Electricity spot prices above $5000/MWh

Queensland, 12 February 2017

17 May 2017

AUSTRALIAN ENERGY REGULATOR

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1 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.

2 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.

3 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.

3.1 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

3.2 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.

3.2.1 Supply

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

3.2.1.1 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

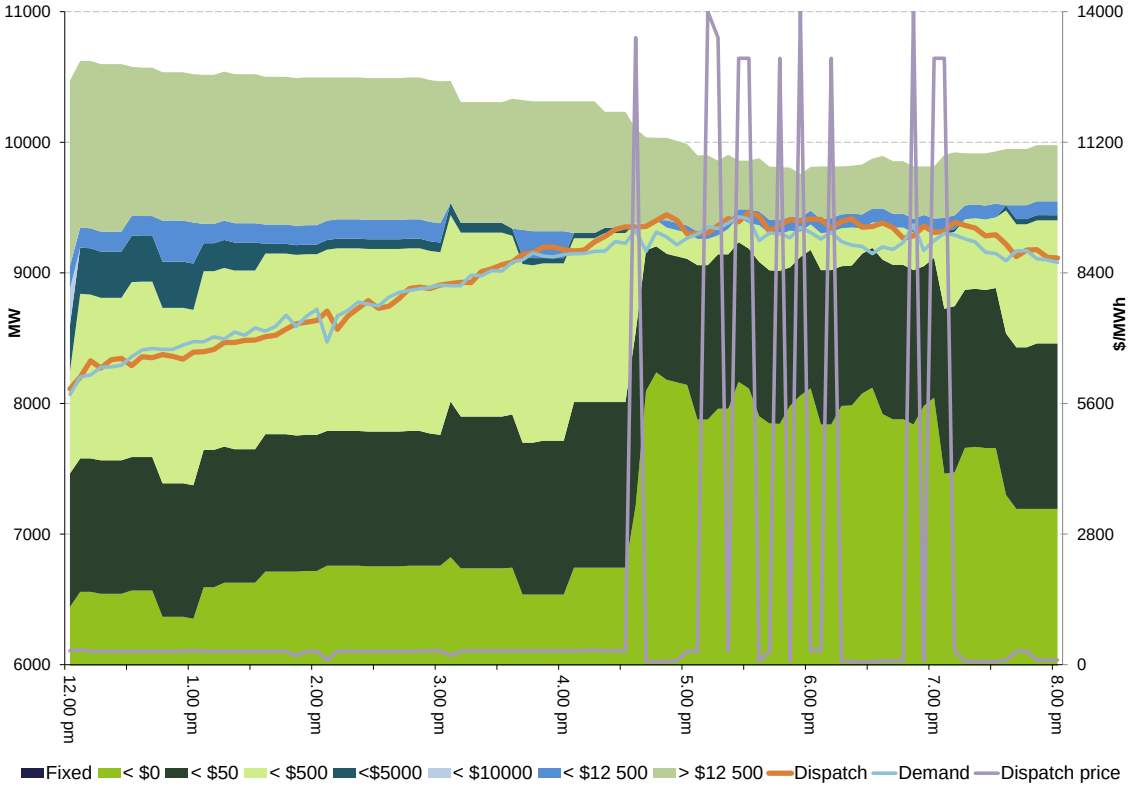
Participant	Capacity priced below $5000/MWh (MW)	Capacity priced at or above $5000/MWh (MW)	Rebid Reasons	Total MW
CS Energy	85	10	Over nine rebids, technical issues and condenser limits	95
Origin	28		Over four rebids, change in ambient conditions and backpressure limitation	28
Millmerran	60		Over two 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.

3.2.1.2 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.

3.2.1.3 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

3.2.1.4 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.

