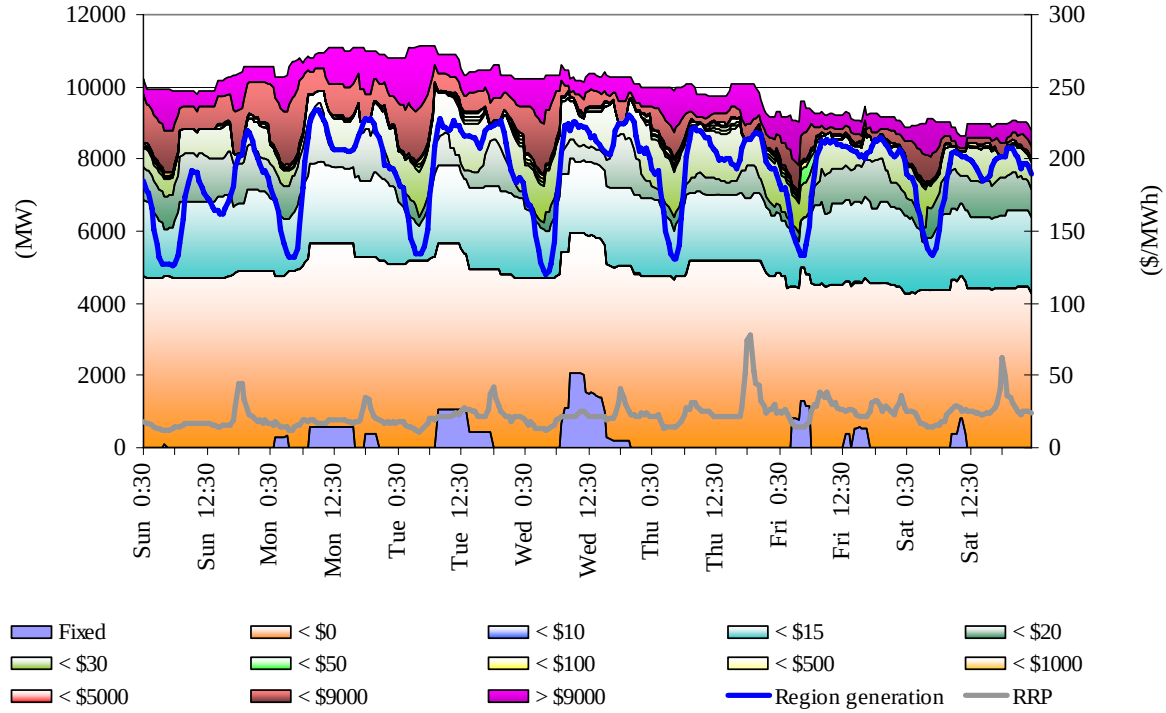


Figure 53: Victoria closing bid prices, despatched generation and spot price

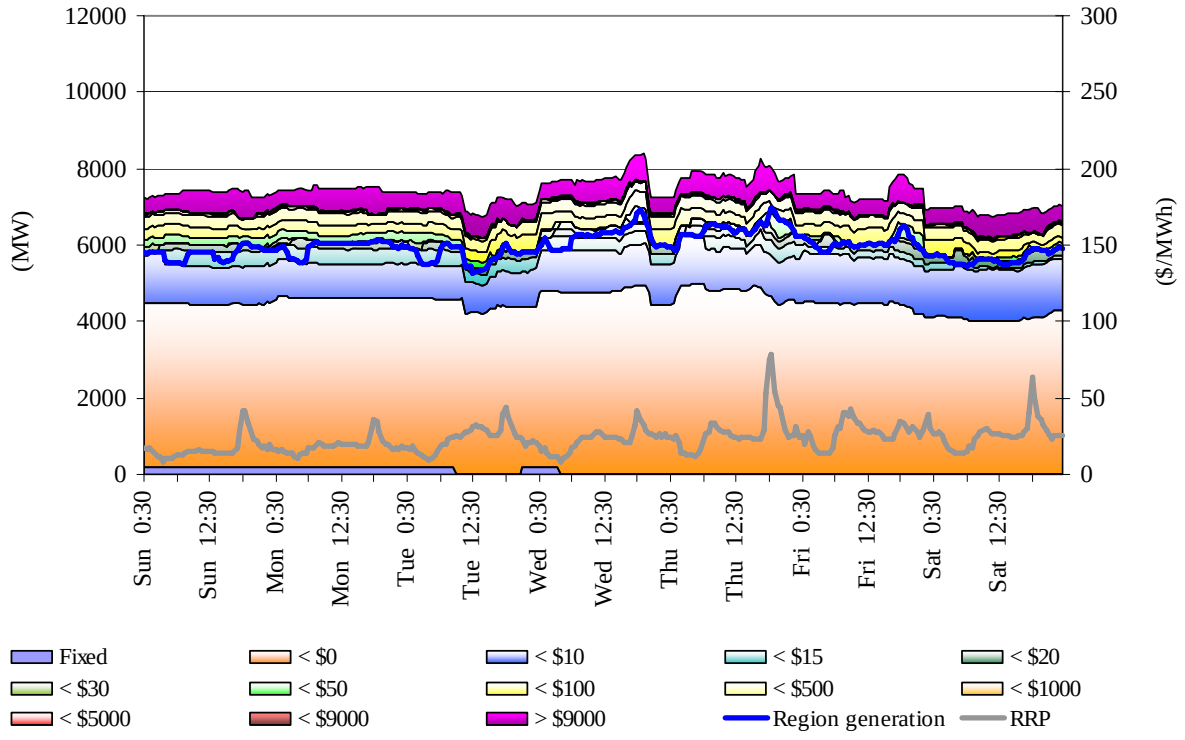


Figure 54: South Australia closing bid prices, despatched generation and spot price

