WEEKLY ELECTRICITY MARKET ANALYSIS

AUSTRALIAN ENERGY REGULATOR

8 January - 14 January 2012

Summary

Congestion issues in central Queensland as a result of either real time changes to transmission line ratings or rapid changes to generation offers, led to un-forecast high prices on a number of occasions. This saw weekly average spot prices of $55/MWh in Queensland, compared to around $20/MWh for all other mainland regions.

Spot market prices

Figure 1 sets out the volume weighted average (VWA) prices for the week 8 January to 14 January and the 11/12 financial year to date (YTD) across the NEM. It compares these prices with price outcomes from the previous week and year to date respectively.

Figure 1: Volume weighted average spot price by region ($/MWh)

	Qld	NSW	VIC	SA	Tas
Average price for 8 Jan - 14 Jan 2012	55	22	19	19	39
% change from previous week*	112	-15	-26	-39	16
11/12 financial YTD	30	31	27	34	31
% change from 10/11 financial YTD **	37	13	18	32	-4

*The percentage change between last week's average spot price and the average price for the previous week. Calculated on VWA prices prior to rounding.
**The percentage change between the average spot price for the current financial year and the average spot price for the previous financial year. Percentage changes are calculated on VWA prices prior to rounding.

Further information is provided in Appendix A when the spot price exceeds three times the weekly average and is above $250/MWh or less than -$100/MWh. Longer term market trends are attached in Appendix B[1].

Financial markets

Figures 2 to 9 show futures contract[2] prices traded on the Australian Securities Exchange (ASX) as at close of trade on Monday 16 January 2012. Figure 2 shows the base futures contract prices for the next three calendar years, and the average over these three years. Also shown are percentage changes[3] from the previous week.

[1] Monitoring the performance of the wholesale market is a key part of the AER's role and an overview of the market's performance in the long term is provided on the AER website. Long-term statistics can be found there on, amongst other things, demand, spot prices, contract prices and frequency control ancillary services prices. To access this information go to www.aer.gov.au -> Monitoring, reporting and enforcement -> Electricity market reports -> Long-term analysis.

[2] Futures contracts traded on the ASX are listed by d-cyphaTrade (www.d-cyphatrade.com.au). A futures contract is typically for one MW of electrical energy per hour based on a fixed load profile. A base load profile is defined as the base load period from midnight to midnight Monday to Sunday over the duration of the contract quarter. A peak load profile is defined as the peak-period from 7 am to 10 pm Monday to Friday (excluding Public holidays) over the duration of the contract quarter.

[3] Calculated on prices prior to rounding.

Figure 2: Base calendar year futures contract prices ($/MWh)

	QLD		NSW		VIC		SA	
Calendar Year 2012	43	-3%	47	-2%	43	-1%	51	-4%
Calendar Year 2013	55*	-2%	60*	-1%	56	-2%	62	-1%
Calendar Year 2014	58	-2%	62	-2%	60	-1%	69	0%
Three year average	52	-2%	56	-2%	53	-1%	61	-1%

Source: d-cyphaTrade www.d-cyphatrade.com.au

* denotes trades in the product.

Figure 3 shows the $300 cap contract price for Q1 2012 and calendar year 2012 and the percentage change[4] from the previous week.

