

Electricity spot prices above $5000/MWh

Queensland, 12 February 2017

17 May 2017

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# Obligation

The Australian Energy Regulator regulates energy markets and networks under national legislation and rules in eastern and southern Australia, as well as networks in the Northern Territory. Its functions include:

* monitoring wholesale electricity and gas markets to ensure energy businesses comply with the legislation and rules, and taking enforcement action where necessary;
* setting the amount of revenue that network businesses can recover from customers for using networks (electricity poles and wires and gas pipelines) that transport energy;
* regulating retail energy markets in Queensland, New South Wales, South Australia, Tasmania (electricity only), and the ACT;
* operating the Energy Made Easy website, which provides a retail price comparator and other information for energy consumers;
* publishing information on energy markets, including the annual State of the energy market report, to assist participants and the wider community.

The AER is required to publish a report whenever the electricity spot price exceeds $5000/MWh in accordance with clause 3.13.7 (d) the National Electricity Rules.

The report:

* describes the significant factors contributing to the spot price exceeding $5000/MWh, including withdrawal of generation capacity and network availability;
* assesses whether rebidding contributed to the spot price exceeding $5000/MWh;
* identifies the marginal scheduled generating units; and
* identifies all units with offers for the trading interval equal to or greater than $5000/MWh and compares these dispatch offers to relevant dispatch offers in previous trading intervals.

These reports are designed to examine market events and circumstances that contributed to wholesale market price outcomes and are not an indicator of potential enforcement action.

# Summary

On Sunday 12 February 2017 at 5.30 pm the spot price in Queensland reached $9005/MWh. Prices were volatile on the day with 11 dispatch intervals priced $13 000/MWh and above between 4.30 pm and 7.30 pm, leading to a number of spot prices greater than $2000/MWh.

The day was characterised by extremely hot weather in Queensland. The maximum temperature in Brisbane was 37.6 degrees and maximum temperature records were broken in several parts of the state. This led to record demand for electricity in Queensland. This was particularly unusual given 12 February was a Sunday, which typically means lower non-residential demand for electricity.

Supply from neighbouring regions was limited due to network limitations. This, coupled with a significant unexpected reduction in low priced local Queensland supply from around 4 pm, meant that high priced local Queensland supply was needed to meet demand.

Rebidding from low to high prices did not contribute to the high priced outcomes.

# Analysis

The Australian Energy Market Operator (AEMO) makes regular assessments of expected demand for electricity in each region, based on inputs including forecast temperature, season and the day of the week. AEMO issues “targets” to generators to generate electricity to meet this demand, taking into account network capability and generator offers. Generator offers comprise the mega-watt (MW) capacities generators are willing to supply at a price and the amount the generator can generate in total (generator availability).

To inform market participants about market conditions, AEMO publishes price, network capability and demand forecasts in five minute and 30 minute timeframes, updated every five minutes. These forecasts form the basis for AEMO’s assessments of interconnector capacity, transfers between regions, reserves and conditions that relate to power system security.

The following sections examine why the high spot prices occurred.

## Overview of actual and expected conditions

From 4.35 pm to 7.05 pm the 5-minute dispatch price reached or exceeded $13 000/MWh on 11 occasions.

Table 1 shows actual and expected spot prices, demand for and local generator supply (availability) of, electricity for Queensland for the trading interval when the spot price exceeded $5000/MWh as well as trading intervals which breached our weekly reporting threshold (above three times greater than the volume weighted average price and $250/MWh). Demand and supply conditions are discussed in detail in section 3.2.

Table 1 shows:

* 12 hours ahead of the high price event, the spot price was expected to exceed $5000/MWh for the 5 pm to 7.30 pm trading intervals inclusive.
* Four hours ahead of the high price event, spot prices were expected to be $290/MWh. This was due to rebidding of capacity from high to low prices, as explained in detail in section 3.3.
* The actual spot price at 5.30 pm was significantly high than forecast four hours ahead. Within four hours of the 5.30 pm trading interval, around 635 MW of low-price supply was withdrawn by Queensland generators for technical plant reasons (see Table 3).

