Electricity Report

AUSTRALIAN ENERGY REGULATOR

10 – 16 January 2016

Introduction

The AER is required to publish the reasons for significant variations between forecast and actual price and is responsible for monitoring activity and behaviour in the National Electricity Market. The Electricity Report forms an important part of this work. The report contains information on significant price variations, movements in the contract market, together with analysis of spot market outcomes and rebidding behaviour. By monitoring activity in these markets, the AER is able to keep up to date with market conditions and identify compliance issues.

Spot market prices

Figure 1 shows the spot prices that occurred in each region during the week 10 to 16 January 2016. There were three occasions where the spot price in Queensland was greater than the Queensland weekly average price of $63/MWh and above $250/MWh. There were seven occasions where the spot price in New South Wales was greater than three times the New South Wales weekly average price of $87/MWh and above $250/MWh. There were two occasions where the spot price in Victoria was greater than three times the Victoria weekly average price of $139/MWh and above $250/MWh. There were seven occasions where the spot price in South Australia was greater than three times the South Australia weekly average price of $98/MWh and above $250/MWh. There was one occasion where the spot price in Tasmania was greater than three times the Tasmania weekly average price of $112/MWh and above $250/MWh.

Additionally, on 13 January there were two spot prices in Victoria and one spot price in South Australia which were above $5000/MWh and on 14 January there was one spot price in New South Wales which was above $5000/MWh. As required under clause 3.8.17 of the National Electricity Rules, the AER will publish separate reports into the events on those days.

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Figure 1: Spot price by region ($/MWh)

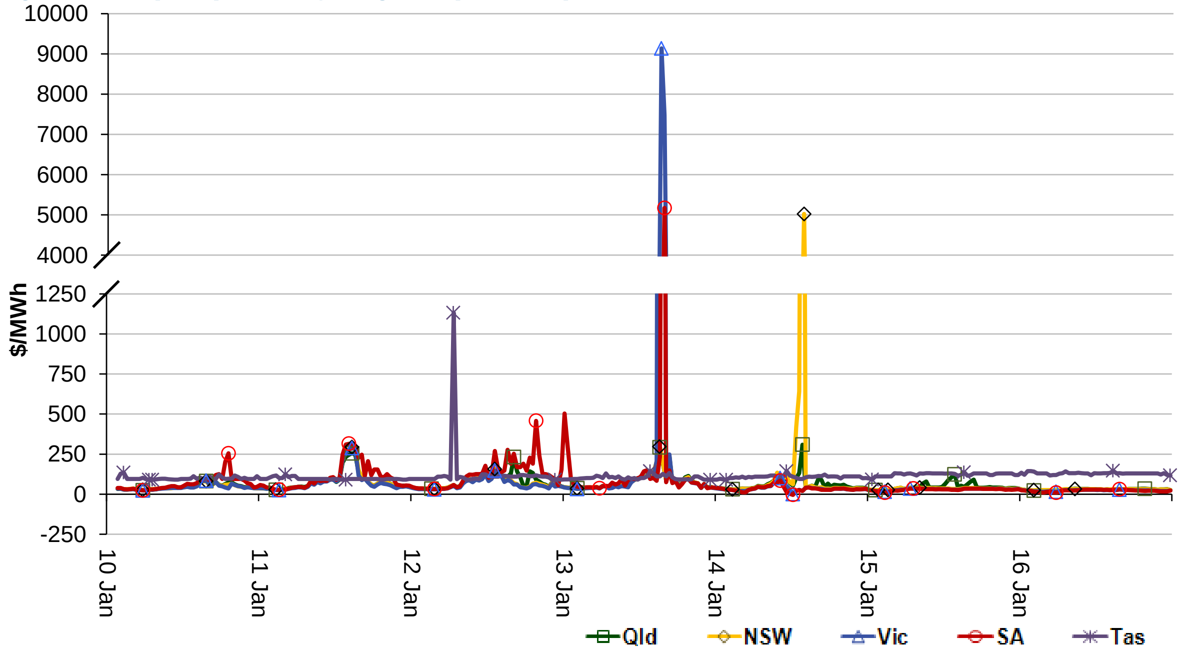


Figure 2 shows the volume weighted average (VWA) prices for the current week (with prices shown in Table 1) and the preceding 12 weeks, as well as the VWA price over the previous 3 financial years. It is worth noting the significant increase in average prices in all mainland regions this week driven by high temperature/demand conditions and rebidding.

Figure 2: Volume weighted average spot price by region ($/MWh)

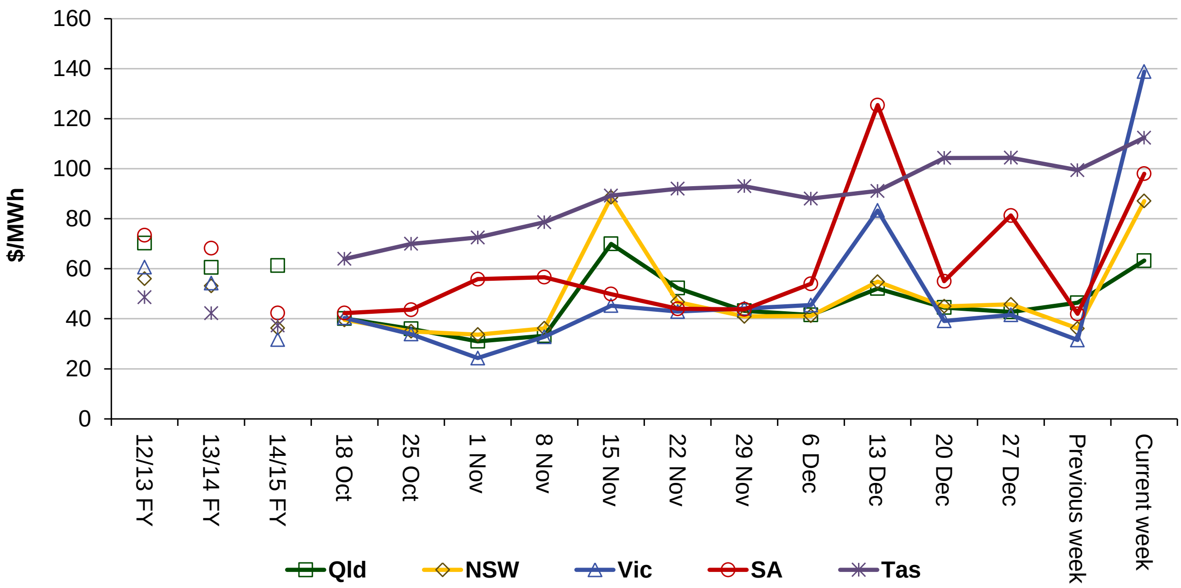


Table 1: Volume weighted average spot prices by region ($/MWh)

Region	Qld	NSW	Vic	SA	Tas
Current week	63	87	139	98	112
14-15 financial YTD	63	37	33	41	38
15-16 financial YTD	45	47	44	64	61

Longer-term statistics tracking average spot market prices are available on the AER website.

