



Report into market ancillary service prices above \$5000/MW

**South Australia,
9 November 2016**

1 September 2017

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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 monitor significant variations between forecast and actual prices and publish a report where:

- prices for a market ancillary service over a period significantly exceed the relevant spot price for energy; and
- prices for a market ancillary service exceed \$5000/MW for a number of trading intervals within that period.

In accordance with the clause 3.13.7(e) of the National Electricity Rules, the report must:

- describe the significant factors that contributed to the ancillary service prices exceeding \$5000/MW;
- identify any linkages between spot prices in the energy market and ancillary service prices contributing to the occurrence; and
- assess whether rebidding pursuant to clause 3.8.22 contributed to prices exceeding \$5000/MW.

These reports examine the reasons for the high price outcomes—they are not compliance reports. We deal separately with compliance issues that come to our attention during the preparation of these reports.

2 Summary

Lower and raise regulation frequency control ancillary services (regulation services) are used to manage small fluctuations in supply or demand.

On 9 November 2016 the price for local regulation services in South Australia exceeded \$5000/MW for 175 consecutive dispatch intervals, from 4.05 am to 6.35 pm. This was much higher than the wholesale (or spot) price for electricity in South Australia, which ranged from around \$50/MWh to \$110/MWh over the same period.

A planned network outage in Victoria on the Heywood interconnector commenced at 6.05 am on 8 November, and ended at 8.10 pm on 9 November. This outage put South Australia on a single contingency, which created the risk of South Australia becoming electrically isolated from the National Electricity Market (NEM). To manage this risk, and in line with its procedures, the market operator (AEMO) notified the market that South Australia would be required to source 35 MW of raise and lower regulation services from within the region for the duration of the outage.

Participants offered more than 35 MW of low-priced regulation services for 8 November--as a result prices for regulation services remained relatively low throughout the day. In contrast, participants offered less than 35 MW of low-priced raise and lower regulation services for 9 November, and as a result high-priced capacity (above \$5000/MW) was required to meet the 35 MW requirement. Price forecasts the day before showed prices for 9 November set to exceed \$5000/MW--re-bidding of capacity on 9 November did not contribute to the high prices.

The sustained high prices led to the Cumulative Price Threshold being breached at 6.35 pm. As required under the Rules, AEMO applied the \$300/MW administered price cap from 6.40 pm.

3 Analysis

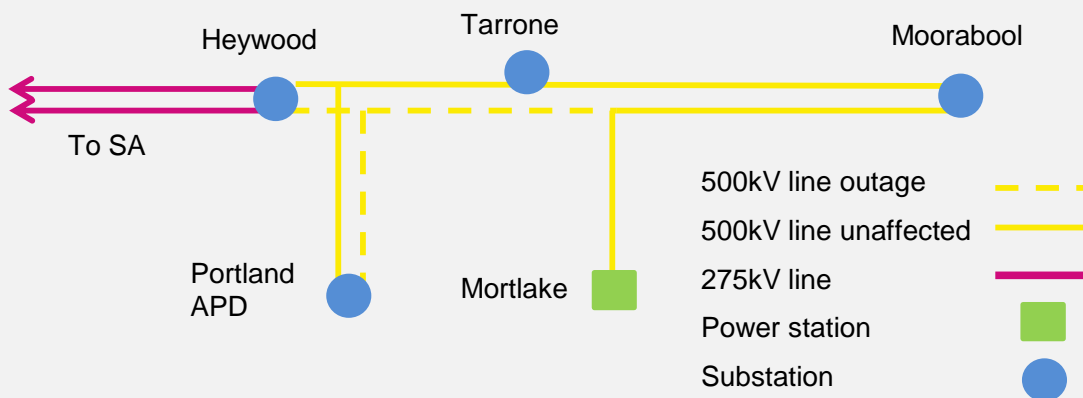
On 9 November 2016 the price for local regulation services exceeded \$6000/MW for all dispatch intervals from 4.05 am to 6.35 pm. The spot price for energy remained below \$110/MWh during these times. The purpose of this section is to explain the two reasons for the high regulation prices. First, there was a 35 MW requirement for local regulation services during a planned outage. Second, participants did not offer enough low priced capacity to meet the requirement.

3.1 Planned network outage

This section discusses the planned network outage in Victoria affecting the Heywood interconnector.

Box 1: Heywood Interconnector and line outage management

South Australia is electrically connected to Victoria by the Heywood and Murraylink interconnectors. Murraylink is a direct current interconnector that cannot provide FCAS. The Heywood Interconnector is an alternating current high voltage transmission link which can transfer FCAS from the rest of the NEM. The figure below is a simplified representation of the network around the interconnector.



When any one of the four lines going through the Heywood substation is on an outage, the South Australian region is on a single contingency. This means that South Australia is at risk of being electrically isolated from the rest of the NEM as only one line is connecting South Australia to Victoria. When this occurs AEMO invokes constraints requiring 35 MW of local regulation services. This ensures adequate regulation services are immediately available to manage the frequency (around 50Hz) within South Australia if the remaining line trips.

Further details on the 35 MW requirement can be found in Appendix B.

At 6 am on 8 November a planned network outage on the Heywood to Mortlake PS 500kV line and Heywood 2 500kV bus in Victoria began. This outage put South Australia on a single contingency.

This outage was first notified to the market on 10 October through a market notice published by AEMO, which stated that the outage would run from 4 pm on 8 November to 6 am on 9 November. It also stated that AEMO would be requiring 35 MW of local regulation services during the outage. On 13 October, the market was notified, through a market notice, that the outage was rescheduled to run from 6 am on 8 November to 4 pm on 9 November.

On 9 November AEMO extended the scheduled 4 pm finish time on several occasions at the same time extending the requirement for regulation services. The outage was complete and the line reinstated by 8.10 pm and AEMO removed the 35 MW requirement for regulation services.

Market notices relating to the outage are in Appendix E.

3.2 Regulation FCAS availability, offer prices and price outcomes

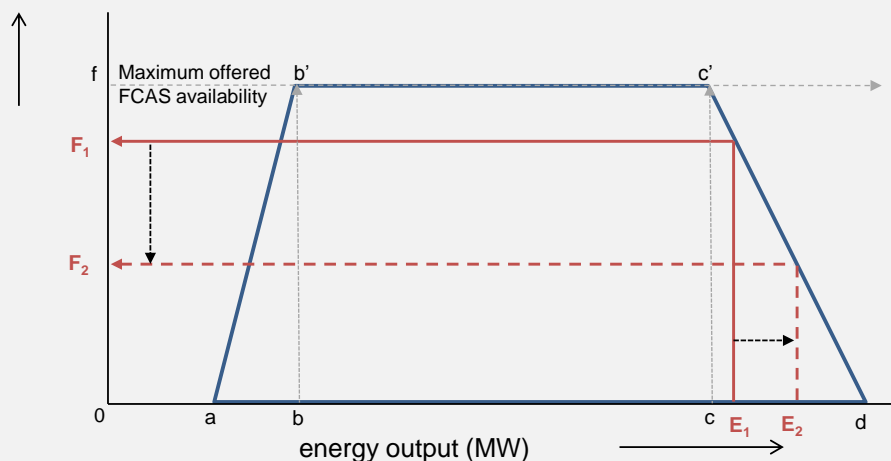
This section discusses participants FCAS offers and price outcomes.

Box 2: Trade-off between generator FCAS and energy offers

Generators must register with AEMO to provide FCAS and offer FCAS capacity in a similar manner to energy into the market.

Participants offer the maximum amount of FCAS (f in the diagram below) and energy, in mega-watts (MW), they are willing to supply across ten price bands, ranging between - \$1000 and \$14 000 for a trading day. A trading day starts at 4 am each day. A participant also offers the limits by which they can be dispatched in FCAS (a, b, c, d in the diagram below). There can be a trade-off between a participant's provision of FCAS and energy, impacting the effective availability of FCAS. For example in the diagram below, if a generator's energy output is at E_1 then its FCAS effective availability is F_1 , if its output in energy increases to E_2 then its effective FCAS availability drops to F_2 .

For every dispatch interval the National Electricity Market Dispatch Engine (NEMDE) co-optimises market participants FCAS and energy offers to arrive at the least cost outcome while maintaining system security.



3.2.1 FCAS capacity

Of the 26 power stations and wind farms in South Australia only four are registered to provide FCAS. Table 1 shows the power stations that were registered to provide raise and lower regulation FCAS in South Australia on the day and their maximum registered capacity. Table 1 shows each power station, if fully operational, was individually capable of providing the local requirement.

Table 1: Registered maximum regulation FCAS capacity by station

Power Station	Registered Capacity (MW)	
	Lower regulation	Raise regulation
Osborne (Origin Energy)	36	36
Quarantine (Origin Energy)	50	50
Pelican Point (Engie)	100	100
Torrens Island (AGL)	200	260
Total	386	446

3.2.2 Prices for maximum and effective available capacity

Around half the registered capacity of regulation services was not available to the market with Osborne power station, half of Pelican Point power station and three units at Torrens Island power station all unavailable. This reduced the regulation services available to the market from around 400 MW to just over 200 MW of each service. Participant offers are reflected in Appendix D.