Table 1: Actual and forecast spot price, demand and available capacity

| Trading interval | Price ($/MWh) | | | Demand (MW) | | | Generator Availability (MW) | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Actual | 4 hr forecast | 12 hr forecast | Actual | 4 hr forecast | 12 hr forecast | Actual | 4 hr forecast | 12 hr forecast |
| 5 pm | 2336 | 322 | 13 400 | 9260 | 9261 | 8987 | 10 034 | 10 616 | 10 711 |
| **5.30 pm** | **9005** | **290** | **12** **000** | **9369** | **9266** | **8950** | **9880** | **10** **631** | **10** **726** |
| 6 pm | 4622 | 290 | 12 000 | 9296 | 9184 | 8977 | 9812 | 10 617 | 10 762 |
| 6.30 pm | 2259 | 290 | 12 000 | 9229 | 9113 | 9036 | 9828 | 10622 | 10817 |
| 7 pm | 4552 | 290 | 12 000 | 9233 | 9226 | 9159 | 9842 | 10627 | 10802 |
| 7.30 pm | 2262 | 290 | 13 400 | 9233 | 9216 | 9312 | 9917 | 10661 | 10870 |

## Supply and Demand

Participants determine the amount of electricity or capacity (MW) they offer and the price they are prepared to receive ($/MWh) in ten price and quantity (MW) pairs. AEMO aggregates these offers from lowest to highest price to meet forecast regional demand for electricity. Every five minutes AEMO “dispatches” generation in ascending price order, taking into account network transfer capability.

The highest priced offer to supply electricity needed to meet demand sets the 5-minute dispatch price. The spot price paid to generators is the average dispatch price over 30 minutes; all dispatched generators are paid at this price, regardless of how they bid.

The following sections analyse supply and demand conditions relevant to the high prices.

### Supply

This section examines the supply side factors that contributed to the high price outcomes; reductions in supply, generator offers and network availability.

#### Loss of available capacity

Table 2 shows that almost 790 MW of supply from local generators was withdrawn within four hours of the 5.30 trading interval, all for technical plant reasons. Of this, 151 MW was priced above $5000/MWh, and 636 MW was priced below $5000/MWh. This reduction in low-price capacity was one of the main reasons why the spot price exceeded $5000/MWh.

Table 2: Capacity withdrawn within four hours of the 5.30 pm trading interval

| Participant | Capacity priced below $5000/MWh (MW) | Capacity priced at or above $5000/MWh (MW) | Rebid Reasons | Total MW |
| --- | --- | --- | --- | --- |
| CS Energy | 85 | 10 | Over nine rebids, technical issues and condenser limits | 95 |
| Origin | 28 |  | Over four rebids, change in ambient conditions and backpressure limitation | 28 |
| Millmerran | 60 |  | Over two rebids, condensate polisher inlet temperature | 60 |
| Arrow Energy | 148 |  | Over one rebid, delayed return to service | 148 |
| Stanwell | 315 | 141 | Over 11 rebids, emissions and condenser vacuum limits | 456 |
| **Total** | **636** | **151** |  | **787** |

The reduction in local Queensland supply was such that the market operator, AEMO determined that there was a shortfall in spare local supply, and notified the market through Market Notice No. 57473, declaring an actual Lack of Reserve (LOR) 2 condition. See Appendix C for an explanation of LOR.

#### Generator offers

Figure 1 shows the cumulative offers for Queensland generators at the time of dispatch. Also known as closing bids, the figure shows the capacity offered by generators in Queensland, including revisions to their offers (known as “rebidding”) throughout the day to adjust for changes in their financial and/or physical positions. To put the figure in context, installed (summer) capacity in Queensland is around 11 500 MW. The 5-minute dispatch price (purple line), local demand (blue line) and local generation output dispatch (“dispatch”, orange line) are also shown on Figure 1.