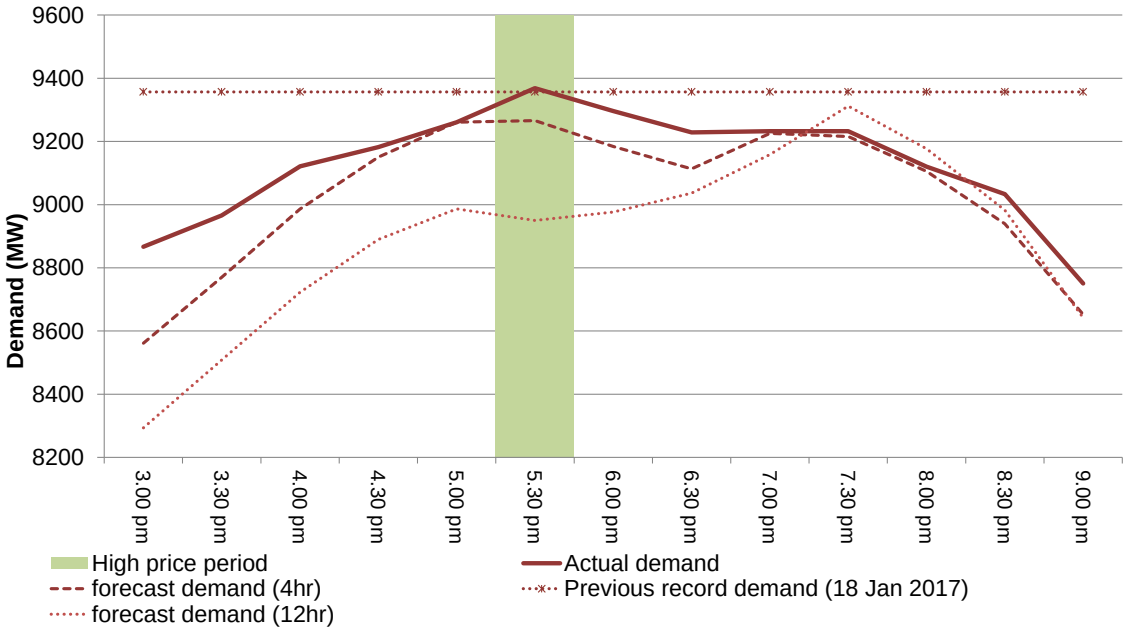
These extreme temperatures led to record "total demand" in Queensland, reaching 9369 MW at 5.30 pm. Total demand is one of a number of measures of demand used by the market operator, and is the measure of demand AEMO uses to determine price and the level of local supply required.[1] The fact that the extreme level of demand was

[1] See AEMO demand definition document https://www.aemo.com.au/-

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



3.3 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

/media/Files/Electricity/NEM/Security_and_Reliability/Dispatch/Policy_and_Process/2016/Demand-terms-in-EMMS-Data-Model_Final.pdf

$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

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid Reason
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

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid Reason
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

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid Reason
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

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid Reason
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] The 30-minute spot price is the average of the six dispatch interval prices.

5.30 pm trading interval

DI	Dispatch Price	Participant	Unit	Service	Offer price	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	BRAEMAR1	Energy	$14 000	0.08	$1120
		Braemar	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	CPP_3	Energy	$13 000	0.50	$6500
		Callide	CPP_4	Energy	$13 000	0.50	$6500
5:30 pm	$13 000	Callide	CPP_3	Energy	$13 000	0.50	$6500
		Callide	CPP_4	Energy	$13 000	0.50	$6500
Spot Price		**$9005/MWh**					

[2] Details on how the price is determined can be found at www.aemo.com.au

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.

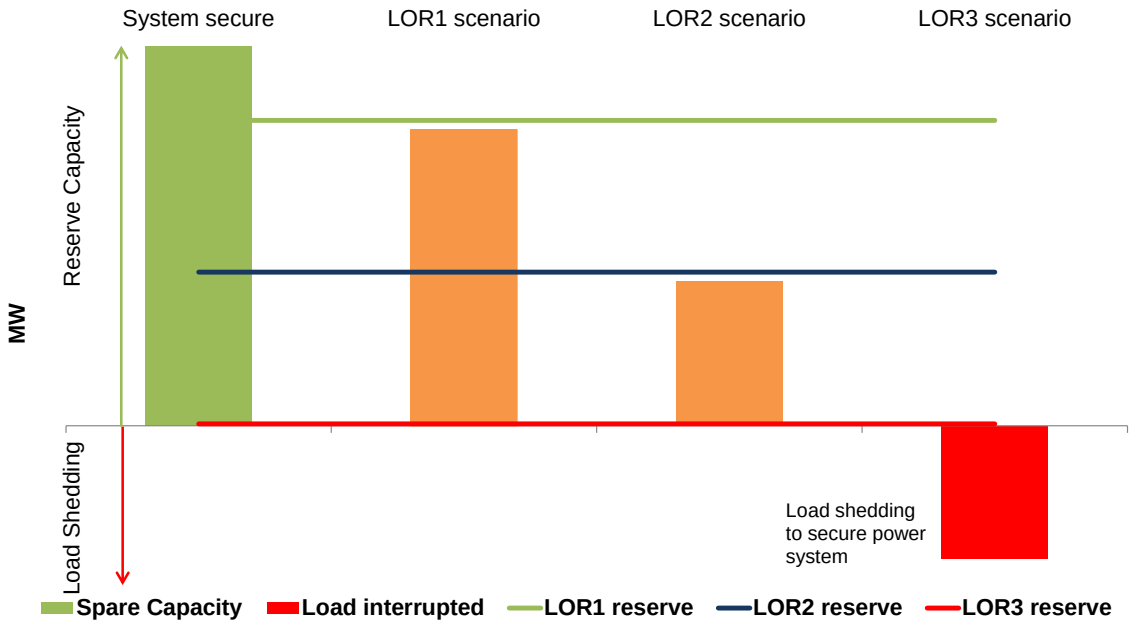
There are three reserve thresholds which relate to managing power system security following a defined number of unplanned failures of either transmission or generating equipment (credible contingencies). An example of a credible contingency would be the failure of a large generator or the failure of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

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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