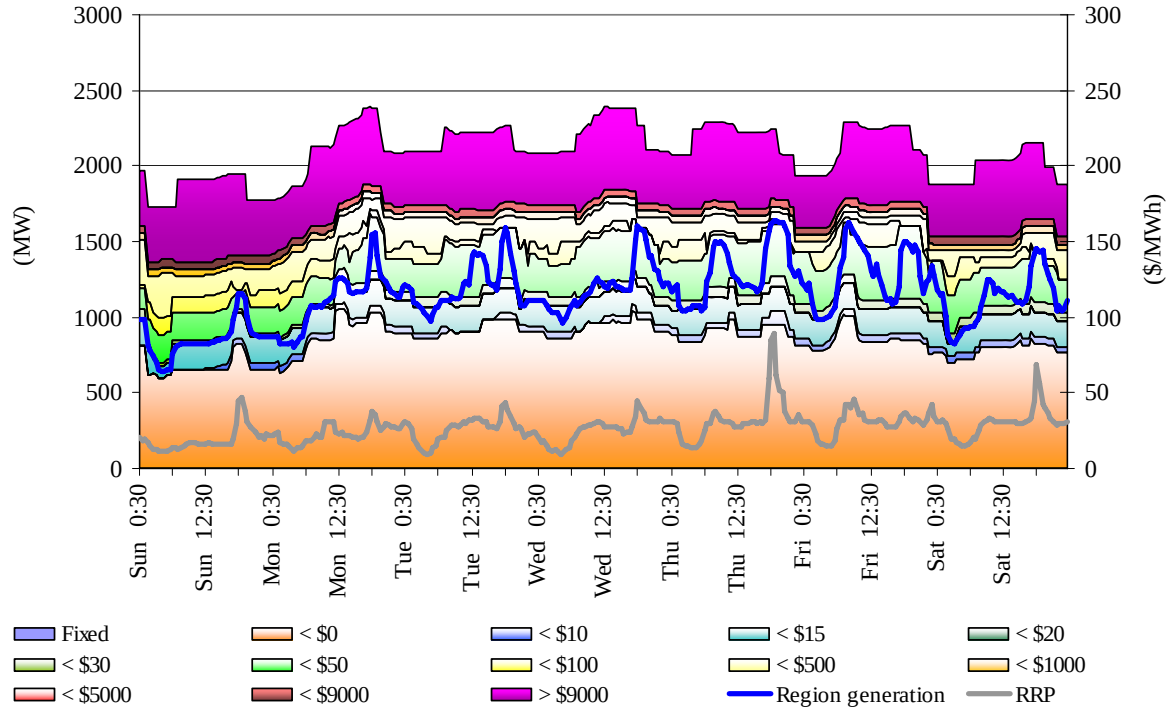
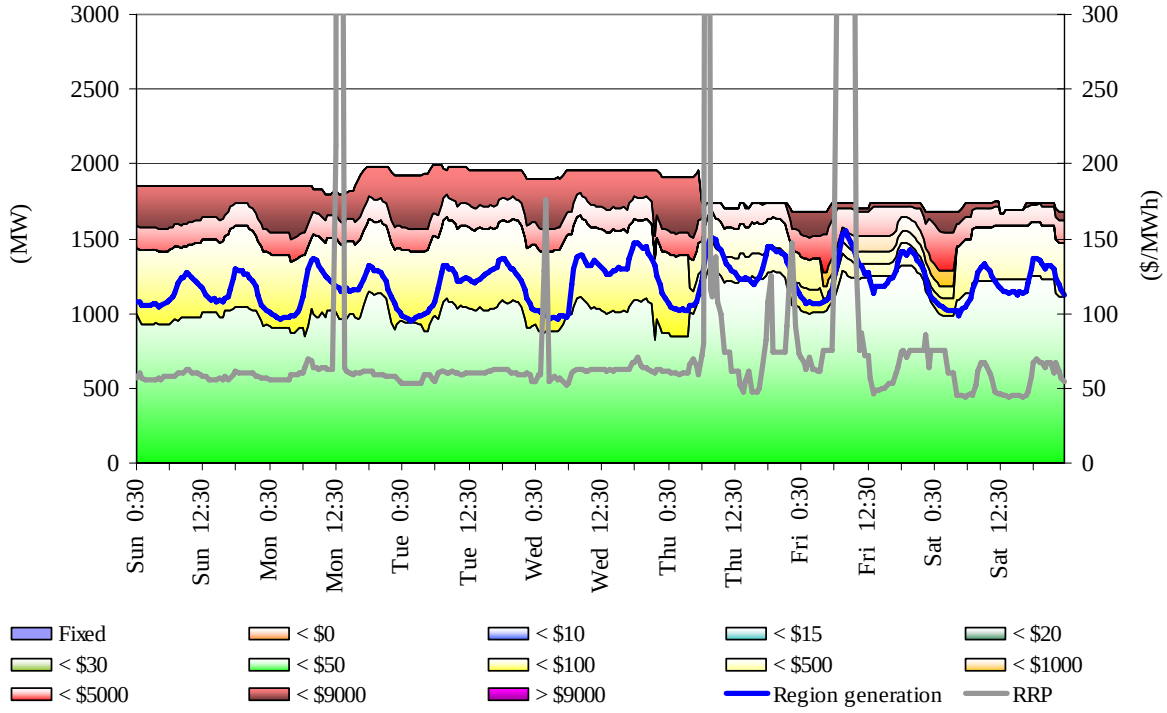


Figure 55: Tasmania closing bid prices, despatched generation and spot price



Ancillary service market

The total cost of ancillary services on the mainland for the week was $286,000 or 0.3 per cent of the total turnover in the energy market. Figure 56 summarises the volume weighted average prices and costs for the eight frequency control ancillary services across the interconnected regions.

