



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

**South Australia,
8 July 2018**

22 November 2018

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AER Reference: 64257 - D18/167659

Amendment Record

Version	Date	Pages
1 version for publication	22/11/2018	52

Contents

1	Obligation	4
2	Summary	5
3	Analysis	6
	3.1. Planned network outage	6
	3.2. AEMO intervention and what-if pricing	7
	3.3. Regulation FCAS capacity, forecast prices and price outcomes	8
	3.3.1 FCAS capacity	8
	3.3.2 Price forecasts	8
	3.3.3 Price outcomes	9
	Appendix A: Explanation of FCAS	14
	Frequency Control Ancillary Service Settlement	15
	Appendix B: Local Frequency Control Ancillary Services	16
	Appendix C: Closing bids	17
	Appendix D: Market Notices	26
	Appendix E: Price setter	28
	Appendix F: Pricing during an intervention	48

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 (FCAS) are used to manage small fluctuations in the supply / demand balance.

On 8 July 2018 the dispatch price for lower and raise regulation services in South Australia exceeded \$5000/MW 25 and 28 times respectively between 8.05 am and 4.05 pm. This was much higher than the wholesale (or spot) price for electricity in South Australia, which was below \$155/MWh for the same period.

Prior to 8 July, the market operator (AEMO):

- directed gas plant in South Australia to operate to maintain system security. As a result, special pricing arrangements were in place across the NEM for energy and all ancillary services from 4 to 8 July.
- announced that a planned outage affecting the Heywood interconnector would occur on 8 July and that for the duration of the outage 35 MW of regulation services would be required to be sourced locally in South Australia.

During the planned outage, numerous times across the day Hornsdale wind farm 2's (HDWF2) low priced regulation services capacity was materially reduced as a result of the special pricing arrangements. When this occurred capacity priced above \$5000/MW was required to satisfy the 35 MW requirement, resulting in the high price outcomes.

The high prices ended at 4.30 pm when AEMO removed the 35 MW requirement, marking the end of the outage.

Rebidding of capacity from low to high prices did not contribute to the price exceeding \$5000/MW.

The requirement for AEMO to source 35 MW of regulation services locally in South Australia was one of the key reasons for the high FCAS prices on 8 July. AEMO announced on 5 October that, effective from 12 October, the 35 MW requirement would be removed. Consistent with this, the circumstances that gave rise to the high FCAS prices on 8 July are unlikely to occur again. Furthermore most consumers are not directly exposed to high prices of this nature.

3 Analysis

On 8 July 2018 the dispatch price for lower and raise regulation services in South Australia exceeded \$5000/MW 25 and 28 times respectively, triggering the requirement to write this report.

In short, the high prices were a result of the combination of:

- Special pricing arrangements.
- The 35 MW local regulation services requirement for the duration of a planned outage on the Heywood interconnector.
- During the planned outage, numerous times across the day low priced regulation services capacity from the Hornsdale 2 wind farm (HDWF2) was materially reduced as a result of the special pricing arrangements. Consequently higher priced FCAS capacity (above \$5000/MW) was needed to satisfy the local regulation requirement.

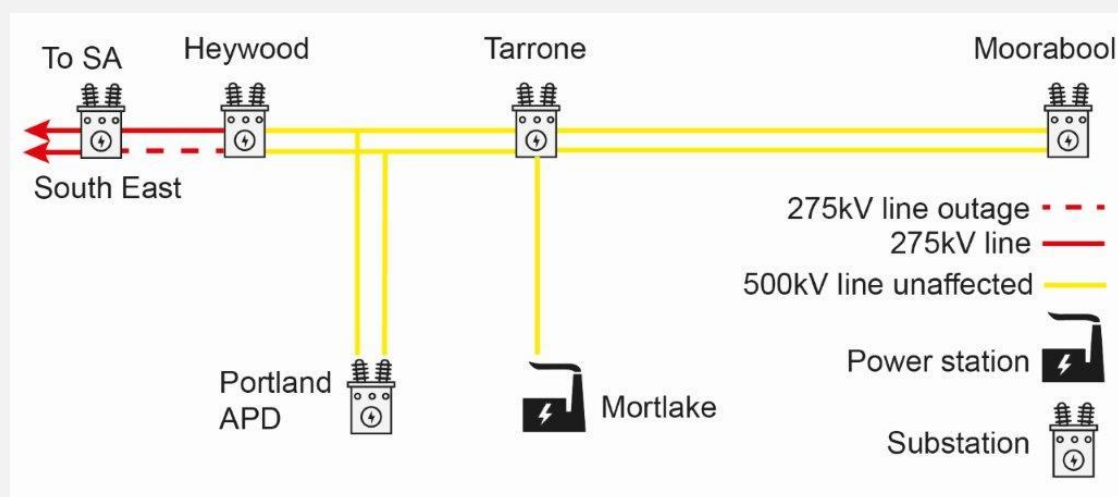
3.1 Planned network outage

AEMO published market notice 63207 (on 14 June 2018) announcing there would be a planned outage on the South East – Heywood No 2 275 kV line in South Australia on 8 July 2018. The notice also stated 35 MW of regulation services would be required to be sourced locally from South Australia during the outage. Box 1 explains how AEMO manages outages on the Heywood interconnector.

The market notice relating to the outage is in Appendix D.

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 does not 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 part of the two 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. To ensure that adequate regulation services are immediately available to manage the frequency (around 50Hz) within South Australia if the remaining line trips, AEMO invokes constraints requiring 35 MW of local regulation services.

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

3.2 AEMO intervention and what-if pricing

Under clause 4.8.9(a) of the Electricity Rules and section 116 of the National Electricity Law, AEMO may direct generators to remain synchronised¹ and follow dispatch targets to maintain the power system in a secure operating state.

As advised over several market notices, from 4 pm on 4 July to 4.30 pm on 8 July AEMO directed various gas-fired generators in South Australia to remain synchronised and follow dispatch targets. AEMO uses market notices to notify the market when it has directed a generator on (See Appendix D for an example of one of these market notices).

When AEMO directs plant on, the dispatch engine (the National Electricity Market Dispatch Engine, or NEMDE) determines prices for energy and ancillary services in all

¹ Essentially this means they must generate.

NEM regions using “what-if” pricing. “What-if” pricing is discussed in Box 2 and in more detail in Appendix F (including price outcomes).

3.3 Regulation FCAS capacity, forecast prices and price outcomes

This section discusses raise and lower regulation services offers and price outcomes.

3.3.1 FCAS capacity

Of the 29 power stations (including wind farms) in South Australia only six 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: 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
Hornsedale power reserve – Generation (Neoen)	100	100
Hornsedale power reserve – Load (Neoen)	80	80
Hornsedale wind farm 2 (Neoen)	20	20
Total	586	646

On the day, Osborne power station, Pelican Point power station and four units at Torrens Island power station were unavailable. Hornsdale power reserve, while registered for a combined 180 MW in both services, only offers in around 30 MW in each service as a generator and 40 MW in each service as a load.

Consequently the operating generators on the day only offered a total of around 210 MW of lower regulation and around 260 MW of raise regulation services.

3.3.2 Price forecasts

Initial forecasts, made the day prior, showed regulation services prices above \$8900/MW for the duration of the Heywood outage (i.e. with the 35 MW requirement in place). However, participants rebid to increase low priced capacity, and as a result, at 9 am on 8 July, prices for regulation services were forecast to be around \$300/MW for the duration of the Heywood outage.

3.3.3 Price outcomes

AEMO intervened in the market by issuing directions to generators under rule 4.9.8.(e), thereby invoking ‘what-if’ pricing. In short, the point of “what-if” pricing is to determine what prices would have been had AEMO not intervened in the market. It is designed to preserve the price signal for generators in the presence of the additional “directed-on” capacity (from gas generators in this case). Box 2 helps to explain “what-if” pricing.

Box 2: “what-if” pricing

AEMO invokes “what-if” pricing when it intervenes in the market, for example by directing a participant to dispatch a specific amount of megawatts over a period of time.

Normally AEMO sets targets for generation and determines wholesale electricity market prices (energy and FCAS) in a single calculation (or “run”) for every five-minute dispatch interval. During an intervention, AEMO does two runs:

1. accounting for the direction called “Intervention” (used to determine dispatch targets) and,
2. without the direction called “what-if” (this run determines price).

The “what-if” run attempts to calculate what the price would have been had AEMO not intervened and directed market participant(s), thereby preserving the price signal. To achieve this, the “what-if” run recalculates, amongst other things, the targets for generation and FCAS.

Results from the two runs can differ substantially as they are dependent on different inputs. For example the dispatch targets determined by the intervention run will be based on actual generation and flows as a starting point. The “what-if” pricing run will determine the price assuming targets from the previous run are the starting point.

The purple lines in Figure 1 and Figure 2 show the “what-if” price² and the red lines show the 35 MW requirement.

The blue and light orange shaded areas indicate “effective” available capacity priced below \$5000/MW and above \$5000/MW, respectively. NEMDE co-optimises FCAS and energy offers to arrive at the least cost security constrained solution every 5 minutes. Effective available FCAS capacity is calculated during the dispatch process and represents the offered FCAS capacity adjusted for the energy output of the generator. Box 3 explains this further.

The capacity shown in the main part of the figures shows what AEMO used for dispatch targets for the intervention run, not what it used to determine the “what-if” price. We have included this information in the report to show what generators actually offered on the day (including MWs from directions).

The key to understanding the high price outcomes is shown in the call out boxes (which shows the “what-if” effective available capacity) in Figure 1 and Figure 2.

² See Appendix E for a list of all prices.

Figure 1: Reductions in effective availability at HDWF2 led to lower regulation “what-if” price spikes

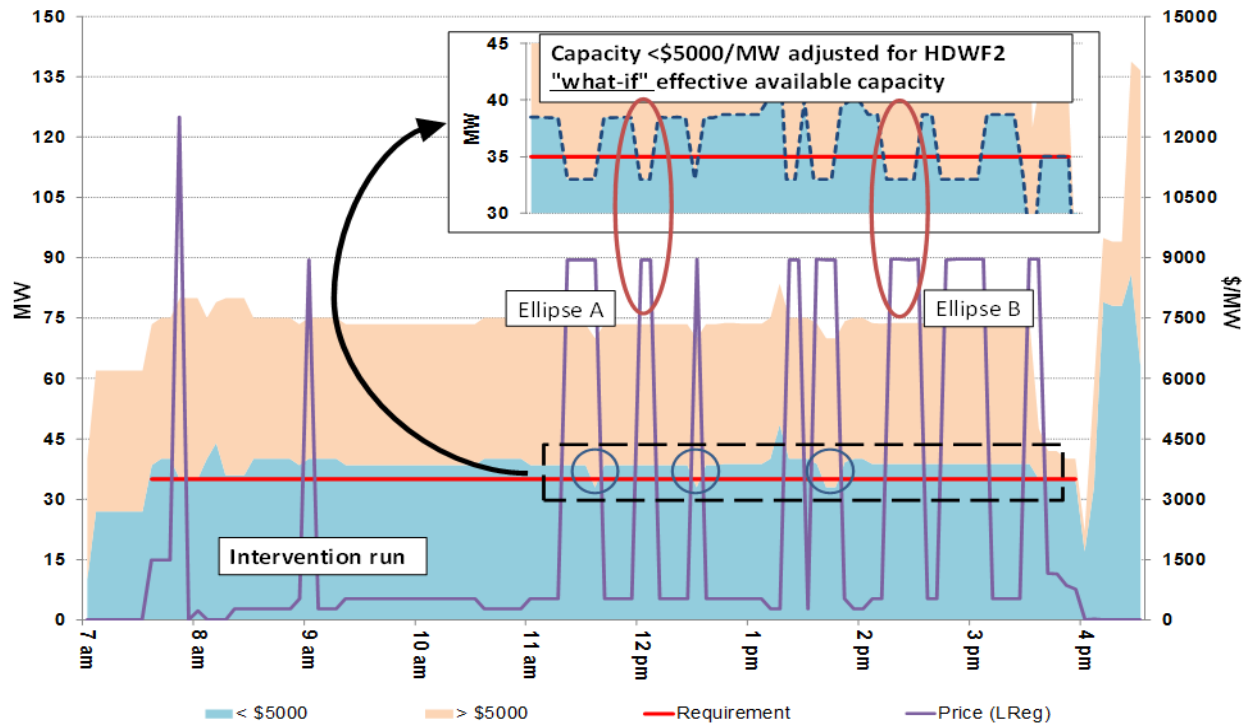
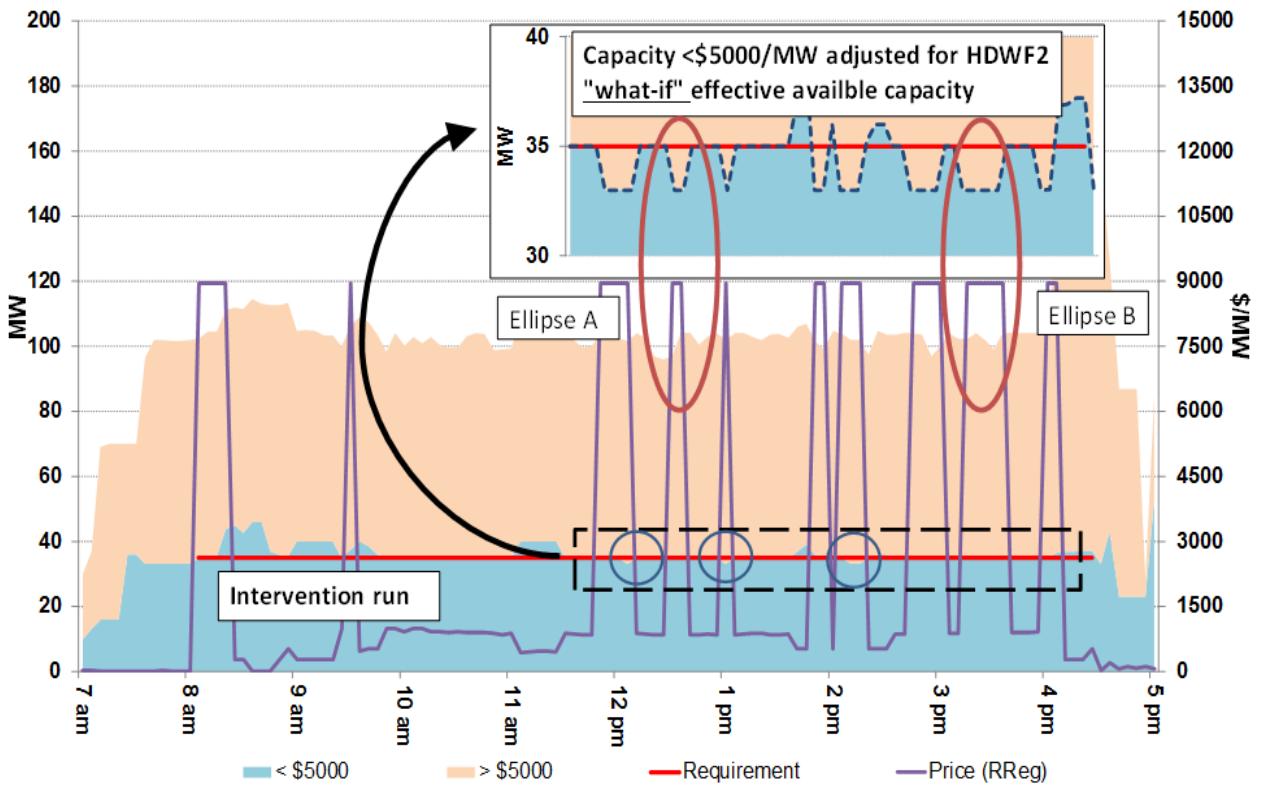


