

# Spot prices greater than \$5000/MWh



AUSTRALIAN ENERGY  
REGULATOR

Tasmania: 10-19 June 2009

## Introduction

The AER is required to publish a report covering the circumstances in which the spot price exceeds \$5000/MWh<sup>1</sup>. That report should:

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

## Summary/assessment

On 12 occasions between 10 and 19 June, the spot price in Tasmania exceeded \$5000/MWh. None of these high prices were forecast. Eleven of the events occurred when sudden and repeated reductions in the output from non-scheduled generation owned by Hydro Tasmania resulted in the dispatch of other high-priced Hydro Tasmania generation. Coincident with this, there was a step change in the amount of generation capacity offered at prices above \$5000/MWh by Hydro Tasmania.

The remaining high price event occurred at 5 pm on 16 June. While there was no reduction in the output from non-scheduled generation on this occasion, there was a significant amount of capacity being priced above \$5000/MWh by Hydro Tasmania for the trading interval.

On 16 June the weekly cumulative price exceeded the Cumulative Price Threshold<sup>2</sup> (CPT). As a result the National Electricity Market Management Company (NEMMCO) (now the Australian Energy Market Operator – AEMO) declared an Administered Pricing Period (the first ever in Tasmania) which was extended until 4 am on 19 June. The spot price exceeded \$5000/MWh on three occasions, only hours after the end of the Administered Pricing Period, but the cumulative price remained below the CPT.

Rebidding was not a factor in the spot price exceeding \$5000/MWh in relation to any of the 12 high price events.

## Non-scheduled generation

The vast majority of installed generation in the National Electricity Market is registered as scheduled. Scheduled generators are dispatched by NEMMCO/AEMO in accordance with their bids to meet demand. A number of smaller generators are classified as non-scheduled generation. Non-scheduled generators fall outside of the market processes and can produce electricity at their discretion. The output from non-scheduled generators is treated as negative demand, so any variation in their output is reflected in the demand that must be met

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<sup>1</sup> Pursuant to clause 3.13.7 (d) of the Electricity Rules

<sup>2</sup> The CPT is defined in Clause 3.14.1(c) of the Electricity Rules as \$150 000. Clause 3.14.2 c(1) states that when the sum of the spot prices for the previous 336 trading intervals (i.e. prices over the previous week) exceeds the CPT, administered pricing is to apply. Administered pricing caps the spot price to a maximum of \$300/MWh.

by scheduled generators (for example, a 10 MW increase from a non-scheduled generator is treated as a 10 MW decrease in demand).

There is around 2400 MW of installed scheduled generation in Tasmania. There is a further 240 MW of non-scheduled generation. The non-scheduled generation includes:

- the 140 MW Woolnorth wind farm operated by Roaring 40s;
- the 28 MW Repulse hydro plant, operated by Hydro Tasmania;
- the 28 MW Palooona hydro plant, operated by Hydro Tasmania;
- the 17 MW Cluny hydro plant, operated by Hydro Tasmania;
- the 14 MW Butlers Gorge hydro plant, operated by Hydro Tasmania; and
- the 10 MW Rowallan hydro plant, operated by Hydro Tasmania.

The five non-scheduled generators operated by Hydro Tasmania are all hydro plant with a nominal capacity of less than 30 MW, and were registered as non-scheduled with NEMMCO/AEMO<sup>3</sup>.

At the times of high prices, the combined output from Hydro Tasmania's three largest non-scheduled generators (Cluny, Palooona and Repulse) changed rapidly by up to 80 MW in total. This occurred up to ten times in one day. As non-scheduled generating units are not scheduled as part of the central dispatch process, there is no requirement to notify the market of the availability or output level of these units. As a result the impacts of these significant changes in output were not forecast.

### **Actual and forecast conditions**

Figure 1 details the actual market outcomes for the first high-priced event on 10 June at 9.30 am, on a 5 minute resolution. The high-priced trading interval is shaded with surrounding dispatch intervals shown for comparison. On this occasion the forecast spot price four hours ahead was \$36/MWh and the respective forecast demand was 1416 MW. The actual demand, however, was greater than that forecast as the output from Hydro Tasmania's non-scheduled generation decreased. This reduction in output from non-scheduled generation coincided with a step change in the amount of generation capacity offered at high prices by Hydro Tasmania's scheduled generators<sup>4</sup>. This is detailed in the columns labelled "Capacity priced" in figure 1.

Figure 1 also shows an apparent reduction in industrial customer demand in response to the high price, from about 9.15 am. This is evident from the column labelled "FCSPS Load enabled", which shows the amount of large industrial demand available for tripping in the event of the loss of the Basslink interconnector<sup>5</sup>. The FCSPS is in place to ensure that if Basslink trips, the frequency in Tasmania can be maintained within acceptable limits by interrupting industrial customer demand. In the final two columns, the actual import limit across Basslink is compared with that forecast four hours ahead. The import limit during this time was determined by the amount of "FCSPS enabled customer load". This meant that as the amount of large industrial customer demand decreased, the Basslink import capability also reduced by the same amount.

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<sup>3</sup> Note that there are a number of Hydro Tasmania's generators close to the 30 MW cut-off including the 32 MW Lake Echo plant, that are registered as scheduled generators.

<sup>4</sup> Aurora Energy Tamar Valley (AETV) is the only other scheduled generator in Tasmania with around 100 MW of capacity. AETV did not offer material capacity at high prices and therefore its offers are excluded from the analysis.

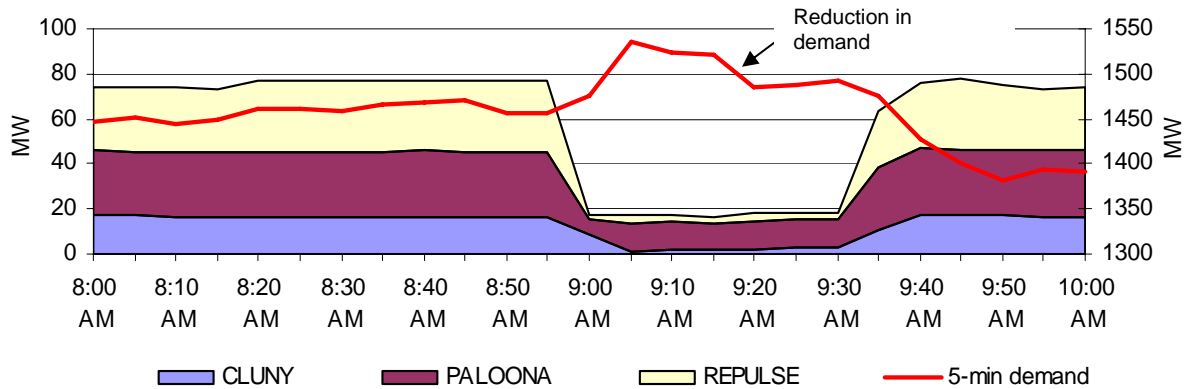
<sup>5</sup> The FCSPS or Frequency Control System Protection Scheme manages the potential failure of the Basslink interconnector. The scheme automatically shuts down generators (for northwards flows) or loads (for southwards flows) in the event of loss of the interconnector, thereby allowing larger flows across the interconnector.