Figure 56: frequency control ancillary service prices and costs

	Raise 6 sec	Raise 60 sec	Raise 5 min	Raise reg	Lower 6 sec	Lower 60 sec	Lower 5 min	Lower reg
Last week ($)	1.45	0.93	0.95	0.99	0.20	0.23	1.31	1.59
Previous week($)	1.14	0.56	0.88	1.21	0.15	0.17	1.03	1.55
Last Quarter($)	1.43	0.69	0.98	1.36	0.16	0.12	1.16	1.58
Market Cost ($1000s)	$78	$50	$66	$22	$2	$2	$32	$35
% of energy market	0.09%	0.06%	0.08%	0.03%	0.00%	0.00%	0.04%	0.04%

In Tasmania, ancillary services totaled $813,000 or four per cent of turnover. The price for raise 6 second reached $10,000/MW on Monday and Thursday. The price for lower 6 second was also high on these days. The cost for 6 second contingency services totalled $682,000, more than 80 per cent of the total cost. On Thursday, interruptions to the AGC status of units in Tasmania resulted in zero despatch for both regulation services and prices at the market cap. Figure 57 summarises the Tasmanian prices and costs.

Figure 57: frequency control ancillary service prices and costs for Tasmania

	Raise 6 sec	Raise 60 sec	Raise 5 min	Raise reg	Lower 6 sec	Lower 60 sec	Lower 5 min	Lower reg
Last week ($)	54.01	1.05	1.05	4.98	13.61	1.06	1.06	1.25
Previous week($)	1.43	1.05	1.06	1.22	3.81	1.08	1.05	1.09
Market Cost ($1000s)	$508	$10	$11	$42	$174	$31	$26	$11
% of energy market	2.62%	0.05%	0.06%	0.22%	0.90%	0.16%	0.13%	0.05%

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

Figure 58: daily frequency control ancillary service costs

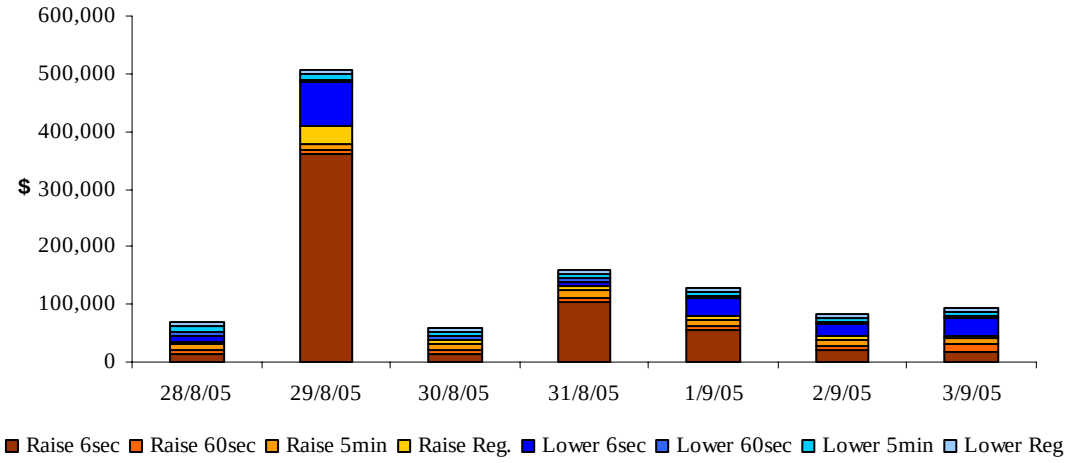
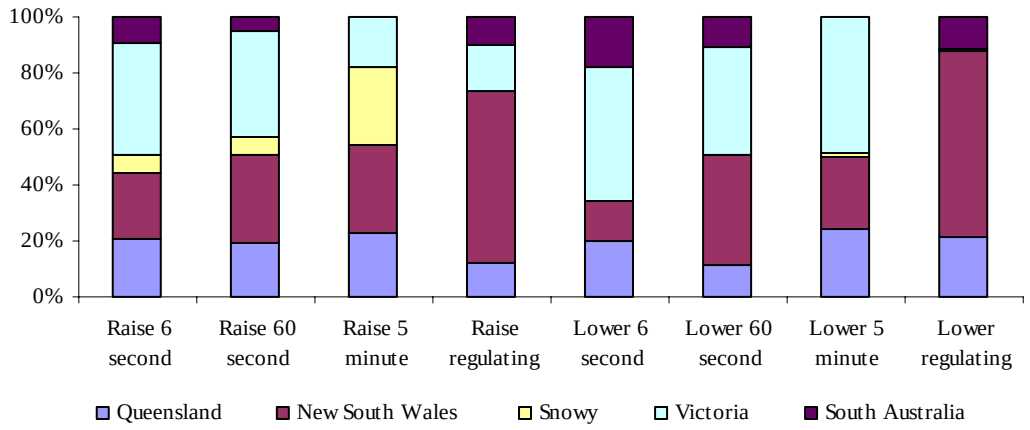


Figure 59 shows the regional weekly participation in each of the ancillary service markets on the mainland.