Figure 2: Reductions in effective availability at HDWF2 led to raise regulation “what-if” price spikes



Neoen's HDWF2 is the only wind farm in South Australia registered to provide regulation services. The call out boxes focus on HDWF2 as its effective availability in the "what-if" run was one of the major causes of the high prices. This becomes clear when you look at the ellipses in the figures. For example, looking at ellipse A in Figure 1 we can see that the reduction in capacity priced less than \$5000/MW shown by fall in the blue dashed line in the call out box (which represents a fall in HDWF2's effective availability), meant that higher priced capacity (orange shading) was required to meet the 35 MW requirement.

Looking further down the same ellipse we can see that the reduction in HDWF2's "what-if" effective availability coincides with the "what-if" price spike of \$9000/MW in the main part of the figure. Looking at both figures we can see that reductions in "what-if" effective availability at HDWF2 are associated with price spikes.

The reason for reductions in effective availability of regulation services from HDWF2 in the "what-if" pricing run was because the wind farm was considered "stranded" according to NEMDE. The ability for generators to provide regulation services depends upon their energy output. Generators registered to provide regulation services are governed by technical limits. When such generators' energy output exceeds their technical limits they are unable to provide regulation services and therefore become "stranded". The concept of "stranded" is explained in Box 3.

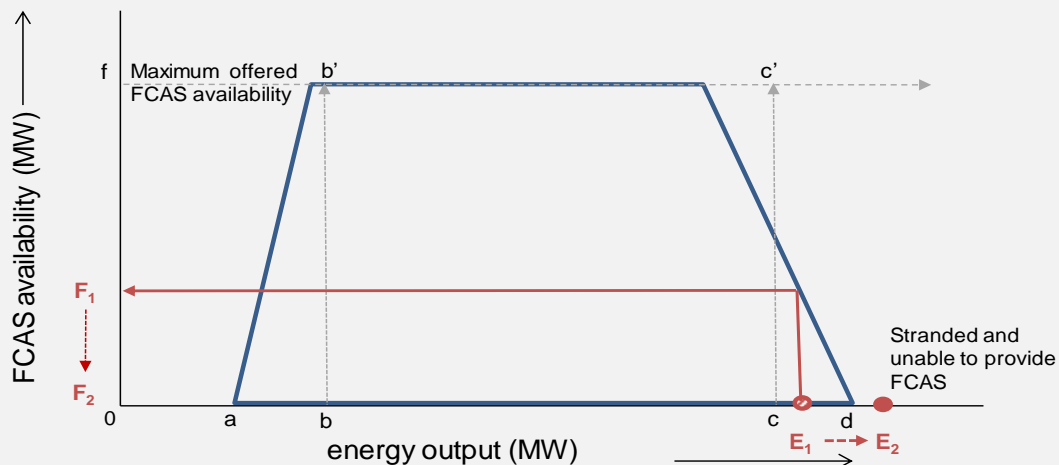
Box 3: Trade-off between generator FCAS and energy offers

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 \$14 500 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).

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.

The trade-off between the provision of FCAS and energy, determines the effective availability of FCAS. For a generating unit to be enabled for FCAS, it is a prerequisite that the energy being produced at the start of the dispatch interval, also known as its initial megawatts, lies within the maximum and minimum enablement limits (points 'a' and 'd'). If a unit's initial megawatts is outside these limits, the unit is said to be 'stranded' for that service. Stranding can be a consideration for semi-scheduled generation such as wind farms, because, in general they have less control over output.

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 increases to E_2 (outside of its trapezium), then its corresponding effective FCAS availability decreases to F_2 (in this case 0), which means the unit is 'stranded', and therefore unable to provide FCAS.



In contrast to the ‘what-if’ run (where HDWF2 became ‘stranded’ multiple times throughout the day), it only became stranded three times (shown by the blue circles) during the intervention run (in other words, what actually occurred).

To manage network constraints, HDWF2 was on a semi-dispatch cap (which limited its energy output). As a result, for the most part the windfarm was able to operate within its technical limits (i.e. inside its trapezium) and so was able to provide regulation services without becoming ‘stranded’ for the intervention run.

However, the “what-if” calculation resulted in the HDWF2 becoming stranded more often. In the absence of the semi dispatch cap to limit energy output, HDFW2 was determined to operate beyond its technical limits (like point E2 in Box 3), resulting in it becoming stranded and therefore unable to supply regulation services.

Appendix F further explains the difference between the “what-if” and intervention pricing runs.

Australian Energy Regulator

November 2018

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 follows³.

- Regulation FCAS: Cost recovery on a “causer pays” basis using the Causer Pays Procedure⁴ 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 generator’s output changes such that it supports maintaining the system frequency its contribution factor is positive. Conversely, if a generator’s 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.

³ For a full description go to <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Ancillary-Services/Ancillary-Services-Payments-and-Recovery>

⁴ 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 changed by AEMO. AEMO 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: Closing bids

Figures C1a to C8b highlight for each dispatch interval the lower and raise regulation services closing bids for Origin, AGL, Hornsdale Power Reserve and Hornsdale Wind Farm 2 (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 C1a: Torrens Island (AGL) lower regulation service closing bid prices, dispatch and dispatch price - maximum offers

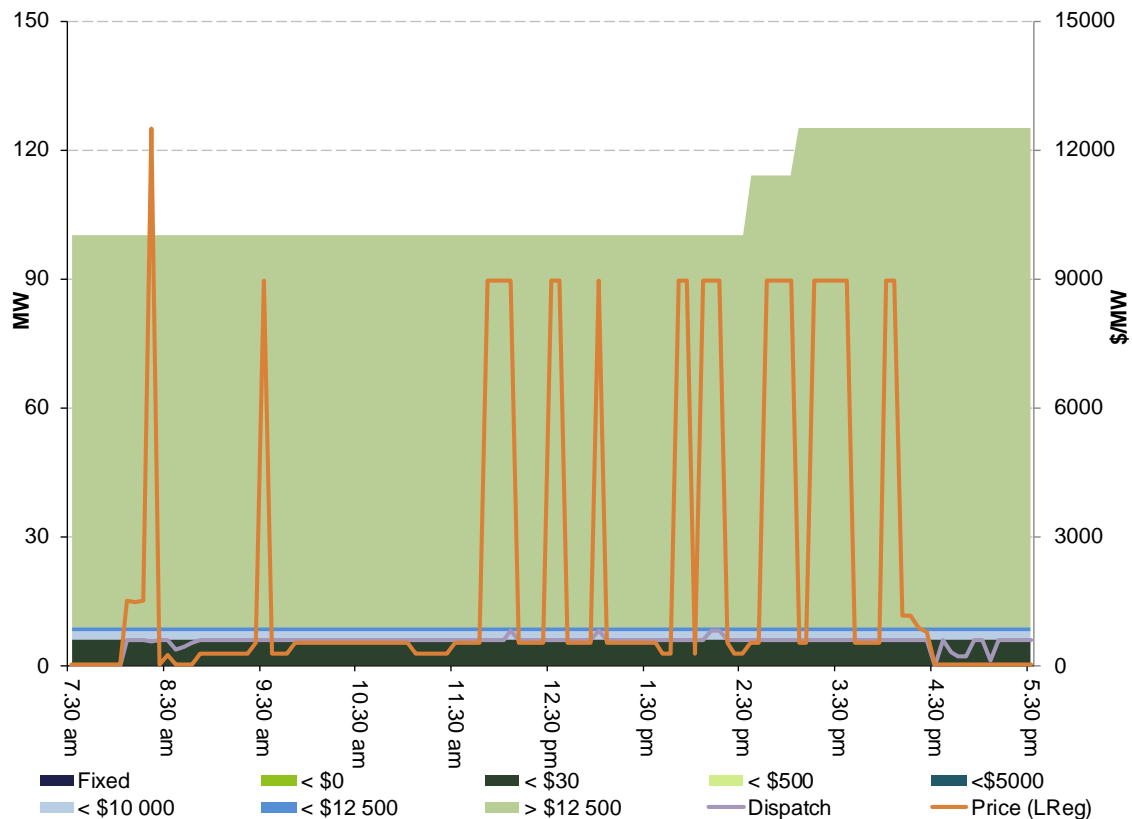


Figure C1b: Torrens Island (AGL) lower regulation service closing bid prices, dispatch and dispatch price – effective offers

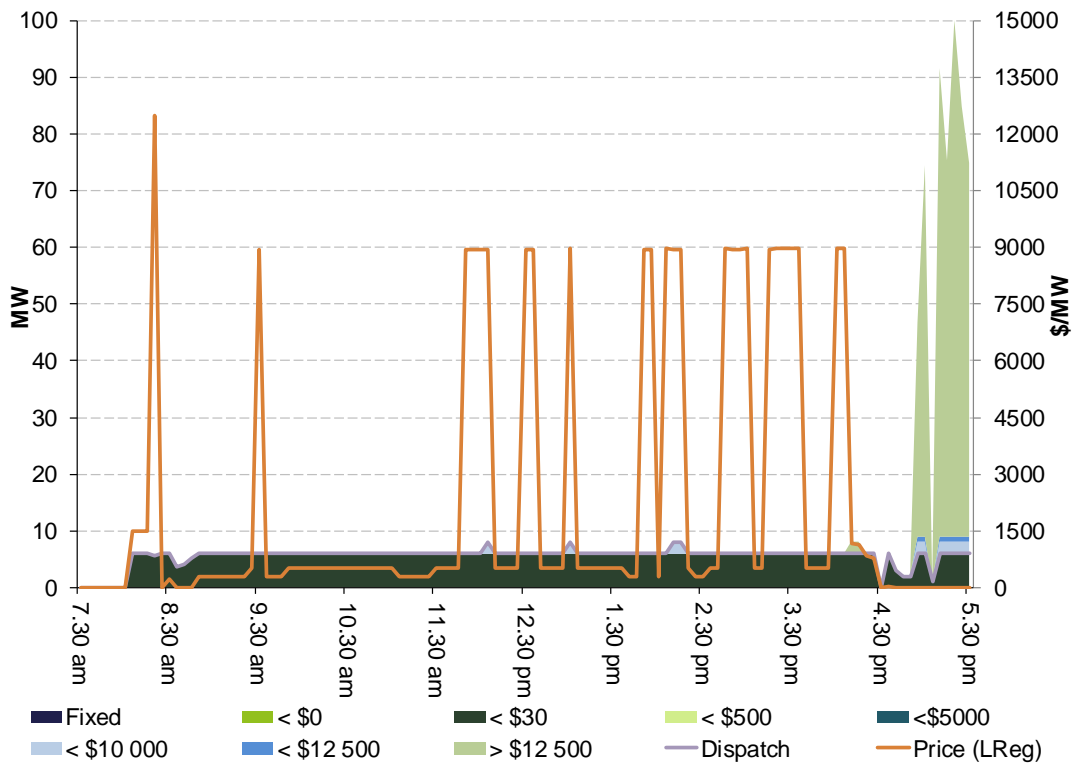


Figure C2a: Hornsdale Power Reserve (Neoen) lower regulation service closing bid prices, dispatch and dispatch price – maximum offers