**Figure 1: Actual and forecast outcomes – 9.30 am on 10 June**

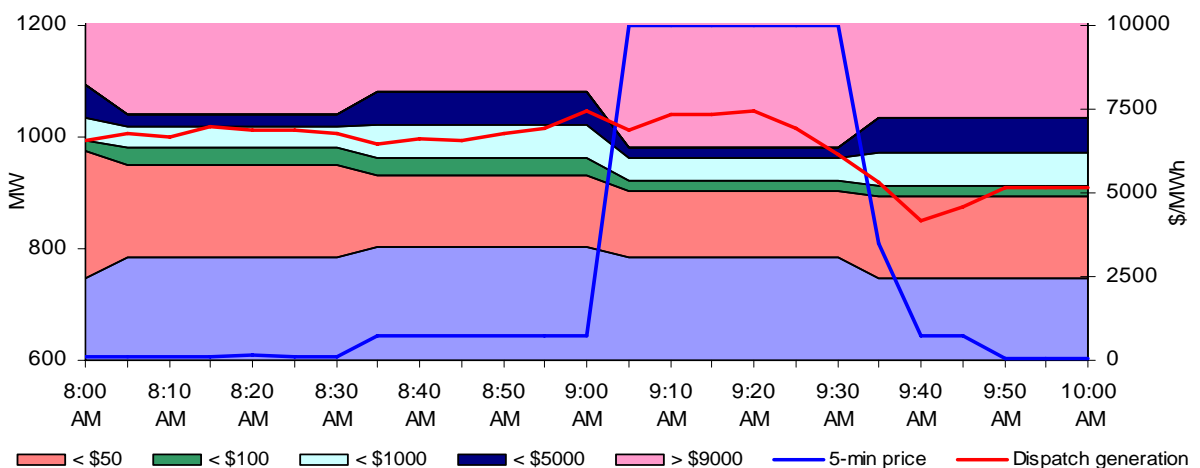
Time	5 min price (\$/MWh)	Hydro Tas non scheduled generation (MW)	5 min demand (MW)	4hour forecast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	FCSPS Load enabled (MW)	Import limit (MW)	4hour forecast import limit (MW)
8:55 am	67	91	1471	1432	1125	740	281	-398	-404
9:00 am	40	91	1486		1125	740	289	-407	
9:05 am	299	59	1469	1416	1010	801	285	-403	-403
9:10 am	4995	40	1495		1010	801	286	-404	
9:15 am	9992	30	1488		1010	801	270	-386	
9:20 am	9992	28	1470		1010	801	246	-362	
9:25 am	9992	28	1416		1010	801	233	-343	
9:30 am	2000	68	1394		1010	801	233	-341	
9:35 am	67	78	1355	1390	1100	697	231	-340	-400

Figure 2 shows the impact of the reduction in output from Hydro Tasmania’s non-scheduled generators (Cluny, Paloona and Repulse) on the 5-minute demand in Tasmania. It also shows the apparent reduction in demand in response to the high price. Figure 3 shows the capacity offered by Hydro Tasmania at different price thresholds, the dispatch of Hydro Tasmania’s scheduled generation and the 5-minute price for the same period.

**Figure 2 – Hydro Tasmania’s Non-scheduled generation and 5 minute demand - 10 June**



**Figure 3 Hydro Tasmania’s bids, dispatch and 5 minute price - 10 June**



Reductions in output from non-scheduled generation resulted in an increase in effective demand. When combined with a reduction in the availability of low-priced scheduled generation capacity, the dispatch of high-priced generation was required. Similar outcomes to that described in Figures 1 to 3 also occurred for ten of the eleven other spot prices above \$5000/MWh. Appendix C presents the equivalent information relating to these other high

price events. There were 27 occasions during the high-priced days where reductions in output from non-scheduled generation aligned with bidding by Hydro Tasmania to increase the 5-minute dispatch price above \$2000/MWh. As an example, Figure 4 highlights the relationship between reductions in non-scheduled generation and spot price for 11 June,

**Figure 4 – Hydro Tasmania’s non-scheduled generation, Tasmania 5-minute demand and 5-minute price - 11 June**

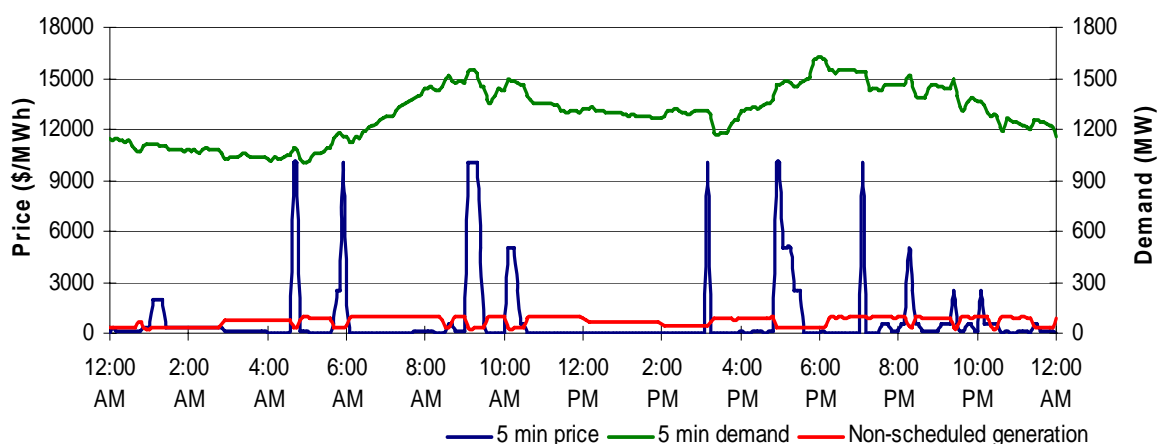


Figure 5 shows, for each of the 12 spot prices above \$5000/MWh:

- the actual spot price and demand compared to that forecast four hours ahead;
- the maximum reduction in output from Hydro Tasmania’s non-scheduled generation during the trading interval; and
- the maximum reduction in import limit (driven by a reduction in the amount of industrial load available to the FCSPS).