Figure 59: regional participation in ancillary services



Figures 60 and 61 show 30-minute prices for each of the ancillary services.

Figure 60: prices for raise services

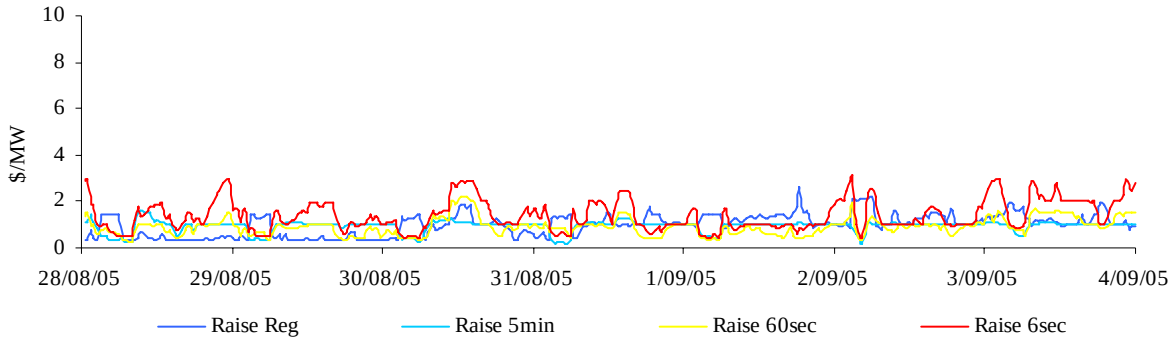


Figure 60A: prices for raise services - Tasmania

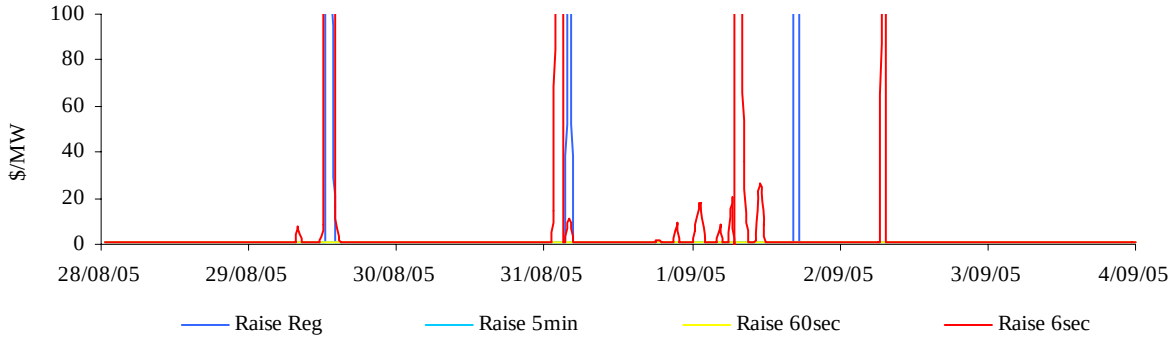