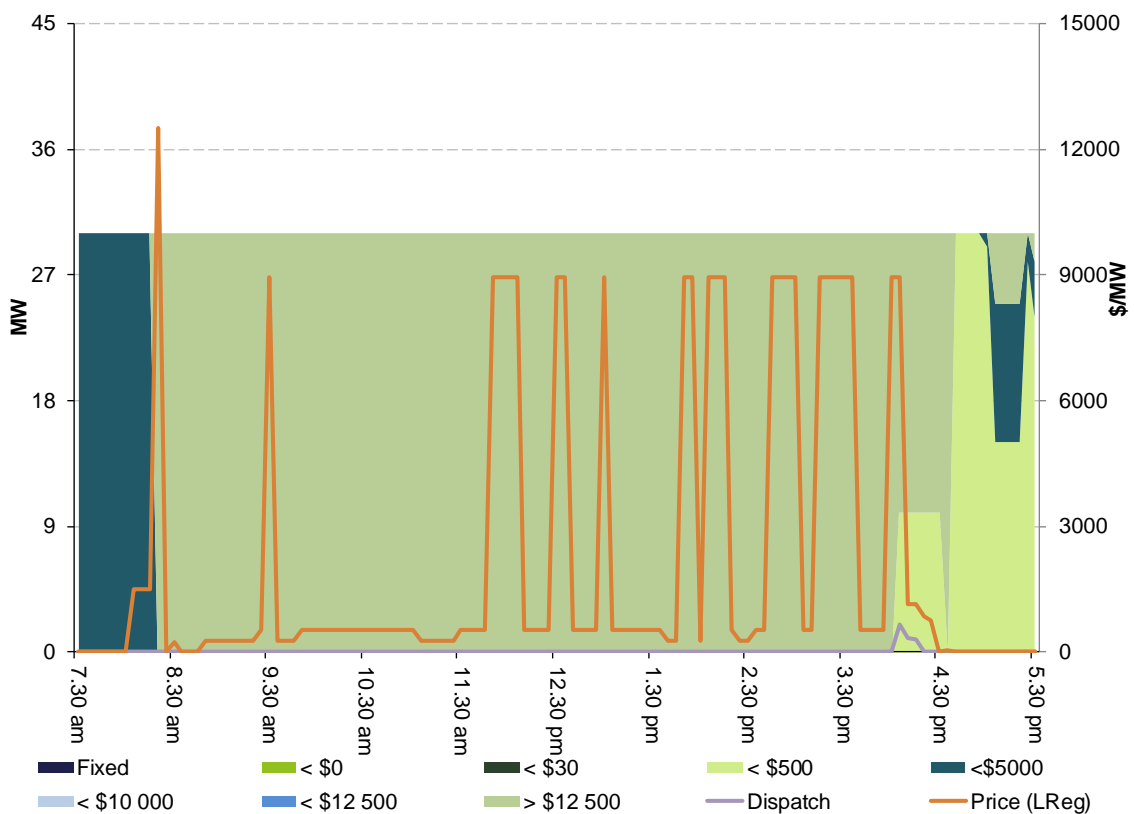


Figure C2b: Hornsdale Power Reserve (Neoen) lower regulation service closing bid prices, dispatch and dispatch price – effective offers

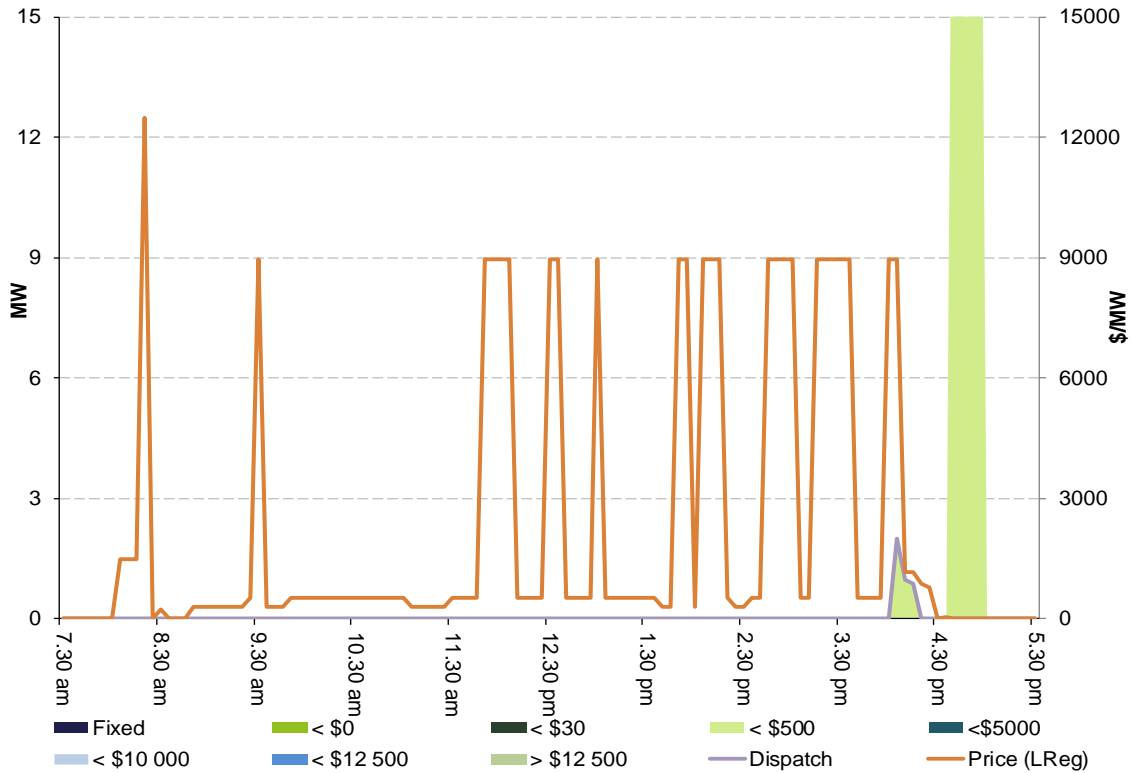


Figure C3a: Quarantine (Origin) lower regulation service closing bid prices, dispatch and dispatch price – maximum offers

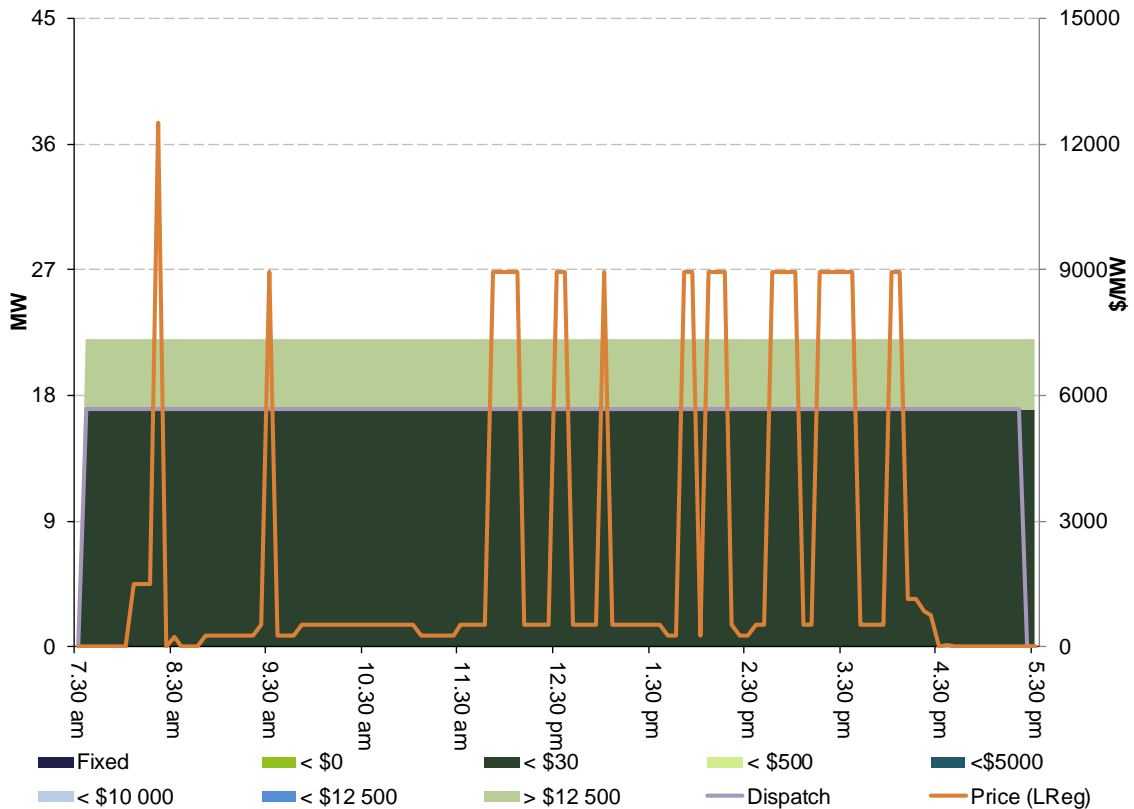


Figure C3b: Quarantine (Origin) lower regulation service closing bid prices, dispatch and dispatch price – effective offers

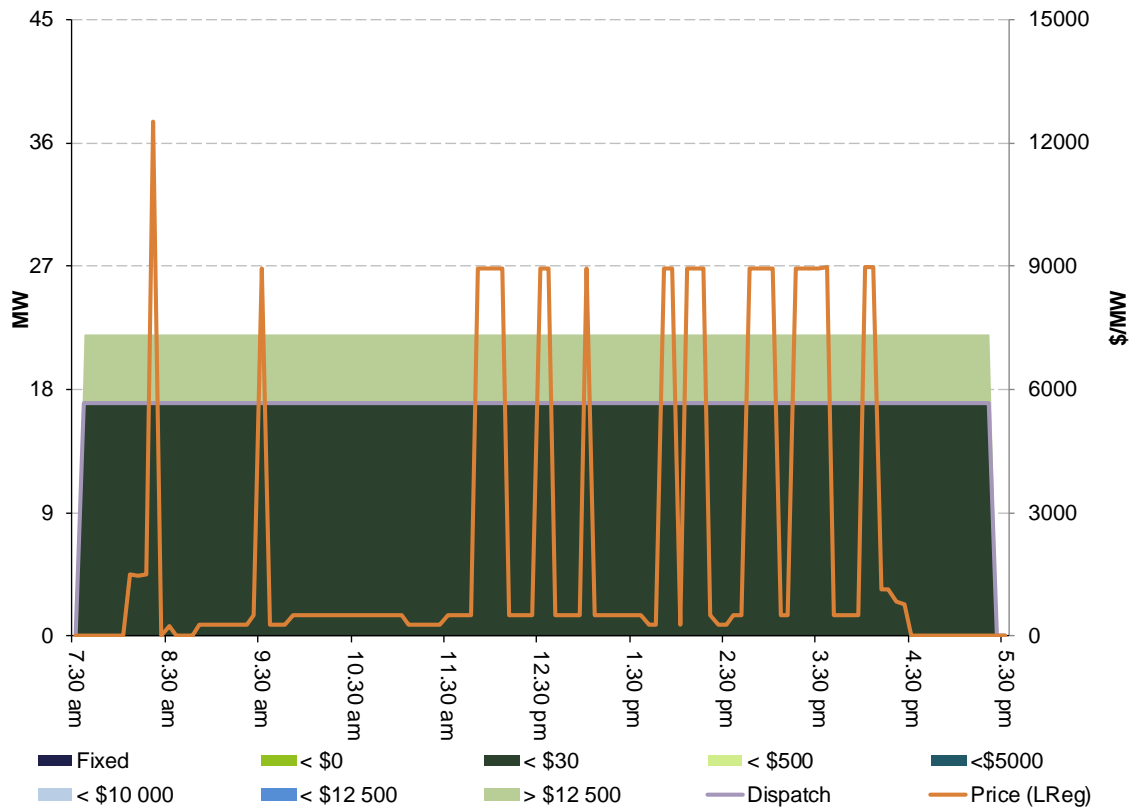


Figure C4a: Hornsdale Wind Farm (HDWF 2) lower regulation service closing bid prices, dispatch and dispatch price – maximum offers