**Figure 5: Actual and forecast data**

		Spot Price (\$/MWh)	Demand (MW)	Maximum reduction in non-scheduled generation (MW)	Maximum reduction in import limit (MW)
10/06 9:30 AM	Actual	6212	1455	63	66
	4 hour forecast	36	1416	-	-
11/06 9:30 AM	Actual	7577	1510	53	59
	4 hour forecast	38	1535	-	-
12/06 9:30 AM	Actual	9992	1508	50	22
	4 hour forecast	36	1462	-	-
15/06 5:00 PM	Actual	8374	1426	51	28
	4 hour forecast	85	1388	-	-
15/06 6:00 PM	Actual	9992	1552	47	34
	4 hour forecast	62	1530	-	-
16/06 8:30 AM	Actual	6875	1564	51	65
	4 hour forecast	35	1589	-	-
16/06 9:30 AM	Actual	9992	1499	47	41
	4 hour forecast	35	1546	-	-
16/06 10:30 AM	Actual	5104	1394	47	37
	4 hour forecast	34	1512	-	-
16/06 5:00 PM	Actual	9992	1338	0	49
	4 hour forecast	280	1486	-	-
19/06 8:30 AM	Actual	9992	1517	48	63
	4 hour forecast	150	1539	-	-
19/06 9:30 AM	Actual	9160	1461	66	43
	4 hour forecast	43	1496	-	-
19/06 10:30 AM	Actual	5000	1379	55	63
	4 hour forecast	41	1414	-	-

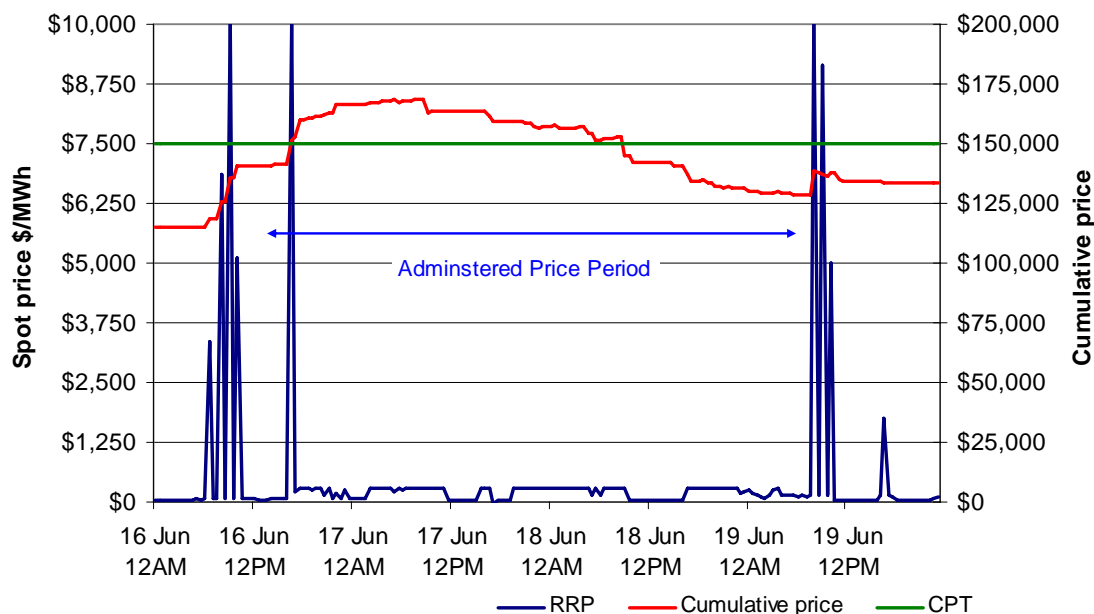
## Generator rebids/offers

The closing bids for participants in Tasmania with capacity priced at or above \$5000/MWh during the high priced periods on the two days are presented in **Appendix A**. Which generators set the spot price during the time prices were above \$5000/MWh, and how that price was determined by the market systems, are detailed in **Appendix B**.

## Administered price period

At 5 pm on 16 June the spot price reached \$9992/MWh (the sixth price above \$5000/MWh for the week) causing the cumulative price to exceed the CPT. As a result NEMMCO/AEMO declared an Administered Pricing Period (the first ever in Tasmania) for the remainder of the trading day. NEMMCO/AEMO subsequently extended the Administered Pricing Period for the 17 June and then for the 18 June trading days. The cumulative price fell below the CPT at 9.30 am on 18 June and the Administered Pricing Period ceased from the beginning (4 am) of the 19 June trading day. There were a further three prices exceeding \$5000/MWh only hours after the end of the Administered Pricing Period, but the cumulative price remained below the CPT. Figure 6 shows the seven day rolling cumulative price for Tasmania together with the cumulative price threshold (CPT) of \$150 000 and the spot price (RRP).

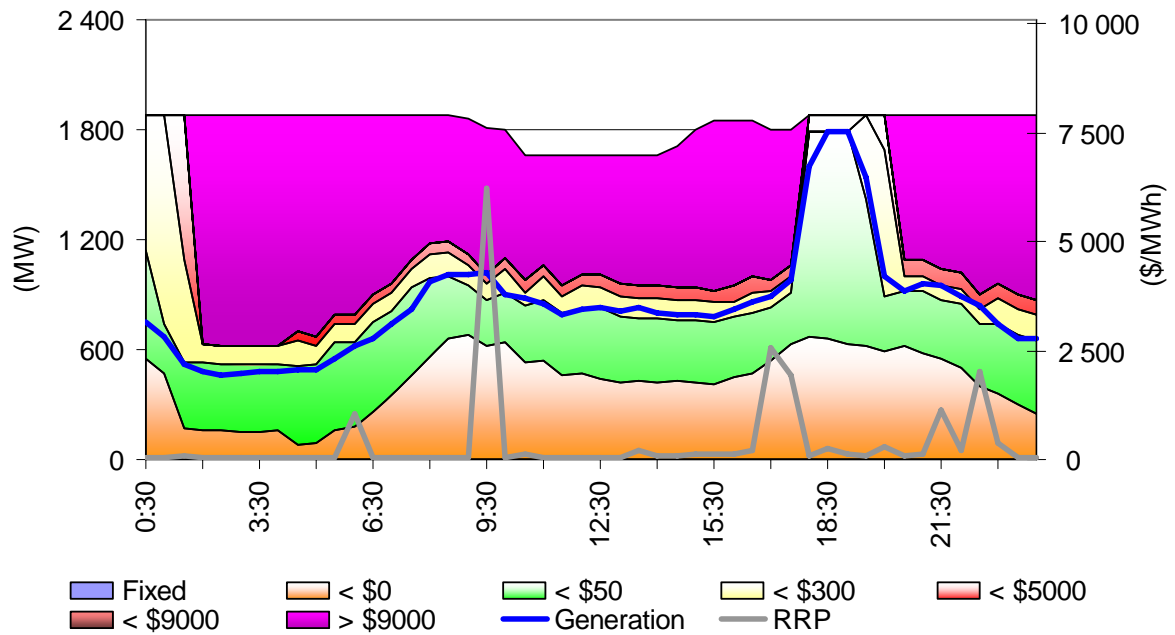
*Figure 6 cumulative price and administered price period*