Figure 1: Closing bids, dispatch prices, dispatch and demand



As shown in Table 2, over 650 MW of low priced capacity became unavailable four hours before the 5.30 pm trading interval. A significant proportion of this capacity became unavailable within an hour of the commencement of the 5.30 pm trading interval. This is reflected by the descending slope at the top of the stack.

The large increase in the bottom green area from 4.30 pm onwards reflects the rebidding of capacity into lower prices. The dispatch price varies significantly because demand for electricity (blue line) is close to the boundary between price bands below $5000/MWh and above $5000/MWh. Almost all demand was met by local generation, as depicted by the absence of space between the dispatch and demand lines.

Appendix B details the generators setting the price during the high-price period.

The closing bids for all participants in Queensland with capacity priced at or above $5000/MWh for the high-price periods are set out in Appendix E.

#### Network Availability

Electricity is transferred between National Electricity Market (NEM) regions via high voltage interconnectors. Queensland is connected to the rest of the NEM via two interconnectors connected to New South Wales: the Queensland – New South Wales Interconnector (QNI) and Terranora. These interconnectors have a combined nominal import limit of around 600 MW.

Import and export limits control the maximum amount of electricity that can flow between regions. AEMO manages network outages using constraints to ensure that system security is maintained. Constraints are mathematical equations that determine the optimal output of generators based on their offers to manage or “limit” flows on specific transmission lines (including interconnectors) for each five minute interval.

Net flows into Queensland across the QNI and Terranora interconnectors were limited to around 40 MW during the 5.30 pm trading interval. Electricity flows from New South Wales into Queensland on QNI were limited to around 170 MW, due to a “system normal” constraint designed to manage voltage stability in north eastern New South Wales. System normal constraints are always present in the market, but vary in their effect on market outcomes, for various reasons.

The long term planned outage of the Coffs Harbour to Koolkhan 132kV line was still in effect. To manage this outage, AEMO invoked a constraint to prevent the Armidale to Koolkhan line being overloaded in the event of the failure of the Coffs Harbour to Lismore line. As a result, electricity was forced out of Queensland and into northern New South Wales across the Terranora interconnector by about 130 MW.

Table 3 shows Interconnector net flows were at or close to their import limit, meaning the reduction in local Queensland supply could not be sourced from neighbouring regions.

Table 3: Actual and forecast network capability

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Trading interval | Imports (MW) | | | Import limit (MW) | | |
|  | Actual | 4 hr forecast | 12 hr forecast | Actual | 4 hr forecast | 12 hr forecast |
| 5 pm | -28 | -116 | 120 | 22 | -12 | 120 |
| 5.30 pm | 41 | -8 | 100 | 41 | -8 | 100 |
| 6 pm | 32 | 17 | 101 | 34 | 17 | 101 |
| 6.30 pm | -5 | 51 | 103 | 37 | 51 | 103 |
| 7 pm | 47 | 71 | 111 | 59 | 71 | 111 |
| 7.30 pm | 78 | 154 | 193 | 105 | 154 | 193 |

#### Demand

On 12 February the temperature reached a top of 37.6 degrees in Brisbane, following on from 37 degrees the previous day. This was almost eight degrees above the February average maximum - maximum temperature records were broken in several parts of the state.

These extreme temperatures led to record “total demand” in Queensland, reaching 9369 MW at 5.30 pm. Total demand is one of a number of measures of demand used by the market operator, and is the measure of demand AEMO uses to determine price and the level of local supply required.[[1]](#footnote-1) The fact that the extreme level of demand was reached on a Sunday is unusual, given the typically lower levels of commercial industrial load on weekends and schools being closed.

Figure 2 shows that actual demand for electricity (solid red line) was somewhat higher than AEMO’s forecast 12 hours in advance (dotted red line) of the 5.30 pm trading interval, but only slightly higher than forecast four hours in advance (dashed red line). Previous record demand of 9357 MW is also shown (dotted red line with crosses).

Figure 2: Actual and forecast total demand



## Differences in forecast prices

Table 4 shows, for the 5.30 pm trading interval, actual and forecast demand for electricity, the volume of local Queensland supply priced below $5000/MWh and spot price.