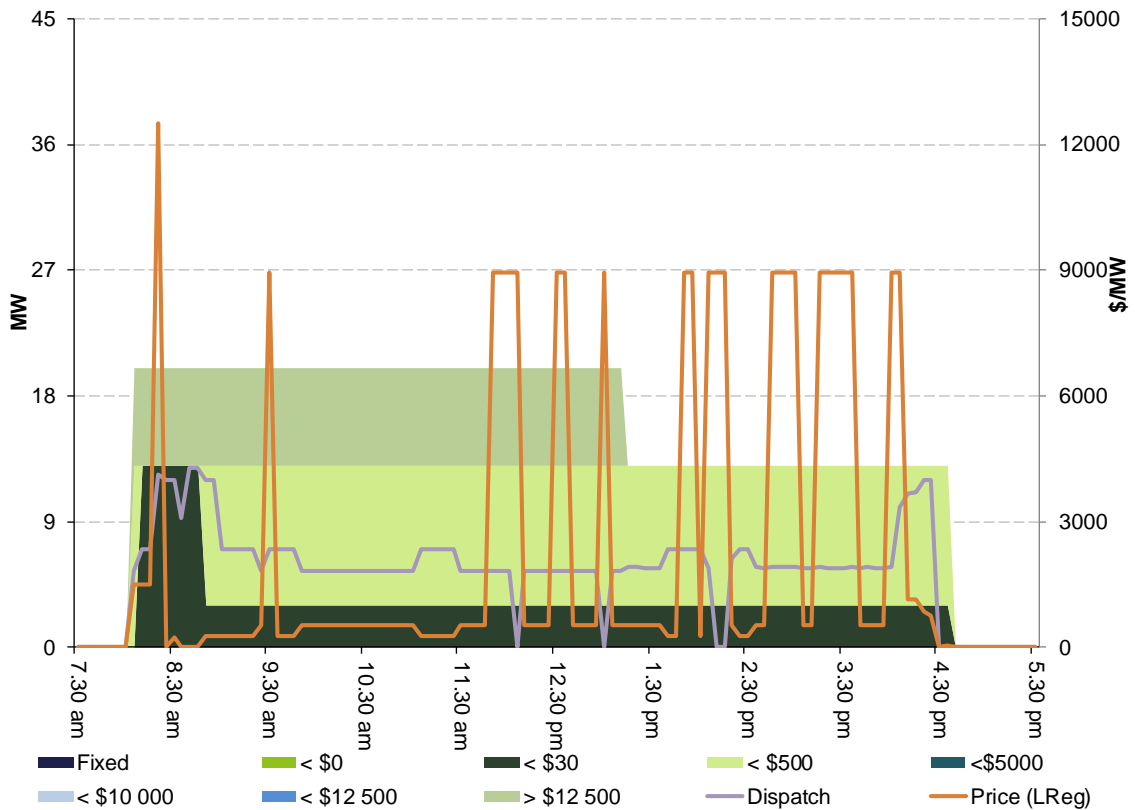
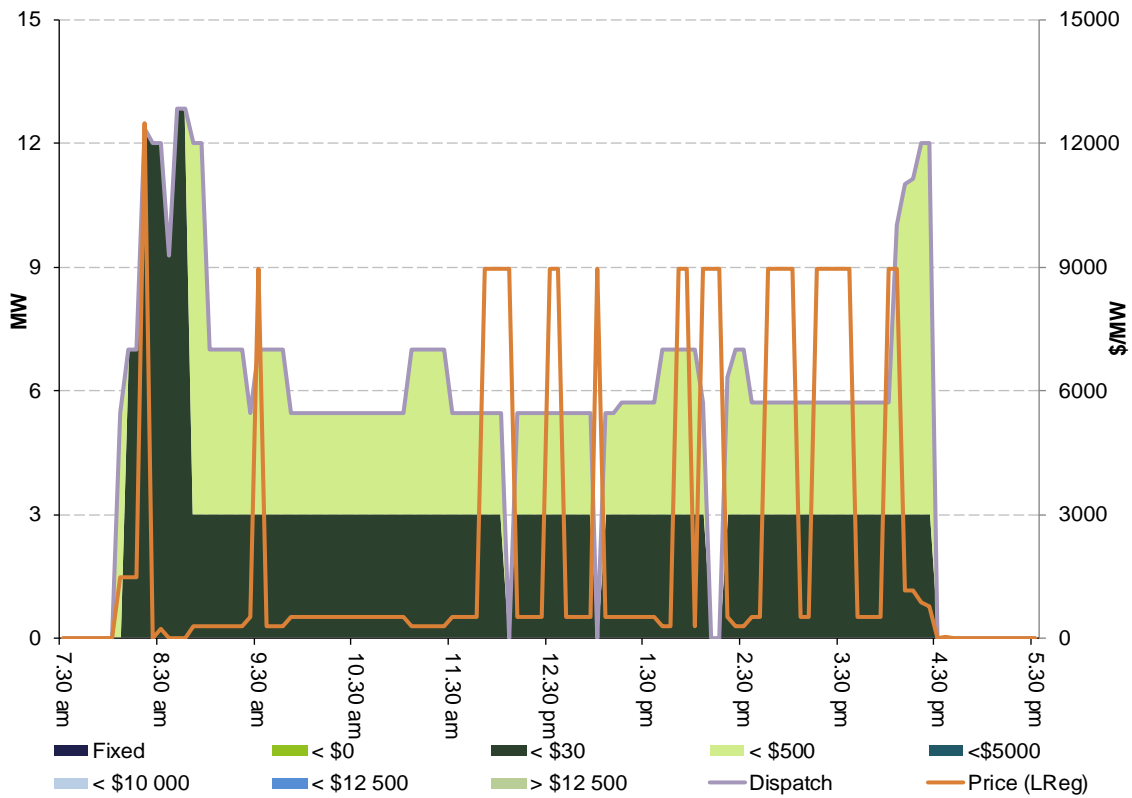


Figure C4b: Hornsdale Wind Farm (HDWF 2) lower regulation service closing bid prices, dispatch and dispatch price – effective offers



Raise Regulation

Figure C5a: Torrens Island (AGL) raise regulation service closing bid prices, dispatch and dispatch price - maximum offers

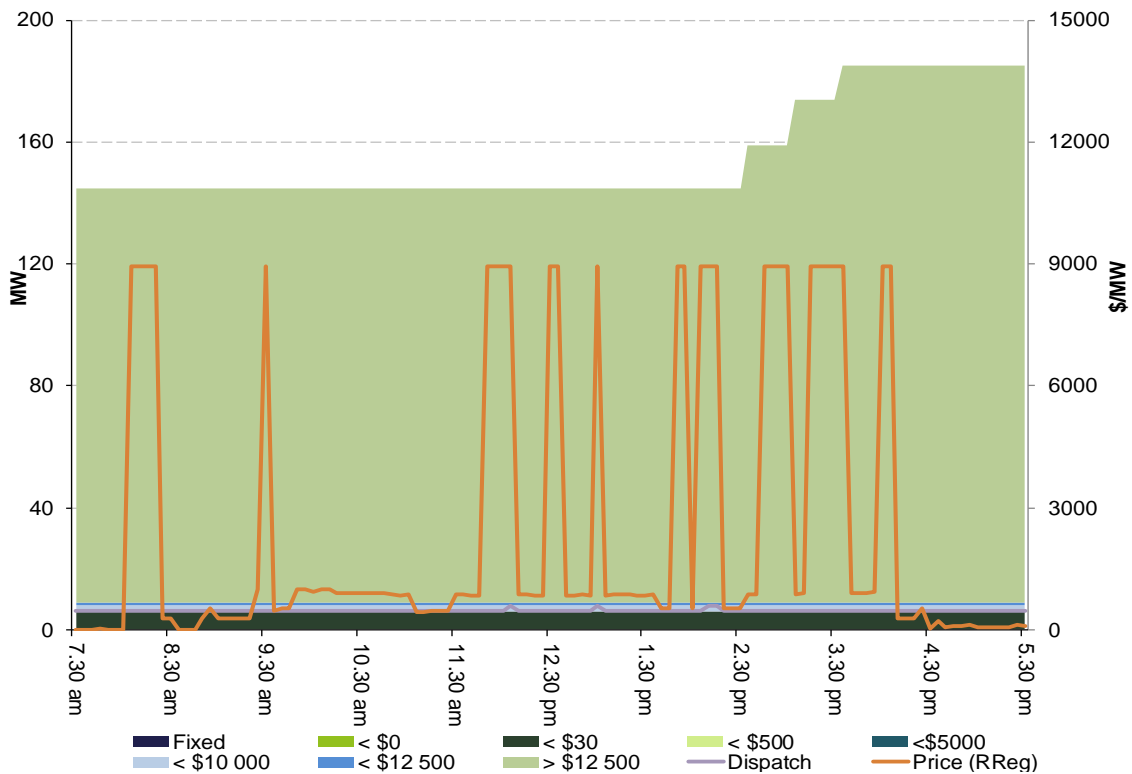


Figure C5b: Torrens Island (AGL) raise regulation service closing bid prices, dispatch and dispatch price - effective offers

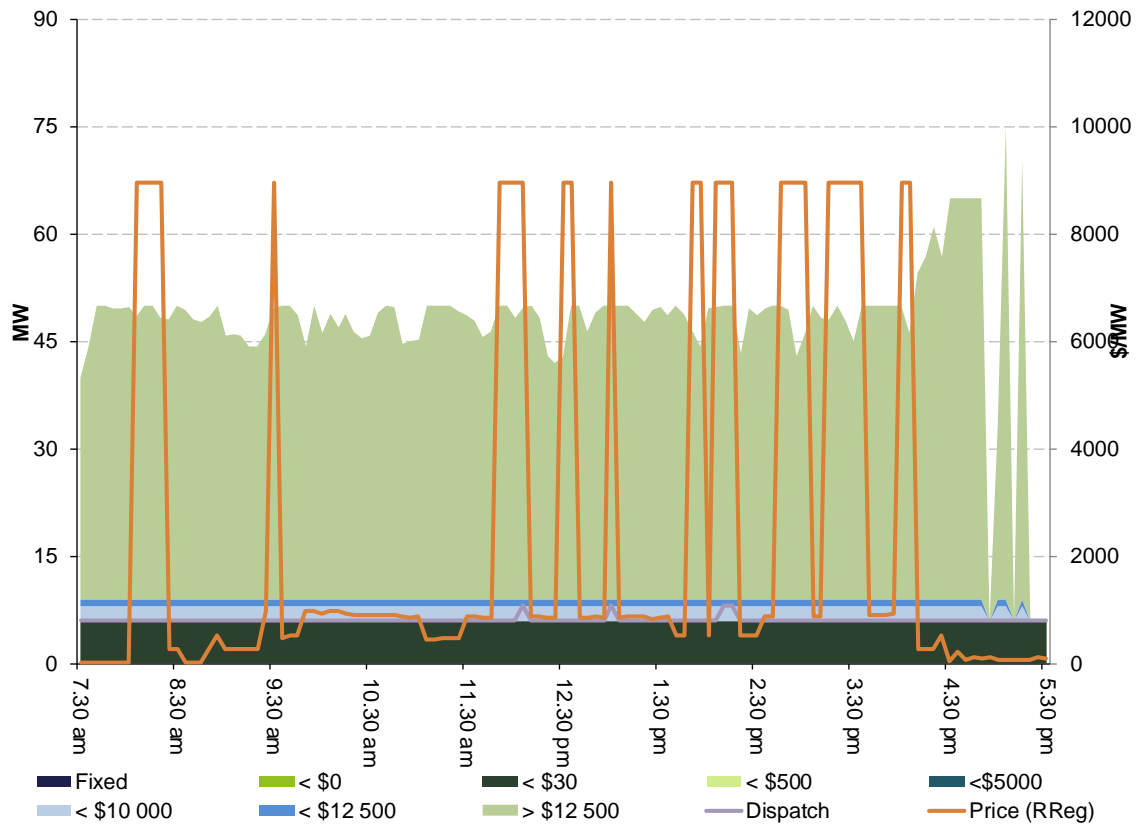


Figure C6a: Hornsdale Power Reserve (Neoen) raise regulation service closing bid prices, dispatch and dispatch price – maximum offers