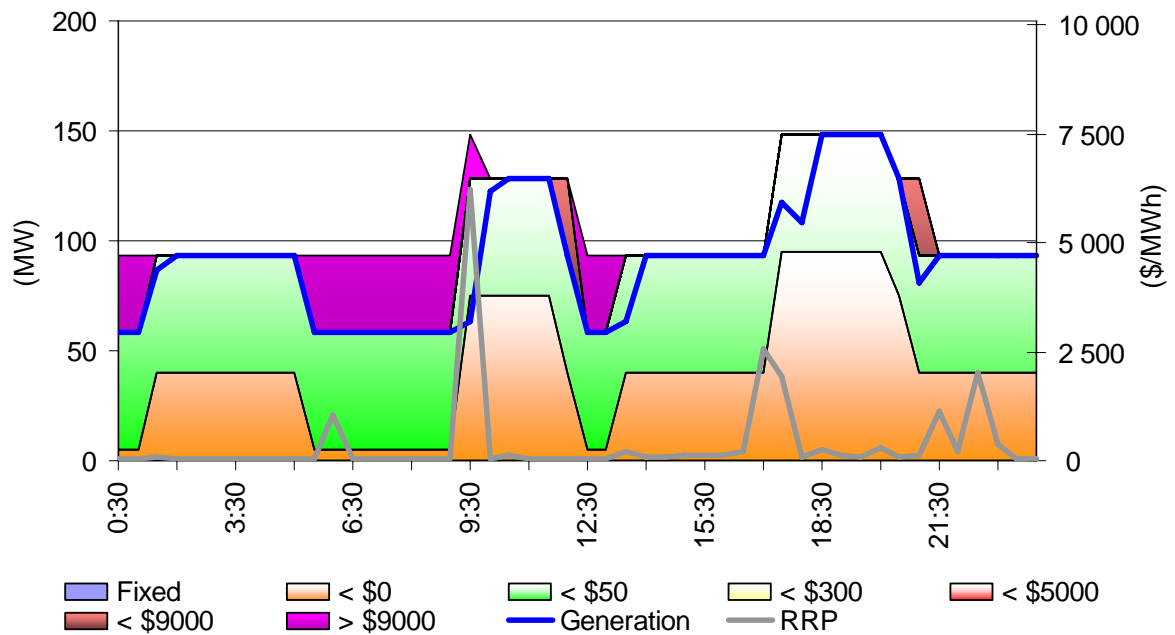
## Appendix A – Closing bids

Figures A1 – A7 highlight the half hour closing bids for participants in Tasmania with capacity priced at or above \$5000/MWh during the trading intervals in which the spot price exceeded \$5000/MWh. It also shows the generation output and the spot price (RRP).

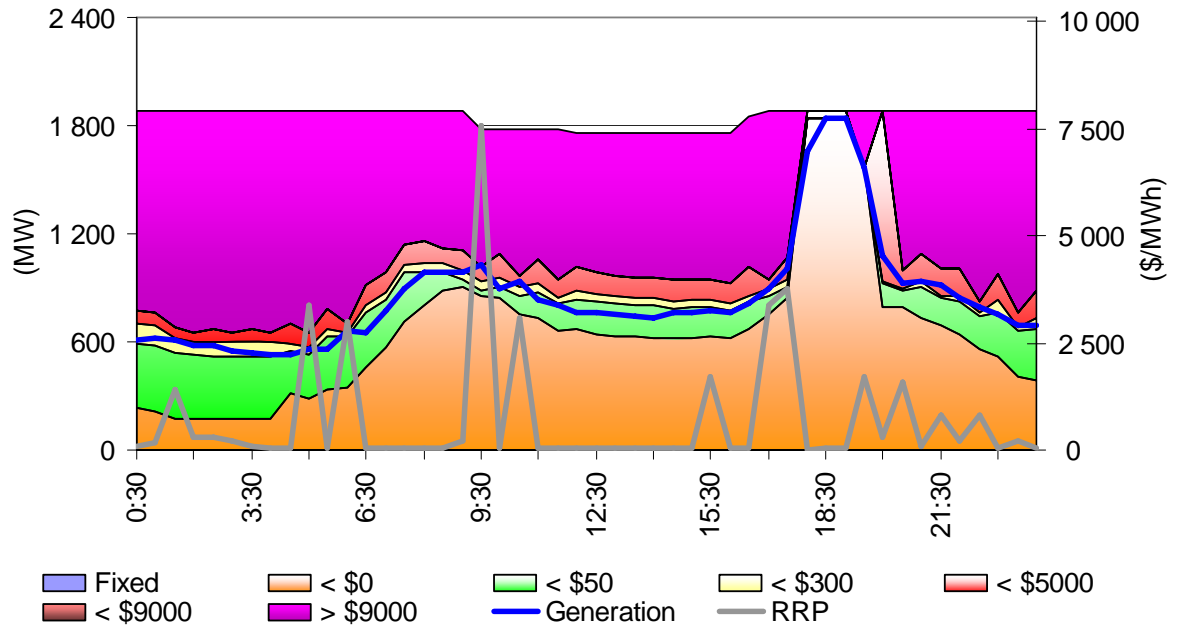
**Figure A1: Hydro Tasmania closing bid prices, dispatch and spot price on 10 June**



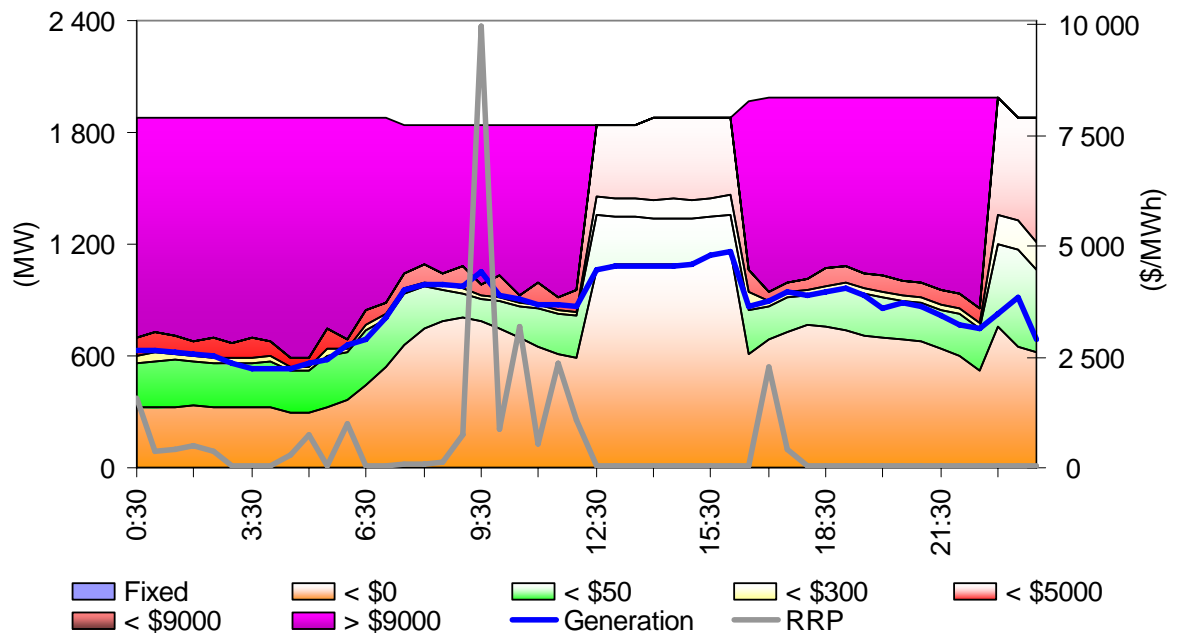
**Figure A2: AETV closing bid prices, dispatch and spot price on 10 June**



