Report into market ancillary service prices above $5000/MW

South Australia, 14 September 2017

15 November 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 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 14 September 2017 the price for local regulation services in South Australia exceeded $5000/MW for 96 consecutive dispatch intervals, from 8.35 am to 4.30 pm. This was much higher than the wholesale (or spot) price for electricity in South Australia, which was below $100/MWh for the same period (with negative prices at 11.30 am and 12 pm).

A planned network outage in Victoria affecting the Heywood interconnector began at 8.35 am on 14 September. 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.

With below 35 MW of low-priced (below $5000/MW) raise and lower regulation services planned and made available for the duration of the outage, prices exceeded $5000/MW for most of the day from 8.35 am. However, from 4.35 pm on the day AGL made sufficient low-priced capacity available to cause prices for both services to fall to around $300/MW until the requirement was removed at 6.20 pm.

3 Analysis

The following sections explain the reasons for the high regulation services prices. To summarise, in response to a planned network outage in South Australia on the Heywood interconnector, AEMO imposed the requirement that 35 MW of regulation services be sourced locally in South Australia. Participants only offered 30 MW of regulation service capacity priced less than $5000/MW and therefore higher priced capacity was needed to meet the requirement. The price for both services reached or exceeded $10 900/MW for all dispatch intervals from 8.35 am to 4.30 pm. From 4.35 pm until the outage finished at 6.20 pm, the price for both services dropped to around $300/MW because AGL rebid 24 MW in both services from high to low prices.

3.1 Planned network outage

Market notice 59175 (published on 11 September and replicated in Appendix E) advised the market there would be a short notice forced outage in South Australia causing constraints to be immediately invoked to reduce the import limit on the Vic-SA interconnector to 250 MW.

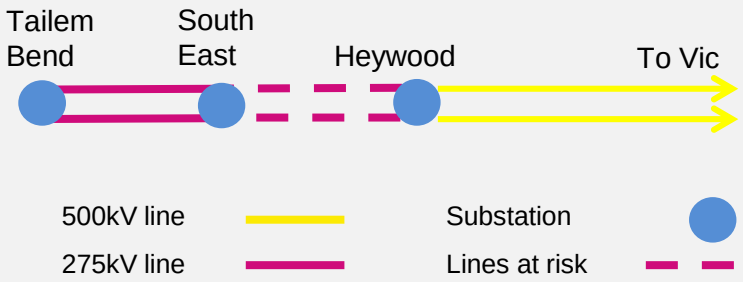
Market notice 59179 (published on 13 September and replicated in Appendix E) advised the market that performing the work would put the Heywood interconnector at increased risk of tripping, and that as a result AEMO would reclassify the interconnector as a credible (single) contingency when the work was being carried out. As explained in Box 1, when South Australia is on a single contingency, AEMO requires South Australia to source 35 MW of regulation services locally. To this end, AEMO invoked the appropriate constraints to give effect to this requirement.

Although the work was scheduled to take place from 8 am to 5 pm on 14 and 15 September (according to market notice 59179), work actually began at 8.35 am on 14 September and finished at 6.02 pm the same day, and the requirement was revoked at 6.20 pm (see market notice 59191).

All market notices relating to the outage are at Appendix E.

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.

3.2 Regulation FCAS availability, forecast prices and price outcomes

This section discusses participants' FCAS offers and price outcomes.

3.2.1 FCAS capacity

Of the 26 power stations (including 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

Power Station	Registered Capacity (MW)	
	Lower regulation	Raise regulation
Pelican Point (Engie)	100	100
Torrens Island (AGL)	200	260
Total	**386**	**446**

On the day, Quarantine power station, half of Pelican Point and five units at Torrens Island power station were unavailable. So, although the registered capacity is as shown in Table 1, participants only offered around 110 MW of lower regulation and around 140 MW of raise regulation services.

3.2.2 Forecast prices

As only 20 MW of low-priced (below $5000/MW) raise and lower regulation services capacity was initially offered on 13 September for the duration of the outage on 14 September, prices for regulation services were initially expected to be above $12 800/MW for the duration of the outage.

As shown in Appendix C, in a rebid at 3.20 pm on 13 September, effective from 8.05 am on 14 September, Origin Energy added 10 MW of capacity of both services at its Osborne power station, all priced at $0/MW. The rebid reason related to constraint management, and was effective for the entire duration of the outage. As a result of the rebid, more low-priced capacity was available, but still not enough to meet the 35 MW requirement. Prices for both services for the following day were expected to be around $11 000/MW, lower than the $12 800/MW originally expected.

3.2.3 Price outcomes

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 priced below $5000/MW and effective available capacity priced above $5000/MW is indicated by the light orange shaded areas. The figures show that, as there was not enough low priced capacity (blue shaded area) to meet the requirement (red line), high priced capacity (light orange shaded area) was required, resulting in prices of around $10 970/MW and above from 8.35 am until 4.30 pm inclusive, after which time the price for both services fell to significantly lower levels.

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

Figure 1: Lower regulation effective offers, requirement and price

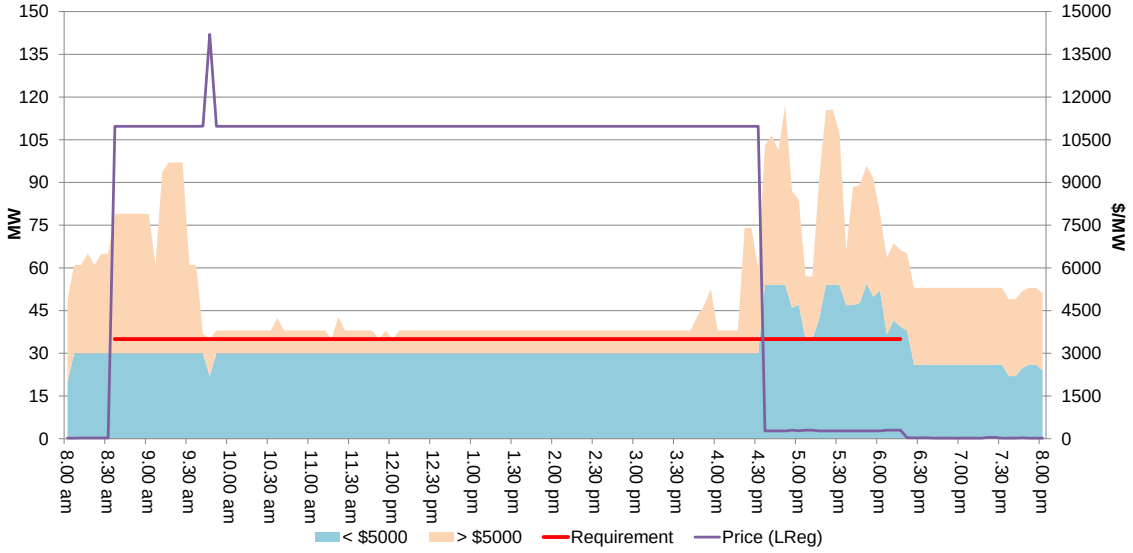
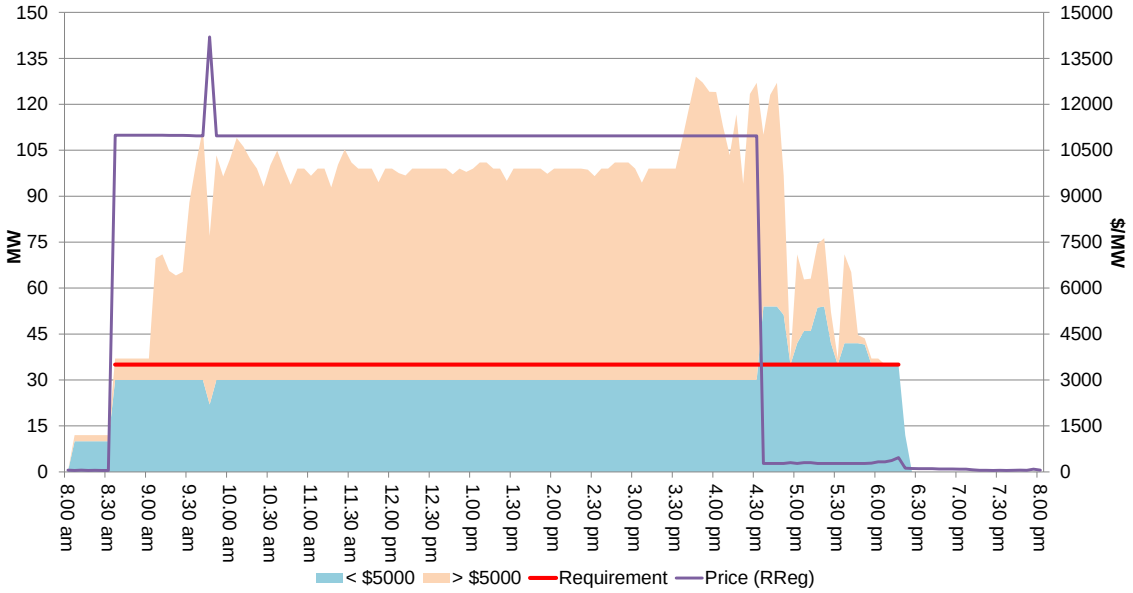


