

30 OCT – 5 NOV 2005

A forced network outage on one of the major transmissions lines between Wallerawang and south Sydney on Sunday, and the need for a further network outage, to facilitate repairs, the following day, resulted in significant disruption to the market early in the week.

As a result of the outages there were step reductions of up to 1000MW on transfers into New South Wales and significant amounts of generation dispatched out of merit order. NEMMCO recalled the outage, while modifications to the constraints were made. A further period of high prices occurred in the afternoon in New South Wales and Queensland, with a further outage to continue the repairs.

Spot prices in New South Wales were above \$5000/MWh for more than two hours on Monday, when network constraints designed to manage the outage, failed to maintain power flows on the network below secure levels. Spot prices peaked at \$6724/MWh in New South Wales with five-minute prices driven to almost zero at times, in all other mainland regions.

These events saw almost \$180 million added to the energy market turnover in New South Wales and Queensland and average prices for the week of \$158/MWh and \$44/MWh respectively.

Investigations into the main contributing factors which led to the prices above \$5 000/MWh, as required by clause 3.13.7 of the rules, are continuing.

Average spot prices in Victoria and South Australia for the week were \$35/MWh, up by more than a third from the previous week. Demand in Victoria approached 8 000 MW, the highest since January. The average spot price in Tasmania was \$65/MWh, consistent with the previous week.

Turnover in the energy market for the mainland was \$320 million. The total cost of ancillary services for the week was around \$310 000 or 0.1 per cent of turnover. Turnover for the week in Tasmania was \$11 million, while the cost of ancillary services was around \$120 000 or 1 per cent of turnover.

Demand forecasts produced 4 and 12 hours ahead varied from actual by more than 5 per cent in approximately 20 per cent of all trading intervals across the market. These variations were most frequent in South Australia occurring in around two thirds of all trading intervals. Significant variations between forecast and actual prices occurred in 47, or 14 per cent, of trading intervals. Demand variations were the main contributor.

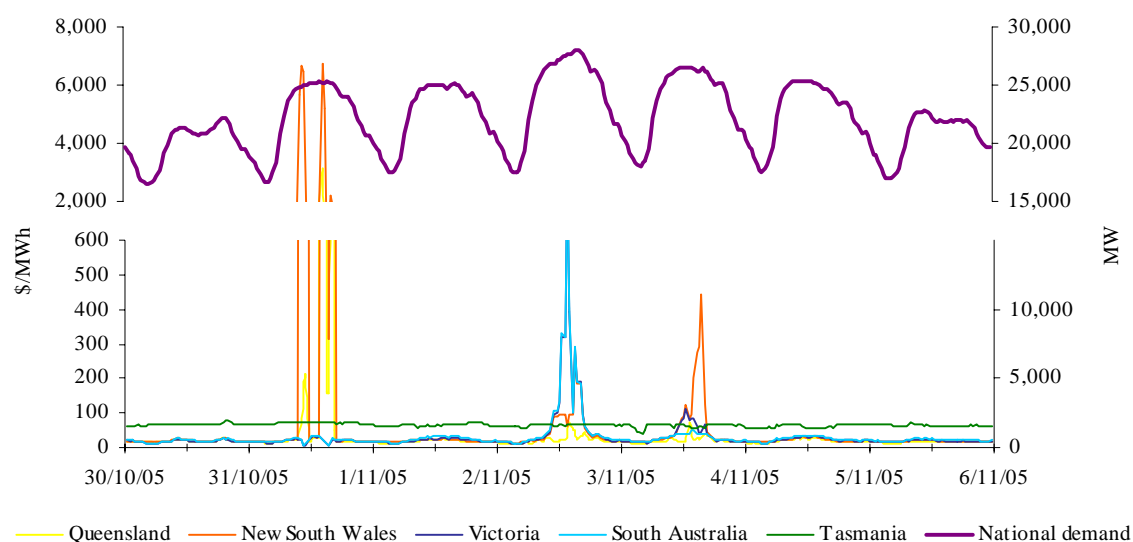
## Energy prices

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 to date. 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                            | 44  | 158  | 35  | 35  | 65  |
| Previous week                        | 23  | 24   | 24  | 27  | 68  |
| Same quarter last year               | 48  | 90   | 38  | 54  | -   |
| Financial year to date               | 23  | 34   | 29  | 34  | 95  |
| % change from previous week          | ▲86 | ▲549 | ▲46 | ▲30 | ▼4  |
| % change from same quarter last year | ▼9  | ▲76  | ▼8  | ▼34 | -   |
| % change from year to date           | ▼31 | ▼20  | ▼12 | ▼11 | -   |

**Figure 2: national demand and spot prices**

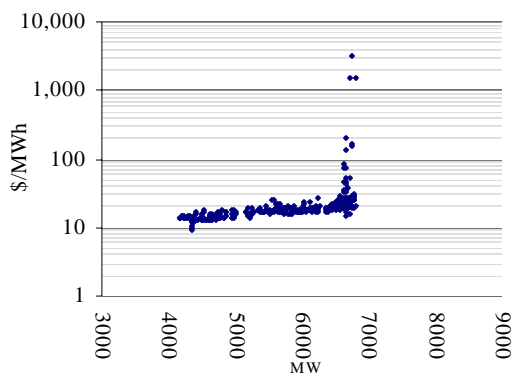


**Figure 3: volatility index during peak periods**

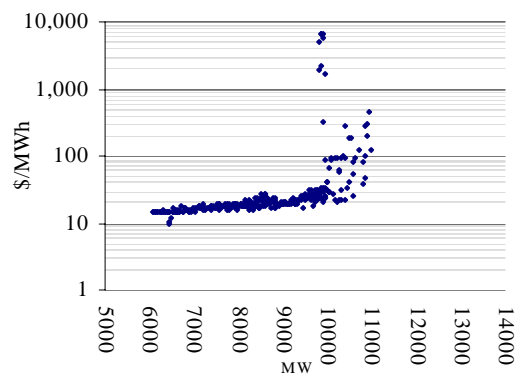
|                        | QLD  | NSW  | VIC  | SA   | TAS  |
|------------------------|------|------|------|------|------|
| Last week              | 0.72 | 3.22 | 1.79 | 0.66 | 0.18 |
| Previous week          | 0.80 | 0.69 | 0.59 | 0.50 | 0.03 |
| Same quarter last year | 1.13 | 1.23 | 0.96 | 0.77 | -    |

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

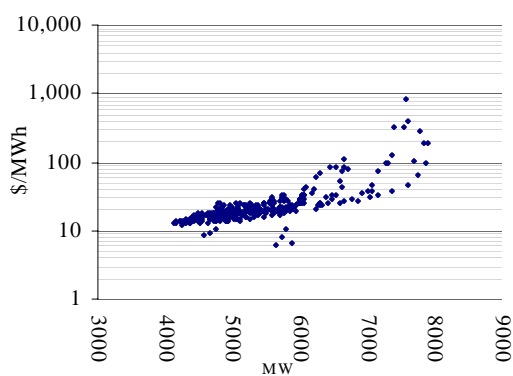
**Figure 4: Queensland**



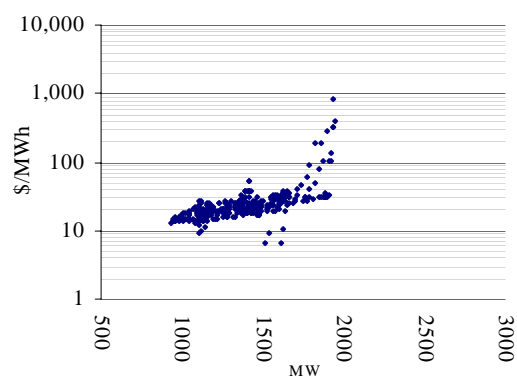
**Figure 5: New South Wales**



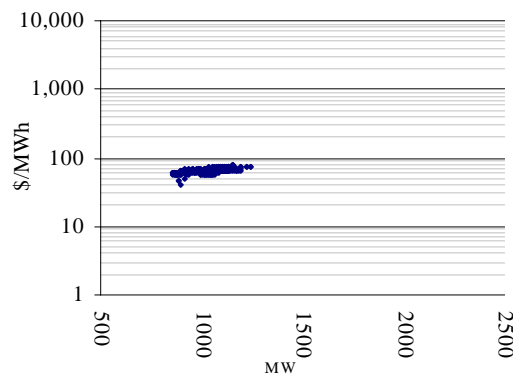
**Figure 6: Victoria**



**Figure 7: South Australia**



**Figure 8: Tasmania**



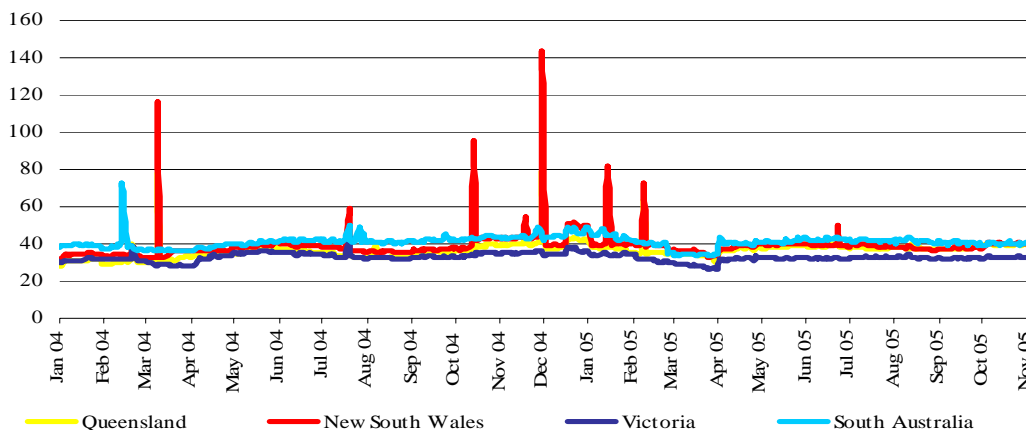
Maximum spot prices for the week were \$3 153/MWh in Queensland, \$6 724/MWh in New South Wales, \$810/MWh in Victoria, \$822/MWh in South Australia and \$77/MWh in Tasmania.