The planned network outage covered two trading days. Different pricing outcomes occurred on each of those trading days. At the start of the outage at 6 am on 8 November, 36 MW of capacity was offered at prices below \$5000/MW and regulation prices were around \$300/MW. At the start of the trading day on 9 November, 34 MW of capacity was offered at prices below \$5000/MW and regulation prices exceeded \$5000/MW until the administered price cap was applied at 6.40 pm.

Table 2 and Table 3 show by station the maximum and average effective amount of capacity offered above and below \$5000/MW for regulation services on 8 and 9 November.

Table 2: Regulation FCAS capacity below and above \$5000/MW by station 8 November 2016

Power Station	Raise regulation				Lower regulation			
	Max Availability		Effective Availability		Max Availability		Effective Availability	
	Below \$5000	Above \$5000	Below \$5000	Above \$5000	Below \$5000	Above \$5000	Below \$5000	Above \$5000
Quarantine	8	38	8	14	8	38	8	16
Pelican Point	4	31	4	31	4	31	4	14
Torrens Island	24	131	24	47	24	101	24	38
Total	36	200	36	92	36	170	36	68

Table 3: Regulation FCAS capacity below and above \$5000/MW by station 9 November 2016

Power Station	Raise regulation				Lower regulation			
	Max Availability		Effective Availability		Max Availability		Effective Availability	
	Below \$5000	Above \$5000	Below \$5000	Above \$5000	Below \$5000	Above \$5000	Below \$5000	Above \$5000
Quarantine	8	38	8	14	8	38	8	16
Pelican Point	4	31	4	29	4	31	4	22
Torrens Island	22	133	22	57	22	103	22	31
Total	34	202	34	100	34	172	34	69

Table 3 highlights that there was only 34 MW of capacity offered in below \$5000/MW for both maximum and effective availability. These offers were all set up in advance the day before. Effectively 34 MW was available at less than \$5000/MW, 1 MW less than the requirement of 35 MW, the rest was priced above \$5000/MW. Hence capacity priced above \$5000/MW was forecast, and actually, dispatched to meet the requirement.

3.2.3 Sustained high prices

As only 34 MW was initially offered below \$5000/MW regulation prices were forecast to exceed \$5000/MW for the duration of the outage on 9 November. This did not change in the lead up to the start of the trading day.

Co-optimisation of the FCAS and energy markets could not result in lower regulation services prices as only 34 MW of capacity priced below \$5000/MW was offered and reducing energy could not make any more low priced capacity available.

As 1 MW of the 35 MW requirement for both lower and raise services was met by high priced capacity, prices for both lower and raise regulation services were around \$6500/MW for approximately fourteen and a half hours, exceeding \$5000/MW for 175

dispatch intervals. AGL's Torrens Island set the price for all but one of the 175 dispatch intervals priced above \$5000/MW in both raise and lower regulation services.

Figure 1 and Figure 2 show actual price (purple line)¹ and effective available capacity over the high price period. The (constant) 35 MW requirement is shown as a red line. The blue shaded areas indicate effective available capacity below \$5000/MW and effective available capacity above \$5000/MW is indicated by the light orange shaded areas. The inset graphs in each figure highlight the decrease in low priced capacity from 4.05 am (the start of the new trading day) which resulted in the price increasing from around \$300/MW to around \$6500/MW.

Figure 1 Lower regulation effective offers, requirement and price

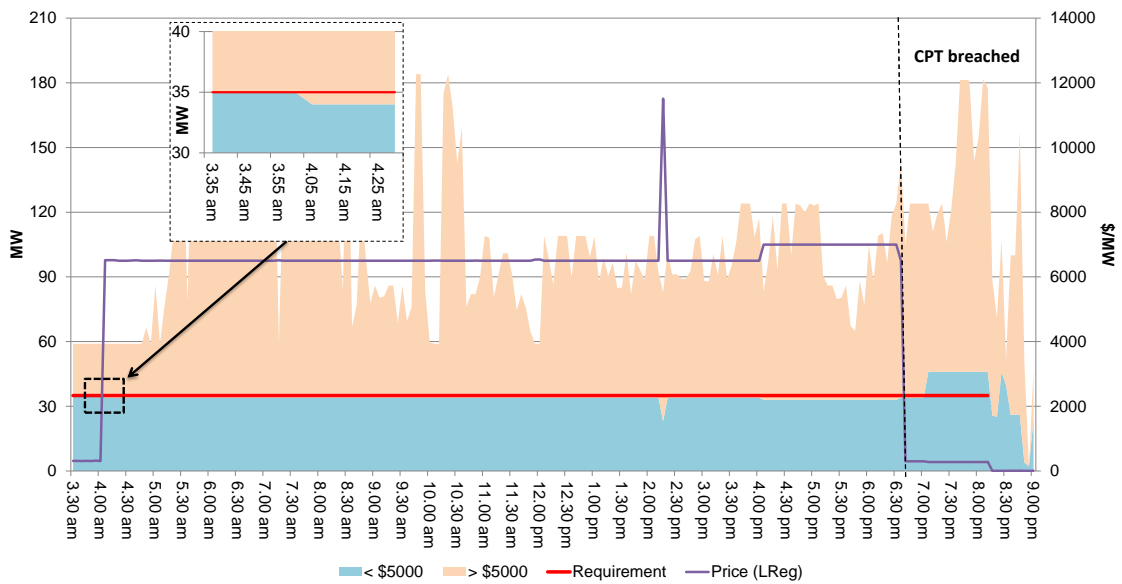
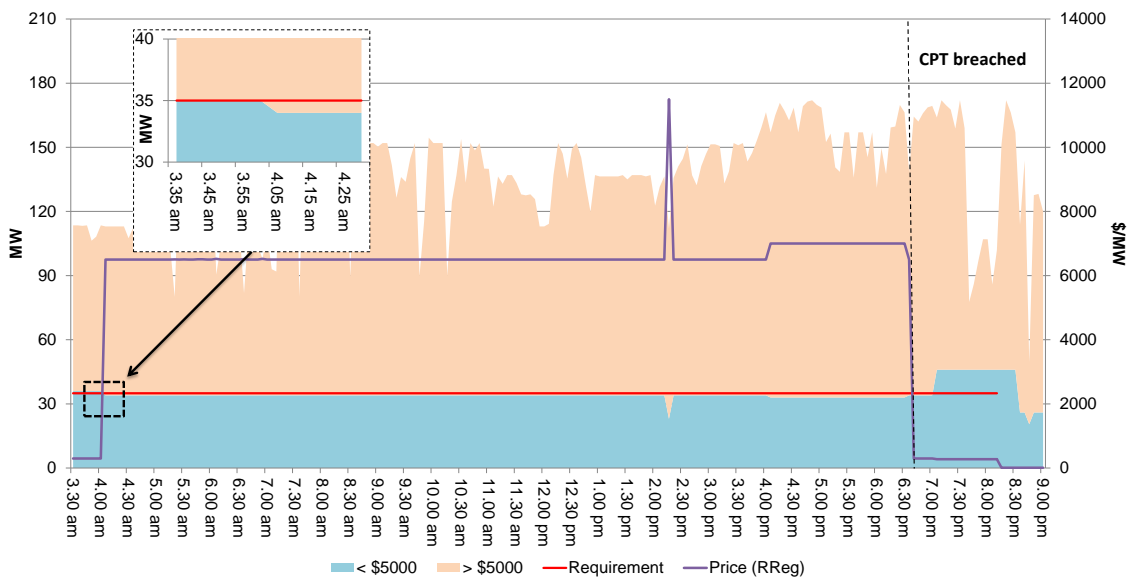


Figure 2 Raise regulation effective offers, requirement and price



¹ Individual prices are contained in the Price Setter at Appendix F

From 2 pm onwards there were three changes in price:

- a 2.15 pm price spike
- the outage was extended and a change in offers led to a higher than \$6500/MW price
- administered pricing of \$300/MW due to the CPT being breached

3.2.3.1 2.15 pm price spike

The price for both raise and lower regulation services increased to around \$11 500/MW at 2.15 pm, as shown in Figure 1 and Figure 2, when the Automatic Generator Control (AGC) on AGL's Torrens Island B1 unit was became unavailable for 5 minutes.

The AGC allows a power station to automatically respond to raise and lower regulation service signals provided to it by AEMO. Generators are only eligible for dispatch for regulation services when their AGC is enabled.

When Torrens Island B1's AGC was switched off, it effectively removed 12 MW of raise and lower regulation services priced at less than \$6500/MW. At 2.20 pm the AGC was switched back on and prices returned to around \$6500/MW.

3.2.3.2 Outage extension and changes in price

At the time Origin Energy submitted its original offers (the day before) for Quarantine power station, the outage was due to finish at 4 pm. Origin's offers for regulation services ended at the same time.

Once the network outage had commenced and was extended by AEMO, Origin Energy also extended its regulation service offers but reduced the volume priced less than \$30/MW from 8 MW to 7 MW, 1 MW less than the original offer. This resulted in both raise and lower regulation services increasing from \$6499/MW at 4 pm to \$6999/MW at 4.05 pm. Prices remained around this level until 6.35 pm when the administered price cap was triggered as shown in Figure 1 and Figure 2.

3.2.3.3 Administered pricing

The administered price cap of \$300/MW took effect from 6.40 pm as the cumulative prices of both services exceeded six times the CPT at 6.35 pm. Administered pricing remained in place until 15 November when the cumulative price fell below the threshold.