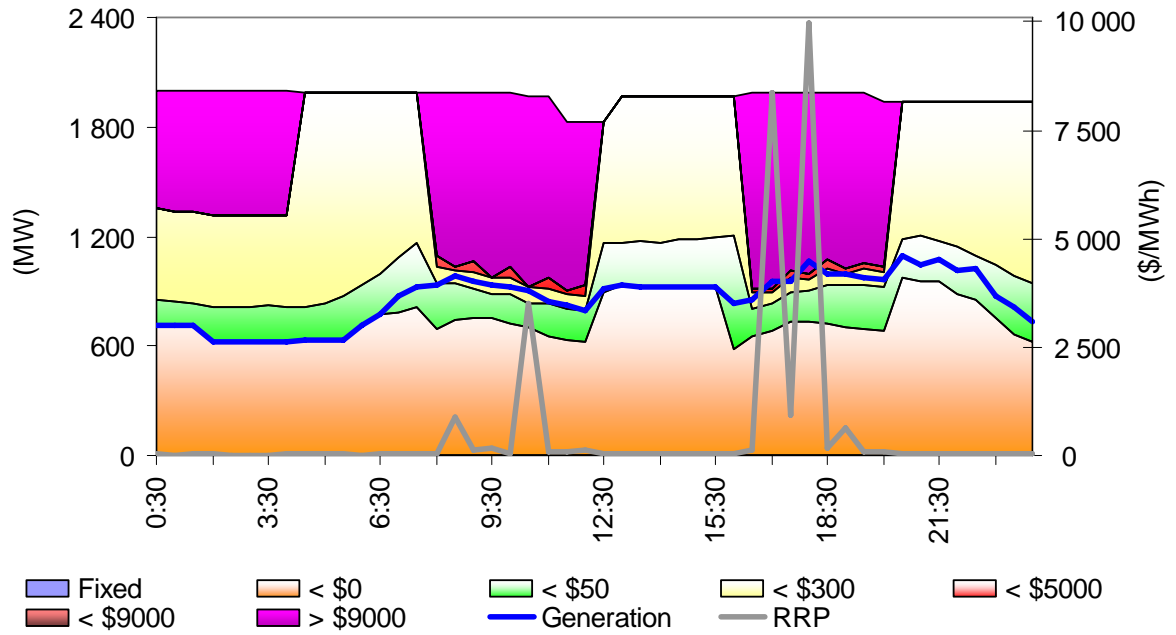
**Figure A3: Hydro Tasmania closing bid prices, dispatch and spot price on 11 June**



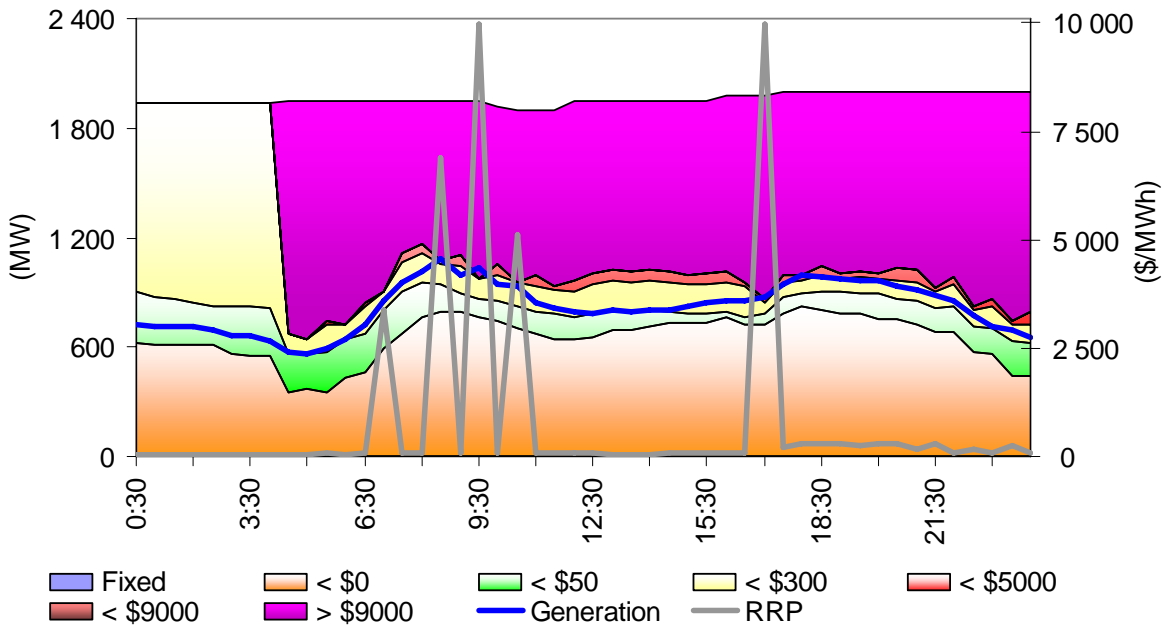
**Figure A4: Hydro Tasmania closing bid prices, dispatch and spot price on 12 June**