Spot market price forecast variations

The AER is required under the National Electricity Rules to determine whether there is a significant variation between the forecast spot price published by the Australian Energy Market Operator (AEMO) and the actual spot price and, if there is a variation, state why the AER considers the significant price variation occurred. It is not unusual for there to be significant variations as demand forecasts vary and participants react to changing market conditions. A key focus is whether the actual price differs significantly from the forecast price either four or 12 hours ahead. These timeframes have been chosen as indicative of the time frames within which different technology types may be able to commit (intermediate plant within four hours and slow start plant within 12 hours).

There were 317 trading intervals throughout the week where actual prices varied significantly from forecasts. This compares to the weekly average in 2015 of 133 counts and the average in 2014 of 71. Reasons for the variations for this week are summarised in Table 2. Based on AER analysis, the table summarises (as a percentage) the number of times when the actual price differs significantly from the forecast price four or 12 hours ahead and the major reason for that variation. The reasons are classified as availability (which means that there is a change in the total quantity or price offered for generation), demand forecast inaccuracy, changes to network capability or as a combination of factors (when there is not one dominant reason). An instance where both four and 12 hour ahead forecasts differ significantly from the actual price will be counted as two variations.

Table 2: Reasons for variations between forecast and actual prices

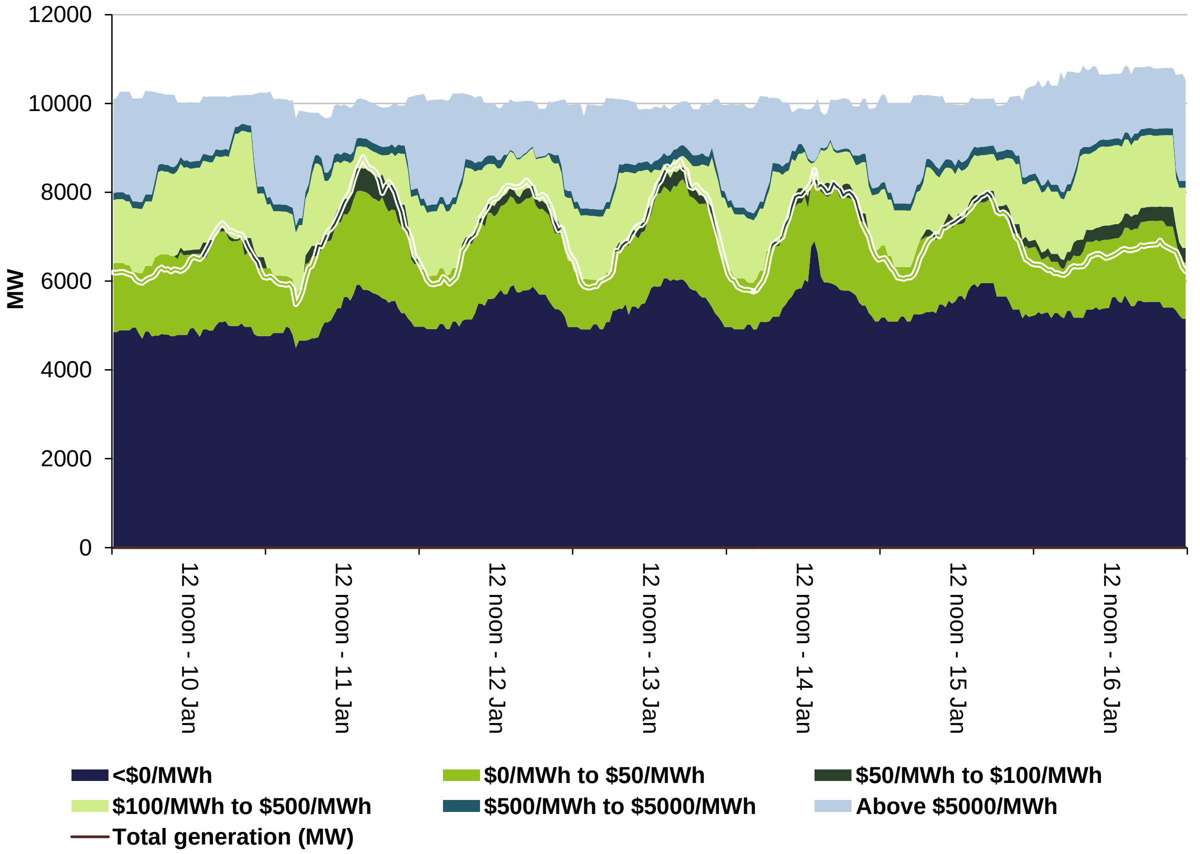
	Availability	Demand	Network	Combination
% of total above forecast	2	19	0	1
% of total below forecast	69	6	0	3

Note: Due to rounding, the total may not be 100 per cent.

Generation and bidding patterns

The AER reviews generator bidding as part of its market monitoring to better understand the drivers behind price variations. Figure 3 to Figure 7 show, the total generation dispatched and the amounts of capacity offered within certain price bands for each 30 minute trading interval in each region.