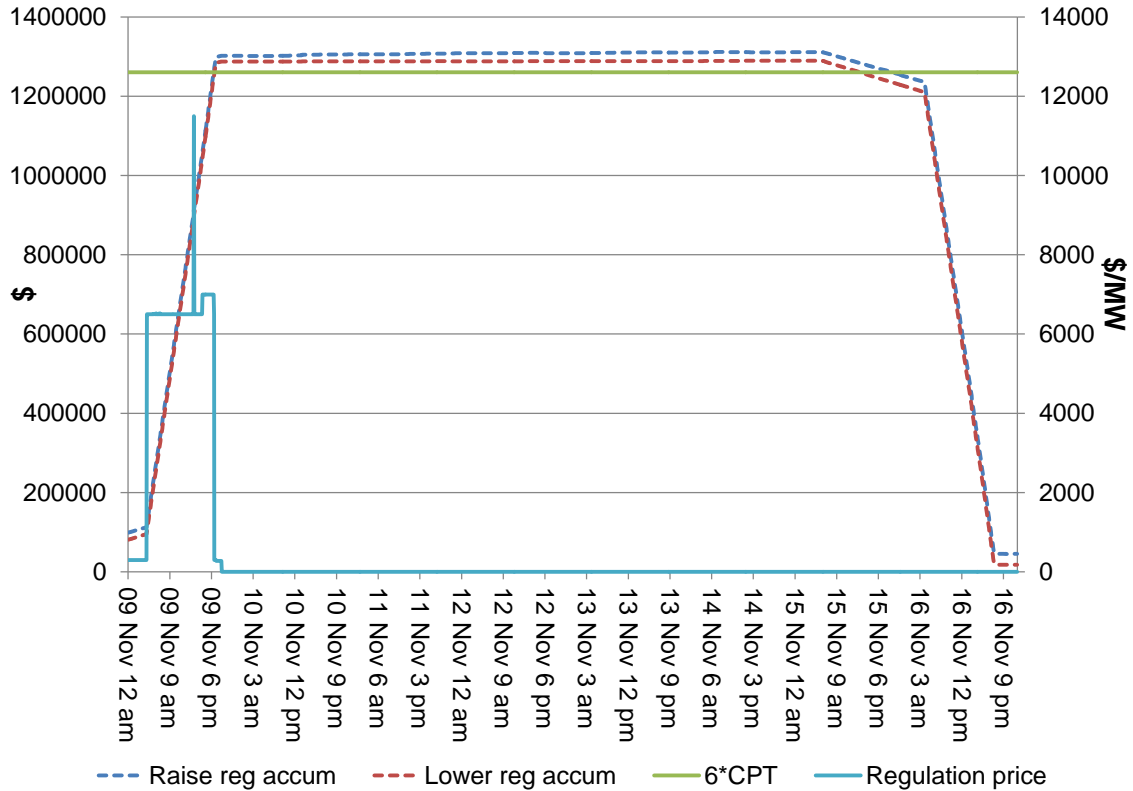
Under the National Electricity Rules, if the sum of the preceding 2016 dispatch interval prices exceeds six times the CPT for any FCAS, then an administered price cap of \$300/MW is applied to all services.²

Figure 3 shows the cumulative prices of both regulation services (dashed red and blue lines for lower and raise services respectively), the dispatch prices for both services

² Clause 3.14.2

(solid blue line³) and six times the CPT value (solid green line at \$1 260 600, or six times \$210 100).

Figure 3: South Australian local regulation services price, cumulative price and CPT



During an administered price period the cumulative price is calculated using uncapped prices based on generator offers. In other words, the cumulative price is calculated according to what the price would have been, had the administered price cap not been applied. The dashed red and blue lines continue above the green line because prices based on generator offers remained high beyond 6.40 pm, the time the administered price cap (of \$300/MW) was imposed.

Australian Energy Regulator

September 2017

³ Prices of both raise and lower regulation services were very similar across the day of the outage

Appendix A: Explanation of FCAS

Frequency control ancillary services (FCAS) are required to maintain the frequency of the power system within the frequency operating standards. The two general categories of FCAS are:

- Regulation services, which continuously adjust to small changes in demand or supply (changes that cause the frequency to move by only a small amount away from 50 Hz). There are regulation services to increase the frequency (raise regulation or RREG) and services to decrease the frequency (lower regulation or LREG).
- Contingency services, which manage large changes in demand or supply that occur relatively rarely and move the frequency by a large amount. There are three contingency services to increase the frequency and three contingency services to decrease the frequency. Raise contingency FCAS are required to be available to correct frequency excursions that have arisen from a credible contingency event that leads to a decrease in frequency. As these contingency events usually involve step reductions in supply side, the Electricity Rules stipulate that generators pay for these services. Lower contingency FCAS are the services required to be available to correct the frequency excursions that arise from a credible contingency event that leads to an increase in frequency. As these contingency events usually involve step reductions in customer demand, the Electricity Rules stipulate that customers pay for these services.

Participants providing regulation services receive adjusted dispatch targets every 5 minutes via their automatic generation control (AGC) signals from AEMO. Participants are paid through the FCAS markets in accordance with their offered volumes. Their energy production, which may be higher or lower depending on the AGC signals they receive, are settled in accordance with energy market prices.

There are three lower and three raise contingency services:

- fast services, which arrest a frequency deviation within the first six seconds of a contingent event (L6 and R6);
- slow services, which stabilise frequency deviations within sixty seconds of the event (L60/R60); and
- delayed services, which stabilise frequency deviations within five minutes of the event (L5/R5).

Participants offering to provide contingency services are enabled in accordance with the “trapezium” supplied in their offers. While participants will not necessarily be supplying these services until a contingency occurs they are paid in accordance with their enablement.

Frequency Control Ancillary Service Settlement

AEMO settles the FCAS markets on a weekly basis, as follows⁴.

- Regulation FCAS: Cost recovery on a “causer pays” basis using the Causer Pays Procedure⁵ developed by AEMO in accordance with the appropriate NER procedures.
- Contingency FCAS: Generators pay for Raise Services and customers pay for Lower Services.

The ‘Causer Pays’ Procedure allocates regulation FCAS costs to those market generators, customers and small generation aggregators with facilities that have the metering capable of determining their contribution to frequency deviations at any time.

Every four weeks based on historical data AEMO calculates a causer pays contribution factor for each generator. Broadly, the contribution factor is determined from historical 4 second generator output and frequency information and is a measure of how each generator contributed to managing changes in the system frequency. If a generators’ output changes such that it supports maintaining the system frequency its contribution factor is positive. Conversely, if a generators’ output changes such that it exacerbates a frequency deviation, its contribution factor will be negative. The causer pays contribution factors for a portfolio of generators effectively represent the aggregation of the individual performance of the generators in that portfolio.

Settlement is determined by allocating the FCAS costs incurred in the current period in accordance with the causer pays contribution factor for that portfolio from the preceding period. Thus cost allocation to a participant is not dependent on the amount of energy purchased or consumed in that period but by the performance of that participant in managing system frequency in the previous period.

Consequently a portfolio of generators with a negative factor in a particular period will still pay a share of FCAS costs irrespective of how much it generates in the current period.

Since not all of the costs will be recovered from generators, the residual costs are recovered from market customers (including retailers) in the relevant region, based on the amount of energy each market customer is purchasing.

⁴ For a full description go to <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Ancillary-Services/Ancillary-Services-Payments-and-Recovery>

⁵ For a full description go to <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Ancillary-services/Ancillary-services-causer-pays-contribution-factors>

Appendix B: Local Frequency Control Ancillary Services

AEMO sets the requirement for FCAS to ensure that the frequency standard (as set by the Reliability Panel) is maintained in the event of step changes in supply or demand that results from credible contingencies. Where a credible contingency results in the loss of an interconnector it is termed a “separation event”.

The standard states that in the event of a “separation event” the frequency must be contained within 49 to 51 Hz or a wider band notified to AEMO by a relevant JSSC. In the case of South Australia the JSSC notified AEMO that the frequency band for separation of the South Australian power system is 47 to 52 Hz and that under frequency relays will operate at frequency levels in the low end of this range.

When there is a potential separation event caused by the loss of an interconnector “local frequency control ancillary services” are usually required.

If the region was exporting at the time the interconnector fails, then as a consequence of the immediate over supply situation local contingency “lower” services are required in the islanded region to lower the frequency (typically generators offer to quickly reduce output to lower frequency). In other words, the loss of the Heywood interconnector when power is flowing from South Australia, results in an oversupply of generation, increasing the frequency in South Australia. Contingency lower services are sourced from registered suppliers in South Australia (typically generators) in proportion to the flow across the interconnector from South Australia to Victoria to quickly reduce that over frequency.

A similar situation exists for contingency “raise” services for all other regions except South Australia where, in accordance with the advice from the JSSC, the raise requirement is covered by under frequency load shedding. In other words, the loss of the Heywood interconnector when power is flowing into South Australia, results in an undersupply of generation decreasing the frequency in South Australia. Under frequency load shedding reduces demand in blocks to arrest the falling frequency until supply matches demand and the frequency is restored.

In either event, in the past, in the period immediately following the separation event AEMO would invoke local regulation services and establish a local regulation reference source to manage frequency until the region can be reconnected to the rest of the NEM. It is this aspect that has been recently changed by AEMO. AEMO will now impose a requirement for local lower and raise regulation services in South Australia prior to the failure of the interconnector so that frequency after an island is formed, and after the contingency services have operated, can be smoothly maintained.