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      | 39.60  | 39.51   | 39.36     | 39.43    | 39.36  |
| New South Wales | 40.42  | 40.60   | 41.21     | 41.53    | 40.95  |
| Victoria        | 32.64  | 32.81   | 34.27     | 33.02    | 32.71  |
| South Australia | 40.64  | 41.29   | 41.18     | 39.25    | 40.60  |

**Figure 10: d-cyphaTrade WEPI**



**Spot prices greater than \$5,000/MWh**

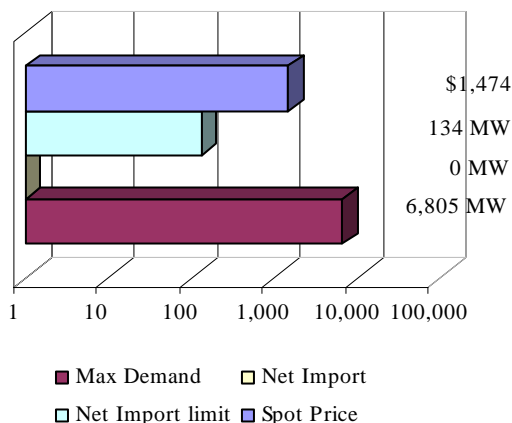
There were five occasions in New South Wales where the spot price was greater than \$5 000/MWh. These occurred between 10am and 11.30am and at 2pm and 2.30pm on Monday. Investigations into the main contributing factors which led to the prices above \$5 000/MWh are continuing.

**Reserve**

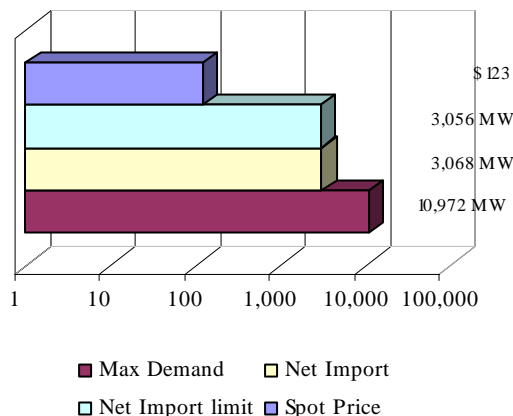
There were no low reserve conditions forecast for the week. Figures 11 to 14 show spot price, net imports and limits at the time of weekly maximum demand.

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

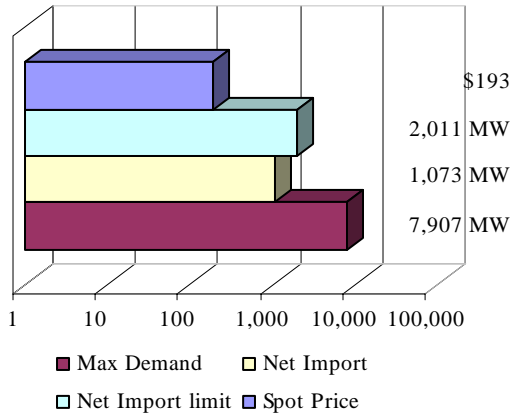
**Figure 11: Queensland**



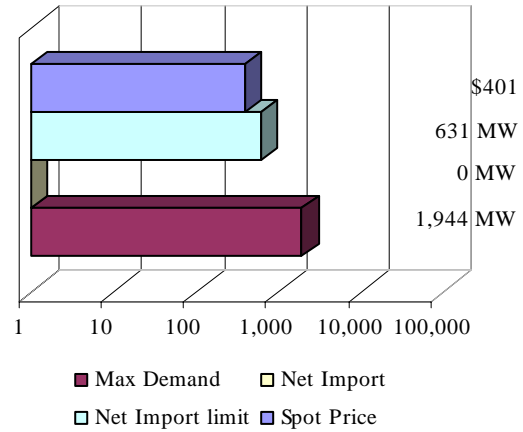
**Figure 12: New South Wales**



**Figure 13: Victoria**



**Figure 14: South Australia**

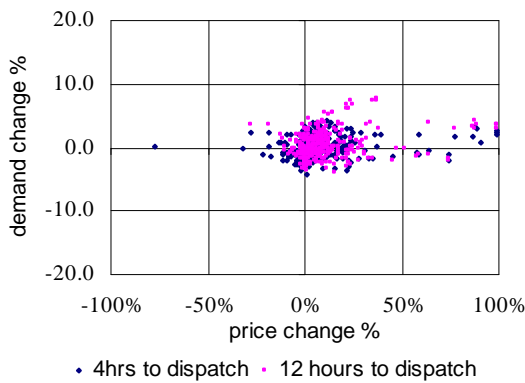


In Tasmania, demand reached a maximum of 1 246MW at 8am on Monday, 31 October. The spot price at the time was \$74/MWh.

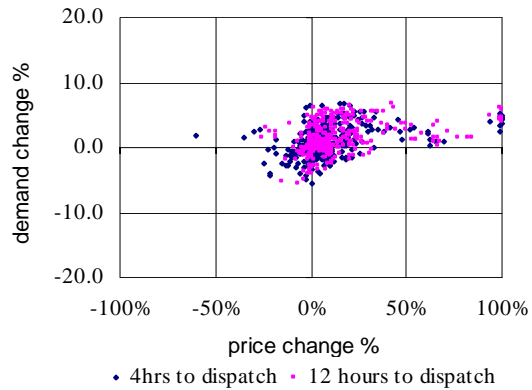
**Price variations**

There were 47 trading intervals where actual prices significantly varied from forecasts made 4 and 12 hours ahead of dispatch. 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 100 per cent have been capped.

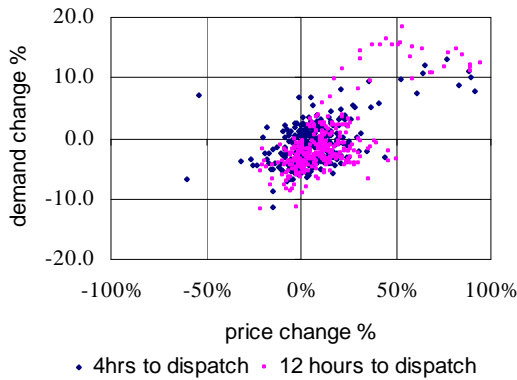
**Figure 15: Queensland**



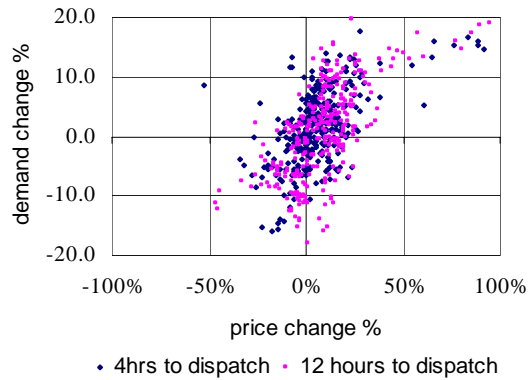
**Figure 16: New South Wales**



**Figure 17: Victoria**



**Figure 18: South Australia**



**Figure 19: Tasmania**

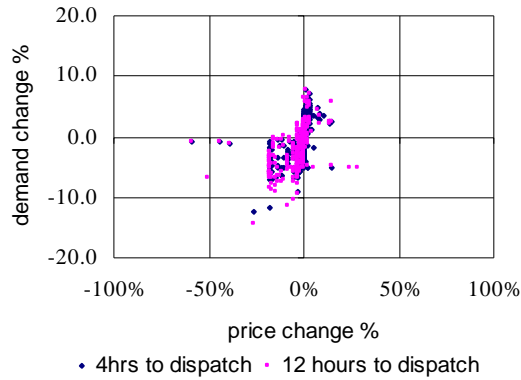
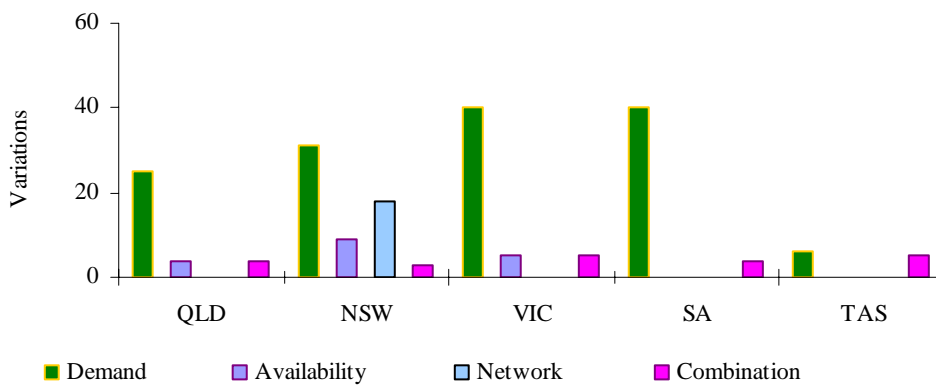


Figure 20 summarises the number and most probable reason for variations between forecast and actual prices.