Figure 2: Raise regulation effective offers, requirement and price



3.2.3.1 9.45 am price spike

Figure 1 and Figure 2 show that prices for raise and lower regulation services increased to $14 200/MW at 9.45 am, when Pelican Point's energy output fell below its minimum output in order to provide FCAS. (See Box 2 for an explanation of the relationship between FCAS availability and energy output.) This had the effect of removing 8 MW of low-priced (below $5000/MW) raise and lower regulation services, resulting in the need for higher priced capacity to meet the 35 MW requirement, ultimately increasing the price of these services to $14 200/MW.

At 9.50 am, Pelican Point's energy output increased to sufficient levels to begin providing FCAS once more, which saw prices return to around $10 970/MW.

3.2.3.2 4.35 pm price drop

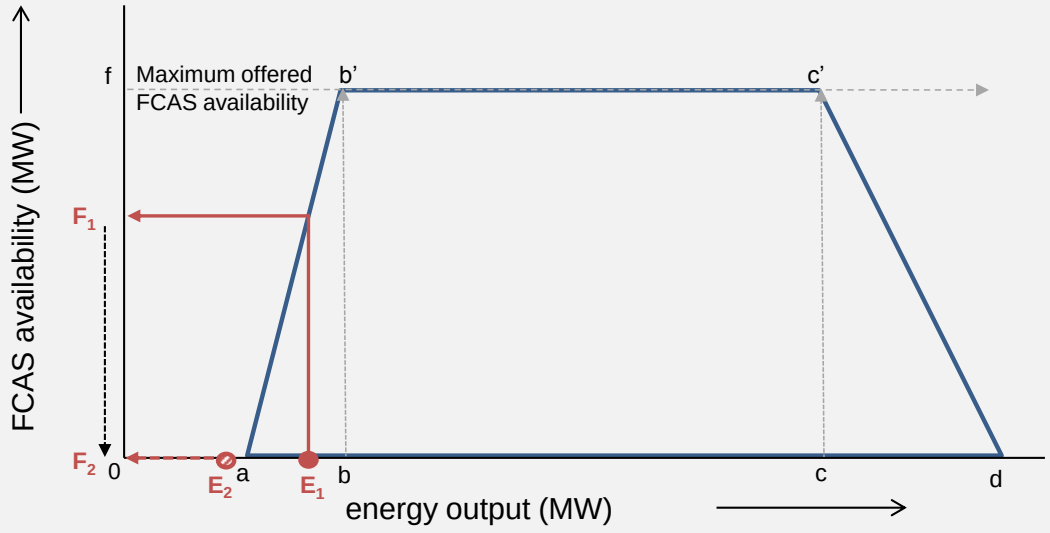
Figure 1 and Figure 2 show prices for raise and lower regulation services fell to $276/MW at 4.35 pm. As shown in Appendix C, at 11.33 am, effective from 4.35 pm, AGL rebid 24 MW of both services from $14 200/MW to $300/MW and below. The rebid reasons related to a change in forecast price. These rebids remained in effect for the remainder of the day, so even though the 35 MW requirement was not revoked until 6.20 pm, the price remained around $300/MW in both services until the outage ended.

Box 2: Relationship 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 $14 200 for a trading day. Trading days start at 4 am. Participants also offer the limits at which they can be dispatched in FCAS (a, b, c, d in the diagram below). The relationship between the provision of FCAS and energy determines the effective availability of FCAS. For example in the diagram below, if a generator's energy output is at E_1 then its effective FCAS availability is at F_1. If its output in energy decreases to E_2 then its effective FCAS availability drops to F_2 (0 MW) until such time as its energy output increases to sufficient levels.

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.



Australian Energy Regulator

November 2017

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 follows[2].

- Regulation FCAS: Cost recovery on a "causer pays" basis using the Causer Pays Procedure[3] 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.

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

3 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 14 September – lower regulation

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MW)	Price to ($/MW)	Rebid reason
3.20 pm (13 Sept)	8.05 am	Origin	Osborne	10	n/a	0	1455A CONSTRAINT MANAGEMENT - F_S++HYSE_L6_1 SL
11.33 am	4.35 pm	AGL	Torrens Island	24	14 200	≤300	1125~A~040 CHG IN AEMO DISP~45 PRICE INCREASE VS PD RAISEREG AND LOWERREG SA $14200 VS $10969

Table C 2: Significant rebids for 14 September – raise regulation

Submit time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MW)	Price to ($/MW)	Rebid reason
3.20 pm (13 Sept)	8.05 am	Origin	Osborne	10	n/a	0	1455A CONSTRAINT MANAGEMENT - F_S++HYSE_L6_1 SL
11.33 am	4.35 pm	AGL	Torrens Island	24	14 200	≤300	1125~A~040 CHG IN AEMO ISP~45 PRICE NCREASE VS PD RAISEREG AND LOWERREG SA $14200 VS $10969