Appendix C: 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.

Table C 1: Significant rebids for 9 November – lower regulation

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MW)	Price to (\$/MW)	Rebid reason
3.16 pm	4.05 pm	Origin	Quarantine	46	NA	>0*	1510A constraint management - F_S+LREG_003 5 SL
6.16 pm	6.35 pm	Origin	Quarantine	46	NA	>0**	1813A constraint management - F-V-HYMO SL

Table C 2: Significant rebids for 9 November– raise regulation

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from (\$/MW)	Price to (\$/MW)	Rebid reason
3.16 pm	4.05 pm	Origin	Quarantine	46	NA	>0*	1510A constraint management - F_S+LREG_0035 SL
6.16 pm	6.35 pm	Origin	Quarantine	46	NA	>0**	1813A constraint management - F-V-HYMO SL

*7 MW was priced at \$0/MW while 39 MW was priced above \$11 480/MW

**8 MW was priced at \$0/MW while 38 MW was priced above \$11 480/MW

Appendix D: Closing bids

Figures D1a to D6b highlight for each dispatch interval the lower and raise regulation services closing bids for Origin, AGL and Engie (the participants in South Australia with ancillary service capability). It also shows the dispatch level of the respective services at each station and the dispatch price.

FCAS services are co-optimised with energy offers. For example a generator that is operating at its maximum capacity cannot provide raise services so their effective available capacity for raise services would be zero. Figures denoted with an “a” refer to the quantities offered while those with a “b” refer to the *effective* quantities available to the market after accounting for the interaction between energy and FCAS (“effective available capacity”).

Lower Regulation

Figure D1a: Quarantine (Origin) lower regulation service closing bid prices, dispatch and dispatch price - maximum offers

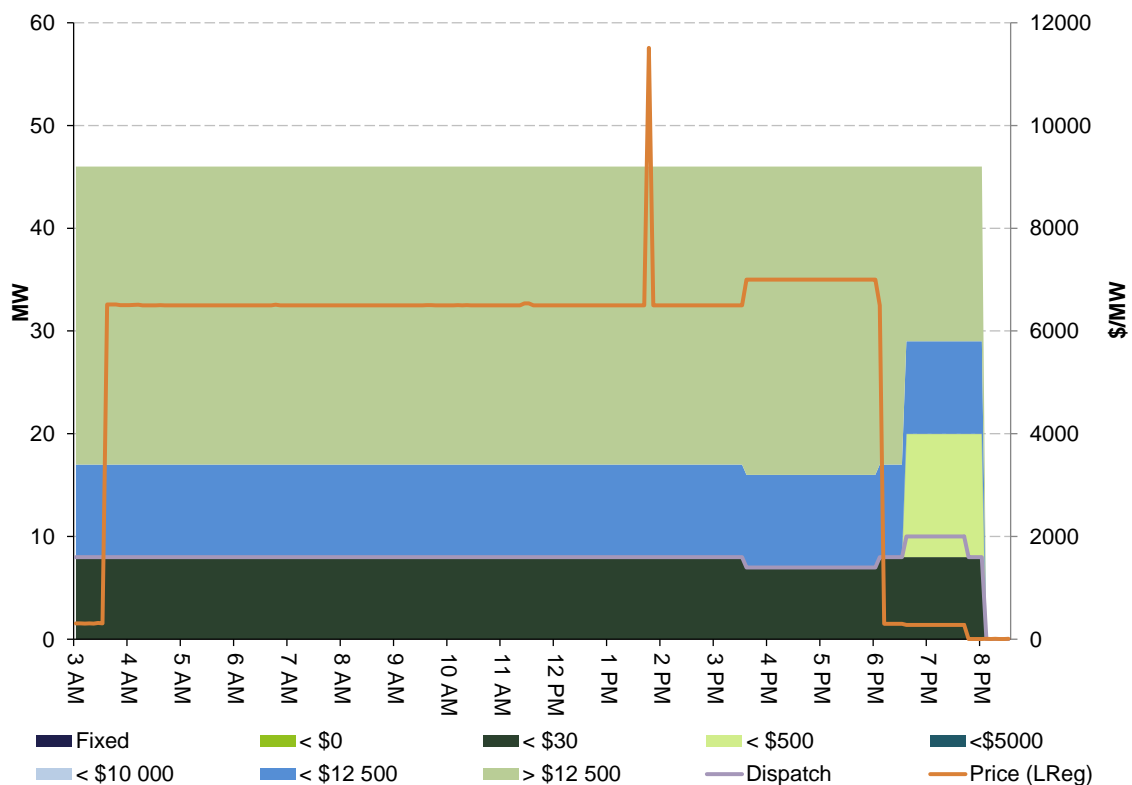


Figure D1b: Quarantine (Origin) lower regulation service closing bid prices, dispatch and dispatch price – effective offers

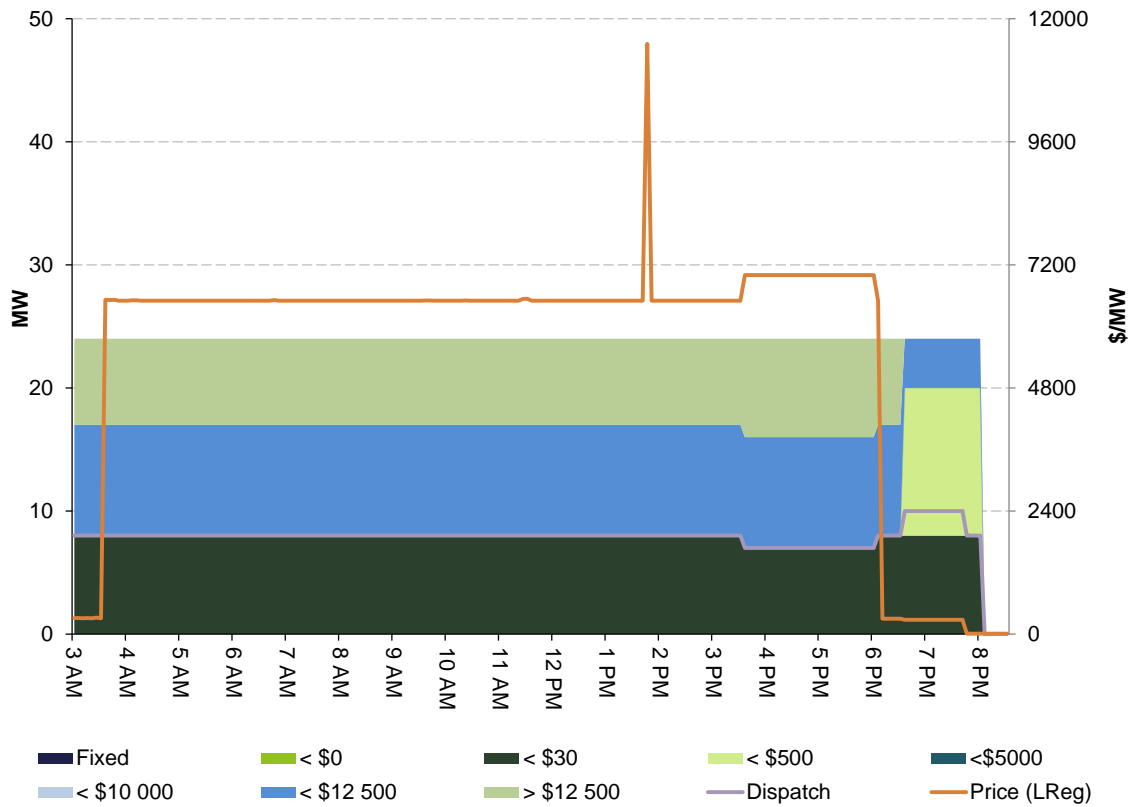


Figure D2a: Torrens Island (AGL) lower regulation service closing bid prices, dispatch and dispatch price – maximum offers