Figure 3: Queensland generation and bidding patterns



The red ellipses on Figure 4, 5 and 6 following, highlight the period where the price exceeded $5000/MWh, the events leading up the price will be discussed in the relevant spot prices above $5000/MWh reports which will be available on the [AER website.](#)

Figure 4: New South Wales generation and bidding patterns

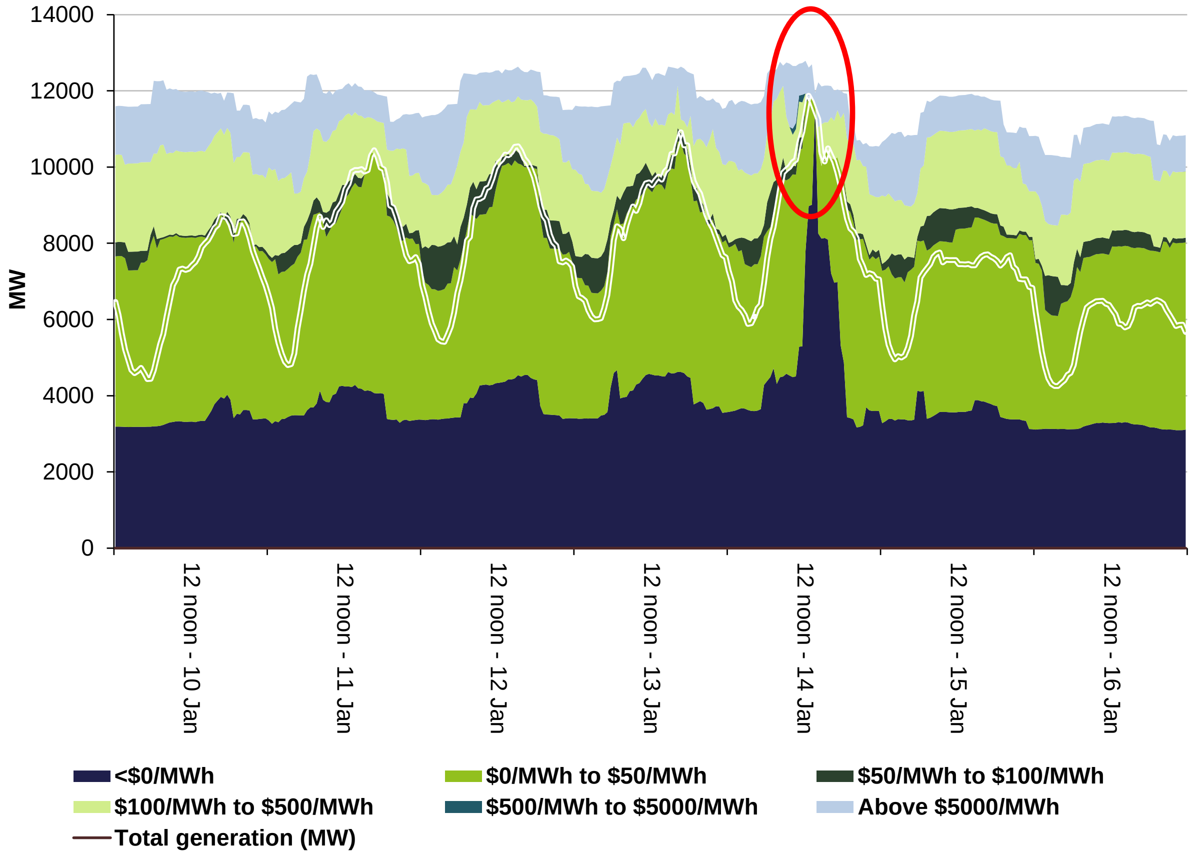


Figure 5: Victoria generation and bidding patterns

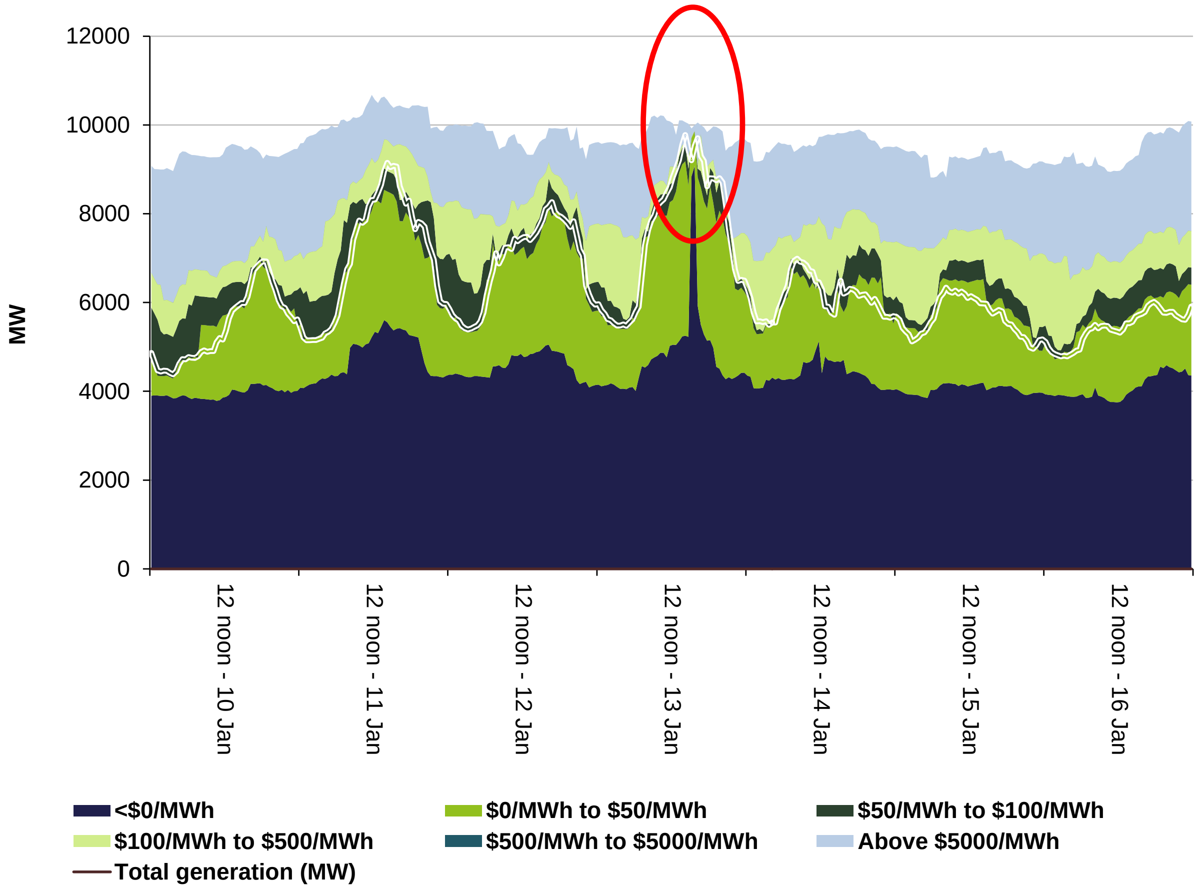


Figure 6: South Australia generation and bidding patterns

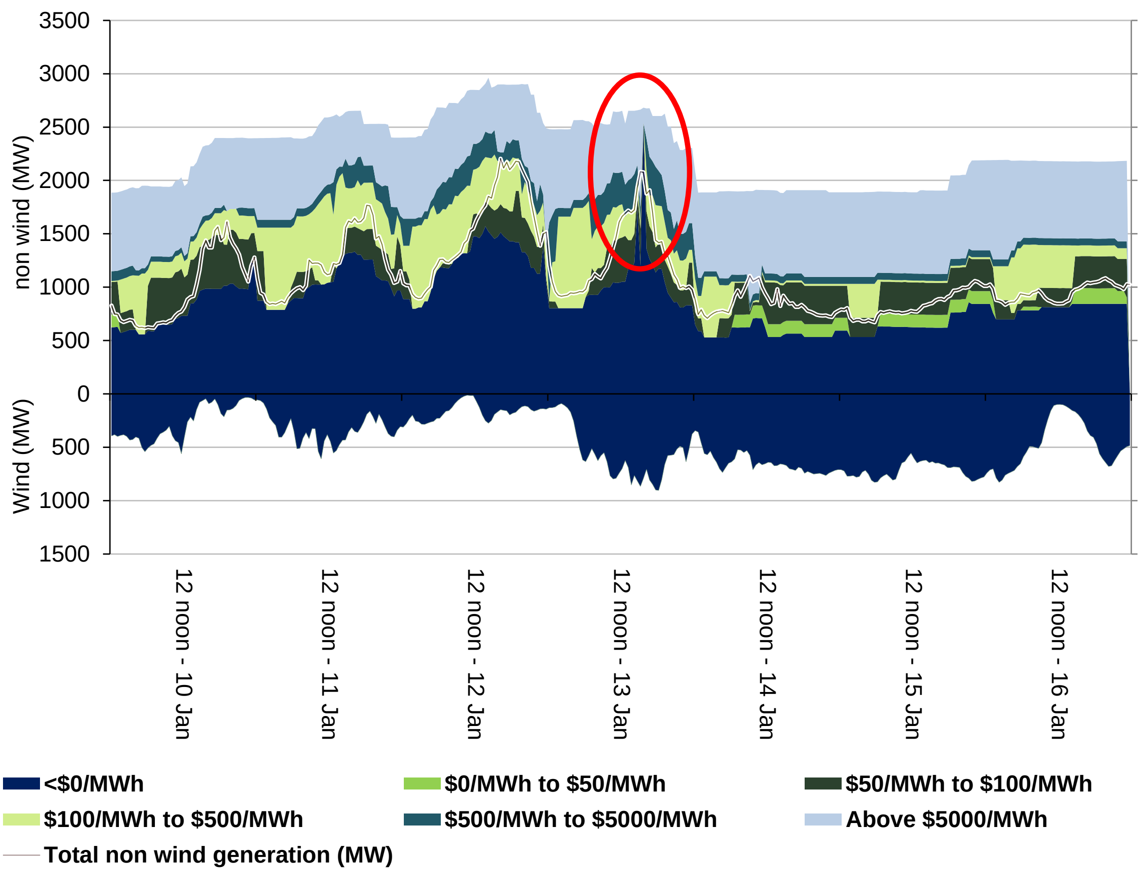
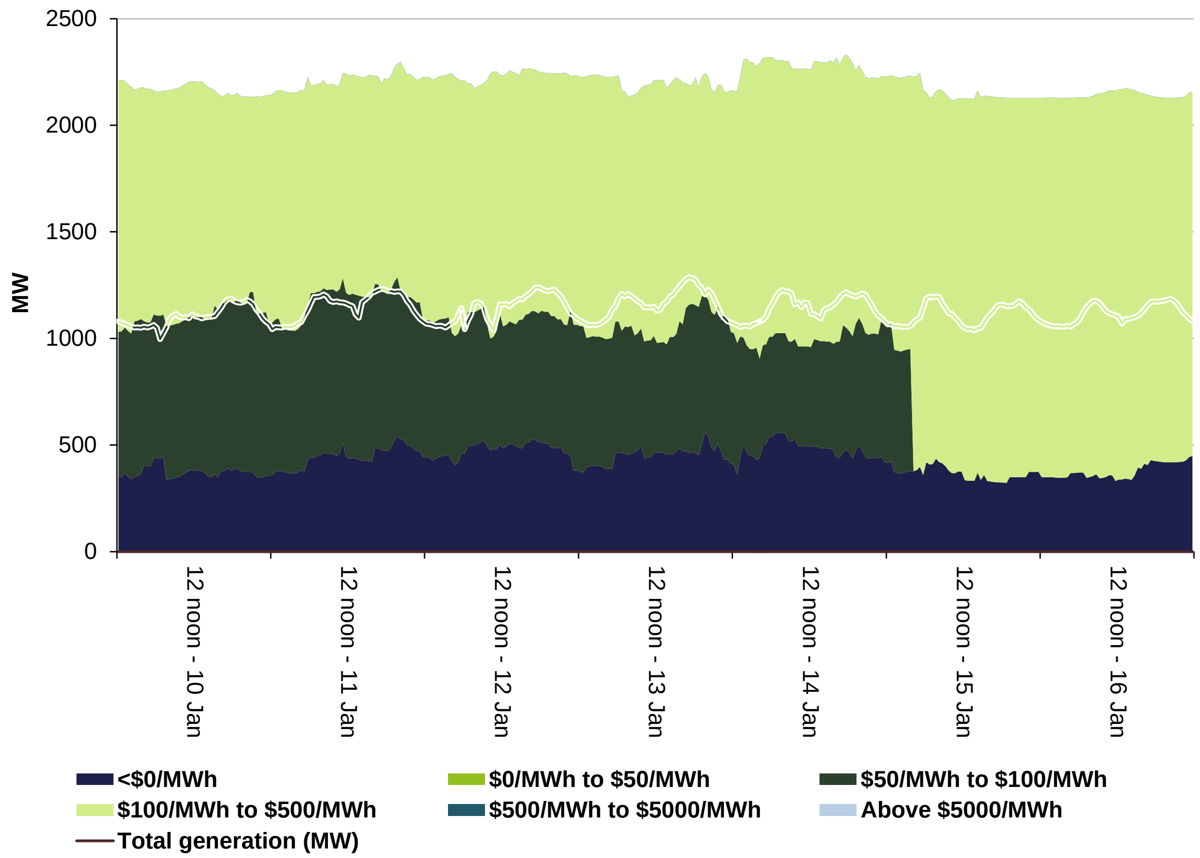


Figure 7: Tasmania generation and bidding patterns



Frequency control ancillary services markets

Frequency control ancillary services (FCAS) are required to maintain the frequency of the power system within the frequency operating standards. Raise and lower regulation services are used to address small fluctuations in frequency, while raise and lower contingency services are used to address larger frequency deviations. There are six contingency services:

- fast services, which arrest a frequency deviation within the first 6 seconds of a contingent event (raise and lower 6 second)
- slow services, which stabilise frequency deviations within 60 seconds of the event (raise and lower 60 second)
- delayed services, which return the frequency to the normal operating band within 5 minutes (raise and lower 5 minute) at which time the five minute dispatch process will take effect.