Table 4: Actual and forecast demand, spot price and capacity below $5000/MWh for 5.30 pm

|  | Actual | 4 hr forecast | 12 hr forecast |
| --- | --- | --- | --- |
| Demand (MW) | 9369 | 9266 | 8950 |
| Capacity priced <$5000/MWh | 9307 | 9728 | 8536 |
| Spot price ($/MWh) | 9005 | 290 | 12 000 |

Table 4 shows that actual demand and demand forecast 12 hours in advance was above local supply priced below $5000/MWh, corresponding to high price outcomes. From 12 hours in advance to four hours in advance of the 5.30 pm trading interval, around 1200 MW of local supply was shifted from high prices to prices below $5000/MWh. Even though expected demand for electricity increased by around 300 MW, in this case low priced capacity exceeded forecast demand for electricity, and the forecast price fell to $290/MWh.

The actual spot price was much higher than the four hour ahead expectation because a significant volume of low-price local Queensland supply became unavailable, as discussed in section 3.2.1.1.

Australian Energy Regulator

May 2017

Appendix A: Significant Rebids

The rebidding tables highlight the relevant rebids submitted by generators that impacted on market outcomes during the time of high prices. It details the time the rebid was submitted and used by the dispatch process, the capacity involved, the change in the price of the capacity was being offered and the rebid reason.