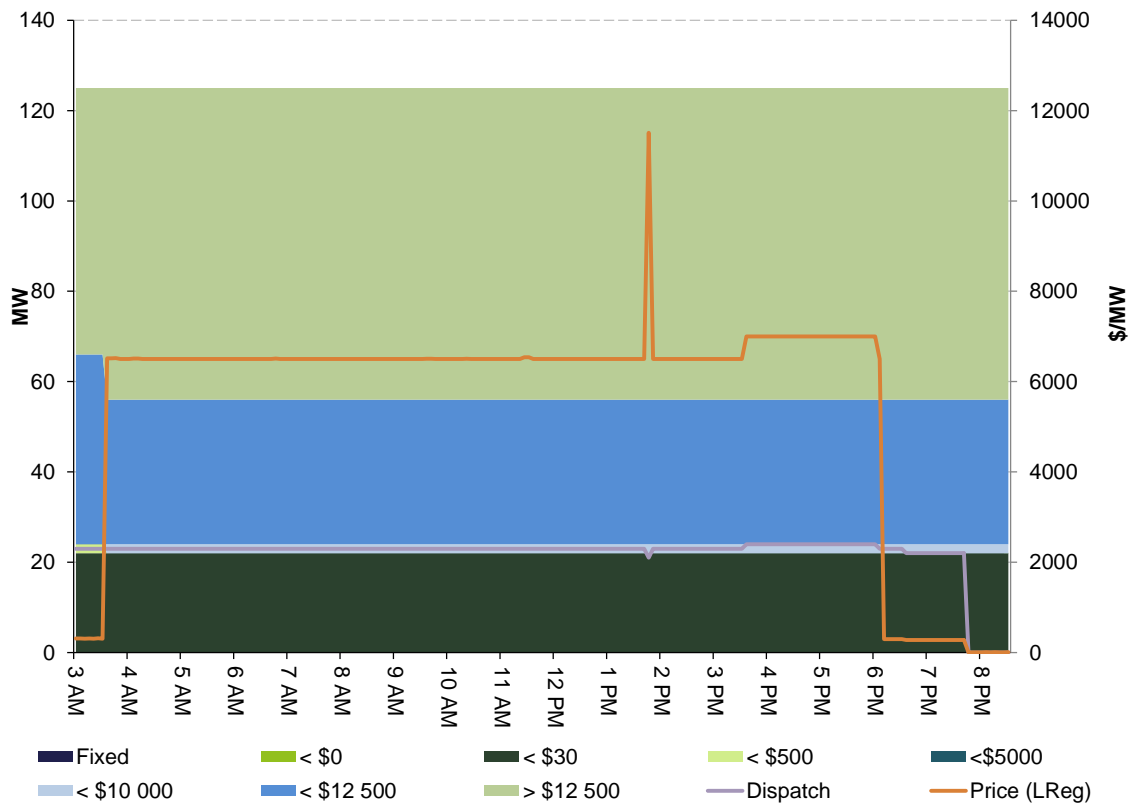


Figure D2b: Torrens Island (AGL) lower regulation service closing bid prices, dispatch and dispatch price – effective offers

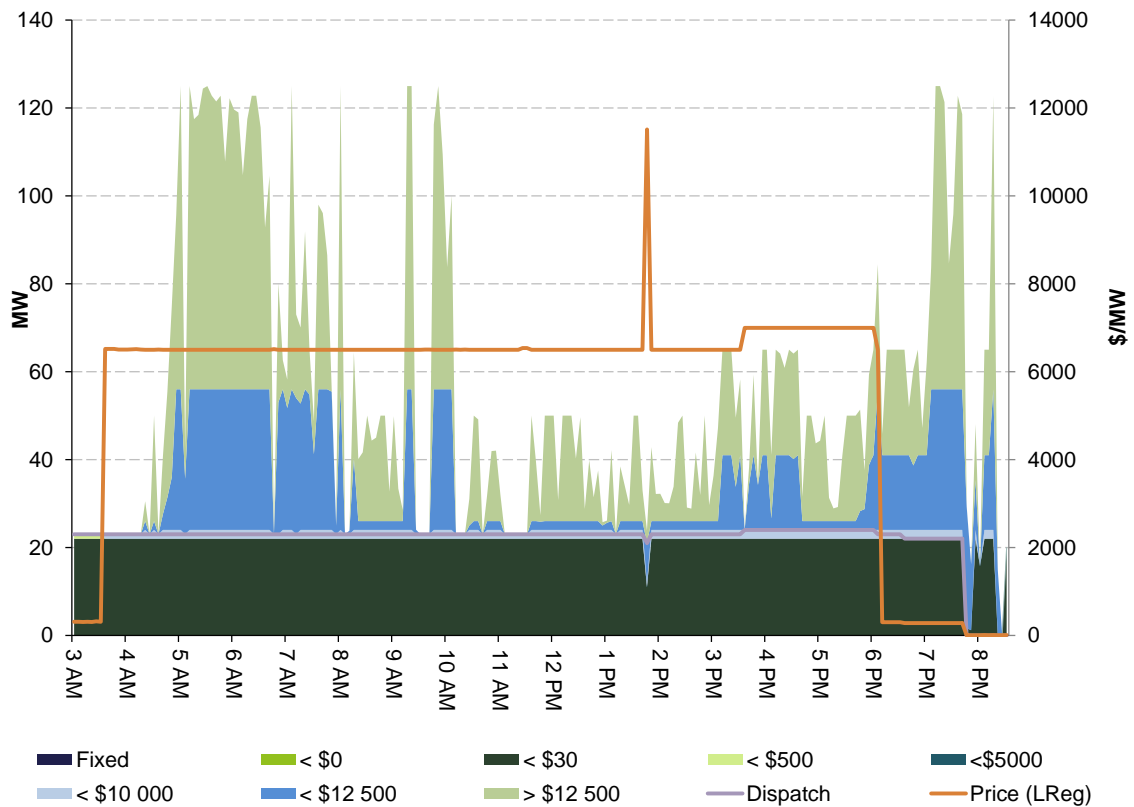


Figure D3a: Pelican Point (Engie) lower regulation service closing bid prices, dispatch and dispatch price – maximum offers

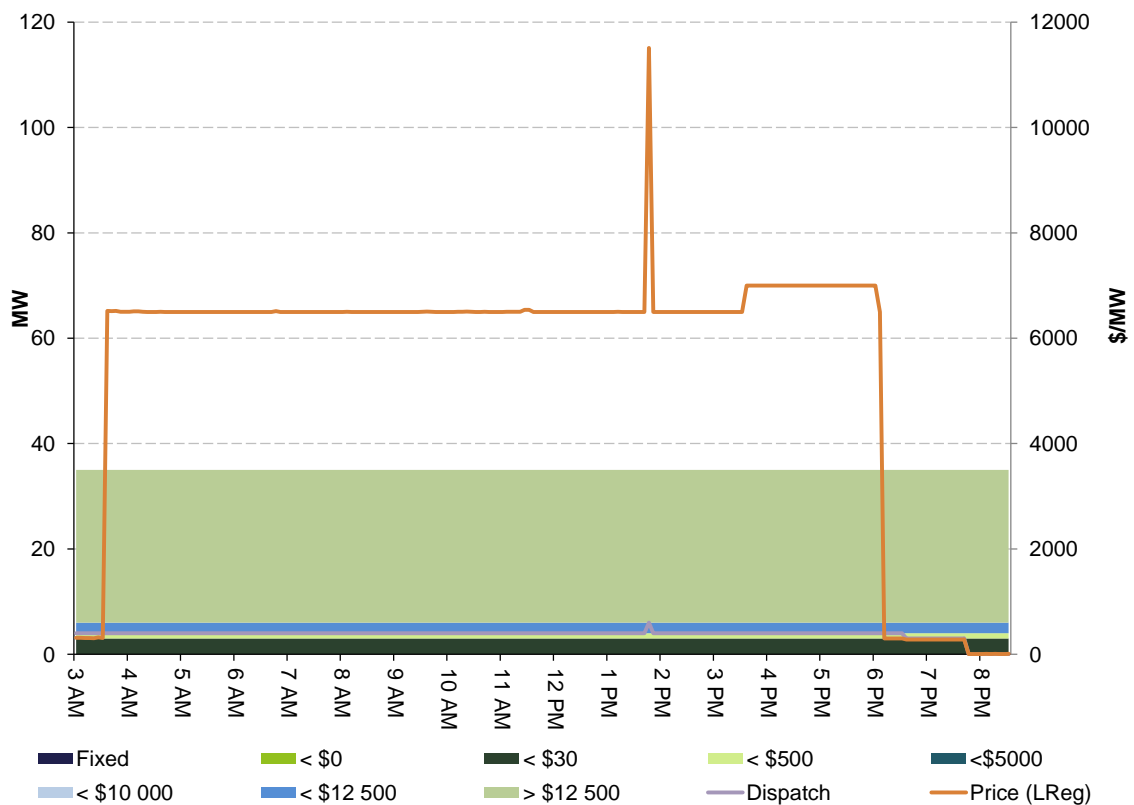
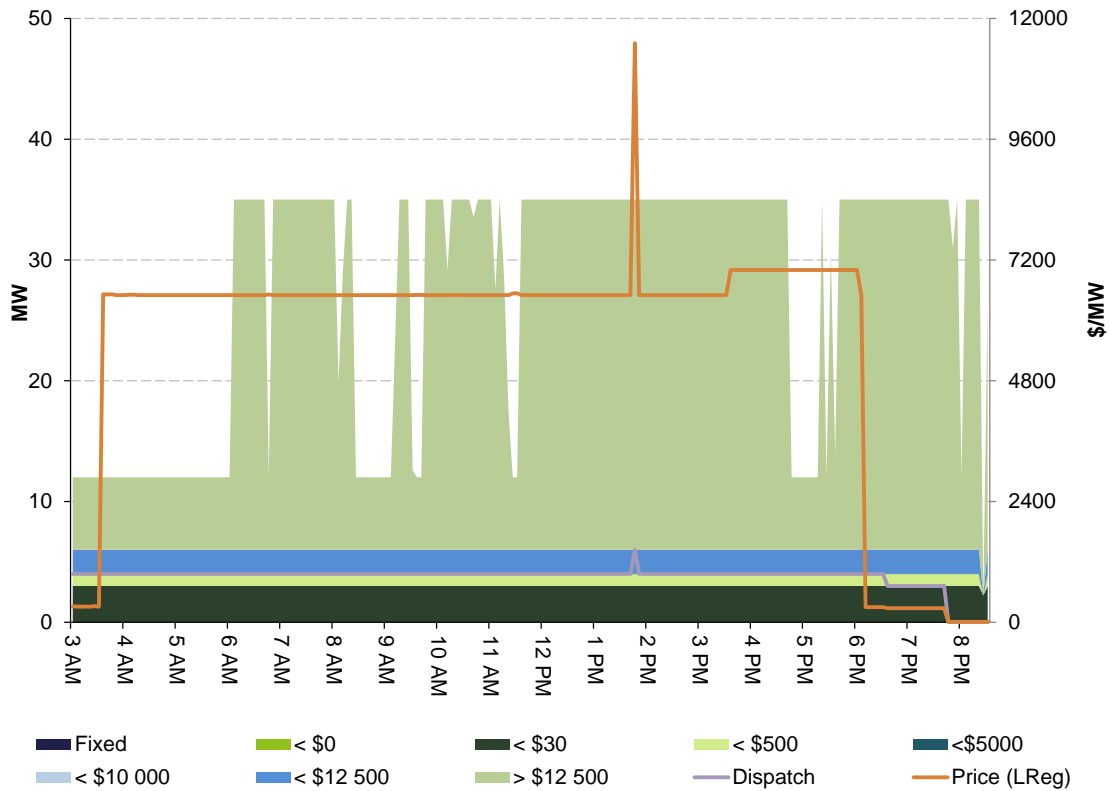