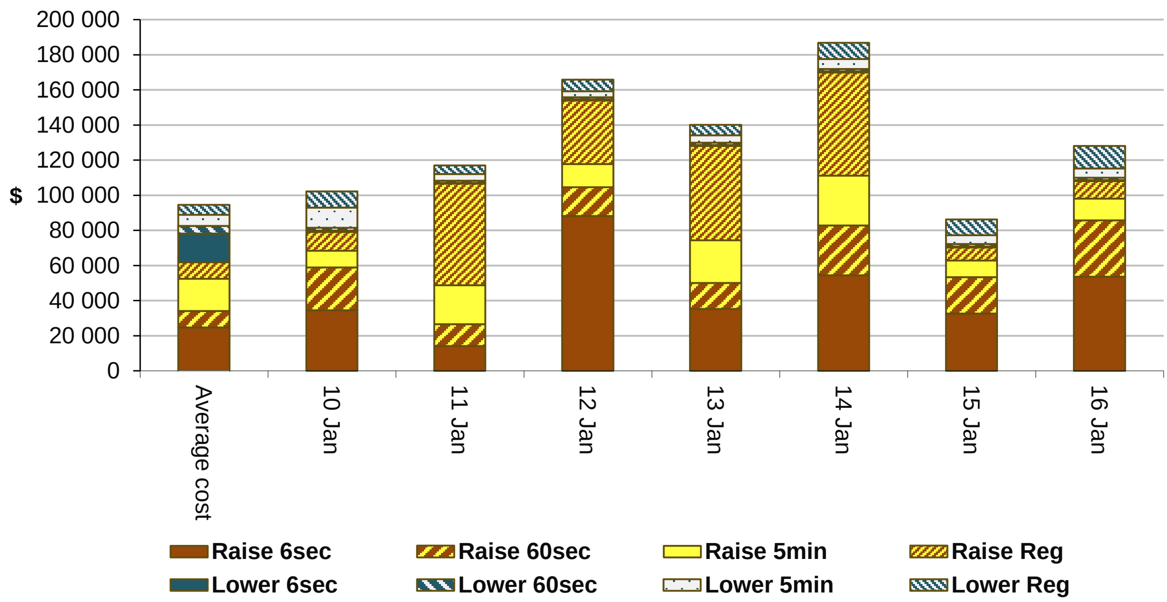
The Electricity Rules stipulate that generators pay for raise contingency services and customers pay for lower contingency services. Regulation services are paid for on a “causer pays” basis determined every four weeks by AEMO.

The total cost of FCAS on the mainland for the week was $671 500 or around 0.2 per cent of energy turnover on the mainland.

The total cost of FCAS in Tasmania for the week was $255 000 or around 1.2 per cent of energy turnover in Tasmania.

Figure 8 shows the daily breakdown of cost for each FCAS for the NEM, as well as the average cost since the beginning of the previous financial year.

Figure 8: Daily frequency control ancillary service cost



On 12 January, the price of raise regulation and raise 6 second services reached $6315/MW and $13 800/MW at 6.50 am respectively. An analysis of this event is included in the detailed market analysis of significant price events section below.

On 14 January, the price of global raise regulation services also reached $300/MW on 14 January for five dispatch intervals between 1.35 pm and 2 pm following the trip of Liddell unit 3.

Detailed market analysis of significant price events

We provide more detailed analysis of events where the spot price was greater than three times the weekly average price in a region and above $250/MWh or was below -$100/MWh.

Queensland

There were three occasions where the spot price in Queensland was greater than three times the Queensland weekly average price of $63/MWh and above $250/MWh.

Monday, 11 January

Table 3: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
3 pm	255.17	259.76	297.68	7429	7479	7703	10 104	10 140	10 169

The actual price was close to that forecast.

Wednesday, 13 January

Table 4: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
3.30 pm	292.45	299.91	259.60	7920	7940	8127	9901	10 059	10 169

The actual price was close to that forecast.

Thursday, 14 January

Table 5: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
2 pm	309.27	280.94	66.73	7411	7528	7701	9932	9873	9973

Conditions at the time saw demand 117 MW less than forecast four hours ahead and availability was 59 MW more than forecast four hours ahead.

At 1.35 pm the export limit and flow into New South Wales across QNI increased to 967 MW from 787 MW at 1.30 pm when the price in New South Wales exceeded $13 000/MWh (see New South Wales section below for details). This resulted in the dispatch price in Queensland reaching $599/MWh at 1.35 pm and 1.40 pm.

New South Wales

There were seven occasions where the spot price in New South Wales was greater than three times the New South Wales weekly average price of $87/MWh and above $250/MWh. Demand on each of these days was high because of high temperatures being experienced in the region.

Monday, 11 January

Table 6: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
2.30 pm	281.49	299.80	256.49	11 502	10 972	11 243	12 102	12 166	13 104
3 pm	293.16	277.23	290.95	11 588	11 188	11 414	12 104	12 172	13 087
3.30 pm	289.09	299.80	299.80	11 678	11 409	11 535	12 016	12 207	13 098

The actual prices were close to that forecast.

Wednesday, 13 January

Table 7: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
3.30 pm	296.36	291.86	243.07	11 288	10 733	10 743	12 620	12 614	12 580

The actual price was close to that forecast.

Thursday, 14 January

Table 8: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
1 pm	418.47	72.93	62	12 665	11 870	11 572	12 727	12 707	12 714
1.30 pm	642.20	97.58	62	12 671	12 241	11 624	12 661	12 698	12 696

Conditions at the time saw demand up to 795 MW more than forecast four hours ahead and availability was close to forecast four hours ahead.