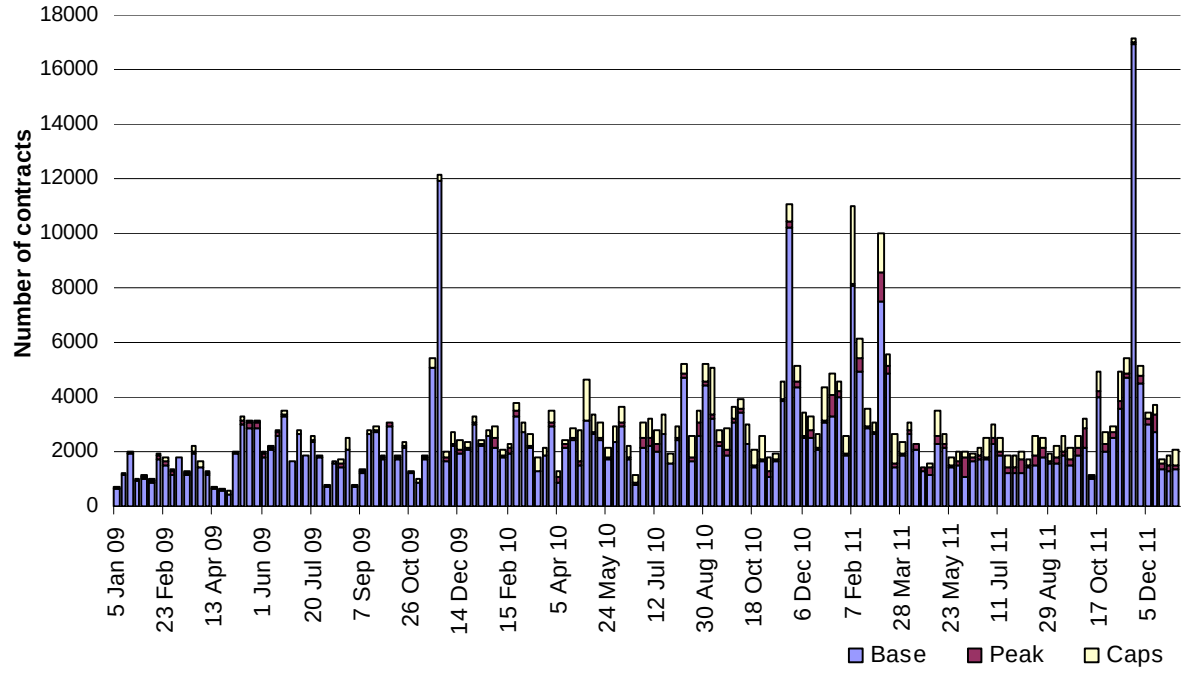
Figure 3: $300 cap contract prices ($/MWh)

	QLD		NSW		VIC		SA	
Q1 2012 (% change)	15*	-15%	14*	-14%	17*	-3%	35	0%
2012 (% change)	7	-10%	9	-8%	6	-3%	13	0%

Source: d-cyphaTrade www.d-cyphatrade.com.au
* denotes trades in the product.

Figure 4 shows the weekly trading volumes for base, peak and cap contracts. The date represents the end of the trading week.

Figure 4: Number of exchange traded contracts per week

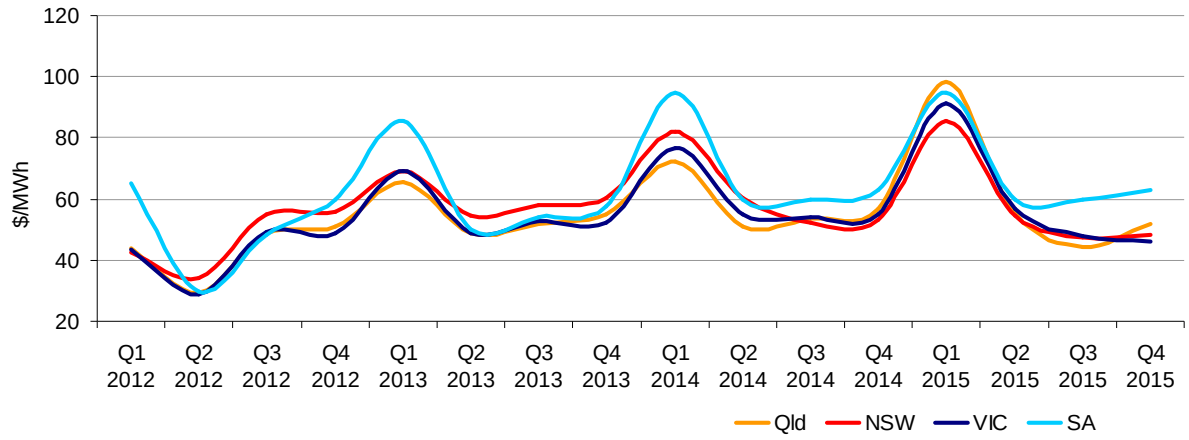


Source: d-cyphaTrade www.d-cyphatrade.com.au

[4] Calculated on prices prior to rounding.