Figure D3b: Pelican Point (Engie) lower regulation service closing bid prices, dispatch and dispatch price – effective offers



Raise Regulation

Figure D4a: Quarantine (Origin) raise regulation service closing bid prices, dispatch and dispatch price - maximum offers

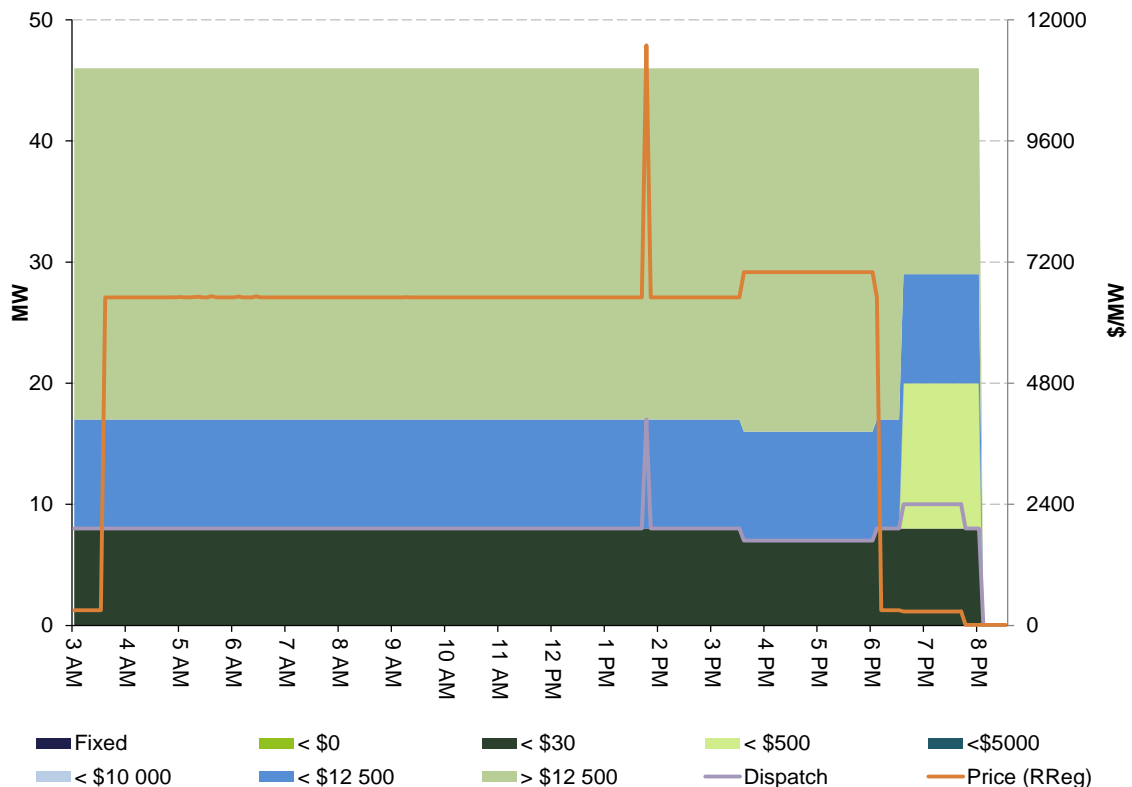


Figure D4b: Quarantine (Origin) raise regulation service closing bid prices, dispatch and dispatch price - effective offers

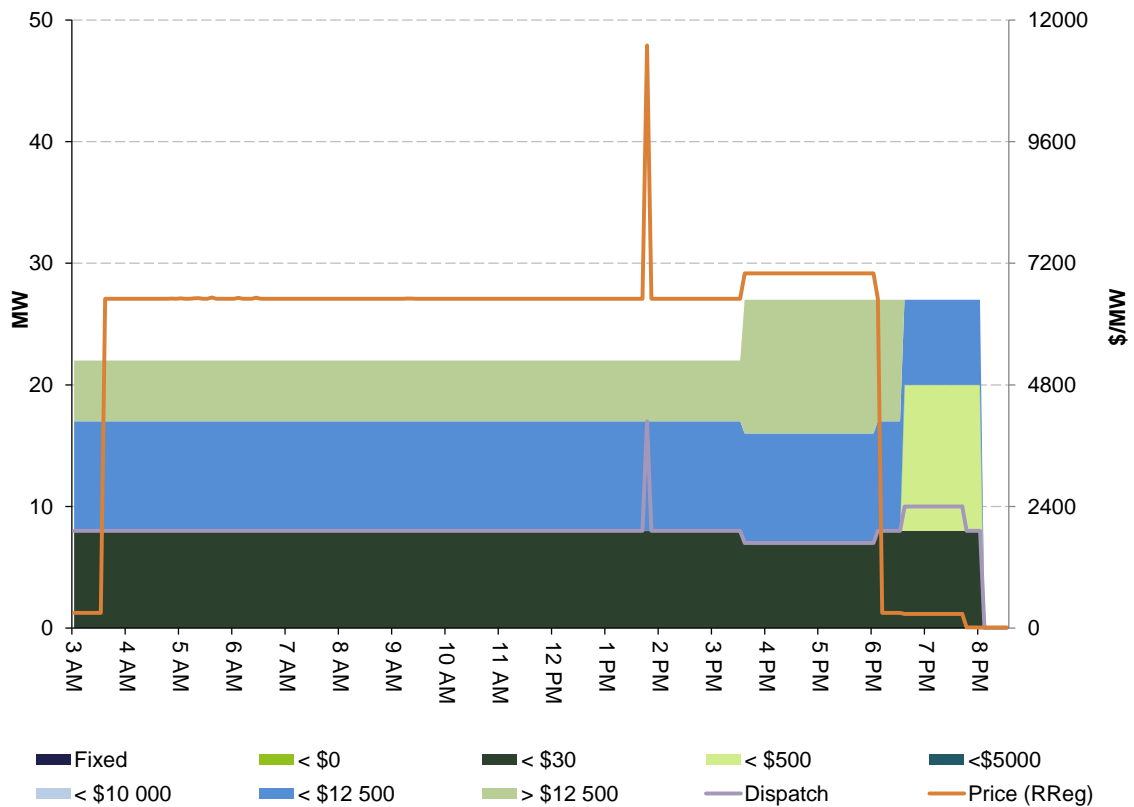


Figure D5a: Torrens Island (AGL) raise regulation service closing bid prices, dispatch and dispatch price – maximum offers