Significant rebids for 5.30 pm

| Submit time | Time effective | Participant | Station | Capacity rebid  (MW) | | Price from  ($/MWh) | | Price to  ($/MWh) | | Rebid Reason |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1.04 pm |  | CS Energy | Kogan Creek | -10 | 14 | | N/A | | 1304P AMBIENT CONDITIONS-SL | |
| 1.43 pm |  | CS Energy | Callide B | -10 | 17 | | N/A | | 1343P CONDENSER VACUUM LIMITS-SL | |
| 1.56 pm |  | CS Energy | Callide B | -10 | 17 | | N/A | | 1356P CONDENSER VACUUM LIMITS-SL | |
| 2.00 pm |  | Arrow Energy | Braemar 2 | 10 | 14 000 | | 199 | | 1400P AMBIENT CONDITIONS: ADJUST BID FOR PREVAILING CONDITIONS SL | |
| 2.17 pm |  | Origin Energy | Darling Downs | -10 | -1 | | N/A | | 1415P CHANGE IN AVAIL - BACKPRESSURE LIMITATION SL | |
| 2.44 pm |  | CS Energy | Callide B | -20 | 17 | | N/A | | 1443P CONDENSER VACUUM LIMITS-SL | |
| 2.53 pm |  | CS Energy | Callide B | -10 | 17 | | N/A | | 1453P CONDENSER VACUUM LIMITS-SL | |
| 2.57 pm |  | Millmerran Energy Trader | Millmerran | -30 | -1000 | | N/A | | 14:57 P: CONDENSATE POLISHER INLET TEMPERATURE | |
| 3.01 pm |  | Millmerran Energy Trader | Millmerran | -30 | -1000 | | N/A | | 15:01 P: CONDENSATE POLISHER INLET TEMPERATURE | |
| 3.30 pm |  | CS Energy | Kogan Creek | -10 | 14 | | N/A | | 1530P AMBIENT CONDITIONS-SL | |
| 3.44 pm |  | Arrow Energy | Braemar 2 | -148 | <2150 | | N/A | | 1544P REVISED OUTAGE SCHEDULE: DELAYED RTS SL | |
| 3.56 pm |  | Origin Energy | Darling Downs | -10 | -1 | | N/A | | 1555P CHANGE IN AVAIL - AMBIENT CONDITIONS SL | |
| 4.10 pm |  | Stanwell Corporation | Stanwell | -80 | >299 | | N/A | | 1606P SPS3 AND SPS4 CONDENSER VACUUM LIMITATION; PREVENT UNIT RUNBACK; MOVE DISPATCH TO TPS UNITS; SL | |
| 4.10 pm |  | Stanwell Corporation | Tarong | 60 | 14 000 | | 299 | | 1606P SPS3 AND SPS4 CONDENSER VACUUM LIMITATION; PREVENT UNIT RUNBACK; MOVE DISPATCH TO TPS UNITS; SL | |
| 4.24 pm |  | Stanwell Corporation | Tarong | -60 | 299 | | N/A | | 1622P TPS4 EMISSIONS ISSUES; RESTRICT AVAIL; SL | |
| 4.24 pm |  | Stanwell Corporation | Tarong North | 60 | 14000 | | -1000 | | 1622P TPS4 EMISSIONS ISSUES; RESTRICT AVAIL; SL | |
| 4.24 pm |  | Stanwell Corporation | Mackay GT | 34 | 14000 | | -1000 | | 1622P TPS4 EMISSIONS ISSUES; RESTRICT AVAIL; START MACKAYGT; SL | |
| 4.26 pm |  | Stanwell Corporation | Tarong | -20 | <299 | | N/A | | 1625P TPS2 EMISSIONS ISSUES; RESTRICT AVAIL; INCREASE AT TPS1 AND 3; SL | |
| 4.26 pm |  | Stanwell Corporation | Tarong | -25 | 13900 | | N/A | | 1625P TPS2 EMISSIONS ISSUES; RESTRICT AVAIL; INCREASE AT TPS1 AND 3; SL | |
| 4.26 pm |  | Stanwell Corporation | Tarong | 20 | 13900 | | -1000 | | 1625P TPS2 EMISSIONS ISSUES; RESTRICT AVAIL; INCREASE AT TPS1 AND 3; SL | |
| 4.27 pm |  | Origin | Darling Downs | 5 | 130 | | N/A | | 1626P CHANGE IN AVAIL - AMBIENT CONDITIONS SL | |
| 4.29 pm |  | Stanwell Corporation | Stanwell | -65 | <299 | | N/A | | 1625P SPS3 RUNBACK ON CONDENSER VACUUM; SL | |
| 4.29 pm |  | Stanwell Corporation | Stanwell | 25 | 13900 | | -1000 | | 1625P SPS3 RUNBACK ON CONDENSER VACUUM; SL | |
| 4.43 pm |  | Callide Power Trading | Callide C | 56 | -1000 | | 13000 | | 1642A 16:35 DS Q RRP DI 16:40 VS 16:30 P5 DI 16:40 SL | |
| 4.45 pm |  | Stanwell Corporation | Tarong North | -20 | -1000 | | N/A | | 1644P TN HIG FLUE GAS OUTLET TEMPS; RESTRICT AVAIL AND WAIT FOR UNIT TO SETTLE; SL | |
| 4.51 pm |  | Stanwell Corporation | Stanwell | -20 | -1000 | | N/A | | 1646P SPS1 CONDENSER VACUUM LIMITATION; RESTRICT AVAIL; SL | |
| 4.55 pm |  | Stanwell Corporation | Tarong | -55 | <290 | | N/A | | 1651P TPS4 EMISSIONS ISSUES; RESTRICT AVAIL; SL | |
| 4.58 pm | 5.05 pm | Stanwell Corporation | Tarong | -40 | -1000 | | N/A | | 1657P TPS2 EMISSIONS ISSUES; RESTRICT AVAIL; SL | |
| 5.05 pm | 5.15 pm | Stanwell Corporation | Tarong | -30 | 14000 | | N/A | | 1705P TPS1 AND TPS2 EMISSIONS ISSUES; RESTRICT AVAIL; SL | |
| 5.08 pm | 5.15 pm | Alinta Energy | Braemar A | 32 | 14000 | | -1000 | | 1705~A~QLD SPOT PRICE $14,000 SL~ | |
| 5.10 pm | 5.20 pm | Stanwell Corporation | Stanwell | 50 | N/A | | <290 | | 1709P CONDENSER VACUUM LIMITATION SLIGHTLY IMPROVED; SL | |
| 5.16 pm | 5.25 pm | Stanwell Corporation | Tarong | -45 | -1000 | | N/A | | 1716P TPS4 EMISSIONS ISSUES; UNIT RUNBACK;SL | |
| 5.17 pm | 5.25 pm | ERM Power | Oakey | 28 | 13441 | | -1000 | | A 1716 1715 INCREASE IN QLD DEMAND FOR 1735: 9,457MW PD5@1715 VS 9,291MW PD5@1650 | |
| 5.18 pm | 5.25 pm | Alinta Energy | Braemar A | 110 | 14000 | | -1000 | | 1715~F~START SIGNAL RECEIVED. COMMIT FOR ECONOMIC DISPATCH.~ | |
| 5.19 pm | 5.30 pm | Callide Power Trading | Callide C | 50 | -1000 | | 13000 | | 1717A 17:15 DS Q RRP DI 17:20 VS 17:10 P5 DI 17:20 SL | |