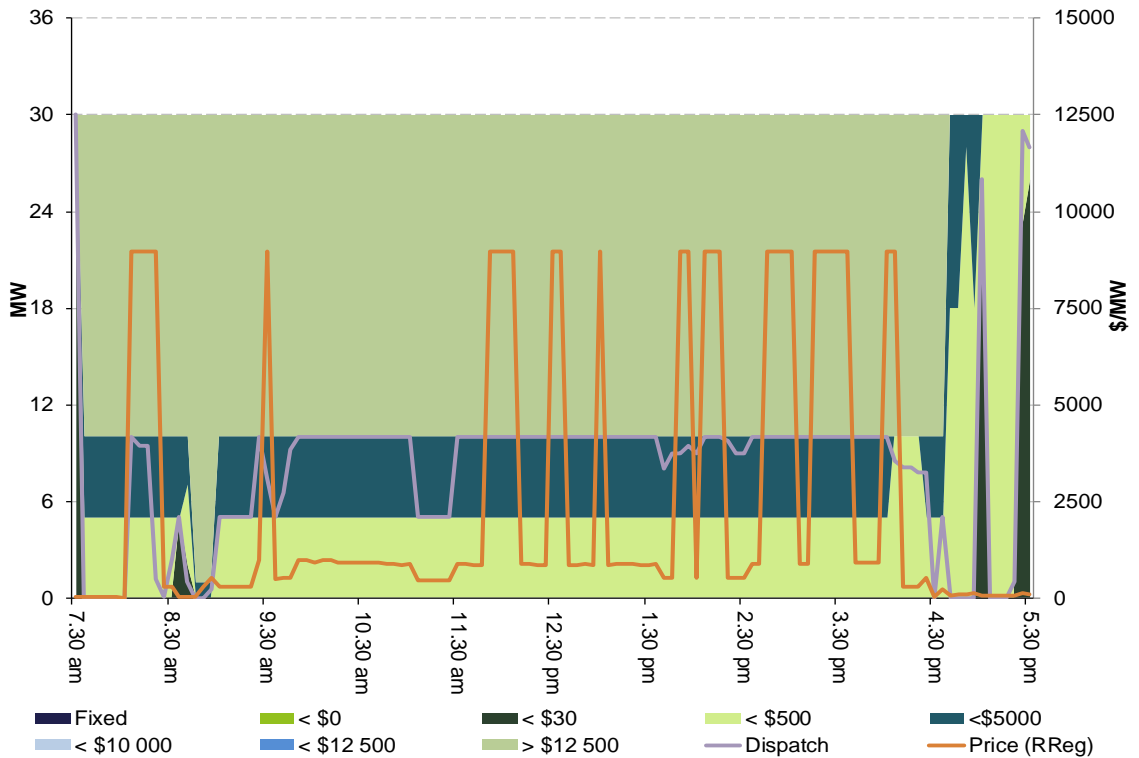


Figure C6b: Hornsdale Power Reserve (Neoen) raise regulation service closing bid prices, dispatch and dispatch price – effective offers

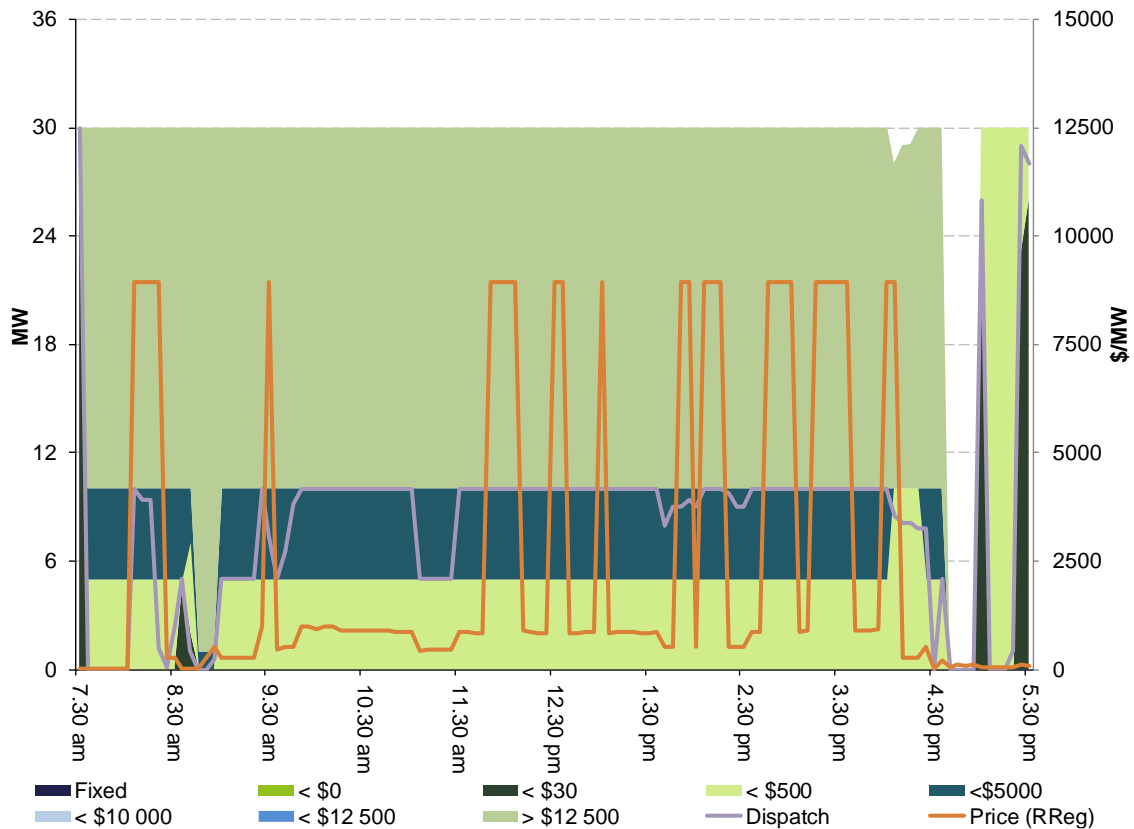


Figure C7a: Quarantine (Origin) raise regulation service closing bid prices, dispatch and dispatch price – maximum offers

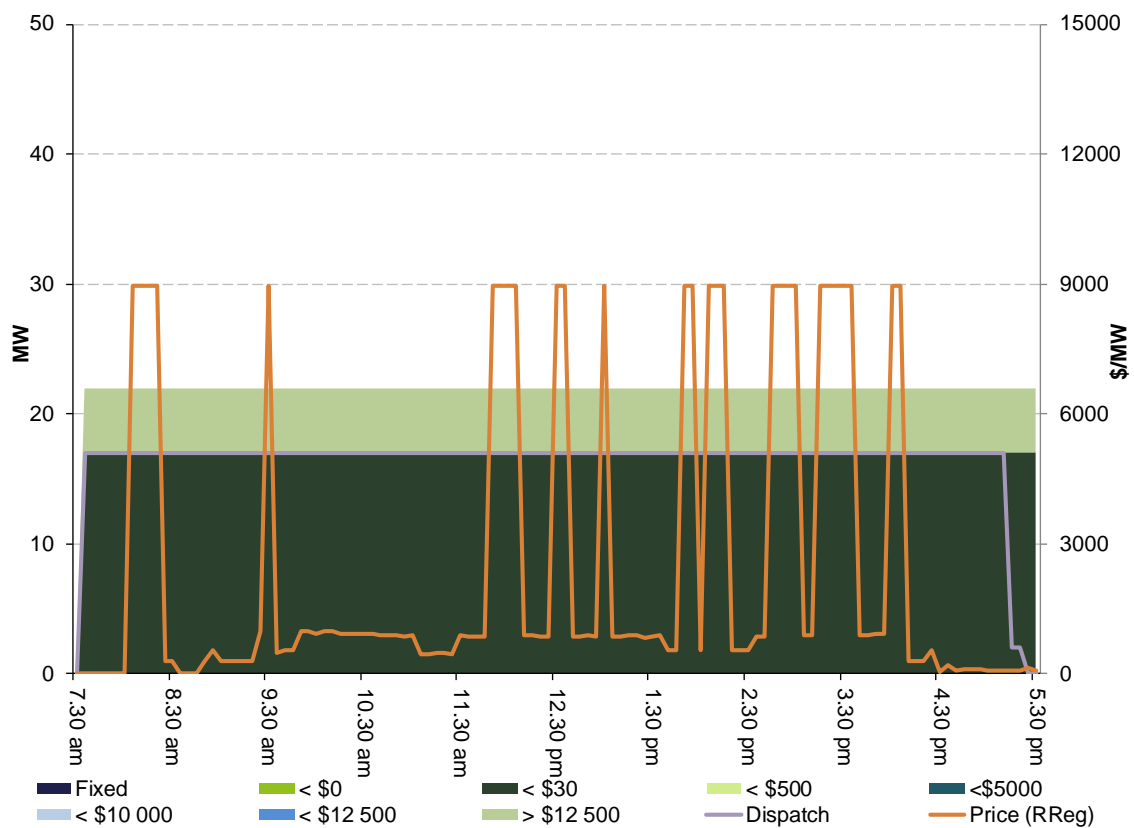


Figure C7b: Quarantine (Origin) raise regulation service closing bid prices, dispatch and dispatch price – effective offers

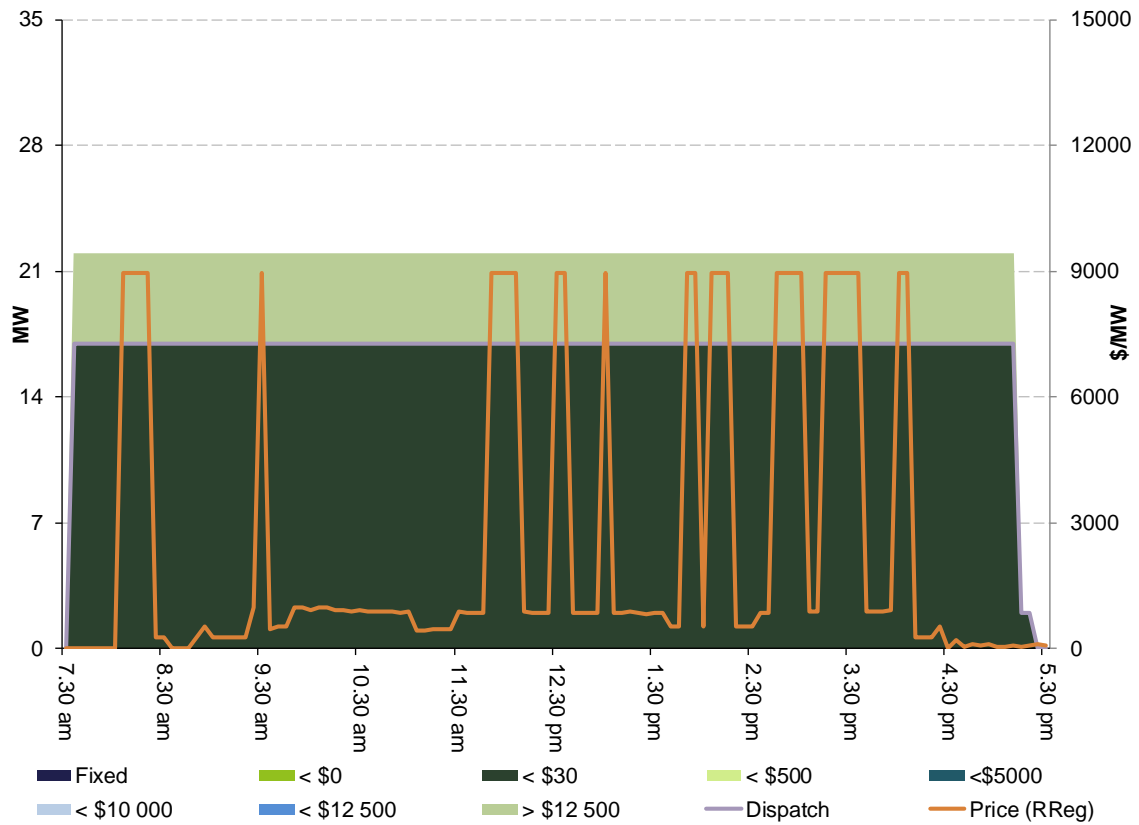


Figure C8a: Hornsdale Wind Farm 2 (HDWF 2) raise regulation service closing bid prices, dispatch and dispatch price – maximum offers