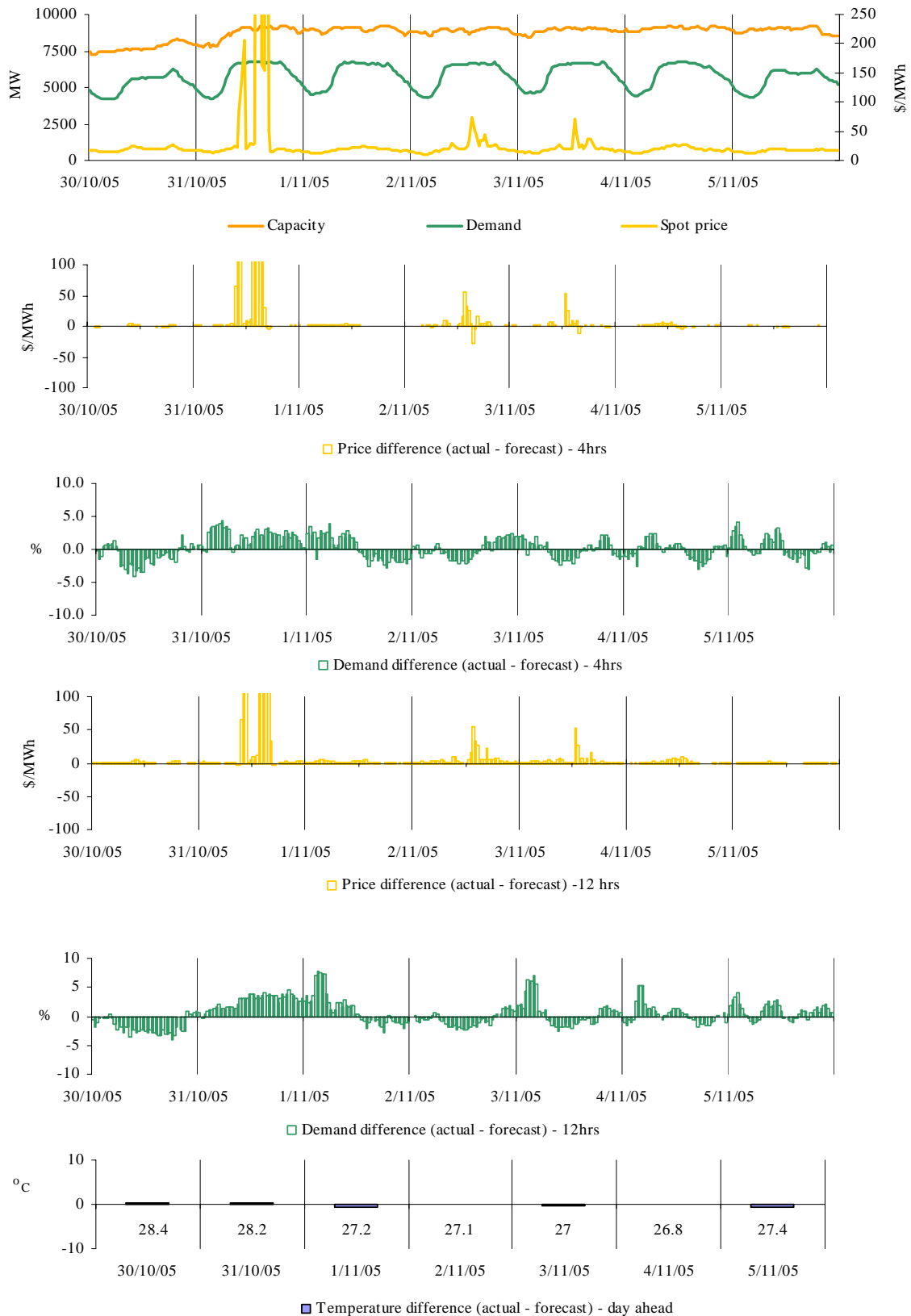
**Figure 20: reasons for variations between forecast and actual prices**



**Price and demand**

Figures 21 - 50 set out details of spot prices and demand on a regional basis. They include the actual spot price, actual demand outcomes and variation from forecasts made 4 and 12 hours ahead of dispatch 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 dispatched in a region are overlaid.

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



There were 7 occasions in Queensland where the spot price was greater than three times the weekly average price of \$44/MWh. These all occurred on Monday.

### Monday, 31 October

| <b>10:30 am</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
|-------------------------|---------------|----------------------|-----------------------|
| Price (\$/MWh)          | 138.30        | 18.69                | 18.69                 |
| Demand (MW)             | 6 646         | 6 536                | 6 437                 |
| Available capacity (MW) | 9 099         | 9 181                | 9 184                 |
| <b>11:00 am</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 205.34        | 19.26                | 25.20                 |
| Demand (MW)             | 6 667         | 6 621                | 6 467                 |
| Available capacity (MW) | 9 118         | 9 181                | 9 184                 |
| <b>2:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 1474.01       | 20.94                | 18.69                 |
| Demand (MW)             | 6 805         | 6 650                | 6 568                 |
| Available capacity (MW) | 8 957         | 9 162                | 9 184                 |
| <b>2:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 3152.79       | 18.69                | 18.69                 |
| Demand (MW)             | 6 758         | 6 621                | 6 556                 |
| Available capacity (MW) | 9 176         | 9 162                | 9 184                 |
| <b>3:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 164.06        | 18.69                | 18.69                 |
| Demand (MW)             | 6 754         | 6 555                | 6 514                 |
| Available capacity (MW) | 9 164         | 9 162                | 9 184                 |
| <b>3:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 154.41        | 18.69                | 18.69                 |
| Demand (MW)             | 6 750         | 6 531                | 6 470                 |
| Available capacity (MW) | 9 139         | 8 960                | 9 184                 |
| <b>4:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 1574.06       | 20.81                | 18.69                 |
| Demand (MW)             | 6 713         | 6 539                | 6 474                 |
| Available capacity (MW) | 9 133         | 9 165                | 9 184                 |

Conditions at the time reflected the extreme conditions in New South Wales. Demand was as much as 200MW higher than forecast four hours to dispatch. Network limitations between central and south Queensland led to out of merit order dispatch of Queensland generation for much of the day. These constraints, which affect more than 5 700 MW of generation, led to as much as 3 152 MW of capacity being rebid to prices of less than zero.

Over a number of rebids, all of short duration, Enertrade rebid as much as 1 400 MW of capacity across its portfolio to prices of zero or below. These rebids commenced at 9.45am, the rebid reason given for all rebids was “Material change in market conditions::changed MW distrib”.

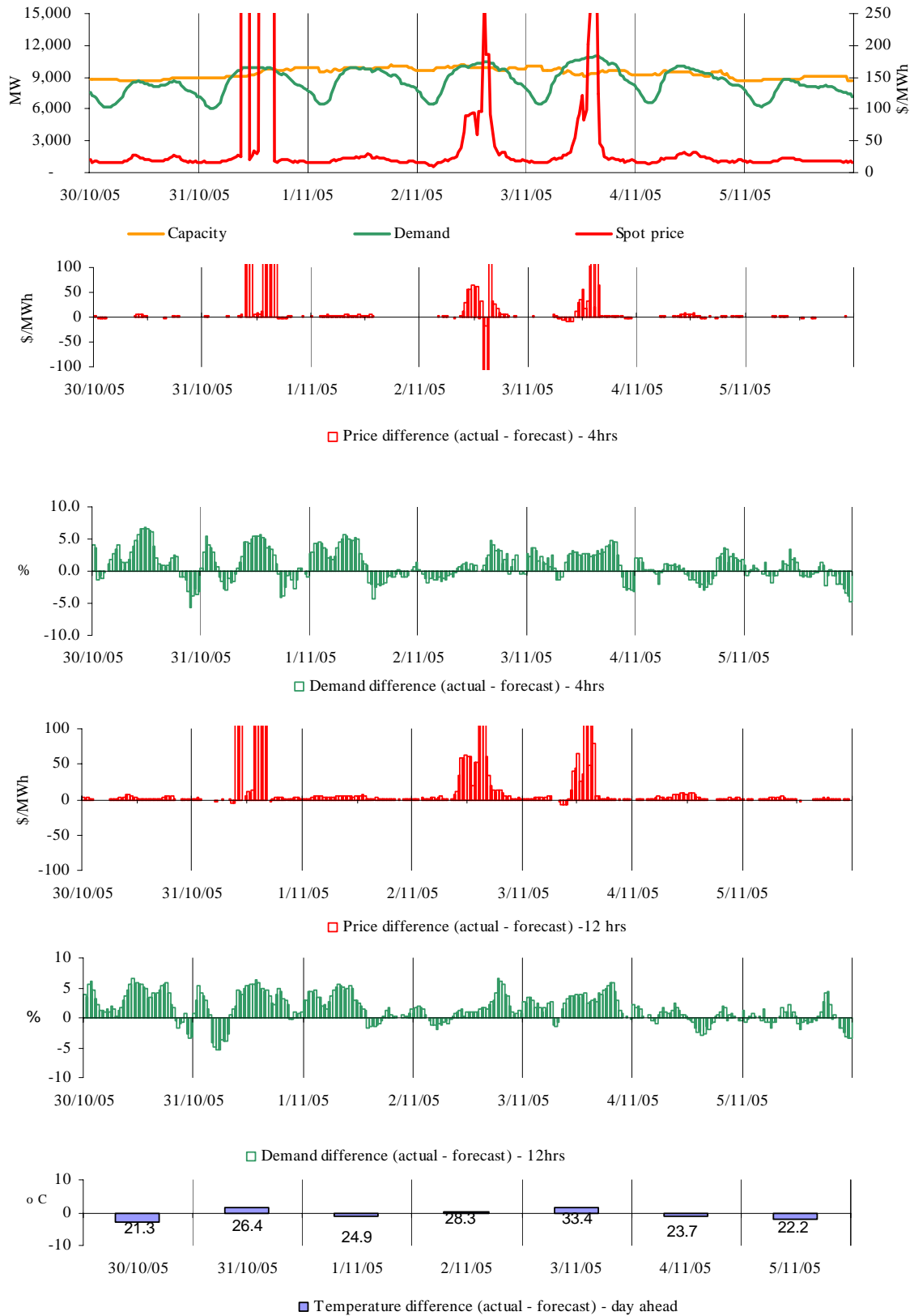
From 9.54am, CS Energy rebid as much as 330MW of capacity at Callide to prices of zero or less. The rebid reasons given were “Callide B manage C to S constraint”.

From 9,50am, Stanwell rebid almost 1 000MW of capacity to prices of zero or below. The rebid reasons given were “RRP grt than pre dis” and “Manage constraints”. Some of these rebids also reduced the ramp down rates at Stanwell.

There was no other significant rebidding.



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



There were 8 occasions in New South Wales where the spot price was greater than three times the weekly average price of \$158/MWh. The majority of these occurred on Monday, following a forced network outage on one of the major transmissions lines into Sydney's south on Sunday, and the need for a further network outage, to facilitate repairs.

### Monday, 31 October

| <b>10:00 am</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
|-------------------------|---------------|----------------------|-----------------------|
| Price (\$/MWh)          | 5 677.08      | 22.00                | 20.77                 |
| Demand (MW)             | 9 905         | 9 460                | 9 436                 |
| Available capacity (MW) | 9 105         | 9 315                | 9 395                 |
| <b>10:30 am</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 6 661.42      | 20.89                | 21.58                 |
| Demand (MW)             | 9 853         | 9 403                | 9 423                 |
| Available capacity (MW) | 9 065         | 9 445                | 9 425                 |
| <b>11:00 am</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 6 489.47      | 22.00                | 29.55                 |
| Demand (MW)             | 9 845         | 9 426                | 9 451                 |
| Available capacity (MW) | 9 095         | 9 445                | 9 425                 |
| <b>2:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 1 693.48      | 23.91                | 21.19                 |
| Demand (MW)             | 9 954         | 9 434                | 9 332                 |
| Available capacity (MW) | 9 503         | 9 623                | 9 773                 |
| <b>2:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 6 724.08      | 20.70                | 21.36                 |
| Demand (MW)             | 9 908         | 9 423                | 9 324                 |
| Available capacity (MW) | 9 683         | 9 623                | 9 803                 |
| <b>3:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 5 189.30      | 20.21                | 21.21                 |
| Demand (MW)             | 9 822         | 9 462                | 9 361                 |
| Available capacity (MW) | 9 720         | 9 593                | 9 833                 |
| <b>4:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 2 183.32      | 24.00                | 20.91                 |
| Demand (MW)             | 9 849         | 9 505                | 9 412                 |
| Available capacity (MW) | 9 733         | 9 683                | 9 883                 |
| <b>4:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 1 880.75      | 24.00                | 20.61                 |
| Demand (MW)             | 9 808         | 9 571                | 9 352                 |
| Available capacity (MW) | 9 733         | 9 713                | 9 883                 |

Spot prices in New South Wales rose to more than \$5000/MWh for more than two hours, peaking at \$6724/MWh mid afternoon, when network constraints, designed to manage the forced outage south of Sydney, failed to maintain security. Five-minute prices were driven to zero at times, in all other mainland regions.