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

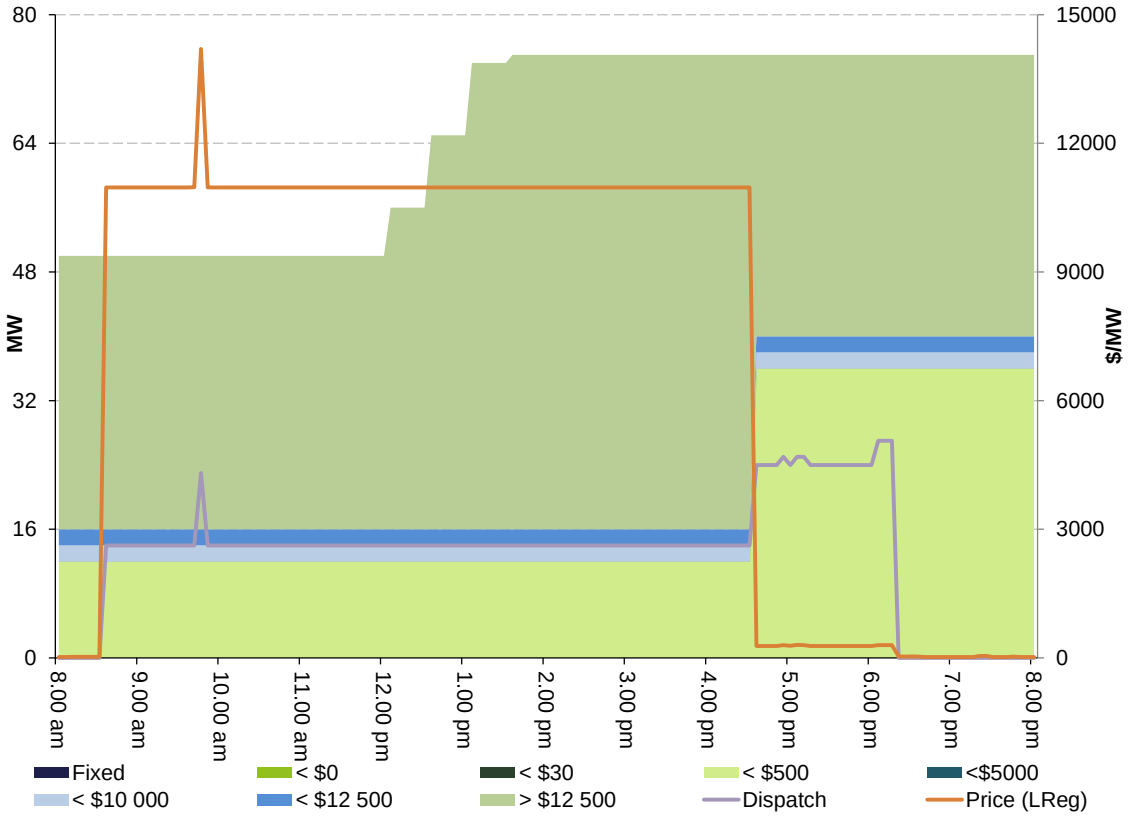


Figure D1b: Torrens Island (AGL) lower regulation service closing bid prices, dispatch and dispatch price – effective offers

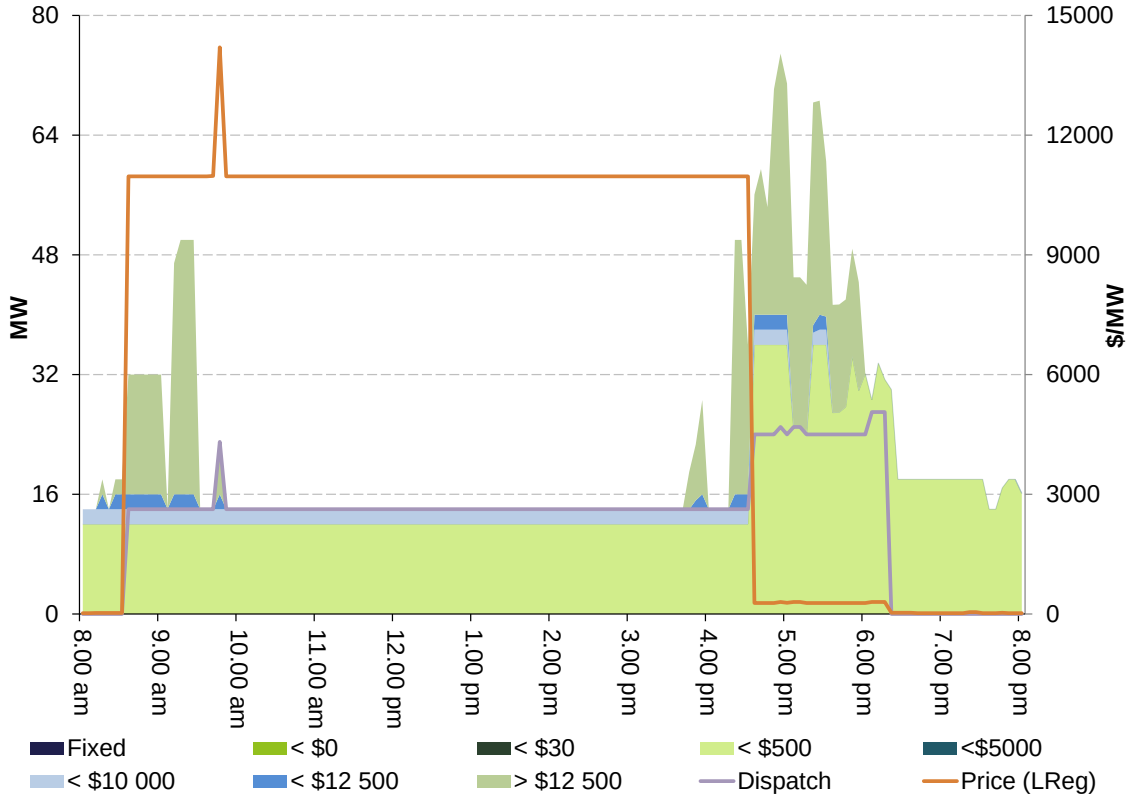


Figure D2a: Pelican Point (Engie) lower regulation service closing bid prices, dispatch and dispatch price – maximum offers

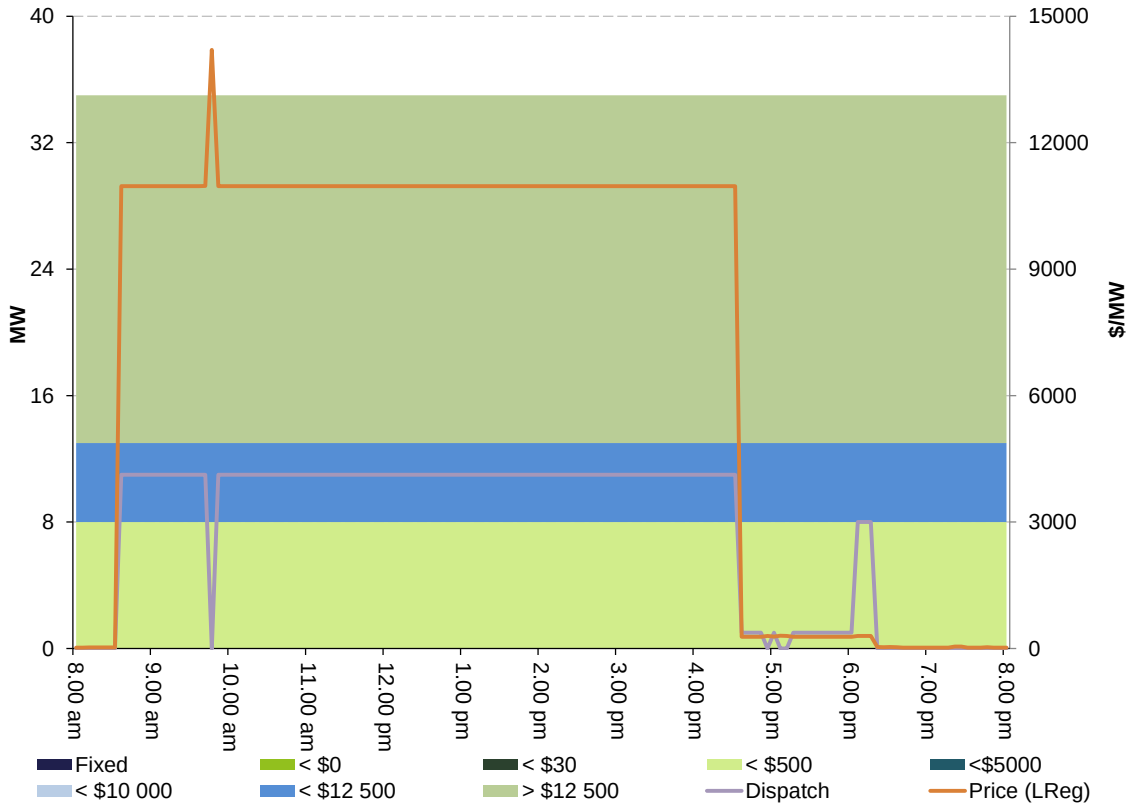


Figure D2b: Pelican Point (Engie) lower regulation service closing bid prices, dispatch and dispatch price – effective offers