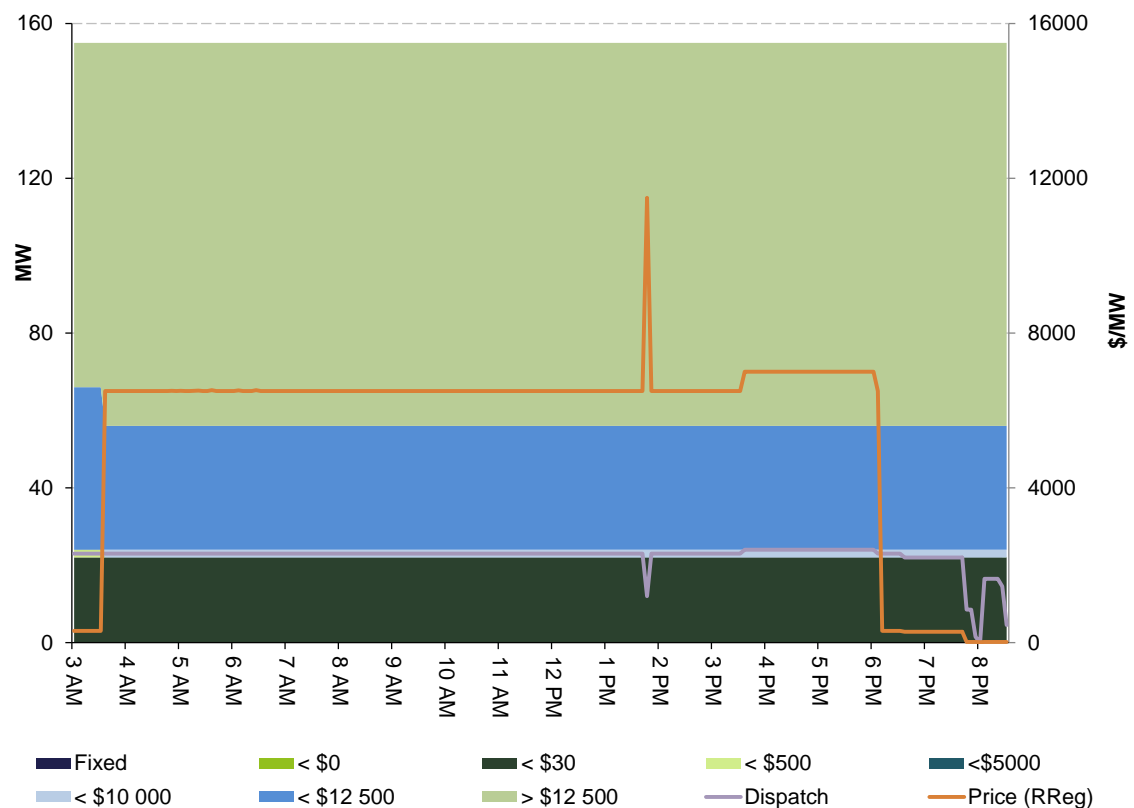


Figure D5b: Torrens Island (AGL) raise regulation service closing bid prices, dispatch and dispatch price – effective offers

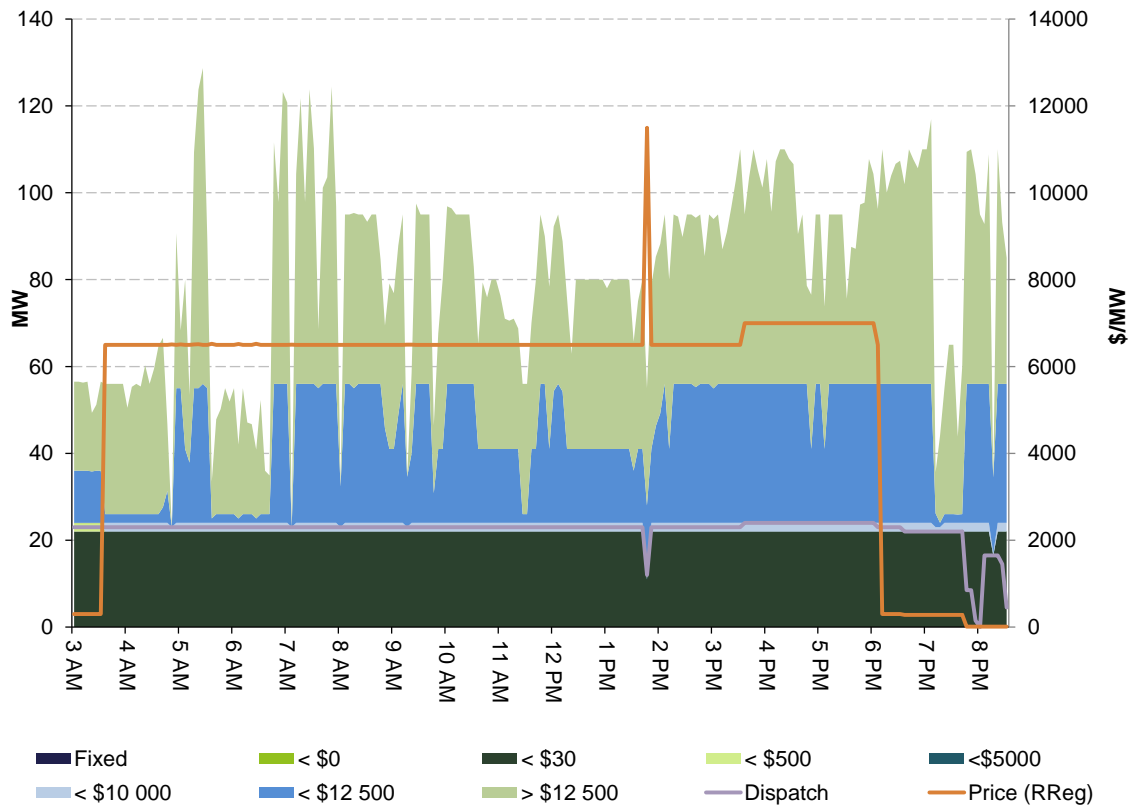


Figure D6a: Pelican Point (Engie) raise regulation service closing bid prices, dispatch and dispatch price – maximum offers

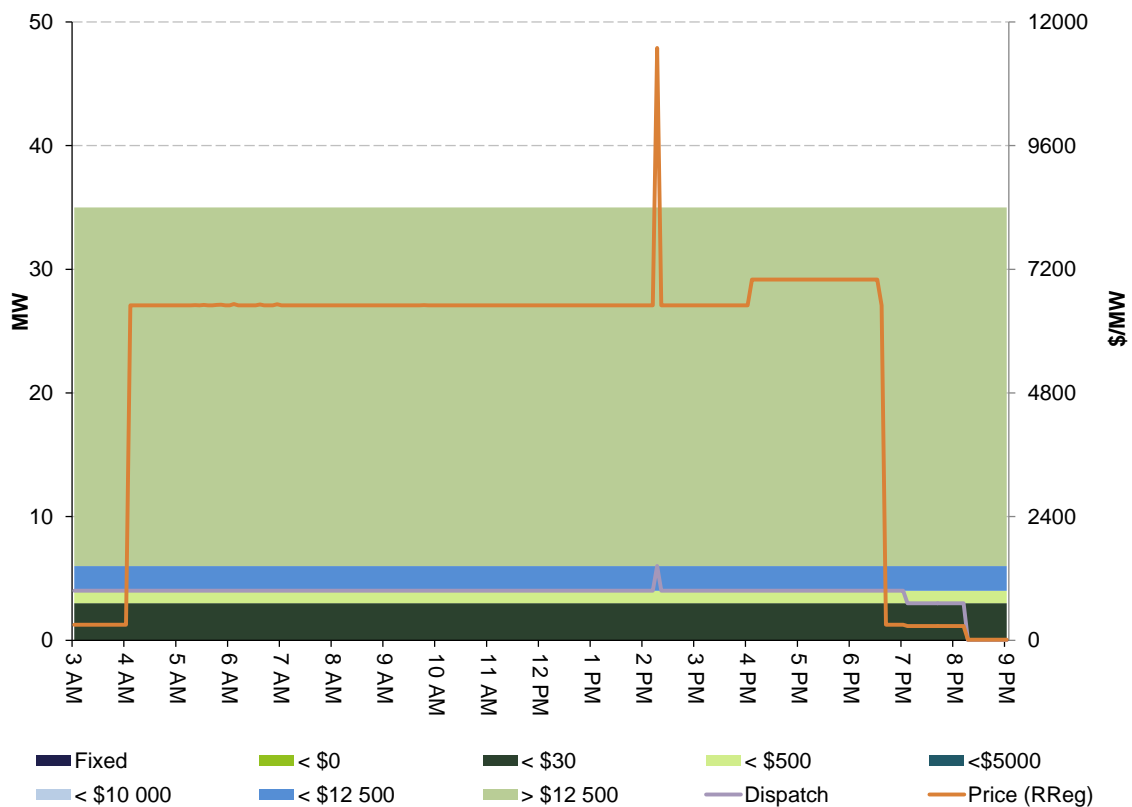
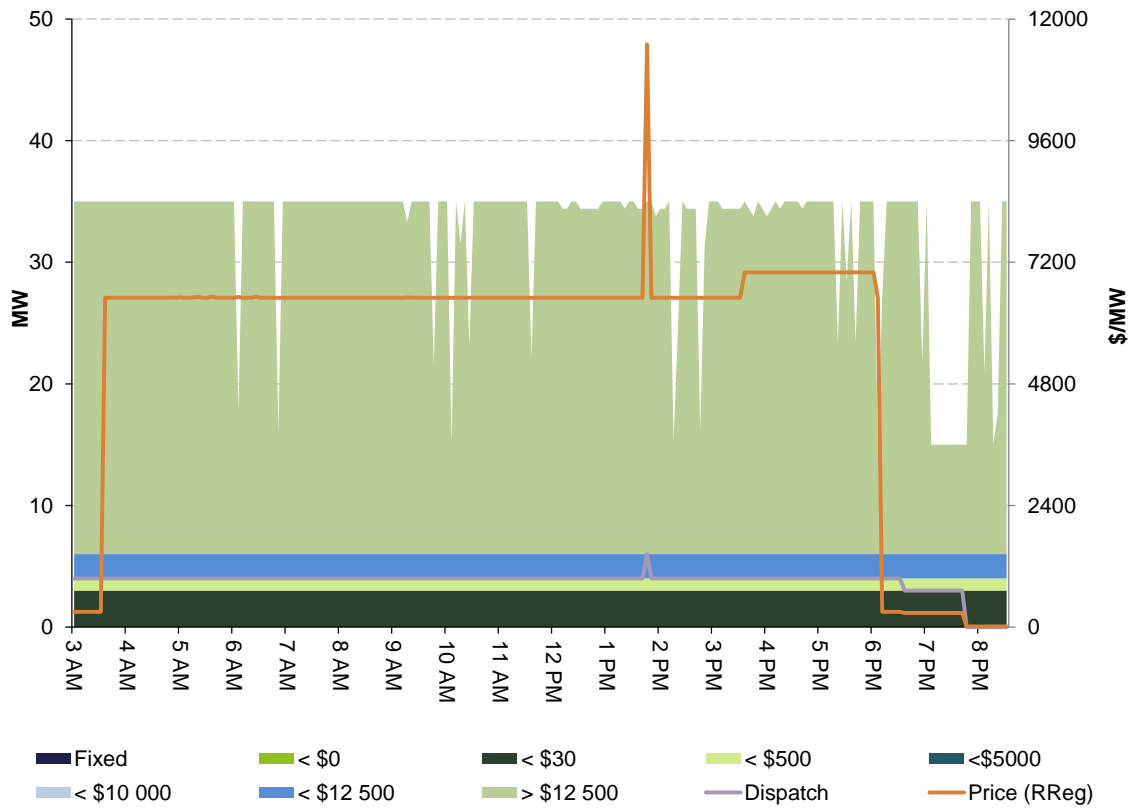


Figure D6b: Pelican Point (Engie) raise regulation service closing bid prices, dispatch and dispatch price – effective offers



Appendix E: Relevant Market Notices

AEMO issued the following market notices relating to events on the day.