As a result, there were step reductions of up to 1 000MW on transfers into New South Wales, significant amounts of generation dispatched out of merit order and a number of inter-regional and intra-regional constraints violated. Almost 3 000 MW of capacity was rebid to prices below zero by Macquarie Generation and Delta Electricity. NEMMCO recalled the outage, while modifications to the constraints were made. A further period of high prices occurred in the afternoon with a further outage to continue the repairs.

The constraints used to manage the outages led to unexpected interactions with system normal constraints. At times all generation within New South Wales and all interconnectors into New South Wales were constrained.

Demand was as much as 500MW higher than forecasts four hours to dispatch.

Over the course of the day, Delta Electricity shifted as much as 1 500 MW of capacity to prices of less than zero across its portfolio. The rebid reasons given included “Line constraints::ROC DN change/Band shift”, “Constraint management::Band shift”, “Line constraint::ROC change” and “Line constraints::Band shift/ROC change”.

Macquarie Generation rebid just under 1 500 MW of capacity to prices of less than zero. The rebid reason given was “constraint management”. Later, at 5.57pm, 400MW of capacity was shifted from prices of less than zero to prices around \$8 000/MWh. The rebid reason given was “RP/Volume tradeoff – network constraints”.

There was no other significant rebidding.

#### Thursday, 3 November

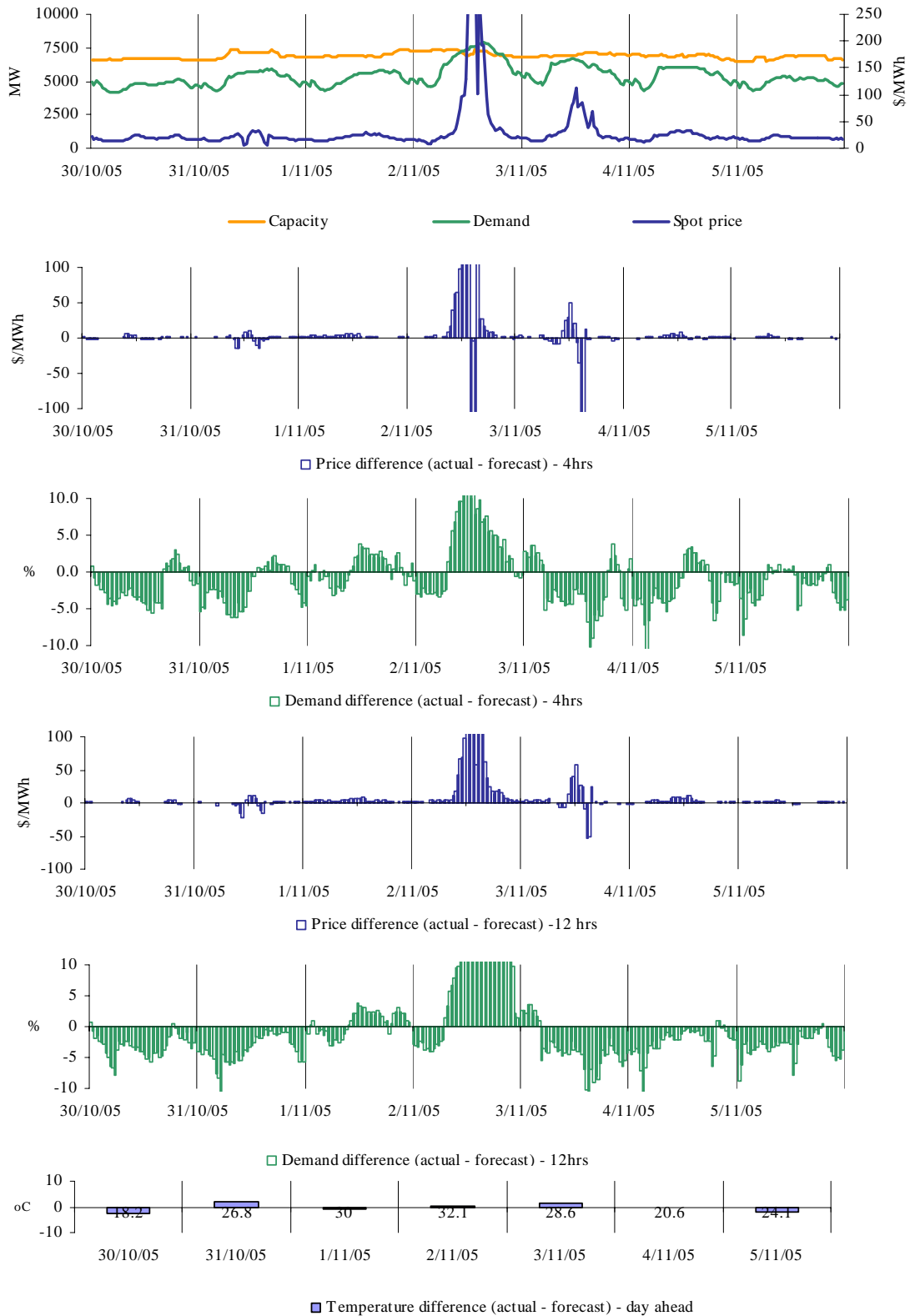
| <b>2:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
|-------------------------|---------------|----------------------|-----------------------|
| Price (\$/MWh)          | 201.07        | 97.72                | 67.31                 |
| Demand (MW)             | 10 885        | 10 585               | 10 445                |
| Available capacity (MW) | 9 168         | 9 763                | 9 693                 |
| <b>2:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 273.07        | 106.21               | 78.10                 |
| Demand (MW)             | 10 859        | 10 623               | 10 604                |
| Available capacity (MW) | 9 418         | 9 553                | 9 693                 |
| <b>3:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 292.89        | 273.00               | 245.00                |
| Demand (MW)             | 10 909        | 10 645               | 10 616                |
| Available capacity (MW) | 9 418         | 9 463                | 9 693                 |
| <b>3:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 441.61        | 309.60               | 245.00                |
| Demand (MW)             | 10 949        | 10 681               | 10 641                |
| Available capacity (MW) | 9 388         | 9 443                | 9 693                 |

Conditions at the time saw demand as much as 300MW higher than forecast four hours to dispatch. Flows from Victoria along the Victoria to Snowy interconnector were constrained by discretionary constraints to prevent negative settlements accruing across the interconnector. Flows north were limited to between 250 MW and 350 MW between 2.15pm and 4pm.

Over two rebids, at 10.06am and 12.38pm, Macquarie Generation rebid a total of 345 MW of capacity from prices of less than \$15/MWh to prices above \$250/MWh. The rebid reasons given were “Poor mill performance”, “RP/volume tradeoff – load expected to vary from forecast”. These rebids included reductions in availability, totalling 400MW across the portfolio.

There was no other significant rebidding.

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



There were 9 occasions in Victoria where the spot price was greater than three times the weekly average price of \$35/MWh. These occurred between midday and 4pm on Wednesday, and at 12.30pm on Thursday.

### Wednesday, 2 November

|                         |               |                      |                       |
|-------------------------|---------------|----------------------|-----------------------|
| <b>12:00 pm</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 128.06        | 29.30                | 30.93                 |
| Demand (MW)             | 7 378         | 6 418                | 6 519                 |
| Available capacity (MW) | 6 967         | 7 355                | 7 522                 |
| <b>12:30 pm</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 321.02        | 35.21                | 33.90                 |
| Demand (MW)             | 7 403         | 6 666                | 6 574                 |
| Available capacity (MW) | 6 925         | 7 355                | 7 522                 |
| <b>1:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 317.16        | 35.41                | 34.28                 |
| Demand (MW)             | 7 546         | 6 705                | 6 652                 |
| Available capacity (MW) | 7 018         | 7 355                | 7 522                 |
| <b>1:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 810.23        | 66.15                | 41.10                 |
| Demand (MW)             | 7 580         | 6 990                | 6 645                 |
| Available capacity (MW) | 6 998         | 7 353                | 7 522                 |
| <b>2:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 395.18        | 65.80                | 43.15                 |
| Demand (MW)             | 7 611         | 6 952                | 6 697                 |
| Available capacity (MW) | 7 316         | 7 348                | 7 512                 |
| <b>3:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 287.99        | 291.81               | 43.16                 |
| Demand (MW)             | 7 773         | 7 243                | 6 713                 |
| Available capacity (MW) | 7 256         | 7 202                | 7 512                 |
| <b>3:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 191.99        | 295.73               | 43.40                 |
| Demand (MW)             | 7 842         | 7 285                | 6 741                 |
| Available capacity (MW) | 7 280         | 7 236                | 7 512                 |
| <b>4:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 192.76        | 75.45                | 35.05                 |
| Demand (MW)             | 7 907         | 7 311                | 6 751                 |
| Available capacity (MW) | 7 282         | 7 235                | 7 497                 |

Warm weather saw demand in Victoria approach 8 000 MW, the highest since January this year. Actual demand was at least 500 MW and as much as 960 MW higher than forecast four hours to dispatch. At the same time, available capacity fell throughout the afternoon. Plant problems at Hazelwood and Yallourn contributed to the reduction.

Fuel limitations across Hazelwood power station saw the available capacity reduce by as much as 380MW over the course of the day. The rebid reasons given included firing and draft limits and fuel limitation. All of this capacity had been priced at less than \$20/MWh.