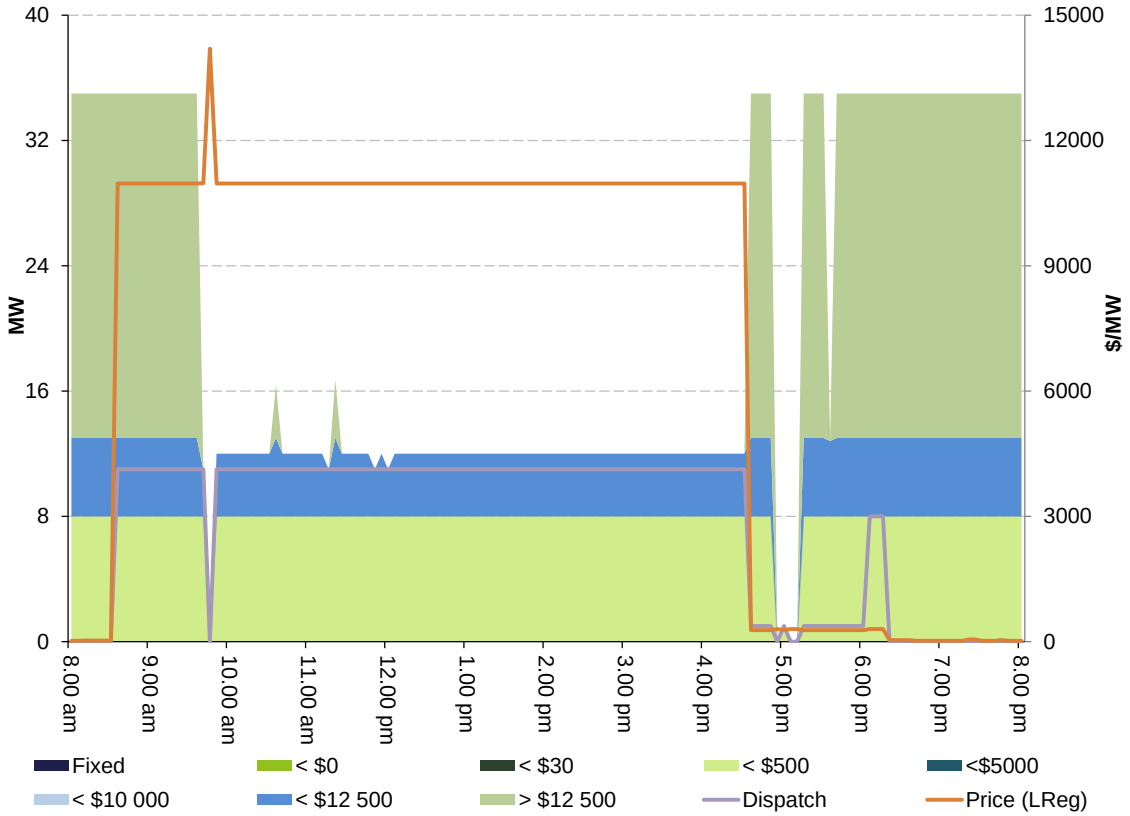


Figure D3a: Osborne (Origin) lower regulation service closing bid prices, dispatch and dispatch price – maximum offers

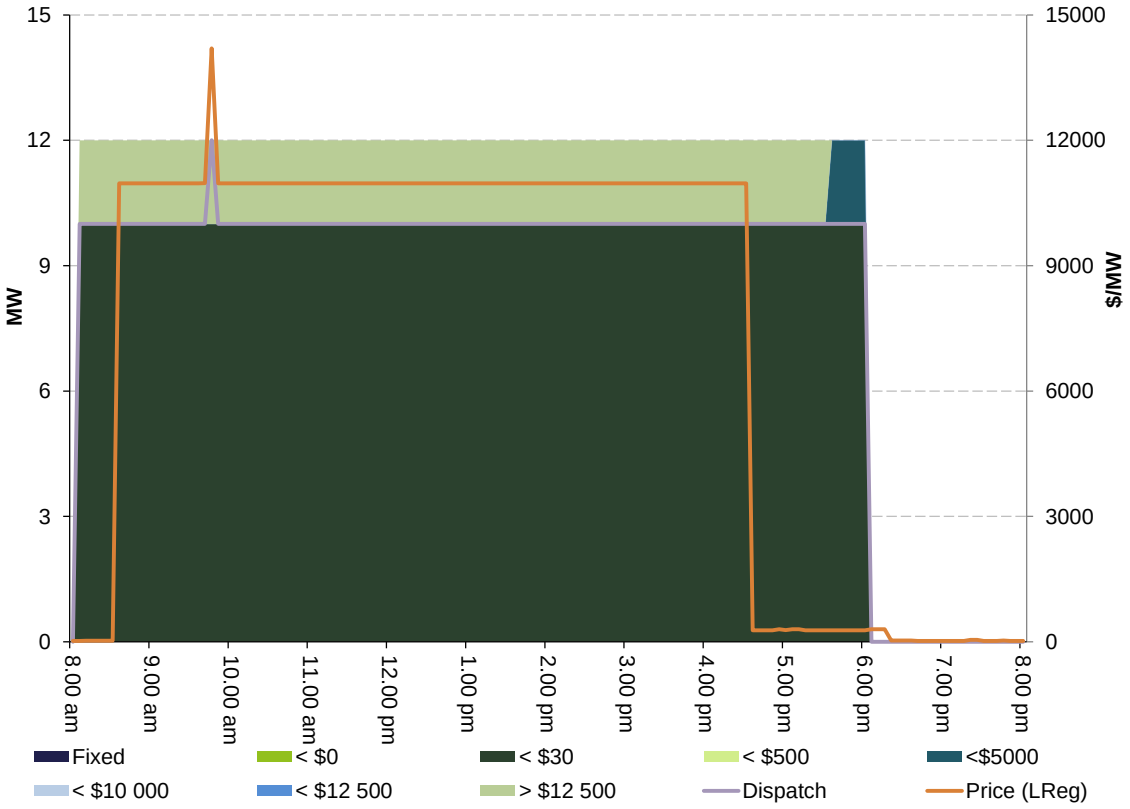
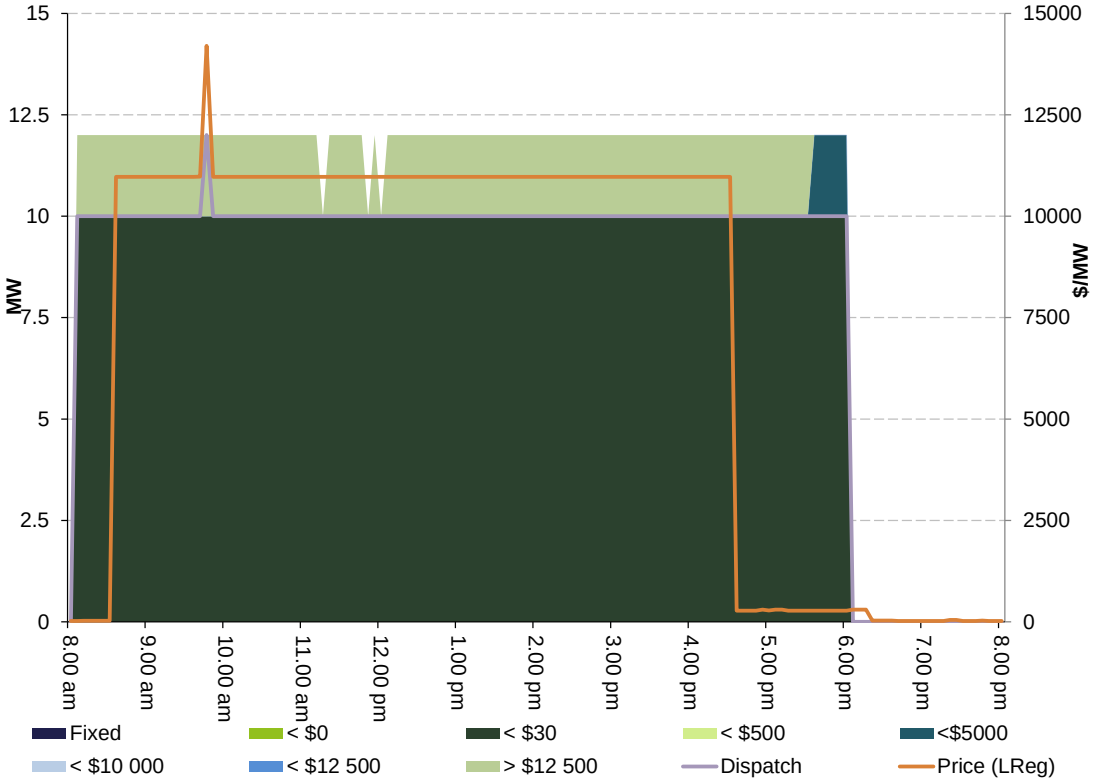