Appendix B: Price setter

The following table identifies for the trading intervals in which the spot price exceeded $5000/MWh, each five minute dispatch interval price and the generating units involved in setting the energy price. This information is published by AEMO.[[2]](#footnote-2) The 30-minute spot price is the average of the six dispatch interval prices.

5.30 pm trading interval

| DI | Dispatch Price ($/MWh) | Participant | Unit | | Service | Offer price ($/MWh) | Marginal change | Contribution |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5:05 pm | $290 | Stanwell | STAN-4 | | Energy | $290 | 1.00 | $290 |
| 5:10 pm | $14 000 | CS Energy | W/HOE#1 | | Energy | $14 000 | 0.71 | $9940 |
|  |  | Braemar Power Projects | BRAEMAR1 | | Energy | $14 000 | 0.08 | $1120 |
|  |  | Braemar Power Projects | BRAEMAR2 | | Energy | $14 000 | 0.08 | $1120 |
|  |  | Stanwell | STAN-2 | | Energy | $14 000 | 0.06 | $840 |
|  |  | Stanwell | TARONG#1 | | Energy | $14 000 | 0.08 | $1120 |
| 5:15 pm | $13 440.69 |  | OAKEY1 | | Energy | $13 440.69 | 0.50 | $6720.35 |
|  |  |  | OAKEY2 | | Energy | $13 440.69 | 0.50 | $6720.35 |
| 5:20 pm | $299 | Stanwell | STAN-4 | | Energy | $299 | 1.00 | $299 |
| 5:25 pm | $13 000 | Callide Power | CPP\_3 | | Energy | $13 000 | 0.50 | $6500 |
|  |  | Callide Power | CPP\_4 | | Energy | $13 000 | 0.50 | $6500 |
| 5:30 pm | $13 000 | Callide Power | CPP\_3 | | Energy | $13 000 | 0.50 | $6500 |
|  |  | Callide Power | CPP\_4 | | Energy | $13 000 | 0.50 | $6500 |
| **Spot Price** | | **$9005/MWh** | |  |  |  |  |  |

Appendix C: Lack of Reserve (LOR)

AEMO is required to monitor the level of reserve, or spare capacity, within each region of the NEM. Reserves are defined as the difference between the volume of electricity that can be made available to consumers, either by local generation or through the network from other regions of the NEM, and the regional customer demand at that time.

Reserves are an indicator of the supply demand balance and an important tool to communicate with the market potential and actual shortfalls. This is achieved through the release of LOR notices by AEMO. Forecast LOR notices are designed to elicit a market response from generators to increase their declared available capacity or retailers to reduce demand to address any forecast reserve shortfalls. Actual LOR notices are also issued when the thresholds are actually triggered.

There are three reserve thresholds which relate to managing power system security following a defined number of unplanned failures of either transmission or generating equipment (credible contingencies). An example of a credible contingency would be the failure of a large generator or the failure of a transmission line that would reduce interconnector capacity.

The three LOR levels are categorised as follows:

* An LOR1 is declared when AEMO considers load shedding would occur after two single credible contingencies.
* An LOR2 is declared when AEMO considers load shedding would occur after a single credible contingency.
* An LOR3 is declared when customer(s) load would be, or is shed, in order to maintain the stability of the power system.