**Figure A5: Hydro Tasmania closing bid prices, dispatch and spot price on 15 June**

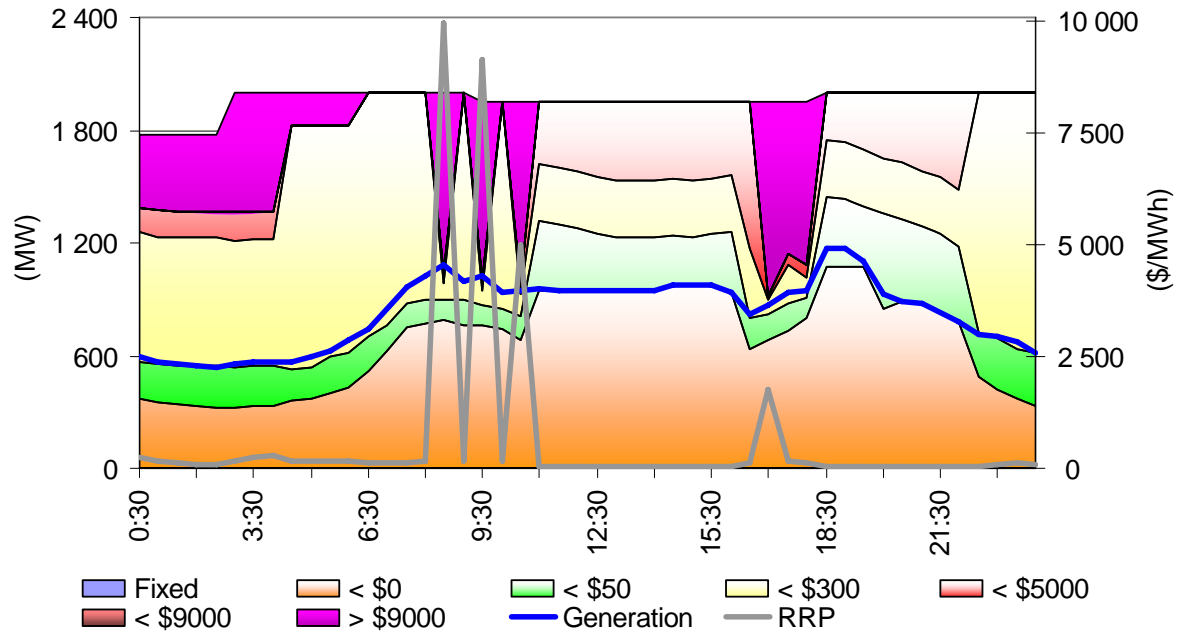


**Figure A6: Hydro Tasmania closing bid prices, dispatch and spot price on 16 June**





**Figure A7: Hydro Tasmania closing bid prices, dispatch and spot price on 19 June**



## Appendix B – Price setters for 10-16 June 2009

The following tables identify the trading intervals in which the spot price exceeded \$5000/MWh. Each five-minute dispatch interval price and the generating units involved in setting the energy price, as published in the market systems are shown. Also shown is the energy or ancillary service offer price involved in determining the dispatch price together with the quantity of that service and the contribution to the total energy price. The 30-minute spot price is the time weighted average of the six dispatch interval prices.

### Wednesday 10 Jun – 9.30 am

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
09:05	\$299.22	Hydro Tasmania	REECE1	Energy	\$299.22	1.00	\$299.22
09:10	\$4995.26	Hydro Tasmania	MACKNTSH	Energy	\$4995.26	1.00	\$4995.26
09:15	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
09:20	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
09:25	\$9992.26	Hydro Tasmania	MACKNTSH	Energy	\$9992.26	1.00	\$9992.26
09:30	\$2000.24	Hydro Tasmania	BASTYAN	Energy	\$2000.24	1.00	\$2000.24
		Hydro Tasmania	GORDON	Raise 5 min	\$1.40	1.00	\$1.40
		Hydro Tasmania	BASTYAN	Raise 5 min	\$1.40	-1.00	-\$1.40
		Hydro Tasmania	DEVILS_G	Raise 60 sec	\$0.80	1.52	\$1.22
		Hydro Tasmania	BASTYAN	Raise 60 sec	\$0.80	-1.52	-\$1.22
		Hydro Tasmania	GORDON	Raise 6 sec	\$1.95	0.16	\$0.31
		Hydro Tasmania	BASTYAN	Raise 6 sec	\$1.95	-0.16	-\$0.31
<b>Spot price</b>		<b>\$ 6212/MWh</b>					

### Thursday 11 June – 9.30 am

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
09:05	\$9992.26	Hydro Tasmania	MACKNTSH	Energy	\$9992.26	1.00	\$9992.26
09:10	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
09:15	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
09:20	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
09:25	\$4995.26	Hydro Tasmania	MACKNTSH	Energy	\$4995.26	1.00	\$4995.26
09:30	\$495.22	Hydro Tasmania	REECE1	Energy	\$495.22	1.00	\$495.22
<b>Spot price</b>		<b>\$ 7577/MWh</b>					

### Friday 12 June – 9.30 am

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
09:05	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
09:10	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
09:15	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
		Hydro Tasmania	JBUTTERS	Raise 6 sec	\$1.95	0.29	\$0.56
		Hydro Tasmania	GORDON	Raise 6 sec	\$1.95	-0.29	-\$0.56
09:20	\$9,992.29	Hydro Tasmania	JBUTTERS	Energy	\$9,992.29	1.00	\$9,992.29
09:25	\$9,992.29	Hydro Tasmania	JBUTTERS	Energy	\$9,992.29	1.00	\$9,992.29
09:30	\$9,992.29	Hydro Tasmania	JBUTTERS	Energy	\$9,992.29	1.00	\$9,992.29
<b>Spot price</b>		<b>\$ 9992/MWh</b>					

### Monday 15 Jun – 5 pm

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
16:35	\$280.22	Hydro Tasmania	MACKNTSH	Energy	\$280.22	1.00	\$280.22
16:40	\$9,992.24	Hydro Tasmania	BASTYAN	Energy	\$9,992.24	1.00	\$9,992.24
		Hydro Tasmania	GORDON	Raise 5 min	\$1.00	1.00	\$1.00
		Hydro Tasmania	BASTYAN	Raise 5 min	\$1.00	-1.00	-\$1.00
16:45	\$9992.24	Hydro Tasmania	BASTYAN	Energy	\$9992.24	1.00	\$9992.24
		Hydro Tasmania	GORDON	Raise 5 min	\$1.00	1.00	\$1.00
		Hydro Tasmania	BASTYAN	Raise 5 min	\$1.00	-1.00	-\$1.00
		Hydro Tasmania	GORDON	Raise 60 sec	\$0.80	1.52	\$1.22
		Hydro Tasmania	BASTYAN	Raise 60 sec	\$0.80	-1.52	-\$1.22
		Hydro Tasmania	GORDON	Raise 6 sec	\$1.95	0.16	\$0.31
		Hydro Tasmania	BASTYAN	Raise 6 sec	\$1.95	-0.16	-\$0.31
16:50	\$9992.26	Hydro Tasmania	REECE1	Energy	\$9992.26	1.00	\$9992.26
16:55	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
17:00	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
<b>Spot price</b>		<b>\$ 8374/MWh</b>					