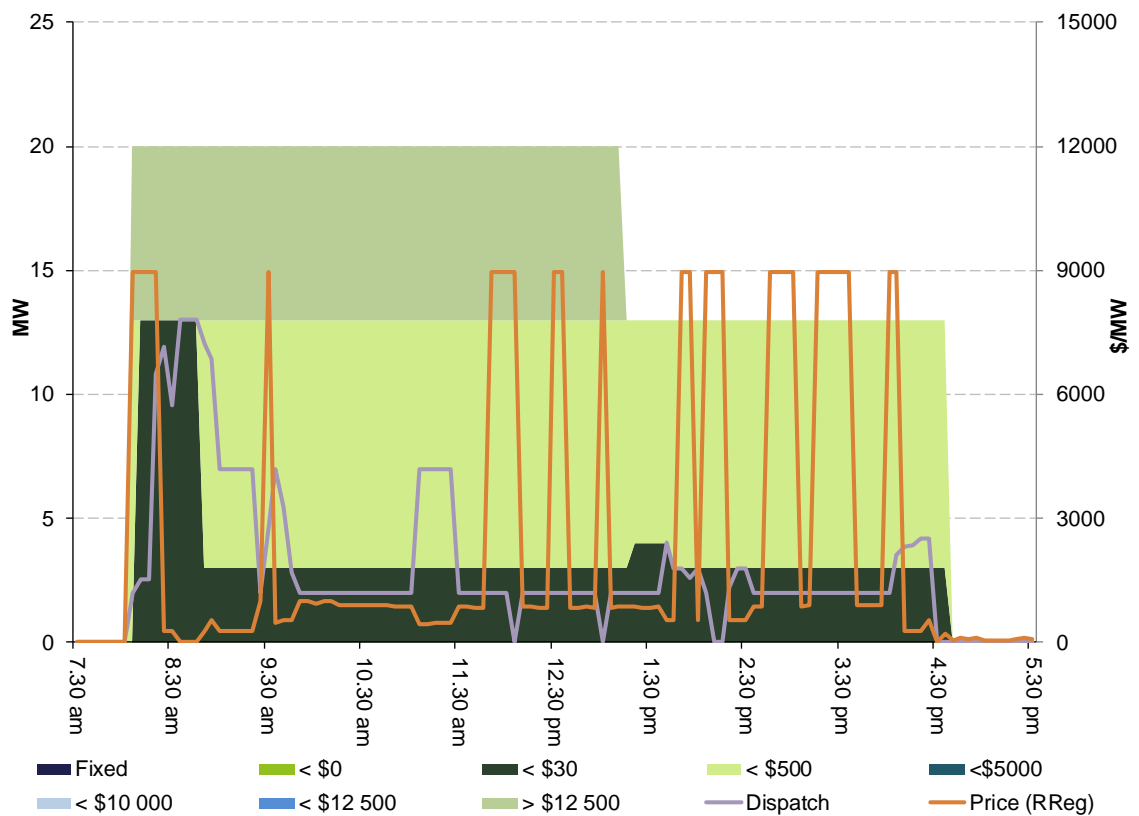
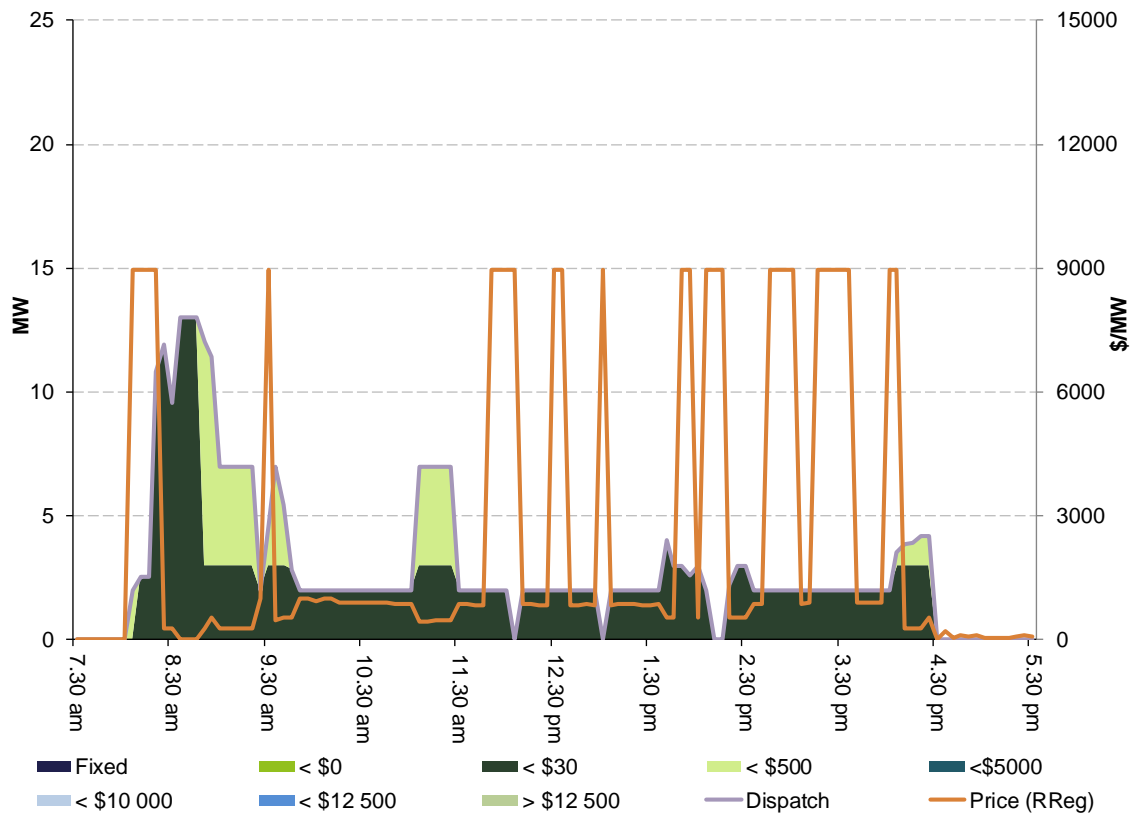


Figure C8b: Hornsdale Wind Farm 2 (HDWF 2) raise regulation service closing bid prices, dispatch and dispatch price – effective offers



Appendix D: Market Notices

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

Market Notice	Type	Date of issue	Last Changed
63207	GENERAL NOTICE	14/06/2018 11:20:10	14/06/2018 11:20:10

Reason

The South East - Heywood No 2 275 kV line in the South Australia (SA) region is planned to be out of service from 0800 hrs to 1700 hrs on 08/07/2018.

A credible contingency event during this planned outage could cause synchronous separation of the South Australia (SA) region from the rest of the NEM. If separation occurs, load may be interrupted due to the operation of the Automatic Under Frequency Load Shedding (AUFLS) scheme in SA.

The credible separation contingency is managed as follows:

- 35 MW of raise and lower regulation FCAS will be sourced from SA.

- When power transfer is from SA to Victoria, contingency lower FCAS will be sourced from SA.

- When power transfer is from Victoria to SA, due to the 47-52Hz island separation frequency band advised by the SA jurisdiction, contingency raise FCAS is not sourced in SA and the AUFLS scheme may respond to low frequency events.

- Power transfer will be restricted on Victoria - South Australia interconnector (Heywood interconnector) to manage system security following the loss of the next contingency.

Forecast capacity reserves in the SA region are currently sufficient to meet electricity demand during the planned outage.

The following constraint sets have been invoked for this outage:

- F-I-HYSE

- I-HYSE

- I-VS_050

- S-HYSE_BC-2CP

- S-X_BC_CP

- V-HYTS_M12

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

Diyoni Hoole

AEMO Operations

Market Notice	Type	Date of issue	Last Changed
63395	MARKET INTERVENTION	07/07/2018 09:07:59	07/07/2018 09:07:59
Reason			

AEMO ELECTRICITY PARTICIPANT NOTICE.

Refer AEMO Participant Notice 63368 & 63381

In accordance with section 116 of the National Electricity Law AEMO is issuing a direction to AGL SA Generation Pty Limited to take the following action.

Torrens Island Unit A1 to remain synchronised and follow dispatch targets from 2230 hrs 05/07/2018.

AGL SA Generation Pty Limited does not incur any civil monetary liability for a relevant action taken in accordance with this direction unless the action is taken in bad faith.

The direction is issued at 0857 hrs 07/07/2018 hrs and is expected to stay in place until 1400 hrs 08/07/2018.

For the purposes of the National Electricity Rules this is a direction under clause 4.8.9(a).

Manager NEM Real Time Operation

Appendix E: 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.⁵ 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 8 July

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
08:05	\$1489.86	Hornsedale Power Reserve	HPRG1	Energy	\$1023.44	-1.00	-\$1023.44
		Hornsedale Power Reserve	HPRG1	Lower reg	\$525.00	-1.00	-\$525.00
		CS Energy	GSTONE1	Energy	\$53.73	0.23	\$12.36
		CS Energy	GSTONE2	Energy	\$53.73	0.17	\$9.13
		CS Energy	GSTONE3	Energy	\$53.73	0.23	\$12.36
		CS Energy	GSTONE5	Energy	\$53.73	0.23	\$12.36
		CS Energy	GSTONE6	Energy	\$53.73	0.17	\$9.13
		Engie	LOYYB1	Energy	\$10.50	0.10	\$1.05
		Engie	LOYYB2	Energy	\$10.50	0.10	\$1.05
08:10	\$1485.19	Hornsedale Power Reserve	HPRG1	Energy	\$1023.44	-1.00	-\$1023.44
		Hornsedale Power Reserve	HPRG1	Lower reg	\$525.00	-1.00	-\$525.00
		CS Energy	GSTONE1	Energy	\$53.73	0.29	\$15.58
		CS Energy	GSTONE2	Energy	\$53.73	0.22	\$11.82
		CS Energy	GSTONE3	Energy	\$53.73	0.29	\$15.58
		CS Energy	GSTONE6	Energy	\$53.73	0.22	\$11.82
		EnergyAustralia	YWPS2	Energy	\$25.14	0.16	\$4.02
		EnergyAustralia	YWPS4	Energy	\$25.14	0.16	\$4.02

⁵ 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
08:15	\$1488.65	Hornsdale Power Reserve	HPRG1	Energy	\$1023.44	-1.00	-\$1023.44
		Hornsdale Power Reserve	HPRG1	Lower reg	\$525.00	-1.00	-\$525.00
		CS Energy	GSTONE1	Energy	\$53.73	0.43	\$23.10
		CS Energy	GSTONE2	Energy	\$53.73	0.32	\$17.19
		CS Energy	GSTONE6	Energy	\$53.73	0.32	\$17.19
		Engie	LOYYB1	Energy	\$10.50	0.12	\$1.26
		Engie	LOYYB2	Energy	\$10.50	0.12	\$1.26
08:20	\$12 500.00	Hornsdale Power Reserve	HPRL1	Lower reg	\$12 500.00	-1.00	-\$12 500.00
08:25	\$7.15	CS Energy	GSTONE2	Energy	\$53.73	-0.31	-\$16.66
		CS Energy	GSTONE3	Energy	\$53.73	-0.41	-\$22.03
		CS Energy	GSTONE6	Energy	\$53.73	-0.31	-\$16.66
		Origin Energy	ER03	Energy	\$47.99	0.50	\$24.00
		Origin Energy	ER04	Energy	\$47.99	0.50	\$24.00
		AGL (SA)	TORRB3	Raise 5 min	\$0.50	1.00	\$0.50
		Origin Energy	ER03	Raise reg	\$0.01	-0.50	-\$0.01
		Origin Energy	ER04	Raise reg	\$0.01	-0.50	-\$0.01
		AGL (SA)	TORRB3	Lower reg	\$0.00	-1.00	\$0.00
08:30	\$233.38	Hornsdale Power Reserve	HPRG1	Raise reg	\$275.00	-0.93	-\$255.75
		CS Energy	GSTONE1	Energy	\$53.73	0.57	\$30.63
		CS Energy	GSTONE2	Energy	\$53.73	0.53	\$28.48
		CS Energy	GSTONE6	Energy	\$53.73	0.53	\$28.48
		Hornsdale Wind Farm 2	HDWF2	Energy	\$50.00	-1.40	-\$70.00
		Engie	LOYYB1	Energy	\$10.50	0.27	\$2.84
		Engie	LOYYB2	Energy	\$10.50	0.27	\$2.84
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind	HDWF2	Raise reg	\$0.00	0.93	\$0.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
Farm 2							
08:35	\$4.00	AGL Energy	BW02	Lower reg	\$4.00	-1.00	-\$4.00
08:40	\$4.00	AGL Energy	BW03	Lower reg	\$4.00	-1.00	-\$4.00
08:45	\$4.00	AGL Energy	BW04	Lower reg	\$4.00	-1.00	-\$4.00
08:50	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
08:55	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:00	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:05	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:10	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:15	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:20	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:25	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
09:30	\$8950.00	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
09:35	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:40	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:45	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
09:50	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
09:55	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:00	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:05	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:10	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:15	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Reserve					
10:20	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:25	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:30	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:35	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:40	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:45	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:50	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
10:55	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
11:00	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
11:05	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
11:10	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
11:15	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
11:20	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
11:25	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
11:30	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
11:35	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
11:40	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
11:45	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
11:50	\$8954.50	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Delta Electricity	VP5	Raise 5 min	\$5.00	-1.00	-\$5.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
11:55	\$8956.49	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Origin Energy	ER03	Raise reg	\$6.99	-1.00	-\$6.99
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
12:00	\$8955.17	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Hydro Tasmania	JBUTTERS	Raise reg	\$18.16	1.00	\$18.16
		Hydro Tasmania	JBUTTERS	Raise 5 min	\$16.63	-1.00	-\$16.63
		CS Energy	GSTONE3	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
12:05	\$8956.70	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		CS Energy	GSTONE3	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
12:10	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
12:15	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
12:20	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
12:25	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
12:30	\$8954.96	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Hydro Tasmania	JBUTTERS	Raise reg	\$18.16	1.00	\$18.16
		Hydro Tasmania	JBUTTERS	Raise 5 min	\$16.63	-1.00	-\$16.63
		Origin Energy	ER02	Raise reg	\$6.99	-1.00	-\$6.99
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
12:35	\$8953.75	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Stanwell	TARONG#1	Raise 5 min	\$4.25	-1.00	-\$4.25
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
12:40	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
12:45	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
12:50	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
12:55	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:00	\$8958.49	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
			APD01	Raise 5 min	\$8.99	-1.00	-\$8.99
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
13:05	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:10	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:15	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:20	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:25	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:30	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:35	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
13:40	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
13:45	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
13:50	\$8955.17	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Hydro Tasmania	JBUTTERS	Raise reg	\$18.16	1.00	\$18.16
		Hydro Tasmania	JBUTTERS	Raise 5 min	\$16.63	-1.00	-\$16.63
		CS Energy	GSTONE6	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
13:55	\$8956.70	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		CS Energy	GSTONE3	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
14:00	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
14:05	\$8958.50	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Stanwell	STAN-3	Raise reg	\$9.00	-1.00	-\$9.00
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
14:10	\$8956.70	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		CS Energy	GSTONE6	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
14:15	\$8956.70	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		CS Energy	GSTONE2	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
14:20	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
14:25	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
14:30	\$274.00	Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
14:35	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
14:40	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
14:45	\$8958.49	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
			APD01	Raise 5 min	\$8.99	-1.00	-\$8.99
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
14:50	\$8957.51	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Delta Electricity	VP5	Energy	\$38.00	-0.50	-\$19.00
		Delta Electricity	VP6	Energy	\$38.00	-0.50	-\$19.00
		Origin Energy	ER02	Energy	\$36.98	0.33	\$12.20
		Origin Energy	ER03	Energy	\$36.98	0.33	\$12.20
		Origin Energy	ER04	Energy	\$36.98	0.33	\$12.20
		Origin Energy	ER02	Raise reg	\$6.99	-0.33	-\$2.31
		Origin Energy	ER03	Raise reg	\$6.99	-0.33	-\$2.31
		Origin Energy	ER04	Raise reg	\$6.99	-0.33	-\$2.31