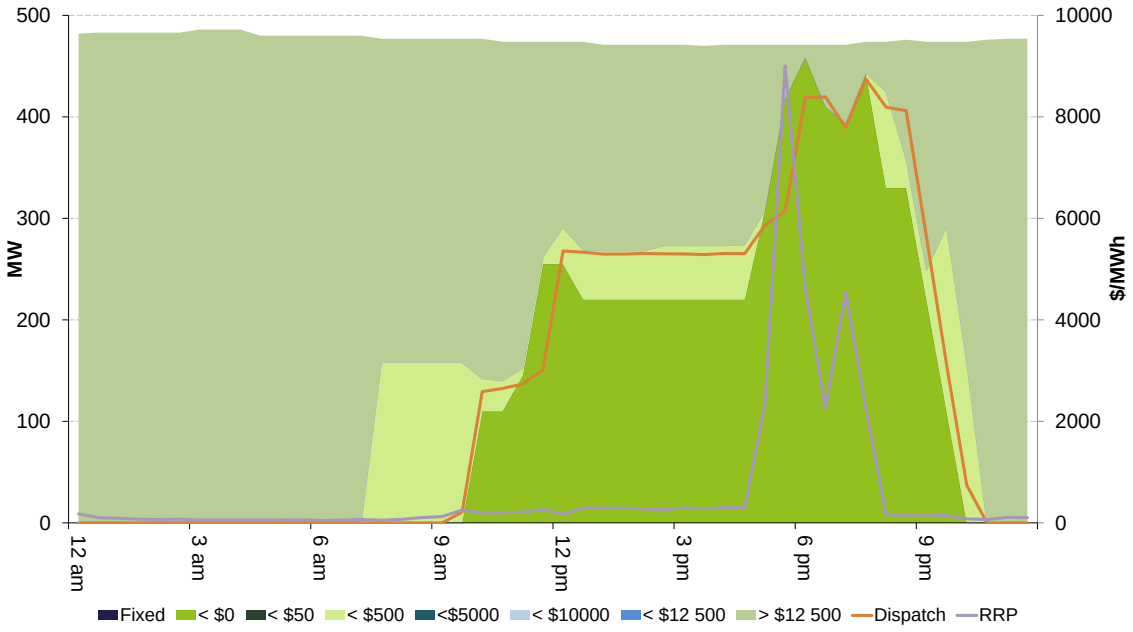

Figure C2 – Callide Power Trading (Callide C) closing bid prices, dispatch and spot price

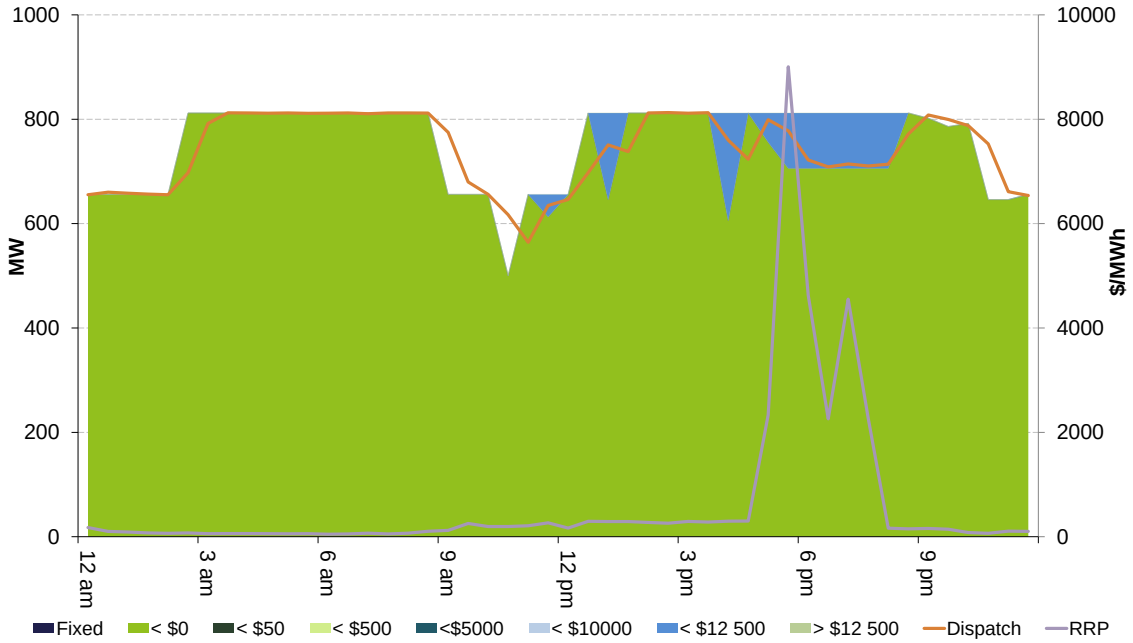

Figure C3 – CS Energy (Callide B, Gladstone, Kogan Creek, Wivenhoe) closing bid prices, dispatch and spot price