At 10.20am, Yallourn Energy reduced the available capacity of unit 2 by 160MW, or almost half. The reason given was a tube leak. Shortly after, at 11am, 50 MW of this capacity was returned. This net reduction was in part offset by increases in the output of unit one, although precipitator and temperature limits restricted the unit to around 300MW. At 4.40pm unit 2 was shutdown until the following Saturday, leaving the station with only 2 of its four units available.

At 10.58am LYMMCO rebid 100MW of capacity at Loy Yang A from prices less than \$20/MWh to just over \$1000/MWh, effective from midday. As a result, the station output was reduced by around 85MW until 4pm. The reason given “Material change in PD at 10.31am.”

A planned network outage between Lower Tumut and Murray at times restricted imports into Victoria during this period. The reductions in capacity and import were replaced by generation at Jeeralang, Bairnsdale, Southern Hydro and Somerton and imports from South Australia.

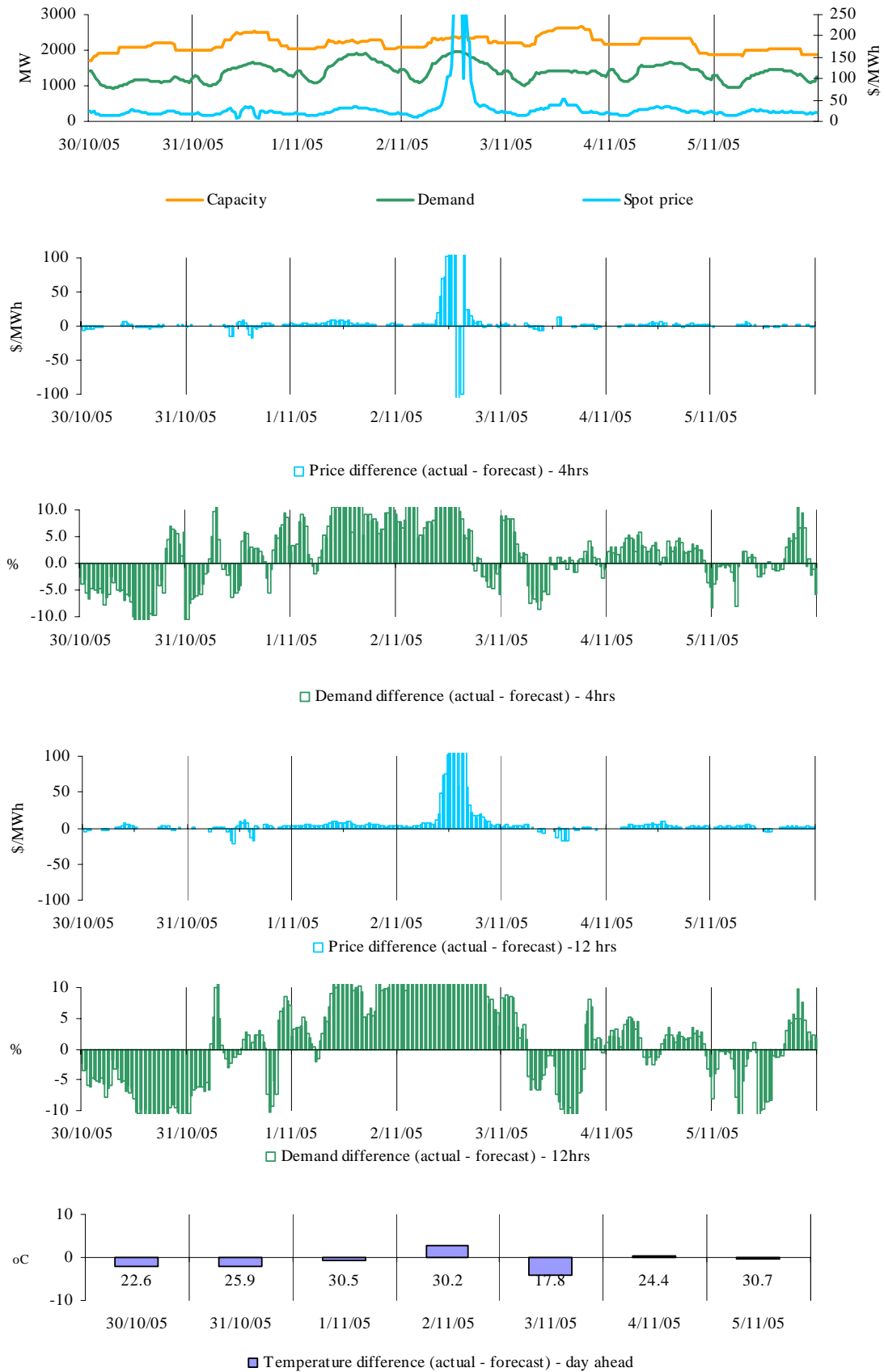
There was no other significant rebidding.

#### **Thursday, 3 November**

| <b>12:30 pm</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
|-------------------------|---------------|----------------------|-----------------------|
| Price (\$/MWh)          | 113.58        | 63.09                | 55.75                 |
| Demand (MW)             | 6 640         | 6 838                | 6 868                 |
| Available capacity (MW) | 6 944         | 7 011                | 7 262                 |

Conditions at the time saw demand 200MW higher than forecasts four hours to dispatch. At 10.57am, LYMMCO rebid 100MW of capacity at Loy Yang A from prices less than \$20/MWh to around \$250/MWh. The rebid reason given was “Material change in PD at 10.31am”. There was no other significant rebidding.

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



There were 9 occasions in South Australia where the spot price was greater than three times the weekly average price of \$35/MWh. These occurred between 11.30am and 4pm on Wednesday.

### Wednesday, 2 November

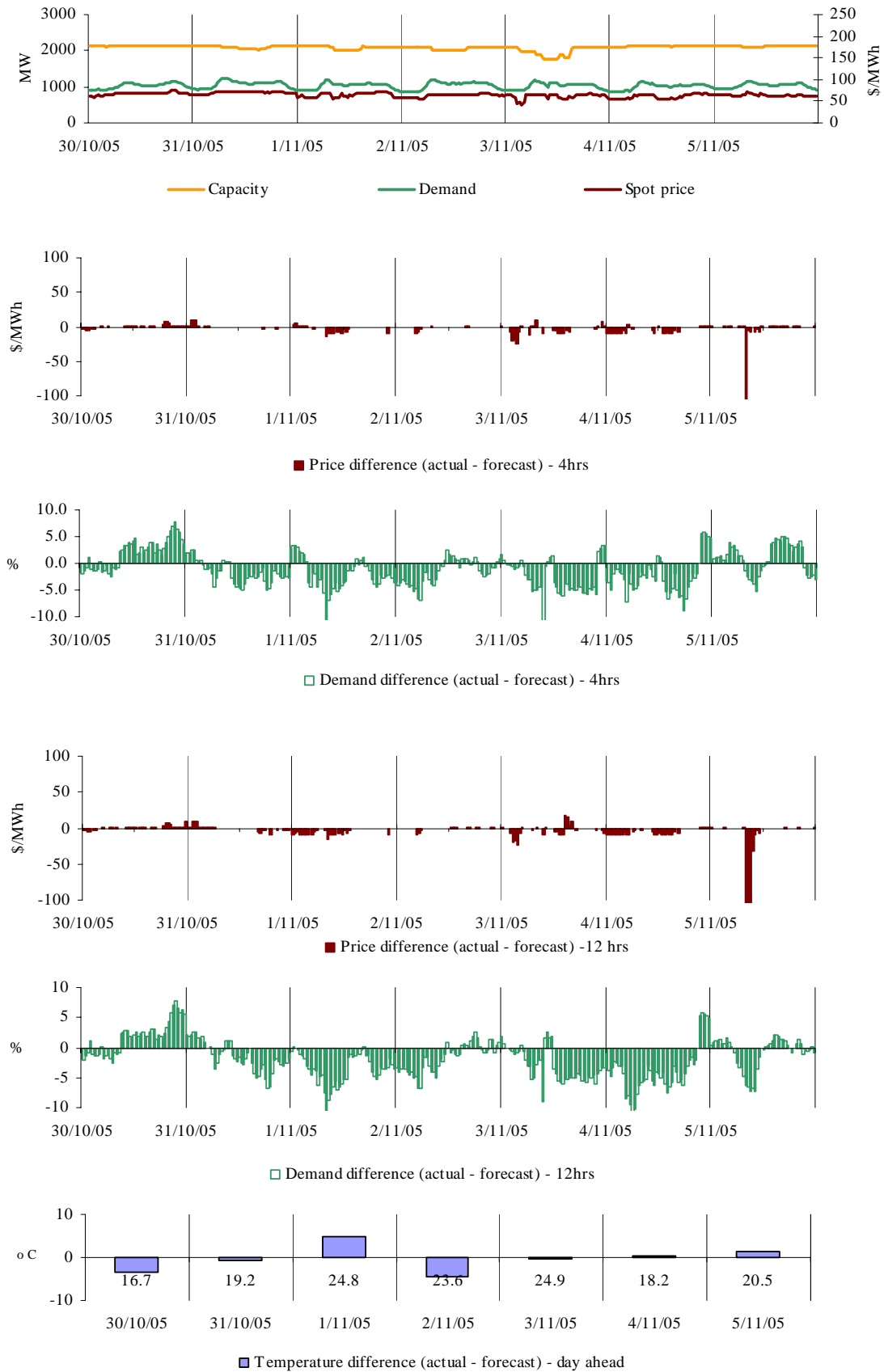
| <b>11:30 am</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
|-------------------------|---------------|----------------------|-----------------------|
| Price (\$/MWh)          | 106.58        | 35.87                | 31.07                 |
| Demand (MW)             | 1 921         | 1 614                | 1 473                 |
| Available capacity (MW) | 2 317         | 2 349                | 2 353                 |
| <b>12:00 pm</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 132.25        | 31.00                | 31.10                 |
| Demand (MW)             | 1 917         | 1 623                | 1 481                 |
| Available capacity (MW) | 2 367         | 2 559                | 2 353                 |
| <b>12:30 pm</b>         | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 328.20        | 36.88                | 34.28                 |
| Demand (MW)             | 1 938         | 1 628                | 1 496                 |
| Available capacity (MW) | 2 373         | 2 559                | 2 353                 |
| <b>1:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 319.26        | 37.28                | 34.49                 |
| Demand (MW)             | 1 940         | 1 646                | 1 485                 |
| Available capacity (MW) | 2 367         | 2 559                | 2 353                 |
| <b>1:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 822.27        | 65.51                | 40.69                 |
| Demand (MW)             | 1 939         | 1 658                | 1 574                 |
| Available capacity (MW) | 2 343         | 2 559                | 2 353                 |
| <b>2:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 400.97        | 65.17                | 42.94                 |
| Demand (MW)             | 1 944         | 1 622                | 1 583                 |
| Available capacity (MW) | 2 355         | 2 336                | 2 353                 |
| <b>3:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 289.53        | 292.00               | 42.74                 |
| Demand (MW)             | 1 903         | 1 717                | 1 573                 |
| Available capacity (MW) | 2 360         | 2 363                | 2 353                 |
| <b>3:30 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 190.40        | 291.44               | 42.98                 |
| Demand (MW)             | 1 867         | 1 709                | 1 569                 |
| Available capacity (MW) | 2 358         | 2 341                | 2 353                 |
| <b>4:00 pm</b>          | <b>Actual</b> | <b>4 hr forecast</b> | <b>12 hr forecast</b> |
| Price (\$/MWh)          | 186.25        | 72.83                | 36.05                 |
| Demand (MW)             | 1 827         | 1 730                | 1 559                 |
| Available capacity (MW) | 2 344         | 2 362                | 2 353                 |

Conditions at the time saw demand as much as 300MW higher than forecast, four hours to dispatch. The warmer weather saw actual demand reach 1 950MW, more than 400MW higher than the average maximum demand during the previous week. Prices were aligned with those in Victoria with exports as high as 200MW during the afternoon.