Interconnector flows were affected by system normal constraints managing flows on the Mt Piper to Wallerawang line, Bannaby to Sydney West line and voltage stability in New South Wales which were not forecast four hours ahead. Flows into New South Wales from Queensland across the QNI interconnector were up to 517 MW less than forecast four hours ahead and flows into New South Wales from Victoria across the VIC-NSW interconnector were up to 925 MW less than forecast four hours ahead. Additionally, these constraints also reduce generation in New South Wales.

The increased demand was driven by temperatures in New South Wales (e.g. 40 degrees in Olympic Park and 41 degrees in Sydney Airport) peaking during the 1 pm and 1.30 pm trading intervals.

Table 9: Rebids for 1 pm and 1.30 pm trading interval

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
9.40 am		Delta Electricity	Vales Point	220	290	13 400	0939A PREDISPATCH CHANGE – 30MPD DEMAND MATERIALLY HIGHER @ 0932
10.39 am		Snowy Hydro	Colongra	162	0	13 800	10:37:F PORTFOLIO REDISTRIBUTION DUE TO CHANGE IN FUEL FORECAST
11.17 am		AGL Energy	Liddell	-50	352	N/A	1105~P~010 UNEXPECTED/PLANT LIMTS~PA FAN LIMITS
11.23 am		EnergyAustralia	Mount Piper	-30	36	N/A	11:21 P CAPACITY ADJ DUE TO TURBINE INEFFICIENCY
12.46 pm	12.55 pm	AGL Energy	Liddell	-180	<39	N/A	1245~P~020 REDUCTION IN AVAIL CAP~203 PLANT FAILURE
12.51 pm	1 pm	Snowy Hydro	Colongra	37	0	13 800	12:49:P FUEL MANAGEMENT
1.01 pm	1.10 pm	Snowy Hydro	Colongra	125	0	13 800	12:59:P MANAGE FUEL JEMENA COMPRESSOR OOS

In addition to the above rebidding, in the four hours leading up to the 1 pm trading interval many local generators rebid capacity to lower price bands in response to high pre-dispatch price forecasts. While this resulted in the majority of the available generation in New South Wales being priced under $60/MWh, it created a tight supply conditions at the top of the supply curve around the forecast maximum demand, with no generation priced between $58/MWh and $341/MWh. Further the system normal constraints mentioned above were reducing the output of low priced generation in New South Wales. Consequently, as demand reached its peak at the start of 1 pm trading interval, small changes in demand, availability or interconnector flow could result in large changes in price.

With constraints backing off low priced generation in New South Wales, the dispatch price increased from $52/MWh at 12.35 pm to $477/MWh at 12.40 pm, and from $53/MWh at 12.45 pm to $491/MWh following incremental increases in demand of around 30 MW. The dispatch price continued to increase in the next two dispatch intervals, reaching $650/MWh at 12.55 pm and $788/MWh at 1 pm as the output of low priced generation continued to reduce and AGL withdrew 180 MW of low price capacity at Liddell (see Table 9 above).

With the effect of the constraints continuing, at the start of the next trading interval, the dispatch price increased to $936/MWh at 1.05 pm and 1.10 pm. The dispatch price fell to $514/MWh at 1.15 pm as the impact of the constraints began to be reduced and total flows into New South Wales from Queensland and Victoria increased by 141 MW. The dispatch remained around $500/MWh for the remainder of the trading interval.

Table 10: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
2 pm	5022.74	290	62.96	12 635	12 491	11 789	12 293	12 706	12 676

Events of 14 January 2016 which led to the New South Wales spot price reaching $5023/MWh will be discussed in the relevant spot prices above $5000/MWh report which will be available on the AER website

Victoria

There were two occasions where the spot price in Victoria was greater than three times the Victoria weekly average price of $139/MWh and above $250/MWh.

Wednesday, 13 January

Table 11: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
3.30 pm	9137.03	313.34	247.33	9116	8929	8599	9907	9884	10 075
4 pm	7477.35	332.92	299.90	9141	9068	8734	9993	9889	10 028

Events of 13 January 2016 which led to the Victorian spot price reaching $9137/MWh and $7477/MWh will be discussed in the relevant spot prices above $5000/MWh report which will be available on the AER website.

South Australia

There were seven occasions where the spot price in South Australia was greater than three times the South Australia weekly average price of $98/MWh and above $250/MWh.

Monday, 11 January

Table 12: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
2 pm	309.95	270.19	124.99	2206	2286	2266	3095	2922	2912

Conditions at the time saw demand 80 MW less than forecast four hours ahead and availability 173 MW more than forecast four hours ahead.

Table 13: Rebids for 2 pm trading interval

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
10.32 am		AGL Energy	Torrens Island	320	<125	362	1001~F~060 CHG IN FUEL COST~60 INCREASE IN F/CAST GAS VALUE – CONSERVE GAS
1.06 pm		AGL Energy	Torrens Island	160	95	362	1231~A~050 CHG IN AEMO PD~INTERMITTENT GEN +97MW1330
1.32 pm	1.40 pm	Origin Energy	Quarantine	46	<125	351	13:32 P ADJ PANDS DUE TO UNITS ONLINE CAPACITY

As a result of the above rebidding, the dispatch price reached between $255/MWh and $361/MWh for the trading interval, slightly higher than forecast four hours ahead.

Table 14: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
2.30 pm	314.60	306.75	272.94	2164	2241	2304	3042	2923	2856
3 pm	303.25	285.57	313.74	2154	2221	2329	3071	2916	2816
3.30 pm	302.31	361.99	333.64	2206	2137	2359	3002	2879	2778

The 2.30 pm and 3 pm trading interval prices were close to forecast four hours ahead.

The 3.30 pm trading interval price was $50/MWh less than forecast four hours ahead as a result of generators rebidding capacity into lower price bands and net flows into South Australia from Victoria across the Heywood and Murraylink interconnectors being 50 MW higher than forecast.

Tuesday, 12 January

Table 15: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
8 pm	457.37	254.99	124.99	2505	2375	2341	3022	3051	3065

Conditions at the time saw demand 130 MW more than forecast four hours ahead and availability slightly less than forecast four hours ahead (mostly attributed to less wind being available than forecast four hours ahead).