Figure D3b: Osborne (Origin) lower regulation service closing bid prices, dispatch and dispatch price – effective offers



Raise Regulation

Figure D4a: Torrens Island (AGL) raise regulation service closing bid prices, dispatch and dispatch price - maximum offers

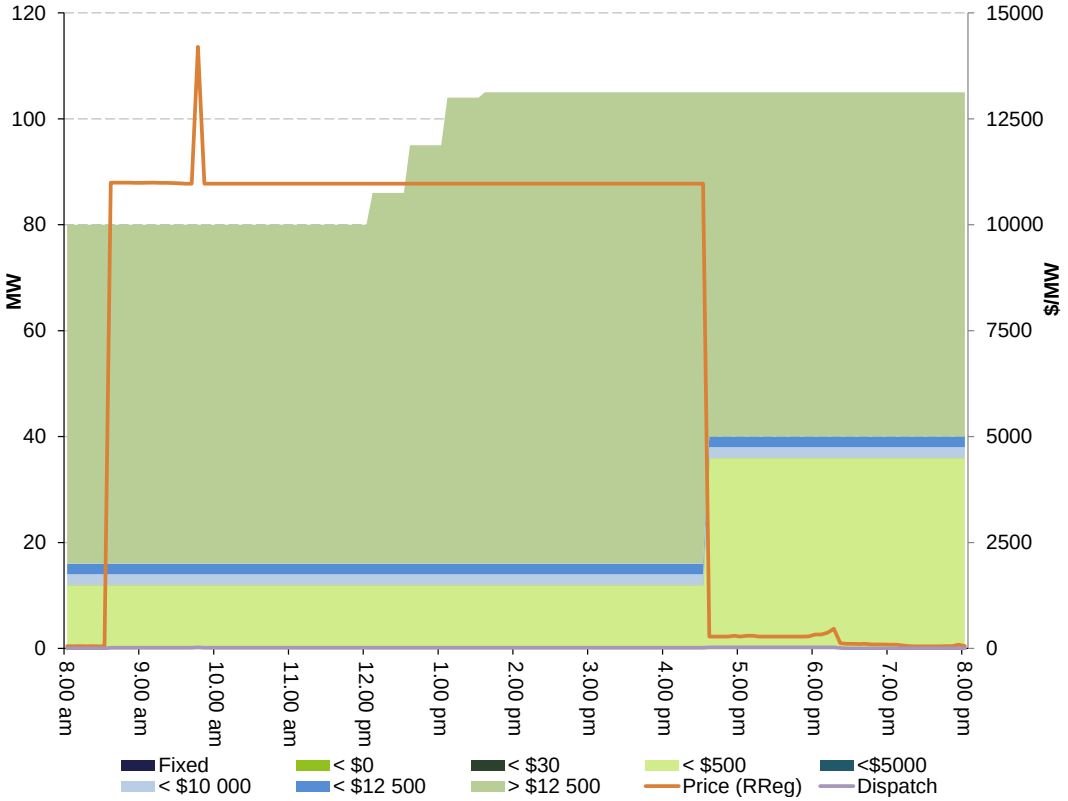


Figure D4b: Torrens Island (AGL) raise regulation service closing bid prices, dispatch and dispatch price - effective offers

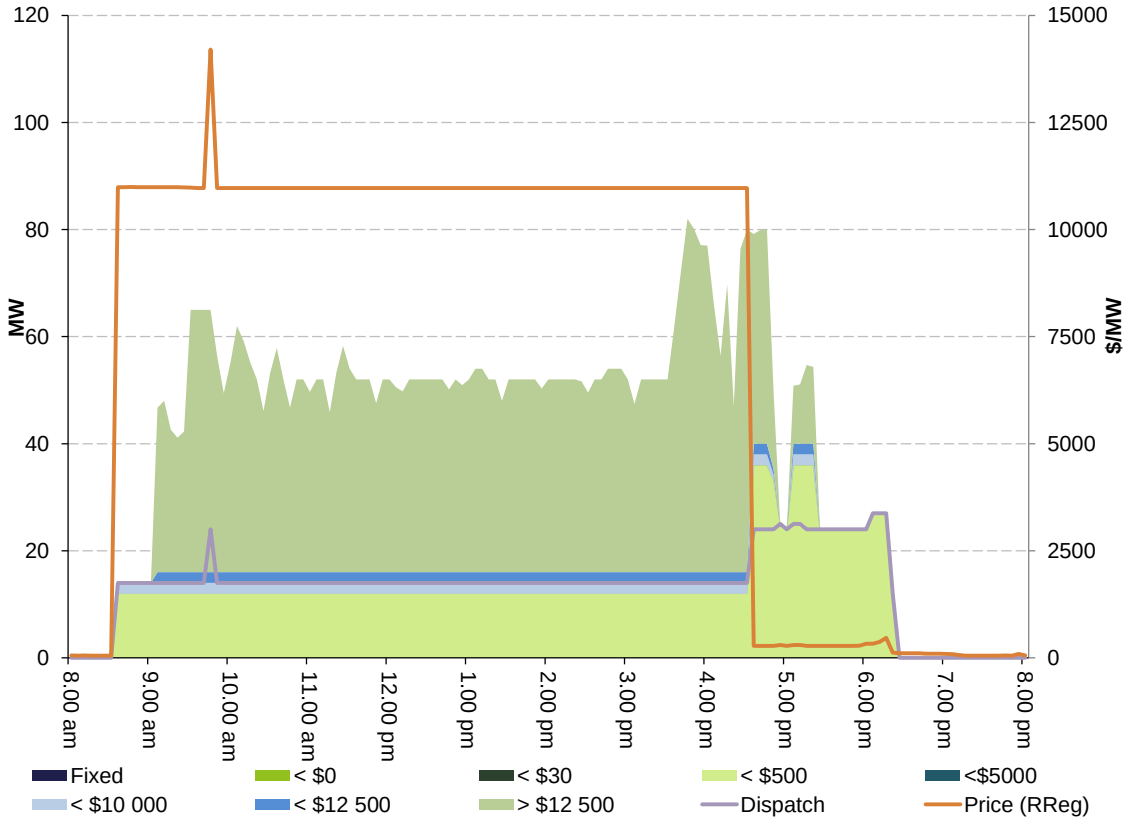


Figure D5a: Pelican Point (Engie) raise regulation service closing bid prices, dispatch and dispatch price – maximum offers