Additional capacity at Angaston, Mintaro, Dry Creek and Hallet was committed throughout the day. There was no other significant rebidding.

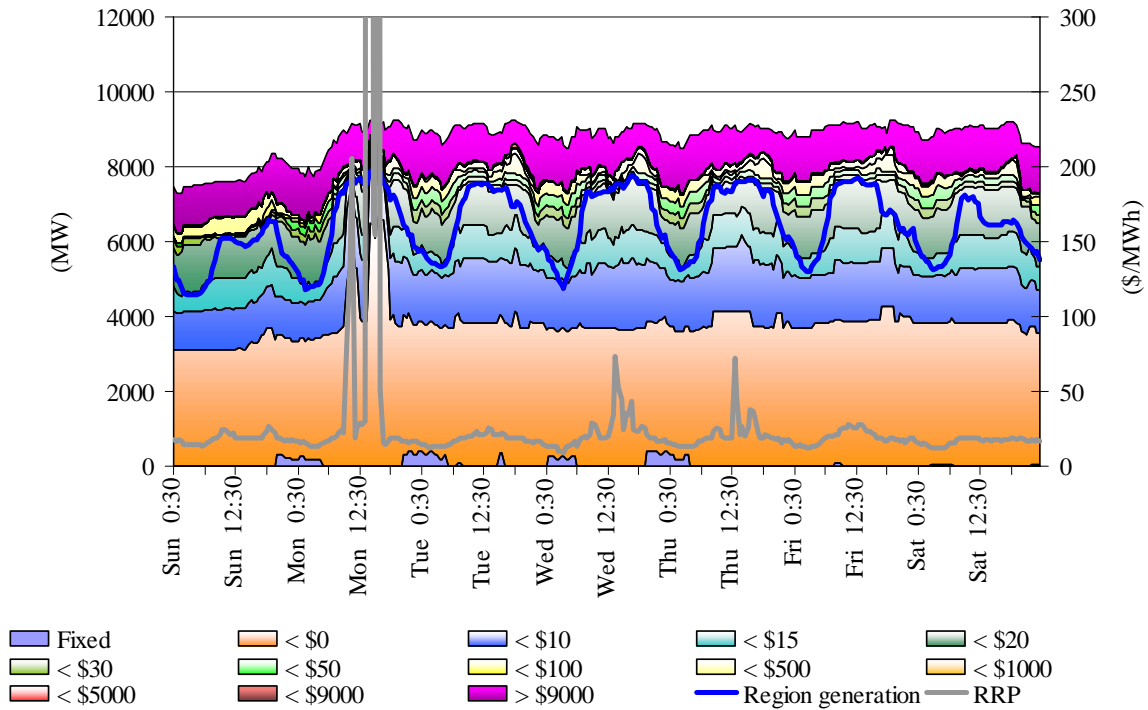


**Figures 45-50: Tasmania actual spot price, demand and forecast differences**

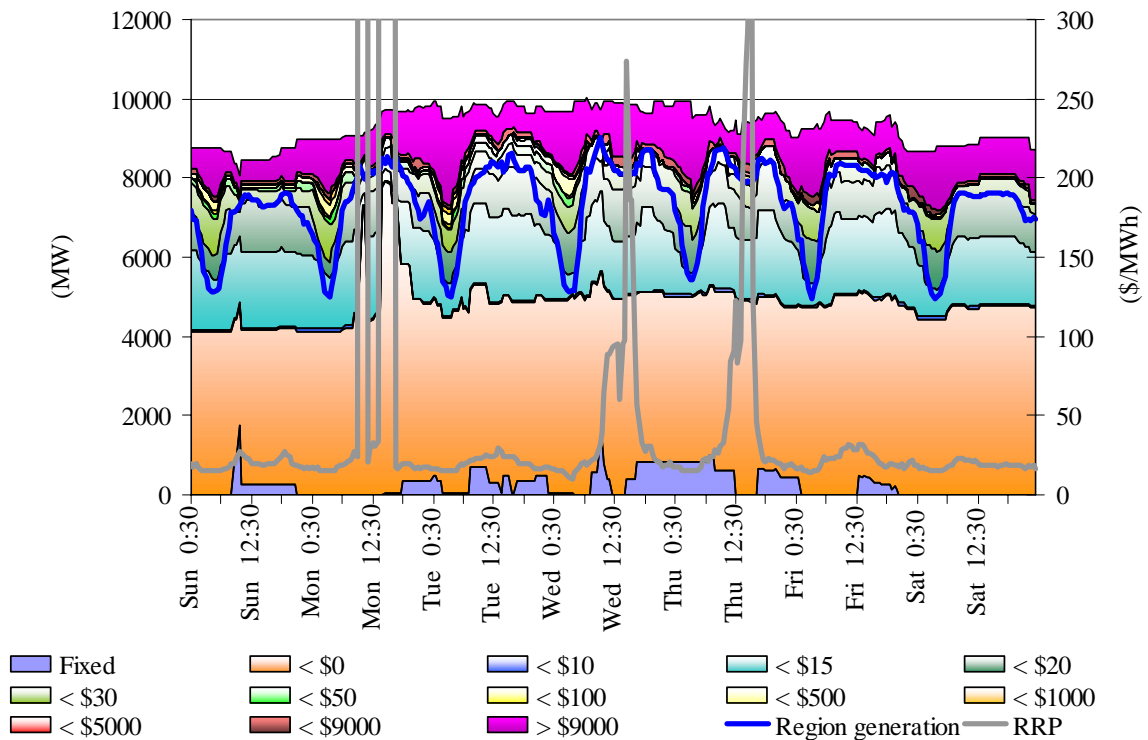


There were no occasions in Tasmania where the spot price was greater than three times the weekly average price of \$65/MWh.

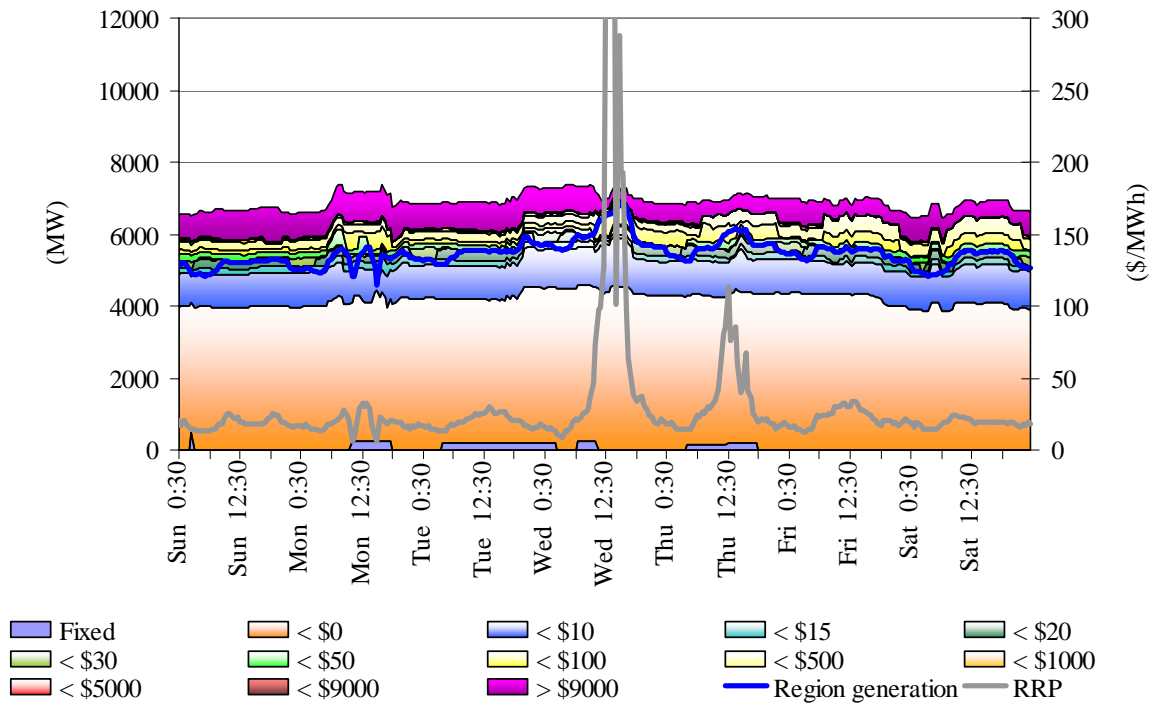
**Figure 51: Queensland closing bid prices, dispatched generation and spot price**