Table 16: Rebids for 8 pm trading interval

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
7.37 pm	7.45 pm	AGL Energy	Torrens Island	200	<255	592	1930~F~080 CHG IN PIPELINE COND~80 AVOID UNORTH OVERRUN EPIC

As a result of AGL Energy's rebid the dispatch price increased from $255/MWh at 7.40 pm to $592/MWh at 7.45 pm and remained above $590/MWh for the remainder for the 8 pm trading interval.

Wednesday, 13 January

Table 17: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
12.30 am	503.08	56.92	42.95	1691	1810	1747	2607	2807	2884

Conditions at the time saw demand 119 MW less than forecast four hours ahead and available capacity 200 MW less than forecast four hours ahead. Flows into South Australia from Victoria across the Heywood interconnector were 33 MW less than forecast four hours ahead.

Table 18: Rebids for 12.30 am trading interval

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
9.51 pm		Alinta Energy	Northern	-200	-1000	N/A	2145~P~REVISED UNIT AVAILABILITY – TUBE LEAK~
11.35 pm		EnergyAustralia	Hallett	60	<90	13 482	23:34 A BAND ADJ DUE TO CHANGE IN PD5 PRICE SL
11.38 pm		AGL Energy	Torrens Island	240	<362	592	2331~F~080 CHG IN PIPELINE COND~82 CHANGE IN IMBAL POS SEAGAS – CONSERVE GAS

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
11.50 pm		AGL Energy	Torrens Island	230	362	592	2345~F~050 CHG IN FUEL AVAILABILITY~CONSERVE GAS
12.08 am	12.15 am	AGL Energy	Torrens Island	140	<362	>592	0005~A~040 CHG IN AEMO DISP~44 PRICE DECREASE VS PD SA $230.05 – CONSERVE GAS

As a result of the above rebidding and with lower priced generation either trapped in FCAS or fully dispatched, the dispatch price increased from $292/MWh at 12 am to $592/MWh at 12.05 am and remained around there for a majority of the trading interval.

Table 19: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
4 pm	5173.04	337.12	292.97	1920	2339	2278	3466	3365	3421

Events of 13 January 2016 which led to the South Australian spot price reaching $5173/MWh will be discussed in the relevant spot prices above $5000/MWh report which will be available on the AER website.

Tasmania

There was one occasion where the spot price in Tasmania was greater than three times the Tasmania weekly average price of $112/MWh and above $250/MWh.

Tuesday, 12 January

Table 20: Price, Demand and Availability

Time	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast	Actual	4 hr forecast	12 hr forecast
7 am	1132.12	114.33	200.02	1044	1160	1151	2196	2235	2200

Conditions at the time saw demand 116 MW less than forecast four hours ahead and available capacity 39 MW less than forecast four hours ahead.

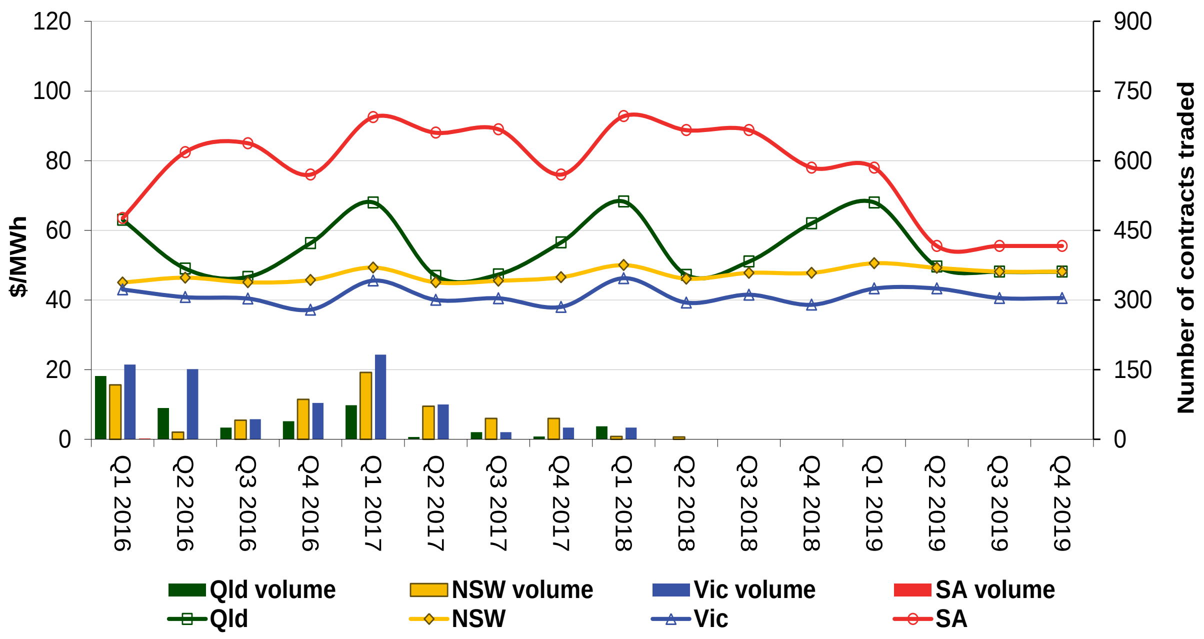
With Basslink out of service since late December, all FCAS requirements had to be sourced from local generators. At the same time a frequency event occurred in Tasmania, resulting in the suspension of Automatic Generation Control (AGC) for most local generators for one dispatch interval. This resulted in a shortage of raise services. The price of raise regulation and raise 6 second services reached $6315/MW and $13 800/MW at 6.50 am. The 6.50 am dispatch price spiked to $6312/MWh from $110/MWh at 6.45 am as a result of the co-optimisation of energy and FCAS markets.

In the following dispatch intervals the price of raise services fell to less than $7/MW as AGC controls were lifted and Hydro Tasmania rebid additional raise services at low price bands. Additionally, as a result of the above the 6.55 am dispatch price also fell to $90/MWh (this was also aided by a 45 MW decrease in demand at 6.55 am due to Nyrstar smelter tripping).

Financial markets

Figure 9 shows for all mainland regions the prices for base contracts (and total traded quantities for the week) for each quarter for the next four financial years.