**Monday 15 Jun – 6 pm**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
17:35	\$9992.26	Hydro Tasmania	REECE1	Energy	\$9992.26	1.00	\$9992.26
17:40	\$9992.24	Hydro Tasmania	BASTYAN	Energy	\$9992.24	1.00	\$9992.24
		Hydro Tasmania	GORDON	Raise 5 min	\$10.00	1.00	\$10.00
		Hydro Tasmania	BASTYAN	Raise 5 min	\$10.00	-1.00	-\$10.00
		Hydro Tasmania	GORDON	Raise 60 sec	\$10.00	1.52	\$15.20
		Hydro Tasmania	BASTYAN	Raise 60 sec	\$10.00	-1.52	-\$15.20
		Hydro Tasmania	GORDON	Raise 6 sec	\$5.00	0.16	\$0.80
		Hydro Tasmania	BASTYAN	Raise 6 sec	\$5.00	-0.16	-\$0.80
17:45	\$9992.24	Hydro Tasmania	BASTYAN	Energy	\$9992.24	1.00	\$9992.24
		Hydro Tasmania	GORDON	Raise 5 min	\$10.00	1.00	\$10.00
		Hydro Tasmania	BASTYAN	Raise 5 min	\$10.00	-1.00	-\$10.00
		Hydro Tasmania	GORDON	Raise 60 sec	\$10.00	1.52	\$15.20
		Hydro Tasmania	BASTYAN	Raise 60 sec	\$10.00	-1.52	-\$15.20
		Hydro Tasmania	GORDON	Raise 6 sec	\$5.00	0.16	\$0.80
		Hydro Tasmania	BASTYAN	Raise 6 sec	\$5.00	-0.16	-\$0.80
17:50	\$9992.24	Hydro Tasmania	BASTYAN	Energy	\$9992.24	1.00	\$9992.24
		Hydro Tasmania	GORDON	Raise 5 min	\$10.00	1.00	\$10.00
		Hydro Tasmania	BASTYAN	Raise 5 min	\$10.00	-1.00	-\$10.00
		Hydro Tasmania	GORDON	Raise 60 sec	\$10.00	1.52	\$15.20
		Hydro Tasmania	BASTYAN	Raise 60 sec	\$10.00	-1.52	-\$15.20
		Hydro Tasmania	GORDON	Raise 6 sec	\$5.00	0.16	\$0.80
		Hydro Tasmania	BASTYAN	Raise 6 sec	\$5.00	-0.16	-\$0.80
17:55	\$9992.26	Hydro Tasmania	REECE1	Energy	\$9992.26	1.00	\$9992.26
18:00	\$9992.24	Hydro Tasmania	BASTYAN	Energy	\$9992.24	1.00	\$9992.24
		Hydro Tasmania	LI_WY_CA	Raise 60 sec	\$10.00	1.52	\$15.20
		Hydro Tasmania	BASTYAN	Raise 60 sec	\$10.00	-1.52	-\$15.20
		Hydro Tasmania	GORDON	Raise 6 sec	\$5.00	0.16	\$0.80
		Hydro Tasmania	BASTYAN	Raise 6 sec	\$5.00	-0.16	-\$0.80

**Spot price \$ 9992/MWh**

**Tuesday 16 June – 8.30 am**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
08:05	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
08:10	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
08:15	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
08:20	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
08:25	\$1000.30	Hydro Tasmania	GORDON	Energy	\$1000.30	1.00	\$1000.30
		Hydro Tasmania	GORDON	Lower 5 min	\$0.50	1.00	\$0.50
		Hydro Tasmania	FISHER	Lower 5 min	\$0.50	-1.00	-\$0.50
08:30	\$280.30	Hydro Tasmania	GORDON	Energy	\$280.30	1.00	\$280.30

**Spot price \$ 6875/MWh**

**Tuesday 16 June – 9.30 am**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
09:05	\$9992.30	Hydro Tasmania	GORDON	Energy	\$9992.30	1.00	\$9992.30
09:10	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
09:15	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
09:20	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
09:25	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
09:30	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29

**Spot price \$ 9992/MWh**

**Tuesday 16 June – 10.30 am**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
10:05	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
10:10	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
		Hydro Tasmania	JBUTTERS	Raise 6 sec	\$1.95	-0.42	-\$0.82
		Hydro Tasmania	GORDON	Raise 6 sec	\$1.95	0.42	\$0.82
10:15	\$9992.29	Hydro Tasmania	JBUTTERS	Energy	\$9992.29	1.00	\$9992.29
10:20	\$280.28	Hydro Tasmania	JBUTTERS	Energy	\$280.28	1.00	\$280.28
10:25	\$280.28	Hydro Tasmania	JBUTTERS	Energy	\$280.28	1.00	\$280.28
10:30	\$85.26	Hydro Tasmania	MACKNTSH	Energy	\$85.26	1.00	\$85.26

**Spot price \$ 5104/MWh**

**Tuesday 16 June – 5 pm**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
16:35	\$9992.20	Hydro Tasmania	REECE2	Energy	\$9992.20	1.00	\$9992.20
16:40	\$9992.20	Hydro Tasmania	REECE2	Energy	\$9992.20	1.00	\$9992.20
		Hydro Tasmania	REECE2	Raise 6 sec	\$1.95	-0.24	-\$0.46
		Hydro Tasmania	GORDON	Raise 6 sec	\$1.95	0.24	\$0.46
16:45	\$9992.20	Hydro Tasmania	REECE2	Energy	\$9992.20	1.00	\$9992.20
16:50	\$9992.20	Hydro Tasmania	REECE2	Energy	\$9992.20	1.00	\$9992.20
16:55	\$9992.20	Hydro Tasmania	REECE2	Energy	\$9992.20	1.00	\$9992.20
17:00	\$9992.20	Hydro Tasmania	REECE2	Energy	\$9992.20	1.00	\$9992.20
<b>Spot price</b>		<b>\$ 9992/MWh</b>					

**Tuesday 19 June – 8.30 am**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
08:05	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
08:10	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
08:15	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
08:20	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
08:25	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
08:30	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
<b>Spot price</b>		<b>\$ 9992/MWh</b>					

**Tuesday 19 June – 9.30 am**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
09:05	\$5,000.30	Hydro Tasmania	GORDON	Energy	\$5,000.30	1.00	\$5,000.30
09:10	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
09:15	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
09:20	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
09:25	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
09:30	\$9,992.30	Hydro Tasmania	GORDON	Energy	\$9,992.30	1.00	\$9,992.30
<b>Spot price</b>		<b>\$ 9160/MWh</b>					

**Tuesday 19 June – 10.30 am**

Time	Dispatch price	Participant	Unit	Service	Offer price	Marginal change	Contribution
10:05	\$5,000.30	Hydro Tasmania	GORDON	Energy	\$5,000.30	1.00	\$5,000.30
10:10	\$5,000.30	Hydro Tasmania	GORDON	Energy	\$5,000.30	1.00	\$5,000.30
10:15	\$5,000.30	Hydro Tasmania	GORDON	Energy	\$5,000.30	1.00	\$5,000.30
10:20	\$5,000.30	Hydro Tasmania	GORDON	Energy	\$5,000.30	1.00	\$5,000.30
10:25	\$5,000.30	Hydro Tasmania	GORDON	Energy	\$5,000.30	1.00	\$5,000.30
10:30	\$5,000.30	Hydro Tasmania	GORDON	Energy	\$5,000.30	1.00	\$5,000.30
<b>Spot price</b>		<b>\$ 5000/MWh</b>					

## Appendix C – Actual and forecast outcomes

The following tables show by dispatch interval, actual and four hour ahead forecasts for demand, import limit across Basslink and capacity priced above and below \$5000/MWh as well as price and the reduction in Hydro Tasmania’s non-scheduled generation for trading intervals where the price exceeded \$5000/MWh. A dispatch interval either side of the trading interval has been included for comparison.