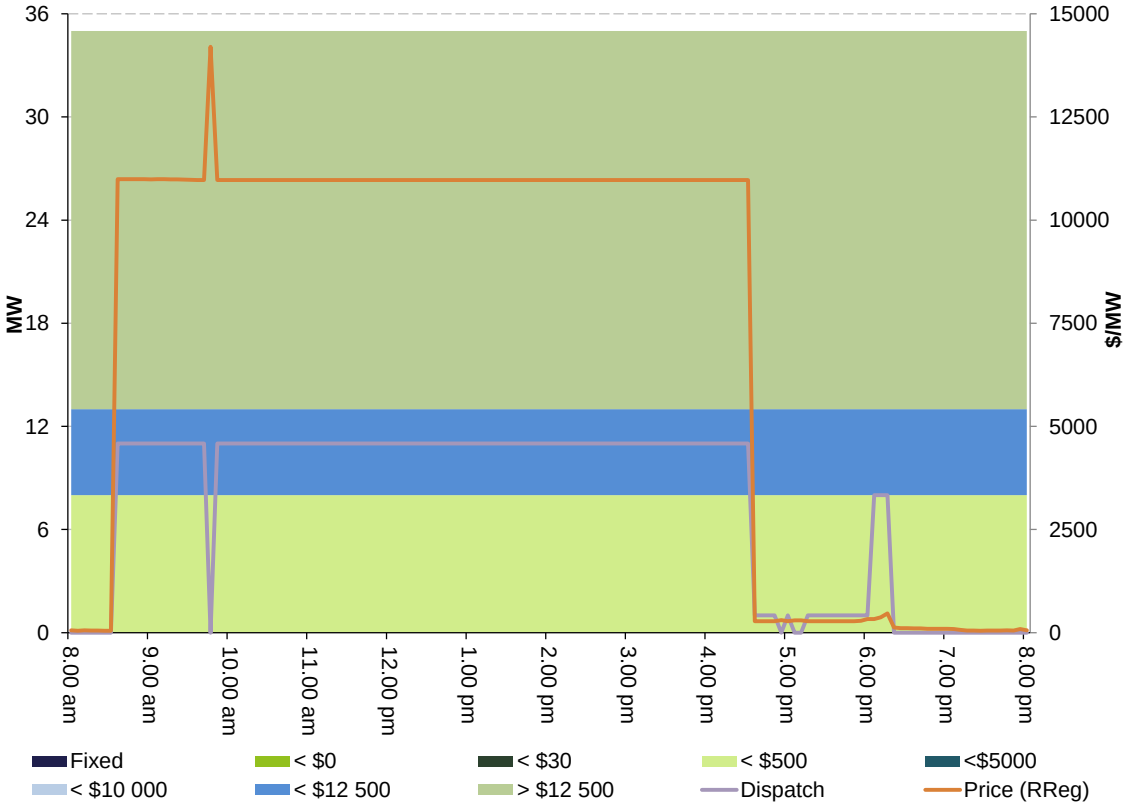


Figure D5b: Pelican Point (Engie) raise regulation service closing bid prices, dispatch and dispatch price – effective offers

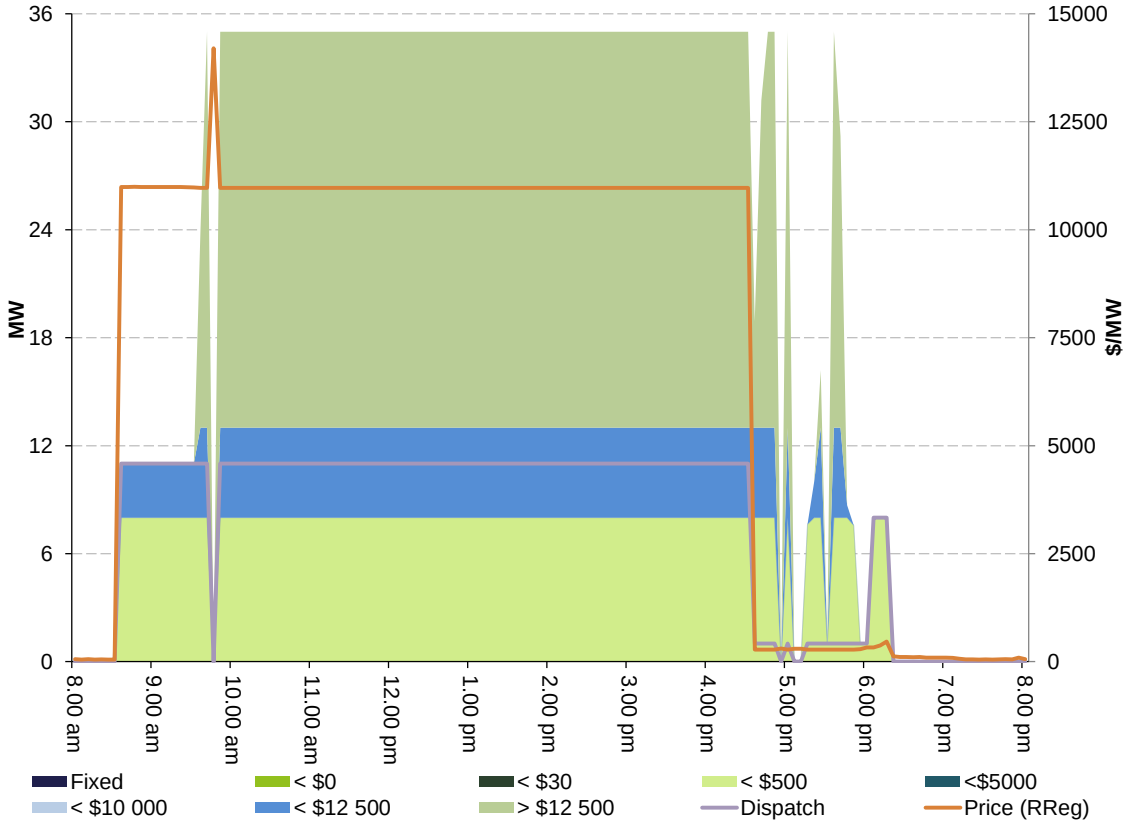


Figure D6a: Osborne (Origin) raise regulation service closing bid prices, dispatch and dispatch price – maximum offers