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
14:55	\$8956.70	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		CS Energy	GSTONE1	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
15:00	\$8958.49	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
			APD01	Raise 5 min	\$8.99	-1.00	-\$8.99
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
15:05	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
15:10	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
15:15	\$8956.70	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		CS Energy	GSTONE6	Raise reg	\$7.20	-1.00	-\$7.20
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
15:20	\$8958.50	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Stanwell	STAN-3	Raise reg	\$9.00	-1.00	-\$9.00
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
15:25	\$8958.50	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Stanwell	TARONG#1	Raise reg	\$9.00	-1.00	-\$9.00
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
15:30	\$8958.50	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Stanwell	TARONG#2	Raise reg	\$9.00	-1.00	-\$9.00
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
15:35	\$8963.99	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Origin Energy	ER02	Raise 5 min	\$14.49	-1.00	-\$14.49
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
15:40	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
15:45	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
15:50	\$525.00	Hornsedale Power	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Reserve					
15:55	\$525.00	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	-1.00	-\$525.00
16:00	\$8963.99	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Origin Energy	ER03	Raise 5 min	\$14.49	-1.00	-\$14.49
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
16:05	\$8963.65	AGL (SA)	TORRB4	Lower reg	\$8950.00	-1.00	-\$8950.00
		Delta Electricity	VP5	Energy	\$58.00	-0.50	-\$29.00
		Delta Electricity	VP6	Energy	\$58.00	-0.50	-\$29.00
		Origin Energy	ER02	Energy	\$36.98	1.00	\$36.98
		Hydro Tasmania	ASTHYD1	Raise 6 sec	\$3.90	1.00	\$3.90
		Stanwell	TARONG#1	Raise 60 sec	\$3.00	1.00	\$3.00
		AGL (SA)	TORRB4	Raise 5 min	\$0.50	1.00	\$0.50
		Origin Energy	ER02	Raise 5 min	\$0.01	-1.00	-\$0.01
		Origin Energy	ER02	Raise 60 sec	\$0.01	-1.00	-\$0.01
		Origin Energy	ER02	Raise 6 sec	\$0.01	-1.00	-\$0.01
16:10	\$1151.20	Hornsedale Power Reserve	HPRG1	Energy	\$1023.44	-1.00	-\$1023.44
		Hornsedale Power Reserve	HPRG1	Lower reg	\$200.00	-1.00	-\$200.00
		Delta Electricity	VP5	Energy	\$58.00	0.62	\$35.96
		Delta Electricity	VP6	Energy	\$58.00	0.62	\$35.96
16:15	\$1142.34	Hornsedale Power Reserve	HPRG1	Energy	\$1023.44	-1.00	-\$1023.44
		Hornsedale Power Reserve	HPRG1	Lower reg	\$200.00	-1.00	-\$200.00
		CS Energy	GSTONE1	Energy	\$59.73	0.68	\$40.62
		CS Energy	GSTONE3	Energy	\$59.73	0.68	\$40.62
16:20	\$854.96	Hornsedale Power Reserve	HPRG1	Raise reg	\$275.00	0.35	\$96.25
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
		Hornsedale Wind	HDWF2	Raise reg	\$274.00	-0.35	-\$95.90

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Farm 2					
		EnergyAustralia	MP1	Energy	\$62.47	-0.34	-\$21.24
		EnergyAustralia	MP2	Energy	\$62.47	-0.34	-\$21.24
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	0.54	-\$540.00
16:25	\$763.21	Hornsedale Power Reserve	HPRG1	Raise reg	\$525.00	0.35	\$183.75
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-1.00	-\$274.00
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$274.00	-0.35	-\$95.90
		CS Energy	GSTONE1	Energy	\$59.73	-0.16	-\$9.56
		CS Energy	GSTONE2	Energy	\$59.73	-0.16	-\$9.56
		CS Energy	GSTONE3	Energy	\$59.73	-0.16	-\$9.56
		CS Energy	GSTONE6	Energy	\$59.73	-0.16	-\$9.56
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	0.54	-\$540.00

Raise regulation 8 July

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
08:05	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
08:10	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
08:15	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
08:20	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
08:25	\$275.00	Hornsedale Power Reserve	HPRG1	Raise reg	\$275.00	-1.00	-\$275.00
08:30	\$275.00	Hornsedale Power Reserve	HPRG1	Raise reg	\$275.00	-1.00	-\$275.00
08:35	\$7.30	Hydro Tasmania	GORDON	Raise reg	\$18.16	-1.00	-\$18.16
		CS Energy	GSTONE2	Energy	\$53.73	-0.35	-\$18.81
		CS Energy	GSTONE6	Energy	\$53.73	-0.35	-\$18.81

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		AGL Energy	BW03	Energy	\$52.52	0.50	\$26.26
		AGL Energy	BW04	Energy	\$52.52	0.50	\$26.26
		AGL Energy	BW03	Raise reg	\$4.00	-0.50	-\$2.00
		AGL Energy	BW04	Raise reg	\$4.00	-0.50	-\$2.00
08:45	\$8.40	CS Energy	GSTONE2	Energy	\$53.73	-0.35	-\$18.81
		CS Energy	GSTONE3	Energy	\$53.73	-0.35	-\$18.81
		CS Energy	GSTONE6	Energy	\$53.73	-0.35	-\$18.81
		Origin Energy	ER03	Energy	\$47.99	0.50	\$24.00
09:00	\$274.00	Hornsedale Wind Farm 2	HDWF2	Raise reg	\$274.00	-1.00	-\$274.00
09:05	\$274.00	Hornsedale Wind Farm 2	HDWF2	Raise reg	\$274.00	-1.00	-\$274.00
09:10	\$274.00	Hornsedale Wind Farm 2	HDWF2	Raise reg	\$274.00	-1.00	-\$274.00
09:15	\$274.00	Hornsedale Wind Farm 2	HDWF2	Raise reg	\$274.00	-1.00	-\$274.00
09:20	\$274.00	Hornsedale Wind Farm 2	HDWF2	Raise reg	\$274.00	-1.00	-\$274.00
09:25	\$987.86	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		AGL (SA)	TORRB3	Energy	\$115.00	-0.75	-\$86.25
		AGL (SA)	TORRB4	Energy	\$115.00	-0.75	-\$86.25
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
09:30	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
09:55	\$987.86	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		AGL (SA)	TORRB3	Energy	\$115.00	-0.75	-\$86.25
		AGL (SA)	TORRB4	Energy	\$115.00	-0.75	-\$86.25
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
10:00	\$918.95	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		AGL (SA)	TORRB3	Energy	\$115.00	-0.75	-\$86.25
		AGL (SA)	TORRB4	Energy	\$115.00	-0.75	-\$86.25
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
10:15	\$914.78	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Snowy Hydro	UPPTUMUT	Energy	\$48.01	-2.07	-\$99.38
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
10:20	\$908.62	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
10:30	\$912.55	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsedale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Delta Electricity	VP5	Energy	\$48.00	-1.01	-\$48.48
		Delta Electricity	VP6	Energy	\$48.00	-1.01	-\$48.48
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
		Hydro Tasmania	TUNGATIN	Energy	\$59.28	-1.76	-\$104.33
		Hydro Tasmania	TUNGATIN	Raise reg	\$18.16	1.76	\$31.96
		Origin Energy	ER04	Raise 5 min	\$9.79	-1.76	-\$17.23
		Hydro Tasmania	JBUTTERS	Raise 60 sec	\$4.69	1.76	\$8.25
		Hydro Tasmania	ASTHYD1	Raise 6 sec	\$3.90	1.76	\$6.86
			VENUS1	Raise 6 sec	\$2.78	-1.76	-\$4.89
		AGL Hydro	DARTM1	Raise 60 sec	\$2.00	-1.76	-\$3.52
		AGL Energy	BW04	Energy	\$52.52	0.81	\$42.54
		Origin Energy	ER02	Energy	\$47.99	-1.54	-\$73.90
		Hydro Tasmania	LI_WY_CA	Raise 5 min	\$18.92	-0.01	-\$0.19
		Hydro Tasmania	TUNGATIN	Raise reg	\$18.16	0.83	\$15.07
		CS Energy	GSTONE3	Raise reg	\$7.20	-0.81	-\$5.83
		Hydro Tasmania	LI_WY_CA	Raise 60 sec	\$4.69	0.81	\$3.80
		AGL Energy	BW04	Lower reg	\$4.00	0.81	\$3.24
		Hydro Tasmania	ASTHYD1	Raise 6 sec	\$3.90	0.81	\$3.16
		Delta Electricity	VP5	Raise 60 sec	\$2.00	-0.81	-\$1.62
		AGL Hydro	WKIEWA1	Raise 6 sec	\$2.00	-0.81	-\$1.62
		Hydro Tasmania	MACKNTSH	Lower reg	\$1.50	-0.81	-\$1.22
			T-V-MNSP1,VIC1	Energy	\$0.01	-0.81	-\$0.01
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
10:55	\$853.75	Hornsedale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Origin Energy	ER04	Energy	\$47.99	-0.24	-\$11.52
		Engie	LOYYB1	Energy	\$10.50	-0.40	-\$4.20
		Engie	LOYYB2	Energy	\$10.50	-0.40	-\$4.20
		Stanwell	STAN-2	Raise reg	\$9.00	-0.72	-\$6.48
		Origin Energy	ER02	Raise reg	\$0.01	0.24	\$0.00
		Origin Energy	ER03	Raise reg	\$0.01	0.24	\$0.00
		Origin Energy	ER04	Raise reg	\$0.01	0.24	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$80.00	1.50	-\$120.00
11:10	\$449.07	Hornsdale Wind Farm 2	HDWF2	Raise reg	\$274.00	-1.00	-\$274.00
		Delta Electricity	VP5	Energy	\$48.00	-0.36	-\$17.28
		Delta Electricity	VP6	Energy	\$48.00	-0.36	-\$17.28
		EnergyAustralia	YWPS1	Energy	\$24.77	-0.82	-\$20.31
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$80.00	1.50	-\$120.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$80.00	1.50	-\$120.00
11:30	\$879.21	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Origin Energy	ER02	Energy	\$47.99	-0.45	-\$21.60
		Origin Energy	ER03	Energy	\$47.99	-0.45	-\$21.60
		Origin Energy	ER04	Energy	\$47.99	-0.45	-\$21.60
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
11:35	\$864.21	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Delta Electricity	VP5	Energy	\$38.00	-0.65	-\$24.70
		Delta Electricity	VP6	Energy	\$38.00	-0.65	-\$24.70
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
		Engie	LOYB1	Energy	\$10.50	-0.53	-\$5.57
		Engie	LOYB2	Energy	\$10.50	-0.53	-\$5.57
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
11:50	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
11:55	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
12:00	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
12:05	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
12:10	\$885.95	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Engie	LOYB1	Energy	\$10.50	-0.02	-\$0.21
		Engie	LOYB2	Energy	\$10.50	-0.02	-\$0.21
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
12:20	\$842.18	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Delta Electricity	VP5	Energy	\$38.00	-0.21	-\$7.98
		Delta Electricity	VP6	Energy	\$38.00	-0.21	-\$7.98
		Engie	LOYB1	Energy	\$10.50	-0.53	-\$5.57
12:40	\$841.76	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Origin Energy	ER02	Energy	\$36.98	-0.14	-\$5.18
		Origin Energy	ER03	Energy	\$36.98	-0.14	-\$5.18
		Origin Energy	ER04	Energy	\$36.98	-0.14	-\$5.18
		Engie	LOYYB1	Energy	\$10.50	-0.54	-\$5.67
		Engie	LOYYB2	Energy	\$10.50	-0.54	-\$5.67
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
12:50	\$869.46	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Origin Energy	ER02	Energy	\$36.98	-0.48	-\$17.75
		Origin Energy	ER03	Energy	\$36.98	-0.48	-\$17.75
		Origin Energy	ER04	Energy	\$36.98	-0.48	-\$17.75
		Engie	LOYYB1	Energy	\$10.50	-0.05	-\$0.53
		Engie	LOYYB2	Energy	\$10.50	-0.05	-\$0.53
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
13:05	\$848.48	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Origin Energy	ER02	Energy	\$36.98	-0.14	-\$5.18
		Origin Energy	ER03	Energy	\$36.98	-0.14	-\$5.18
		Origin Energy	ER04	Energy	\$36.98	-0.14	-\$5.18
		EnergyAustralia	YWPS1	Energy	\$15.91	-1.08	-\$17.18
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.50	-\$1500.00
13:10	\$868.77	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.73	\$1433.25
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.73	-\$748.02
		Origin Energy	ER02	Energy	\$36.98	-0.47	-\$17.38
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00
13:20	\$872.96	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		Origin Energy	ER02	Energy	\$36.98	-0.47	-\$17.38
		Origin Energy	ER03	Energy	\$36.98	-0.47	-\$17.38
		Origin Energy	ER04	Energy	\$36.98	-0.47	-\$17.38
		EnergyAustralia	YWPS3	Energy	\$16.15	0.01	\$0.16
		EnergyAustralia	YWPS4	Energy	\$16.15	0.01	\$0.16
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00
13:25	\$837.51	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		EnergyAustralia	YWPS2	Energy	\$16.15	0.00	\$0.00
		EnergyAustralia	YWPS3	Energy	\$16.15	0.00	\$0.00
		EnergyAustralia	YWPS4	Energy	\$16.15	0.00	\$0.00
		Engie	LOYYB1	Energy	\$10.50	-0.78	-\$8.19
		Engie	LOYYB2	Energy	\$10.50	-0.78	-\$8.19
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
13:30	\$848.51	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		Origin Energy	ER02	Energy	\$36.98	-0.14	-\$5.18
		Origin Energy	ER03	Energy	\$36.98	-0.14	-\$5.18
		Origin Energy	ER04	Energy	\$36.98	-0.14	-\$5.18
		Engie	LOYYB1	Energy	\$10.50	-0.55	-\$5.78
		Engie	LOYYB2	Energy	\$10.50	-0.55	-\$5.78
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00
13:35	\$872.03	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		Delta Electricity	VP5	Energy	\$38.00	-0.69	-\$26.22
		Delta Electricity	VP6	Energy	\$38.00	-0.69	-\$26.22
14:15	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
14:20	\$525.00	Hornsdale Power Reserve	HPRG1	Raise reg	\$525.00	-1.00	-\$525.00
14:25	\$525.00	Hornsdale Power Reserve	HPRG1	Raise reg	\$525.00	-1.00	-\$525.00
14:30	\$525.00	Hornsdale Power Reserve	HPRG1	Raise reg	\$525.00	-1.00	-\$525.00
14:35	\$866.93	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		Origin Energy	ER02	Energy	\$36.98	-0.45	-\$16.64
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00
14:45	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
14:50	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
14:55	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
15:00	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
15:05	\$875.72	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		Delta Electricity	VP5	Energy	\$38.00	-0.72	-\$27.36
		Delta Electricity	VP6	Energy	\$38.00	-0.72	-\$27.36
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00
15:10	\$887.78	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		Origin Energy	ER02	Energy	\$36.98	-0.48	-\$17.75
		Origin Energy	ER03	Energy	\$36.98	-0.48	-\$17.75
		Origin Energy	ER04	Energy	\$36.98	-0.48	-\$17.75
		Stanwell	STAN-2	Raise reg	\$9.00	-1.44	-\$12.96
		AGL Energy	BW02	Energy	\$52.52	-0.48	-\$25.21
		AGL Energy	BW03	Energy	\$52.52	-0.48	-\$25.21
		AGL Energy	BW04	Energy	\$52.52	-0.48	-\$25.21
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00
15:45	\$899.22	Hornsdale Power Reserve	HPRL1	Lower reg	\$525.00	2.86	\$1501.50
		Hornsdale Wind Farm 2	HDWF2	Lower reg	\$274.00	-2.86	-\$783.64
		Hornsdale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsdale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00