Figure 61: prices for lower services

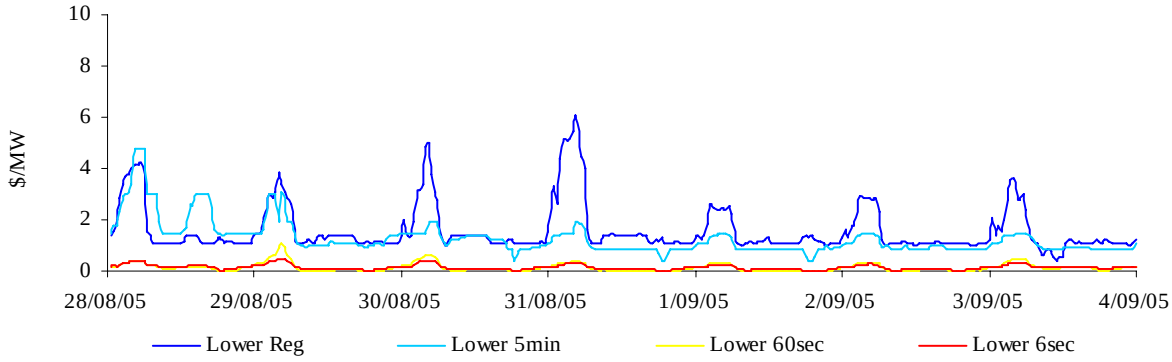
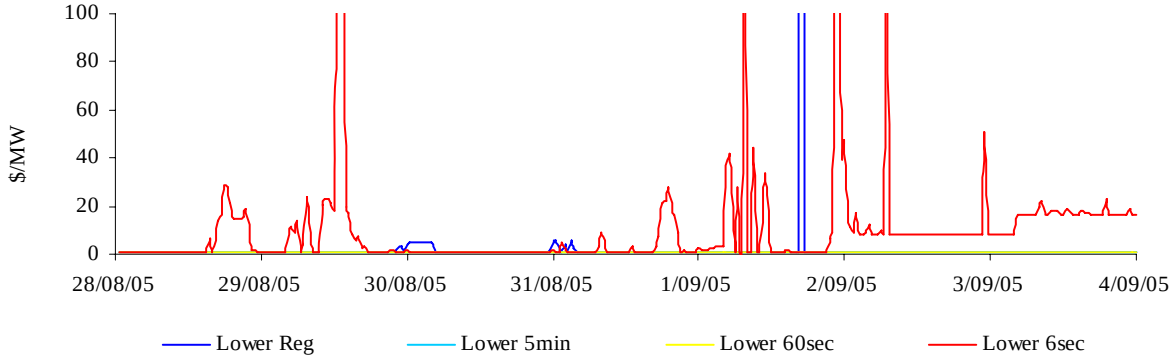


Figure 61A: prices for lower services - Tasmania



Figures 62 and 63 present for both raise and lower services the requirement for each service over the week.