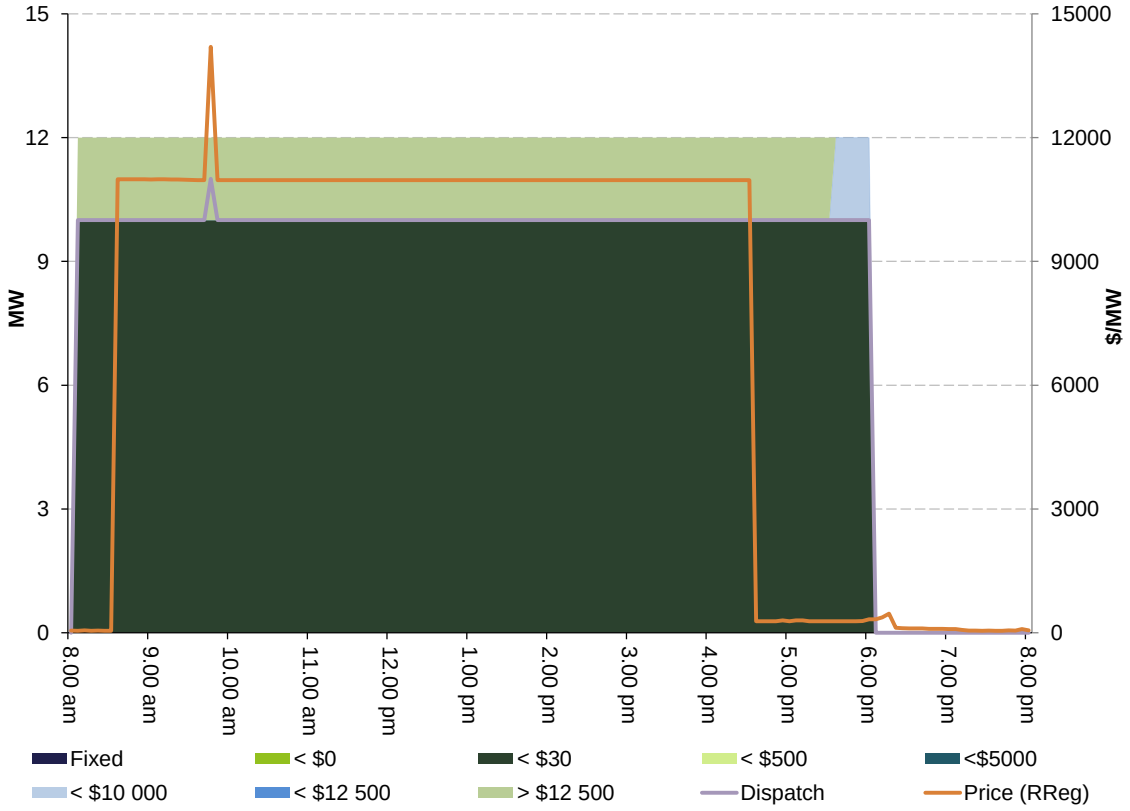
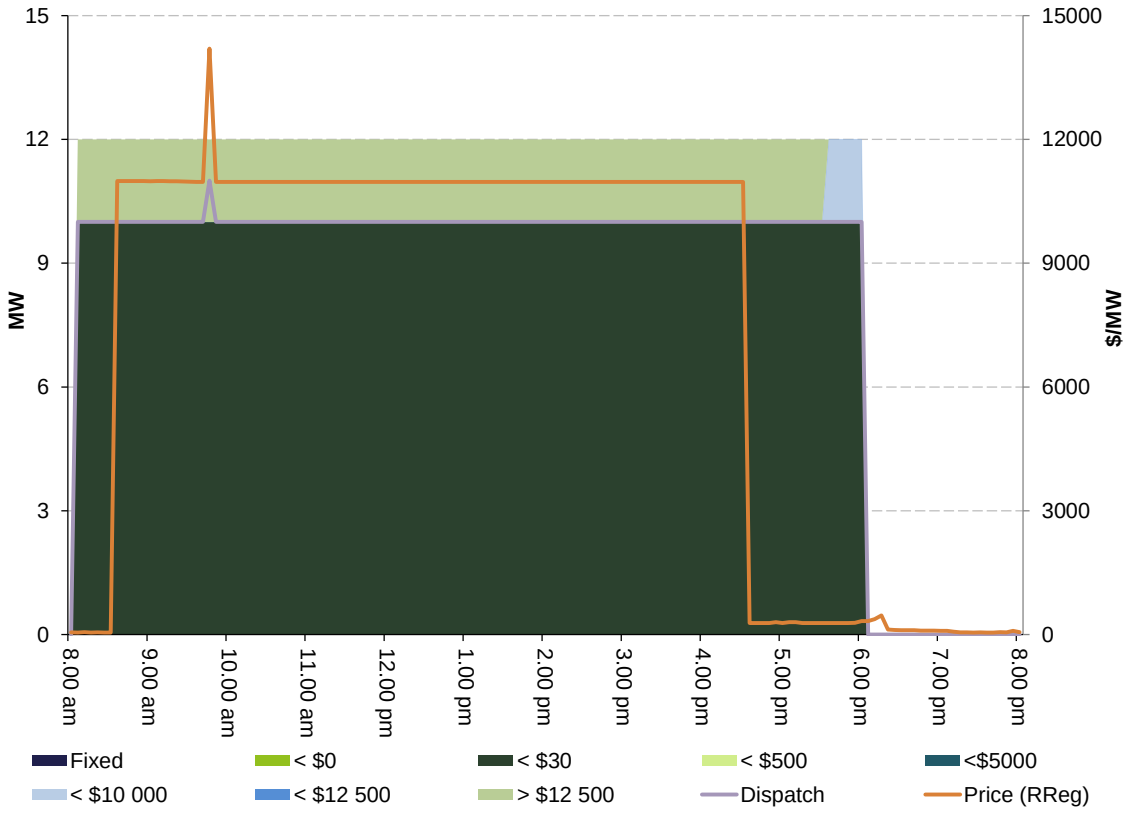


Figure D6b: Osborne (Origin) raise regulation service closing bid prices, dispatch and dispatch price – effective offers



Appendix E: Market Notices

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

Market Notice	Type	Date of issue	Last Changed
59175	INTER-REGIONAL TRANSFER	11/09/2017 18:08:24	11/09/2017 18:08:24

Reason

AEMO ELECTRICITY MARKET NOTICE

Inter regional transfer limit variation - V-SA Interconnector - SA Region - 11 Sept 2017

A forced outage of South East Loss of Synchronism protection in the SA region is scheduled to commence at 1755 hrs.

This forced outage may impact on power system security.
The following constraints are invoked for this outage and will remain in place until further notice

I-SV_250
I-VS_250

The outage constraints contain the following interconnectors on the LHS

V-SA

Refer to AEMO Network Outage Scheduler (NOS) for further details.
Manager NEM Real Time Operations

Market Notice	Type	Date of issue	Last Changed
59177	INTER-REGIONAL TRANSFER	12/09/2017 15:37:24	11/09/2017 18:08:24

Reason

AEMO ELECTRICITY MARKET NOTICE

Update - Inter-regional transfer limit variation - V-SA Interconnector - SA Region - 11 Sept 2017

Refer to AEMO Electricity Market Notice 59175
A forced outage of South East Loss of Synchronism protection in the SA region commenced at 1755 hrs Monday 11th September 2017.

This forced outage may impact on power system security.

The following constraints are invoked for this outage and will remain in place until 1800 hrs Friday 15th September 2017.

I-SV_250
I-VS_250

The outage constraints contain the following interconnector on the LHS

V-SA

Refer to AEMO Network Outage Scheduler (NOS) for further details.
Manager NEM Real Time Operations

Market Notice	Type	Date of issue	Last Changed
59179	INTER-REGIONAL TRANSFER	13/09/2017 10:11:06	13/09/2017 10:11:06

Reason

AEMO ELECTRICITY MARKET NOTICE

Update - Inter-regional transfer limit variation - V-SA Interconnector - SA Region - 11 Sept 2017

Refer to AEMO Electricity Market Notice 59175 and 59177

A forced outage of South East Loss of Synchronism protection in the SA region commenced at 1755 hrs Monday 11th September 2017.

This forced outage may impact on power system security.

The following constraints are invoked for this outage and will remain in place until 1700 hrs 15/09/2017

I-SV_250
I-VS_250

When actual work is being performed on the Loss of Synchronism protection relays at South East substation, the risk of trip to the V-SA interconnector is at an increased level. AEMO will reclassify V-SA interconnector as a credible contingency during this work and invoke associated constraints.

Work on Loss of Synchronism relays is planned for the following periods of time.

0800 hrs to 1700 hrs 14/09/2017
0800 hrs to 1700 hrs 15/09/2017

The following constraints are invoked for this work.

F-I-HYSE
I-HYSE_N-2
I-VS_050
S-X_BC_CP

The outage constraints contain the following interconnectors on the LHS

V-SA
NSW1-QLD1

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

Manager NEM Real Time Operations

Market Notice	Type	Date of issue	Last Changed
59191	INTER-REGIONAL TRANSFER	14/09/2017 18:29:09	14/09/2017 18:29:09

Reason

AEMO ELECTRICITY MARKET NOTICE

Update - Inter-regional transfer limit variation - V-SA Interconnector - SA Region - 14 Sept 2017

Refer to AEMO Electricity Market Notice 59175, 59177 and 59179

The replacement of the South East Loss of Synchronism protection in the SA region was completed at 1802 hrs Thursay 14th September 2017.