DI	Dispatch Price (\$/MW)	Participant	Unit	Service	Offer price (\$/MW)	Marginal change	Contribution
16:00	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
16:05	\$8950.00	AGL (SA)	TORRB4	Raise reg	\$8950.00	-1.00	-\$8950.00
16:10	\$275.00	Hornsedale Power Reserve	HPRG1	Raise reg	\$275.00	-1.00	-\$275.00
16:15	\$275.00	Hornsedale Power Reserve	HPRG1	Raise reg	\$275.00	-1.00	-\$275.00
16:20	\$275.00	Hornsedale Power Reserve	HPRG1	Raise reg	\$275.00	-1.00	-\$275.00
16:25	\$525.00	Hornsedale Power Reserve	HPRG1	Raise reg	\$525.00	-1.00	-\$525.00
		EnergyAustralia	YWPS3	Energy	\$16.15	0.00	\$0.00
		EnergyAustralia	YWPS4	Energy	\$16.15	0.00	\$0.00
		Engie	LOYB1	Energy	\$10.50	-0.78	-\$8.19
		Engie	LOYB2	Energy	\$10.50	-0.78	-\$8.19
		Hornsedale Wind Farm 2	HDWF2	Raise reg	\$0.00	-1.00	\$0.00
		Hornsedale Wind Farm 2	HDWF2	Energy	-\$1000.00	1.54	-\$1540.00

Appendix F: Pricing during an intervention

At times, AEMO, may need to override the normal dispatch process to maintain system security. In accordance with the National Electricity Rules (NER) a dispatch interval where an AEMO intervention event occurs, must be declared an intervention price dispatch interval and set the energy and FCAS prices for all regions as if AEMO had not intervened in the market. An intervention pricing interval is declared when AEMO directs a participant to operate plant other than in accordance with dispatch instructions, or activates a reliability and emergency reserve trader (RERT) contract.

Under normal operations AEMO sets targets for generation and interconnectors and determines wholesale electricity market prices (energy and FCAS) in a single calculation for every five minute dispatch interval. Under “Intervention pricing” these are calculated twice for each dispatch interval, one taking into account the direction called “Intervention” and one that does not include the direction called “What-if”.

The “Intervention” calculation takes into account the direction(s) by AEMO and is used to set targets for generation in order to meet demand. Generators do not receive the pricing outcome of this calculation.

The “What-If” calculation does not take the direction into account and is used to calculate the wholesale electricity market price and is received by generators. The generation targets calculated are not used to dispatch generation.

These calculations dispatch generation to meet demand (intervention calculation) while providing the pricing signal to indicate a shortage of supply (what-if calculation).

Table 2 shows the both the what-if and intervention pricing outcomes.

Table 2: What-if and Intervention prices

Dispatch interval	Raise regulation		Lower regulation	
	What-if pricing (\$/MW)	Intervention pricing (\$/MW)	What-if pricing (\$/MW)	Intervention pricing (\$/MW)
8:05 am	8950	932.62	1489.86	525
8:10 am	8950	525	1485.19	383.14
8:15 am	8950	525	1488.65	383.70
8:20 am	8950	275	12500	14.4
8:25 am	275	275	7.15	258.76
8:30 am	275	275	233.38	257.53
8:35 am	7.3	9	4	8.5
8:40 am	7.83	8.37	4	7.87
8:45 am	8.4	8.03	4	7.52

Dispatch interval	Raise regulation		Lower regulation	
	What-if pricing (\$/MW)	Intervention pricing (\$/MW)	What-if pricing (\$/MW)	Intervention pricing (\$/MW)
8:50 am	274	274	274	274
8:55 am	525	525	274	274
9:00 am	274	274	274	274
9:05 am	274	274	274	274
9:10 am	274	274	274	274
9:15 am	274	274	274	274
9:20 am	274	274	274	274
9:25 am	987.86	886.61	525	525
9:30 am	8950	525	8950	274
9:35 am	468.9	274	274	274
9:40 am	525	525	274	274
9:45 am	525	525	274	274
9:50 am	988.15	894.02	525	525
9:55 am	987.86	889.19	525	525
10:00 am	918.95	881.8	525	525
10:05 am	988.34	883.56	525	525
10:10 am	987.76	881.77	525	525
10:15 am	914.78	872	525	525
10:20 am	908.62	873.28	525	525
10:25 am	904.55	870.61	525	525
10:30 am	912.55	874.43	525	525
10:35 am	904.74	879.59	525	525
10:40 am	899.8	874.03	525	525
10:45 am	891.38	875.13	525	525
10:50 am	880.95	870.38	525	525

Dispatch interval	Raise regulation		Lower regulation	
	What-if pricing (\$/MW)	Intervention pricing (\$/MW)	What-if pricing (\$/MW)	Intervention pricing (\$/MW)
10:55 am	853.75	839.51	525	525
11:00 am	883.34	851.977	525	525
11:05 am	443.49	430.075	274	274
11:10 am	449.07	444.67	274	274
11:15 am	462.17	443.41	274	274
11:20 am	463	447.13	274	274
11:25 am	460.42	427.68	274	274
11:30 am	879.21	852.35	525	525
11:35 am	864.21	852.73	525	525
11:40 am	846.8	843.24	525	525
11:45 am	842.55	841.29	525	525
11:50 am	8950	843.57	8954.5	525
11:55 am	8950	843.26	8956.49	525
12:00 pm	8950	841.27	8955.17	525
12:05 pm	8950	8950	8956.7	8959.29
12:10 pm	885.95	846.17	525	525
12:15 pm	869.7	842.54	525	525
12:20 pm	842.18	841.42	525	525
12:25 pm	842.53	841.67	525	525
12:30 pm	8950	833.95	8954.96	525
12:35 pm	8950	856.13	8953.75	525
12:40 pm	841.76	843.61	525	525
12:45 pm	841.93	841.59	525	525
12:50 pm	869.46	835.81	525	525
12:55 pm	852.8	855.37	525	525

Dispatch interval	Raise regulation		Lower regulation	
	What-if pricing (\$/MW)	Intervention pricing (\$/MW)	What-if pricing (\$/MW)	Intervention pricing (\$/MW)
1:00 pm	8950	8950	8958.49	8959.5
1:05 pm	848.48	853.61	525	525
1:10 pm	868.77	855.61	525	525
1:15 pm	874.98	861.88	525	525
1:20 pm	872.96	864.83	525	525
1:25 pm	837.51	862.29	525	525
1:30 pm	848.51	861.95	525	525
1:35 pm	872.03	868.08	525	525
1:40 pm	525	525	274	274
1:45 pm	525	525	274	274
1:50 pm	8950	525	8955.17	274
1:55 pm	8950	525	8956.7	274
2:00 pm	525	525	274	274
2:05 pm	8950	864.16	8958.5	525
2:10 pm	8950	8950	8956.7	8961.68
2:15 pm	8950	8950	8956.7	8963.99
2:20 pm	525	525	525	525
2:25 pm	525	525	274	274
2:30 pm	525	525	274	274
2:35 pm	866.93	860.79	525	525
2:40 pm	869.09	863.24	525	525
2:45 pm	8950	863.12	8958.49	525
2:50 pm	8950	863.06	8957.51	525
2:55 pm	8950	861.88	8956.7	525
3:00 pm	8950	863.50	8958.49	525

Dispatch interval	Raise regulation		Lower regulation	
	What-if pricing (\$/MW)	Intervention pricing (\$/MW)	What-if pricing (\$/MW)	Intervention pricing (\$/MW)
3:05 pm	875.72	866.36	525	525
3:10 pm	887.78	868.77	525	525
3:15 pm	8950	886.61	8956.7	525
3:20 pm	8950	891.24	8958.5	525
3:25 pm	8950	885.18	8958.5	525
3:30 pm	8950	889.42	8958.5	525
3:35 pm	8950	884.50	8963.99	525
3:40 pm	897.87	888.15	525	525
3:45 pm	899.22	895.91	525	525
3:50 pm	904.59	892.47	525	525
3:55 pm	918.23	910.43	525	525
4:00 pm	8950	910.38	8963.99	525
4:05 pm	8950	275	8963.65	1161.56
4:10 pm	275	275	1151.2	1157.01
4:15 pm	275	275	1142.34	1153.03
4:20 pm	275	275	854.96	849.05
4:25 pm	525	525	763.21	759.74