Figure 62: raise requirements

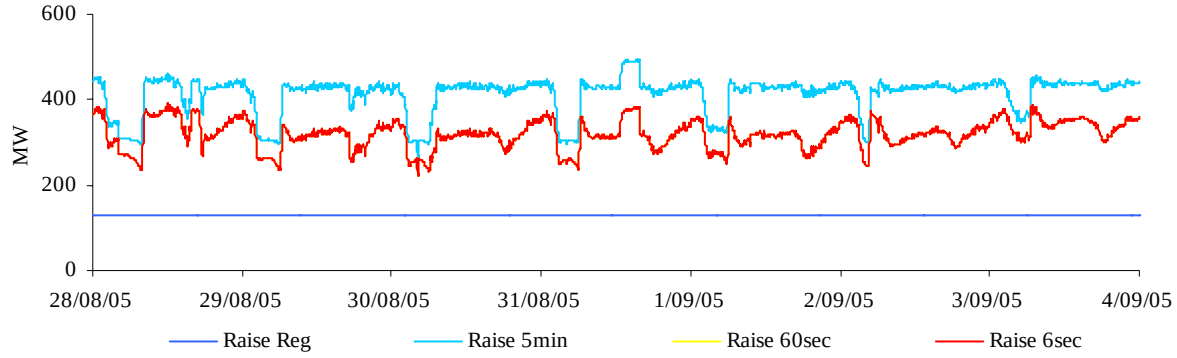


Figure 62A: raise requirements - Tasmania

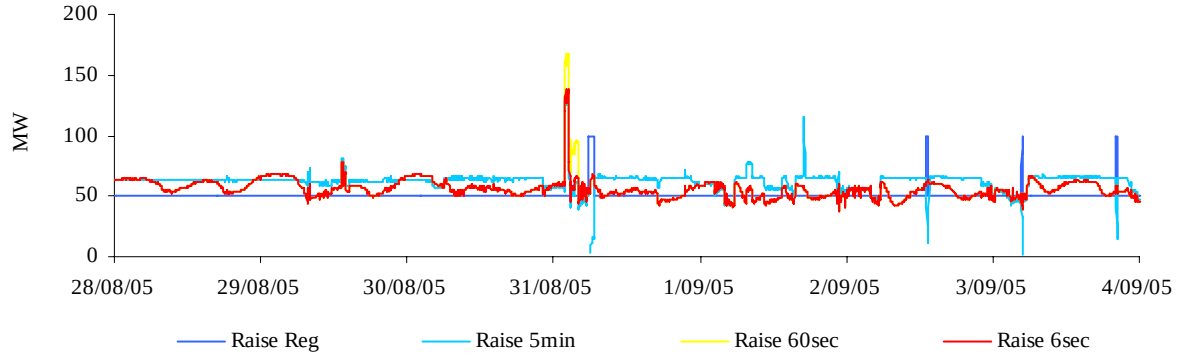


Figure 63: lower requirements

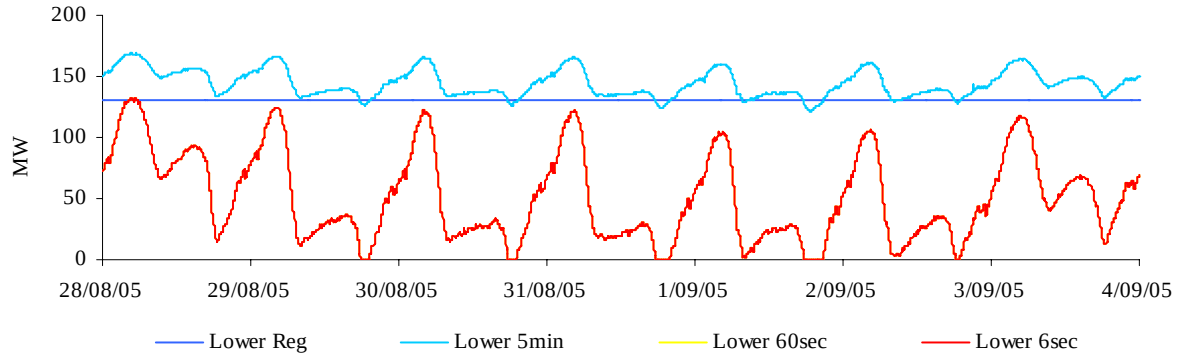
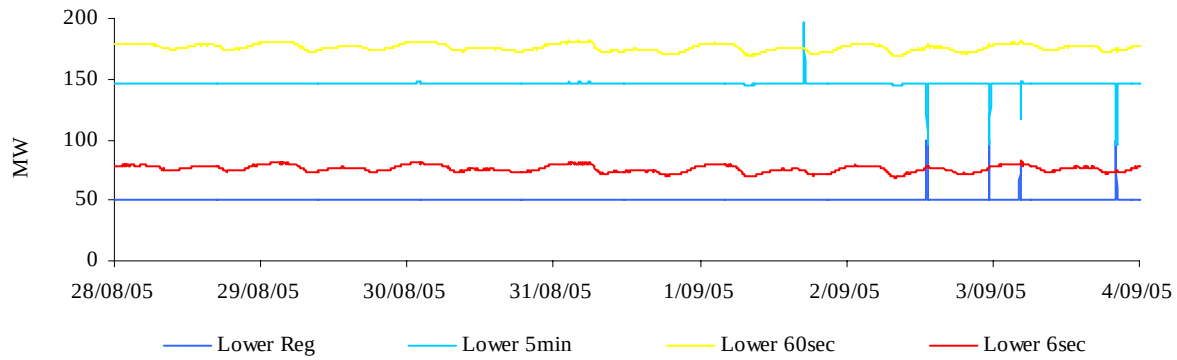


Figure 63A: lower requirements - Tasmania



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