The following constraints are invoked for this outage have been revoked 1820 hrs 14/09/2017

I-SV_250
I-VS_250
F-I-HYSE
I-HYSE_N-2
I-VS_050
S-X_BC_CP

The outage constraints contain the following interconnectors on the LHS

V-SA
NSW1-QLD1

AEMO is reviwing planned work on the South East Loss of Synchronism protection for Friday 15/09/2017

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

Manager NEM Real Time Operation

Market Notice	Type	Date of issue	Last Changed
59192	INTER-REGIONAL TRANSFER	14/09/2017 20:55:25	14/09/2017 20:55:25

Reason

AEMO ELECTRICITY MARKET NOTICE

Update - Inter-regional transfer limit variation - V-SA Interconnector - SA Region - 14 Sept 2017

Refer to AEMO Electricity Market Notice 59175, 59177 59179 and 59191

The replacement of the South East Loss of Synchronism protection in the SA region was completed at 1802 hrs Thursday 14th September 2017.

Planned work on the Loss of Synchronism protection at the South East substation, from 0830 hrs to 1730 hrs Friday 15/09/2017, has been cancelled by the South Australia TNSP.

The following constraints for this outage have been removed.

F-I-HYSE
I-HYSE_N-2
I-VS_050
S-X_BC_CP

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

Manager NEM Real Time Operations

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.[4] 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.

Prices in bold italics have been set at the market price cap of $14 200/MW as the dispatch exceeded the market price cap.

Lower regulation 14 September

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
08:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
08:40	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
08:45	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
08:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
08:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:00	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:40	$10 976.62	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW02	Energy	$87.96	0.43	$37.82
		AGL Energy	BW03	Energy	$87.96	0.38	$33.42
		Engie	PPCCGT	Energy	$78.69	-1.00	-$78.69
09:45	***$14 212.81***	AGL (SA)	TORRB2	Lower reg	$14 200.00	-0.50	-$7100.00
		AGL (SA)	TORRB4	Lower reg	$14 200.00	-0.50	-$7100.00
		AGL Energy	BW02	Energy	$87.96	0.41	$36.06

[4] 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
		AGL Energy	BW03	Energy	$87.96	0.36	$31.67
		AGL (SA)	TORRB2	Energy	$79.99	-0.50	-$40.00
		AGL (SA)	TORRB4	Energy	$79.99	-0.50	-$40.00
09:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
09:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:00	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:40	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:45	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
10:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:00	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
		Engie	PPCCGT	Energy	-$1000.00	-1.00	$1000.00
		Roaring 40s	WATERLWF	Energy	-$1000.00	0.56	-$560.00
		Hornsdale	HDWF2	Energy	-$1000.00	0.44	-$440.00
11:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:40	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:45	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
11:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
		Pacific Hydro	CLEMGPWF	Energy	-$1000.00	0.05	-$50.00
		Hornsdale	HDWF1	Energy	-$1000.00	0.09	-$90.00

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
		Hornsdale	HDWF2	Energy	-$1000.00	0.09	-$90.00
		Engie	PPCCGT	Energy	-$1000.00	-1.00	$1000.00
		Trustpower	SNOWNTH1	Energy	-$1000.00	0.13	-$130.00
		Trustpower	SNOWSTH1	Energy	-$1000.00	0.11	-$110.00
		Trustpower	SNOWTWN1	Energy	-$1000.00	0.09	-$90.00
		AGL (SA)	BLUFF1	Energy	-$1000.00	0.05	-$50.00
		AGL (SA)	HALLWF1	Energy	-$1000.00	0.09	-$90.00
		AGL (SA)	HALLWF2	Energy	-$1000.00	0.06	-$60.00
		AGL (SA)	NBHWF1	Energy	-$1000.00	0.12	-$120.00
		Roaring 40s	WATERLWF	Energy	-$1000.00	0.12	-$120.00
11:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:00	$10 969.69	Infigen	LKBONNY3	Energy	-$1000.00	1.00	-$1000.00
		Engie	PPCCGT	Energy	-$1000.00	-1.00	$1000.00
		Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:40	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:45	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
12:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:00	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
13:40	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:45	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
13:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:00	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:40	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:45	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
14:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:00	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:35	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:40	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:45	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:50	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
15:55	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
16:00	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
16:05	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
16:10	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
16:15	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
16:20	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
16:25	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69
16:30	$10 969.69	Engie	PPCCGT	Lower reg	$10 969.69	-1.00	-$10 969.69

Raise regulation 14 September

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
08:35	$10 991.17	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW01	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW02	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW03	Energy	$87.96	-0.36	-$31.67
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
08:40	$10 991.20	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW03	Energy	$87.96	-1.14	-$100.27
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
08:45	$10 991.61	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW01	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW02	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW03	Energy	$87.96	-0.36	-$31.67
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
08:50	$10 991.01	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW01	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW02	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW03	Energy	$87.96	-0.35	-$30.79
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
08:55	$10 990.27	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW01	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW02	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW03	Energy	$87.96	-0.35	-$30.79
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:00	$10 987.98	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW01	Energy	$87.96	-0.38	-$33.42
		AGL Energy	BW02	Energy	$87.96	-0.38	-$33.42
		AGL Energy	BW03	Energy	$87.96	-0.34	-$29.91
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:05	$10 991.15	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		Origin Energy	ER02	Energy	$88.22	-1.14	-$100.57
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:10	$10 990.90	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW01	Energy	$87.96	-0.39	-$34.30

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
		AGL Energy	BW02	Energy	$87.96	-0.39	-$34.30
		AGL Energy	BW03	Energy	$87.96	-0.35	-$30.79
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:15	$10 986.75	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		Delta Electricity	VP5	Energy	$87.00	-0.55	-$47.85
		Delta Electricity	VP6	Energy	$87.00	-0.55	-$47.85
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:20	$10 987.36	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		AGL Energy	BW03	Energy	$87.96	-1.10	-$96.76
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:25	$10 982.07	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		Delta Electricity	VP5	Energy	$87.00	-0.52	-$45.24
		Delta Electricity	VP6	Energy	$87.00	-0.52	-$45.24
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:30	$10 977.23	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
		EnergyAustralia	MP1	Energy	$87.04	-0.99	-$86.17
		Engie	PPCCGT	Energy	$78.69	1.00	$78.69
09:35	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
09:40	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
09:45	$14 200.00	AGL (SA)	TORRB4	Raise reg	$14 200.00	-1.00	-$14 200.00
09:50	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
09:55	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:00	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:05	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:10	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:15	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:20	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:25	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:30	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:35	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:40	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:45	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:50	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
10:55	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:00	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:05	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:10	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:15	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:20	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
11:25	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:30	$10969.69	Engie	PPCCGT	Raise reg	$10969.69	-1.00	-$10969.69
11:35	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:40	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:45	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:50	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
11:55	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:00	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:05	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:10	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:15	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:20	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:25	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:30	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:35	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:40	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:45	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:50	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
12:55	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:00	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:05	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:10	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:15	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:20	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:25	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:30	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:35	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:40	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:45	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:50	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
13:55	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:00	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:05	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:10	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:15	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:20	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:25	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:30	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:35	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69

DI	Dispatch Price ($/MW)	Participant	Unit	Service	Offer price ($/MW)	Marginal change	Contribution
14:40	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:45	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:50	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
14:55	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:00	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:05	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:10	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:15	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:20	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:25	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:30	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:35	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:40	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:45	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:50	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
15:55	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
16:00	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
16:05	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
16:10	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
16:15	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
16:20	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
16:25	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69
16:30	$10 969.69	Engie	PPCCGT	Raise reg	$10 969.69	-1.00	-$10 969.69