Market Notice	Type	Date of issue	Last Changed
55311	GENERAL NOTICE	10/10/2016 7:49: 06	10/10/2016 7:49: 06

Reason

AEMO ELECTRICITY MARKET NOTICE

This market notice is FOR INFORMATION ONLY.

The Heywood No.2 500 kV busbar in Victoria Region is planned out of service from 1600 hrs on 8 November 2016 to 0600 hrs on 9 November 2016. During this outage, Heywood 500/275 kV M2 transformer will be off-loaded and Heywood - Mortlake - Alcoa Portland No.2 500 kV line will be opened at Heywood.

During this outage, a credible contingency can separate South Australia region from the rest of the NEM.

Under these circumstances, 35 MW of Raise and Lower regulation FCAS will be sourced from South Australia for the duration of this outage. In addition, consistent with AEMO existing procedures, adequate contingency FCAS lower requirements will also be sourced from South Australia at times when power transfer is from South Australia to Victoria.

The following constraint sets have been invoked for this outage:

F-I_HYSE (includes F-S_LREG_0035 and F-S_RREG_0035)
S-X_BC_CP
V-HYTX_M12
V-HY_500BUS

Refer AEMO Network Outage Schedule (NOS) for further details.

AEMO will continue monitoring this proposed outage and will update the Market accordingly.

Edmund Hon
AEMO Operations

Market Notice	Type	Date of issue	Last Changed
55368	GENERAL NOTICE	13/10/2016 14:19: 38	13/10/2016 14:19: 38

Reason

AEMO ELECTRICITY MARKET NOTICE.

Refer to MN 55311

This market notice is FOR INFORMATION ONLY.

The Heywood No.2 500 kV busbar in Victoria Region is planned out of service from 1600 hrs on 8 November 2016 to 0600 hrs on 9 November 2016 has been re-scheduled to start 0600 hrs on 8 November 2016 to 1600 hrs on 9 November 2016 . During this outage, Heywood 500/275 kV M2 transformer will be off-loaded and Heywood - Mortlake - Alcoa Portland No.2 500 kV line will be opened at Heywood.

During this outage, a credible contingency can separate South Australia region from the rest of the NEM.

Under these circumstances, 35 MW of Raise and Lower regulation FCAS will be sourced from South Australia for the duration of this outage. In addition, consistent with AEMO existing procedures, adequate contingency FCAS lower requirements will also be sourced from South Australia at times when power transfer is from South Australia to Victoria.

The following constraint sets have been invoked for this outage:

F-I_HYSE (includes F-S_LREG_0035 and F-S_RREG_0035)
S-X_BC_CP
V-HYTX_M12
V-HY_500BUS

Refer AEMO Network Outage Schedule (NOS) for further details.

AEMO will continue monitoring this proposed outage and will update the Market accordingly.

Edmund Hon
AEMO Operations

Market Notice	Type	Date of issue	Last Changed
55608	INTER-REGIONAL TRANSFER	09/11/2016 17:16:20	09/11/2016 17:16:20

Reason

AEMO ELECTRICITY MARKET NOTICE

Inter-Regional Transfer Limit Variation - Heywood-Mortlake 500 kV Line and Heywood 2 500 kV bus -Vic region 09/11/2016

The return to service of the Heywood-Mortlake 500 kV Line and Heywood 2 500 kV bus has been delayed. Latest return to service time is 1830 hrs.

Refer to AEMO Network Outage Schedule (NOS) for further details.

Manager NEM Real Time Operations

Market Notice	Type	Date of issue	Last Changed
55612	ADMINISTERED PRICE CAP	09/11/2016 18:30:10	09/11/2016 18:30:10

Reason

AEMO ELECTRICITY MARKET NOTICE

Issued by Australian Energy Market Operator Ltd at 1830 hrs on 9 November 2016

ADMINISTERED PRICE PERIOD DECLARED in SA region.

AEMO has determined that the rolling sum of the uncapped market ancillary Raise Reg services(s) prices for the SA region over the previous 2016 dispatch intervals has exceeded 6 times the cumulative price threshold (CPT) of \$210,100.00.

In accordance with Clause 3.14 of the National Electricity Rules, AEMO has determined that an administered price period will commence at the dispatch interval starting 1835 hrs on 9 Nov 2016 and will continue through to the end of that trading day.

An administered price cap (APC) of 300 \$/MWh will apply to all dispatch intervals during this administered price period. This APC will apply to all market ancillary service prices in the SA region.

An administered floor price (AFP) of 0 \$/MWh AFP will apply to all market ancillary service prices.

AEMO will continue to monitor the rolling sum of the uncapped market ancillary service prices and issue further market notices as required.

This is an AEMO autogenerated Market Notice.

Appendix F: Price setter

The following tables identify for each five-minute dispatch interval where regulation dispatch prices were above \$5000/MW, the price and the generating units involved in setting the price for each of the lower and raise regulation services in South Australia. This information is published by AEMO.⁶ Also shown are the offer prices involved in determining the dispatch price, together with the quantity of that service and the contribution to the total price. AEMO reports an increase as a negative marginal change in FCAS price setter. Generator offers which contributed zero to the price have been removed for clarity.

Lower regulation 9 November

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
04:05	\$6517.36	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:10	\$6515.39	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:15	\$6517.63	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:20	\$6502.17	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:25	\$6501.92	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:30	\$6501.37	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:35	\$6508.18	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:40	\$6511.31	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:45	\$6500.69	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
04:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:05	\$6502.36	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
05:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00

⁶ Details on how the price is determined can be found at www.aemo.com.au

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
06:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
06:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:15	\$6512.15	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
07:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:35	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
08:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
09:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
09:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:00	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:05	\$6503.90	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:10	\$6503.37	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:40	\$6501.39	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:45	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:50	\$6505.25	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
10:55	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:10	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:35	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:40	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:45	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:50	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
11:55	\$6536.83	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:00	\$6537.53	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
12:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
12:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:40	\$6499.30	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
13:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:15	\$11 508.64	AGL (SA)	TORRA3	Lower reg	\$11 499.99	-1.00	-\$11 499.99
14:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
14:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:05	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:10	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:15	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:20	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:25	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:30	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
15:40	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:45	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:50	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
15:55	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
16:00	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00
16:05	\$6999.30	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:10	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:15	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:20	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:25	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:30	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:35	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:40	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:45	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:50	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
16:55	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:00	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:05	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:10	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:15	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:20	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:25	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:30	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:35	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:40	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:45	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:50	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
17:55	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:00	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:05	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:10	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:15	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:20	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:25	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:30	\$6999.00	AGL (SA)	TORRB3	Lower reg	\$6999.00	-1.00	-\$6999.00
18:35	\$6499.00	AGL (SA)	TORRB1	Lower reg	\$6499.00	-1.00	-\$6499.00

Raise regulation 9 November

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
04:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
04:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:20	\$6505.13	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:30	\$6506.91	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:45	\$6508.50	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:50	\$6510.83	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
05:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:05	\$6523.61	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:35	\$6515.30	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
06:55	\$6521.95	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
07:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:35	\$6500.50	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
07:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
08:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:45	\$6502.57	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:50	\$6501.95	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
09:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
10:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
10:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
11:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
12:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
13:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
13:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:15	\$11 496.69	Engie	PPCCGT	Raise reg	\$11 496.69	-1.00	-\$11 496.69
14:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
14:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:05	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:10	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:15	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:20	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:25	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:30	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:40	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:45	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:50	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
15:55	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
16:00	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00
16:05	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:10	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:15	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:20	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:25	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:30	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
16:35	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:40	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:45	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:50	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
16:55	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:00	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:05	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:10	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:15	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:20	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:25	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:30	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:35	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:40	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:45	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:50	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
17:55	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:00	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:05	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:10	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:15	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:20	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:25	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:30	\$6999.00	AGL (SA)	TORRB3	Raise reg	\$6999.00	-1.00	-\$6999.00
18:35	\$6499.00	AGL (SA)	TORRB1	Raise reg	\$6499.00	-1.00	-\$6499.00