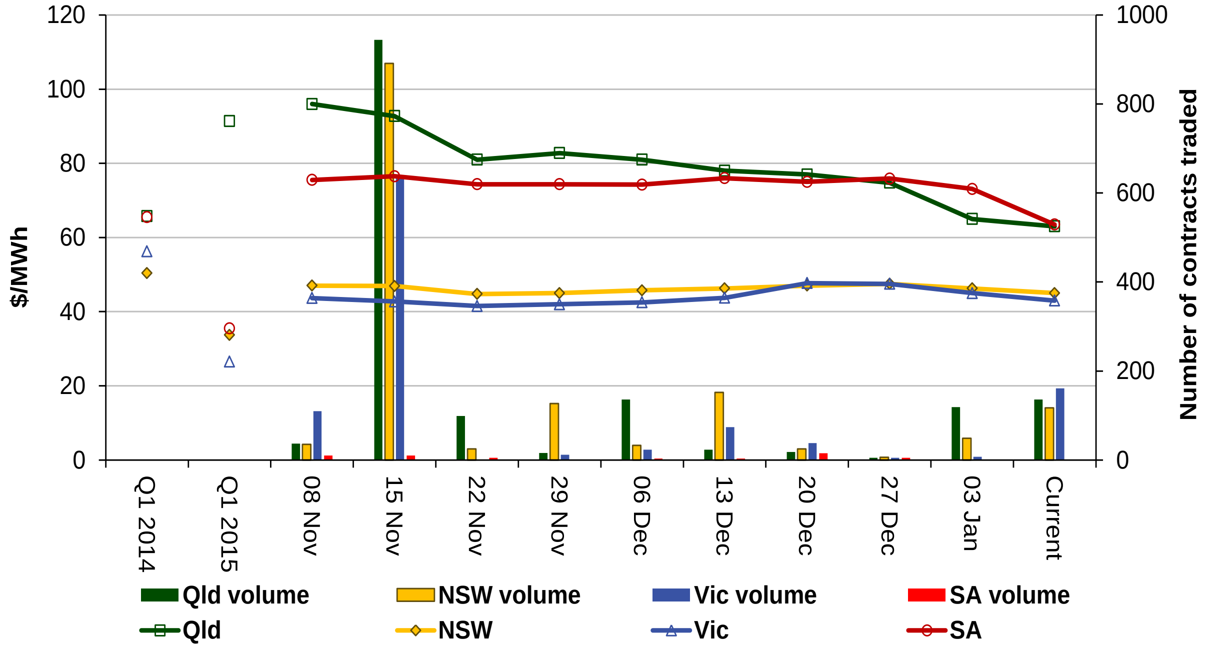
Figure 9: Quarterly base future prices Q1 2016 – Q4 2019



Source. ASXEnergy.com.au

Figure 10 shows how the price for each regional Quarter 1 2016 base contract has changed over the last 10 weeks (as well as the total number of trades each week). The closing quarter 1 2014 and quarter 1 2015 prices are also shown. The AER notes that data for South Australia is less reliable due to very low numbers of trades. The high volume of trades in Figure 9, 10, and 11 are due to options on calendar year base load expiring on Thursday 19 November. The price for both base and cap contracts dropped in all regions, most significantly in South Australia, although there was only one trade recorded for the base contract in South Australia on which to base the estimate.

Figure 10: Price of Q1 2016 base contracts over the past 10 weeks (and the past 2 years)



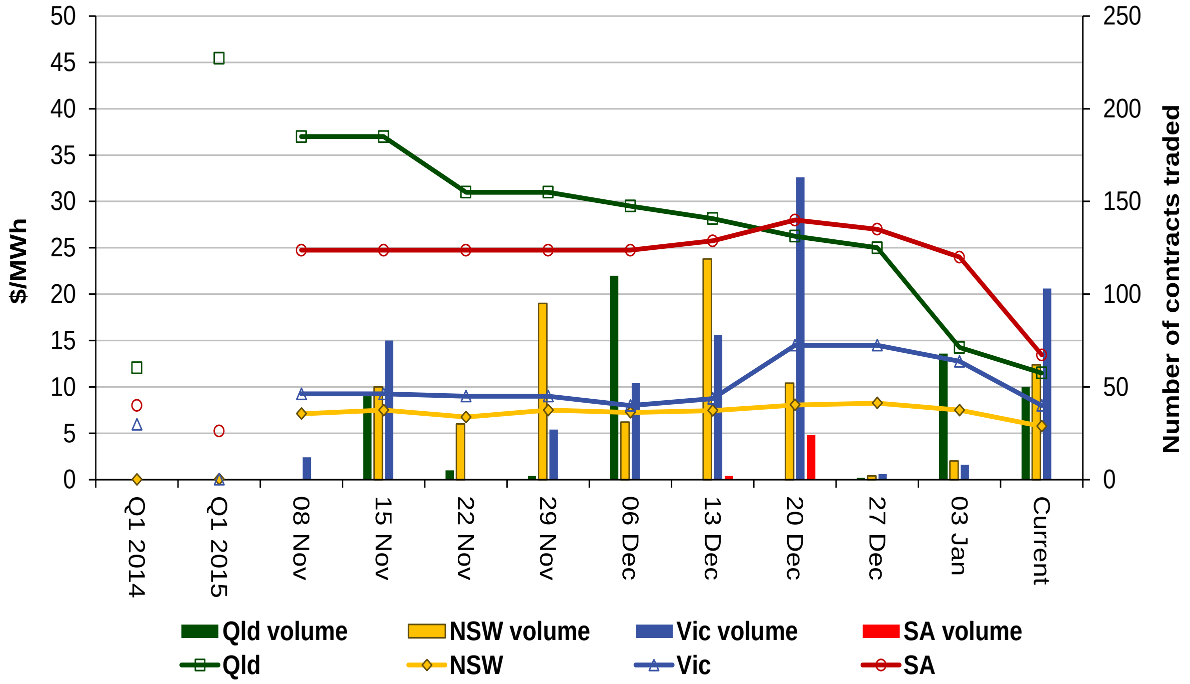
Note. Base contract prices are shown for each of the current week and the previous 9 weeks, with average prices shown for yearly periods 1 and 2 years prior to the current year.

Source. ASXEnergy.com.au

Prices of other financial products (including longer-term price trends) are available in the Industry Statistics section of our website.

Figure 11 shows how the price for each regional Quarter 1 2016 cap contract has changed over the last 10 weeks (as well as the total number of trades each week). The closing quarter 1 2014 and quarter 1 2015 prices are also shown. Of the 100 trades that were recorded in Victoria in the week all but two of them occurred on the 13 and 14 January.

Figure 11: Price of Q1 2016 cap contracts over the past 10 weeks (and the past 2 years)



Source. ASXEnergy.com.au

Australian Energy Regulator
February 2016