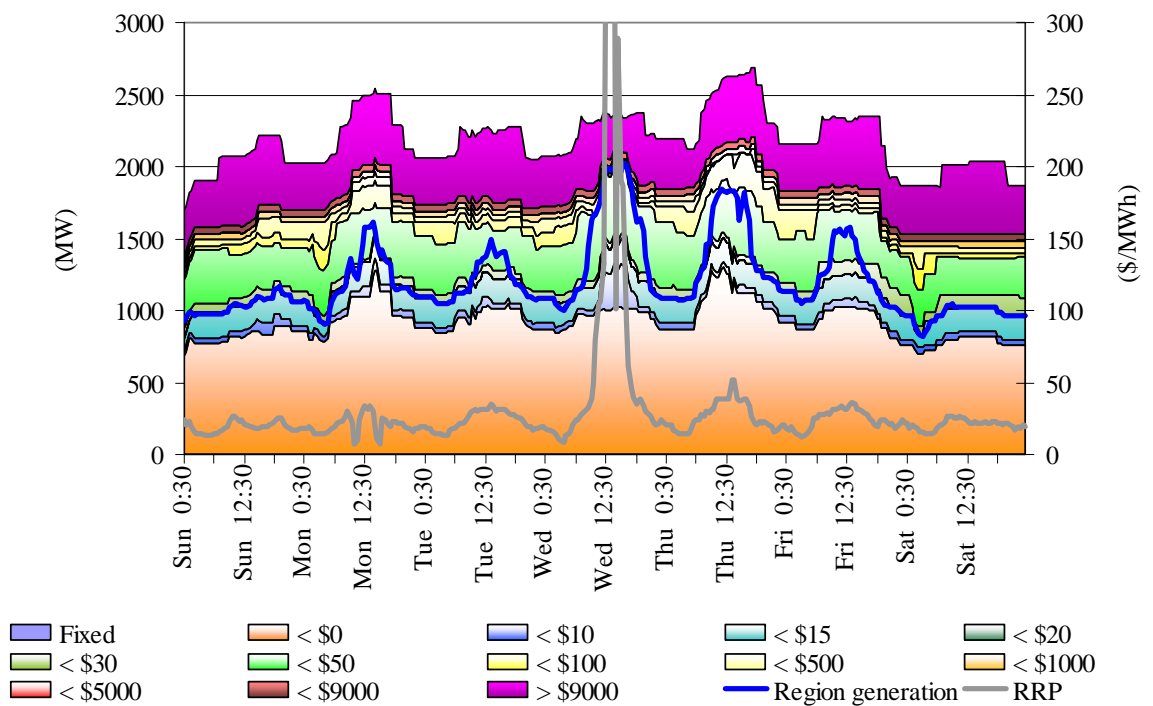
**Figure 52: New South Wales closing bid prices, dispatched generation and spot price**



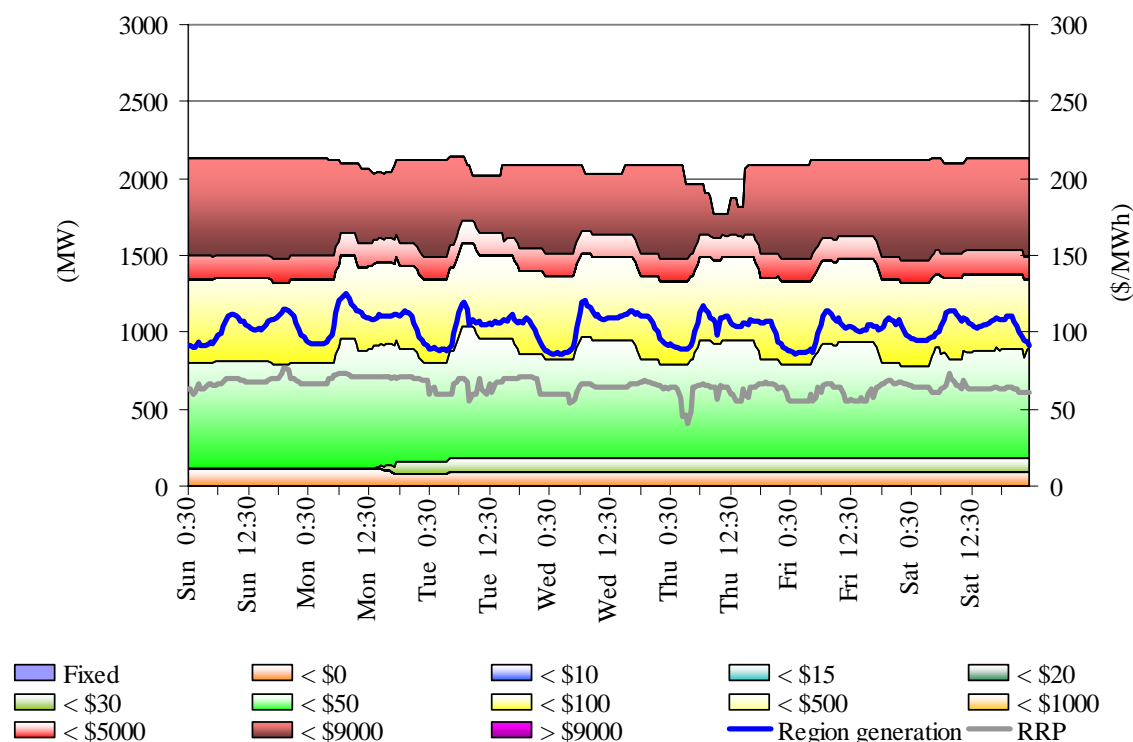
**Figure 53: Victoria closing bid prices, dispatched generation and spot price**



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



**Figure 55: 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 around \$310 000 or 0.1 per cent of the total turnover in the energy market. An unplanned network outage on Wednesday led to an increased requirement for lower contingency services. There was no significant impact on price. 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 |
|------------------------------|-------------|--------------|-------------|-----------|-------------|--------------|-------------|-----------|
| <b>Last week</b>             | 1.41        | 0.70         | 1.14        | 1.13      | 0.26        | 0.31         | 1.74        | 2.29      |
| <b>Previous week</b>         | 1.57        | 0.68         | 1.47        | 1.65      | 0.44        | 2.28         | 5.31        | 1.70      |
| <b>Last quarter</b>          | 1.62        | 0.91         | 1.00        | 1.36      | 0.20        | 0.64         | 2.29        | 1.56      |
| <b>Market Cost (\$1000s)</b> | 74          | 37           | 78          | 25        | 2           | 3            | 43          | 50        |
| <b>% of energy market</b>    | 0.02        | 0.01         | 0.03        | 0.01      | 0.00        | 0.00         | 0.01        | 0.02      |

The total cost of ancillary services in Tasmania for the week was around \$120 000 or 1 per cent of the total turnover in the energy market in Tasmania. At times on Tuesday and Thursday, despatch for raise and lower regulation was zero as a result of a failure of the SCADA system. The price for these services reached \$10 000/MWh at the time. This had no impact on the cost of these services for the week. Figure 57 summarises the volume weighted average prices and costs for the eight frequency control ancillary services across Tasmania.

**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 |
|------------------------------|-------------|--------------|-------------|-----------|-------------|--------------|-------------|-----------|
| <b>Last week</b>             | 1.10        | 1.05         | 1.05        | 1.05      | 1.11        | 1.05         | 1.06        | 1.06      |
| <b>Previous week</b>         | 3.42        | 1.05         | 1.05        | 1.05      | 4.76        | 1.05         | 1.10        | 2.63      |
| <b>Last quarter</b>          | 19.40       | 1.05         | 1.14        | 2.25      | 6.25        | 1.06         | 1.06        | 1.26      |
| <b>Market Cost (\$1000s)</b> | 9           | 10           | 9           | 9         | 15          | 32           | 26          | 9         |
| <b>% of energy market</b>    | 0.08        | 0.08         | 0.08        | 0.08      | 0.13        | 0.28         | 0.23        | 0.08      |

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

**Figure 58: daily frequency control ancillary service costs**

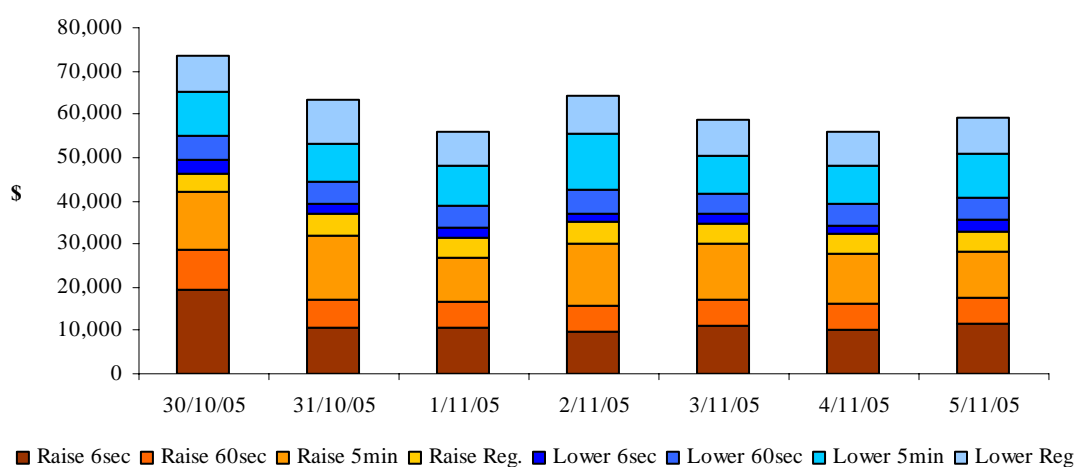
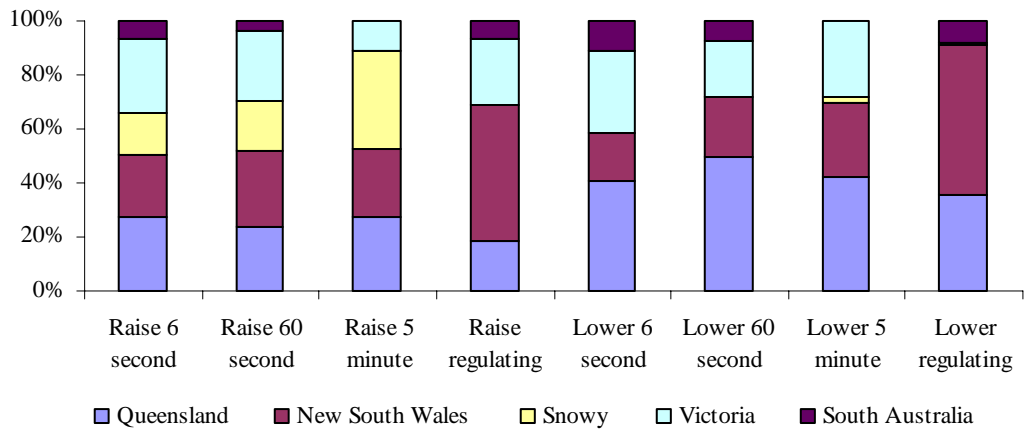