### Thursday 11 June 9.30 am

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
9.00 AM	35	67	1472	1537	1113	767	-406	-411
9.05 AM	27	9992	1534	1535	1014	768	-404	-395
9.10 AM	29	9992	1550		1014	768	-408	
9.15 AM	30	9992	1549		1014	768	-409	
9.20 AM	30	9992	1524		1014	768	-389	
9.25 AM	30	4995	1454		1014	768	-348	
9.30 AM	89	495	1448		1014	768	-347	
9.35 AM	96	40	1375	1504	1093	689	-345	-403

### Friday 12 June 9.30 am

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
9.00 AM	28	750	1476	1482	1081	754	-390	-418
9.05 AM	27	9992	1536	1462	982	853	-384	-415
9.10 AM	27	9992	1525		982	853	-377	
9.15 AM	27	9992	1521		982	853	-368	
9.20 AM	28	9992	1486		982	853	-371	
9.25 AM	29	9992	1487		982	853	-372	
9.30 AM	28	9992	1492		982	853	-382	
9.35 AM	73	3500	1474	1442	1033	802	-373	-424

### Monday 15 June 5 pm

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
4.30 PM	90	280	1364	1348	1064	901	-371	-366
4.35 PM	44	280	1373	1388	949	1041	-372	-370
4.40 PM	36	9992	1412		949	1041	-363	
4.45 PM	36	9992	1433		949	1041	-364	
4.50 PM	36	9992	1445		949	1041	-368	
4.55 PM	38	9992	1453		949	1041	-364	
5.00 PM	95	9992	1437		949	1041	-344	
5.05 PM	96	85	1377	1435	997	993	-331	-374

**Monday 15 June 6 pm**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
5.30 PM	39	2500	1483	1435	997	993	-373	-375
5.35 PM	39	9992	1551	1530	1017	973	-376	-384
5.40 PM	38	9992	1558		1017	973	-376	
5.45 PM	38	9992	1564		1017	973	-374	
5.50 PM	38	9992	1568		1017	973	-377	
5.55 PM	39	9992	1555		1017	973	-364	
6.00 PM	90	9992	1516		1017	973	-339	
6.05 PM	95	280	1457	1533	1068	922	-334	-375

**Tuesday 16 June 8.30 am**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
8.00 AM	38	85	1539	1158	1289	780	-389	-302
8.05 AM	30	9992	1594	1589	1198	871	-389	-304
8.10 AM	30	9992	1611		1198	871	-391	
8.15 AM	34	9992	1611		1198	871	-390	
8.20 AM	32	9992	1546		1198	871	-349	
8.25 AM	33	1000	1514		1198	871	-323	
8.30 AM	88	280	1505		1198	871	-324	
8.35 AM	95	85	1457	1576	1226	843	-327	-303

**Tuesday 16 June 9.30 am**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
9.00 AM	42	85	1498	1576	1103	843	-364	-303
9.05 AM	37	9992	1544	1546	974	972	-362	-324
9.10 AM	36	9992	1535		974	972	-363	
9.15 AM	36	9992	1524		974	972	-355	
9.20 AM	36	9992	1468		974	972	-323	
9.25 AM	37	9992	1464		974	972	-322	
9.30 AM	91	9992	1461		974	972	-323	
9.35 AM	96	85	1402	1544	1059	863	-321	-362

**Tuesday 16 June 10.30 am**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/Mwh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
10.00 AM	39	85	1419	1544	1059	863	-346	-362
10.05 AM	38	9992	1451	1512	952	945	-344	-354
10.10 AM	39	9992	1452		952	945	-352	
10.15 AM	37	9992	1440		952	945	-349	
10.20 AM	38	280	1370		952	945	-313	
10.25 AM	89	280	1356		952	945	-309	
10.30 AM	96	85	1296		952	945	-309	
10.35 AM	94	85	1278	1474	998	899	-309	-377

**Tuesday 16 June 5 pm**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
4.30 PM	98	85	1353	1427	957	1018	-372	-341
4.35 PM	98	9992	1359	1486	867	1108	-372	-371
4.40 PM	97	9992	1363		867	1108	-373	
4.45 PM	96	9992	1373		867	1108	-374	
4.50 PM	96	9992	1308		867	1108	-321	
4.55 PM	98	9992	1309		867	1108	-321	
5.00 PM	98	9992	1315		867	1108	-323	
5.05 PM	99	85	1334	1541	994	1006	-324	-335

**Friday 19 June 8.30 am**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
8.00 AM	36	150	1514	1533	2000	0	-382	-356
8.05 AM	28	9992	1566	1539	1048	952	-385	-302
8.10 AM	27	9992	1580		1048	952	-383	
8.15 AM	29	9992	1496		1048	952	-325	
8.20 AM	29	9992	1495		1048	952	-320	
8.25 AM	29	9992	1487		1048	952	-319	
8.30 AM	85	9992	1480		1048	952	-319	
8.35 AM	96	150	1420	1522	2000	0	-318	-321

**Friday 19 June 9.30 am**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
9.00 AM	93	150	1466	1522	2000	0	-365	-321
9.05 AM	44	5000	1455	1496	1008	947	-364	-356
9.10 AM	28	9992	1498		1008	947	-363	
9.15 AM	37	9992	1505		1008	947	-363	
9.20 AM	33	9992	1439		1008	947	-323	
9.25 AM	29	9992	1436		1008	947	-322	
9.30 AM	29	9992	1436		1008	947	-322	
9.35 AM	30	150	1420	1446	1955	0	-319	-386

**Friday 19 June 10.30 am**

Date/Time	Hydro Tas Non Scheduled generation (MW)	5 min price (\$/MWh)	5 min demand (MW)	4hour f/cast demand (MW)	Capacity priced <\$5000/MWh (MW)	Capacity priced >\$5000/MWh (MW)	Import limit (MW)	4hour f/cast import limit (MW)
10.00 AM	35	150	1388	1443	1955	0	-368	-386
10.05 AM	25	5000	1424	1414	982	973	-367	-386
10.10 AM	15	5000	1424		982	973	-366	
10.15 AM	16	5000	1368		982	973	-308	
10.20 AM	15	5000	1355		982	973	-306	
10.25 AM	15	5000	1352		982	973	-306	
10.30 AM	15	5000	1349		982	973	-305	
10.35 AM	15	33	1343	1376	1955	0	-304	-333