Figure 3 examines the different power system security scenarios at times of limited reserve capacity. The blue columns are the amount of spare capacity available after meeting demand. As the LOR reserve values are calculated in real time and are subject to change, actual values are not included in this chart.

Figure 3: Spare capacity and lack of reserve

As the spare capacity drops below a reserve line (represented as a horizontal line on the chart) either by a reduction in available capacity or an increase in demand, a new LOR notice is issued to participants. If the region is left with insufficient reserve capacity, an LOR3 is issued and load shedding occurs.

Appendix D: Market Notices

The following market notices notified the market of the reserve requirement for Queensland.

|  |  |  |  |
| --- | --- | --- | --- |
| **Market Notice** | **Type** | **Date of issue** | **Last Changed** |
| 57472 | Reserve notice | 12/02/2017 16:16 | 12/02/2017 16:16 |
| Reason | | | |
| AEMO ELECTRICITY MARKET NOTICE  Actual Lack Of Reserve Level 1 (LOR1) in the Qld Region - 12/02/17  An Actual LOR1 condition has been declared for the Qld region from 1600 hrs.  The Actual LOR1 condition is forecast to exist until 1730 hrs  The contingency capacity reserve required is 1123 MW  The minimum reserve available is 978 MW  Manager NEM Real Time Operations | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Market Notice** | **Type** | **Date of issue** | **Last Changed** |
| 57473 | Reserve notice | 12/02/2017 17:08 | 12/02/2017 17:08 |
| Reason | | | |
| AEMO ELECTRICITY MARKET NOTICE  Actual Lack Of Reserve Level 2 (LOR2) in the Qld Region - 12/02/17  An Actual LOR2 condition has been declared for the Qld region from 1700 hrs.  The Actual LOR2 condition is forecast to exist until 1800 hrs  The contingency capacity reserve required is 680 MW  The minimum reserve available is 548 MW AEMO is seeking a market response.  Manager NEM Real Time Operations | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Market Notice** | **Type** | **Date of issue** | **Last Changed** |
| 57474 | Reserve notice | 12/02/2017 19:38 | 12/02/2017 19:38 |
| Reason | | | |
| AEMO ELECTRICITY MARKET NOTICE  Cancellation Actual Lack Of Reserve Level 2 (LOR2) in the Qld Region - 12/02/17  Refer Electricity Market Notice 57473  The Actual LOR2 condition declared for the Qld region is cancelled at 1930 hrs 12/02/2017.  Manager NEM Real Time Operations | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Market Notice** | **Type** | **Date of issue** | **Last Changed** |
| 57475 | Reserve notice | 12/02/2017 20:26 | 12/02/2017 20:26 |
| Reason | | | |
| AEMO ELECTRICITY MARKET NOTICE  Cancellation Actual Lack Of Reserve Level 1 (LOR1) in the Qld Region - 12/02/17  Refer Electricity Market Notice 57472  The Actual LOR1 condition declared for the Qld region is cancelled at 2020 hrs 12/02/2017 Manager NEM Real Time Operations | | | |

Appendix E: Closing bids

Figures C1 to C3 highlight the half hour closing bids for participants in Queensland with significant capacity priced at or above $5000/MWh during the periods in which the spot price exceeded $5000/MWh. They also show generation output and the spot price.

Figure C1 – Alinta Energy (Braemar A) closing bid prices, dispatch and spot price



Figure C2 – Callide Power Trading (Callide C) closing bid prices, dispatch and spot price



Figure C3 – CS Energy (Callide B, Gladstone, Kogan Creek, Wivenhoe) closing bid prices, dispatch and spot price



1. See AEMO demand definition document <https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/2016/Demand-terms-in-EMMS-Data-Model_Final.pdf> [↑](#footnote-ref-1)
2. Details on how the price is determined can be found at [www.aemo.com.au](http://www.aemo.com.au) [↑](#footnote-ref-2)