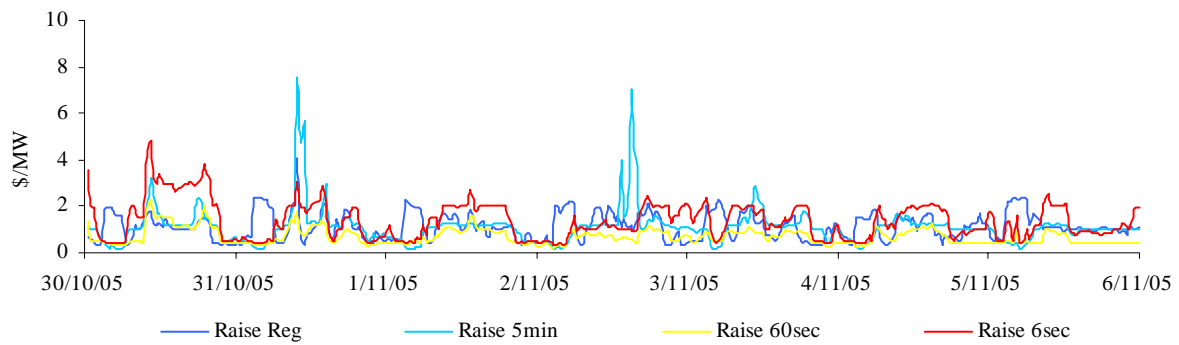
Figure 59 shows the regional weekly participation in each of the ancillary service markets on the mainland.

**Figure 59: regional participation in ancillary services on the mainland**

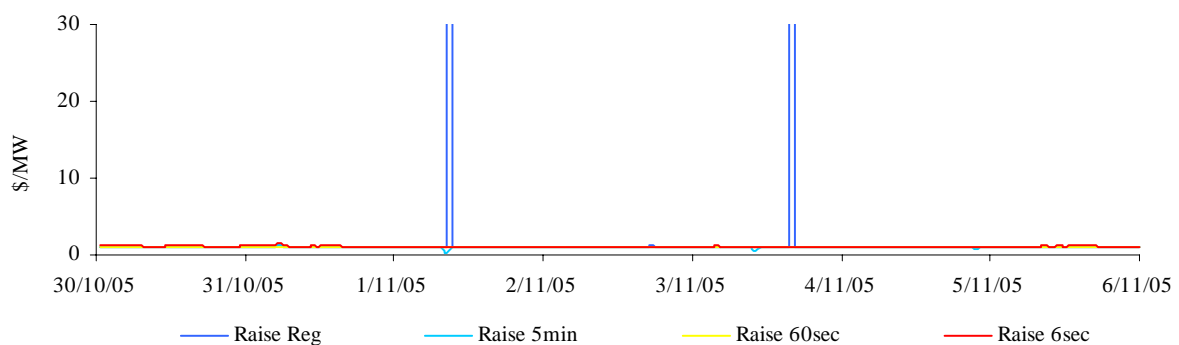


Figures 60 and 61 show 30-minute prices for each of the ancillary services.

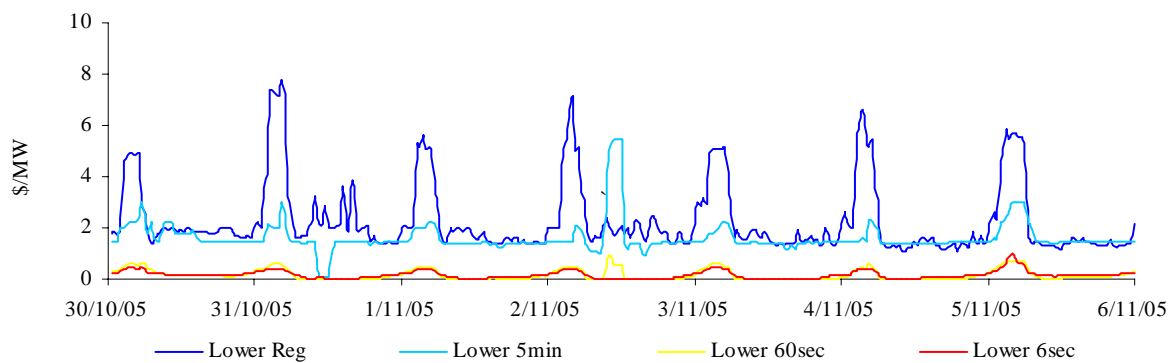
**Figure 60: prices for raise services**



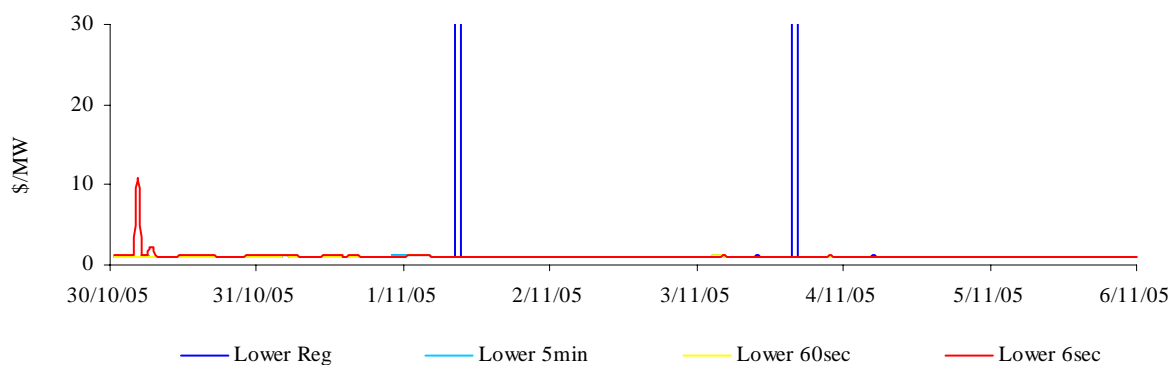
**Figure 60A: prices for raise services - Tasmania**



**Figure 61: prices for lower services**

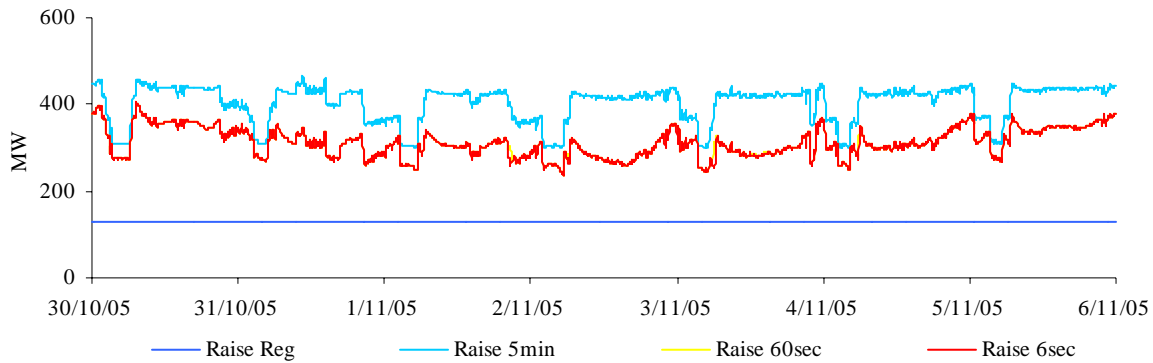


**Figure 61A: prices for lower services - Tasmania**

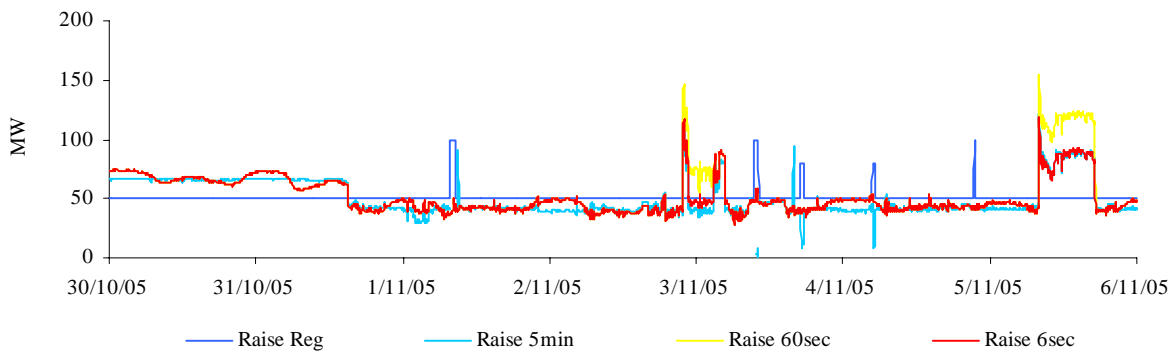


Figures 62 and 63 present for both raise and lower services the requirement for each service over the week.

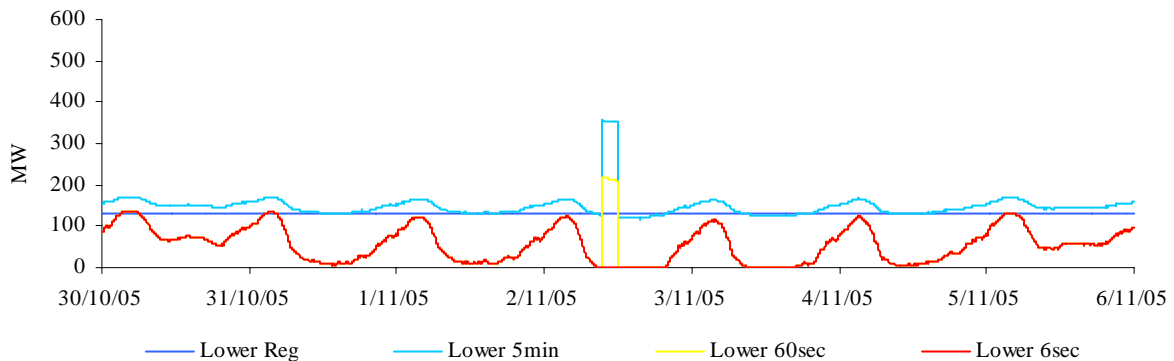
**Figure 62: raise requirements**



**Figure 62A: raise requirements - Tasmania**



**Figure 63: lower requirements**



**Figure 63A: lower requirements - Tasmania**