Figure 5 shows the prices for base contracts for each quarter for the next four financial years.

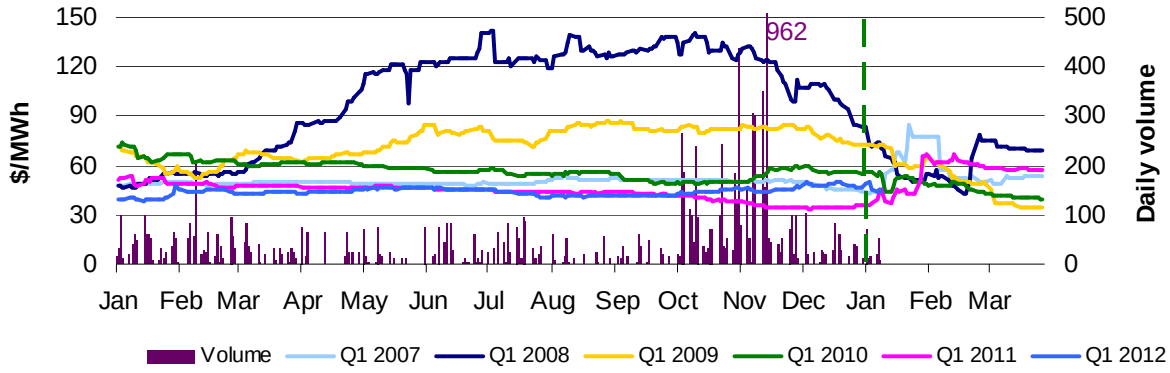
Figure 5: Quarterly base future prices Q1 2012 – Q4 2015



Source: d-cyphaTrade www.d-cyphatrade.com.au

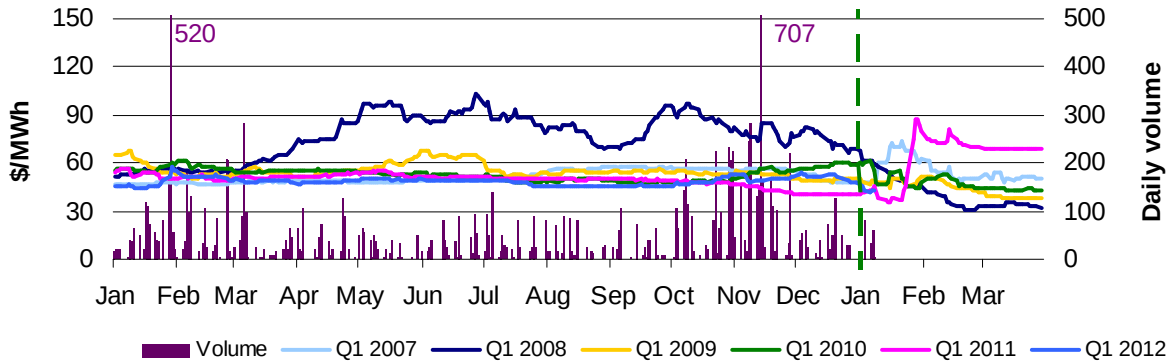
Figures 6-9 compare for each region the closing daily base contract prices for the first quarter of 2007, 2008, 2009, 2010, 2011 and 2012. Also shown is the daily volume of Q1 2012 base contracts traded. The vertical dashed line signifies the start of the Q1 period for which the contracts are being purchased. To understand the diagrams, the dark-blue line in figure 6 demonstrates that throughout the middle of 2007, the market had an expectation of very high spot prices in the first quarter of 2008.

Figure 6: Queensland Q1 2007, 2008, 2009, 2010, 2011 and 2012



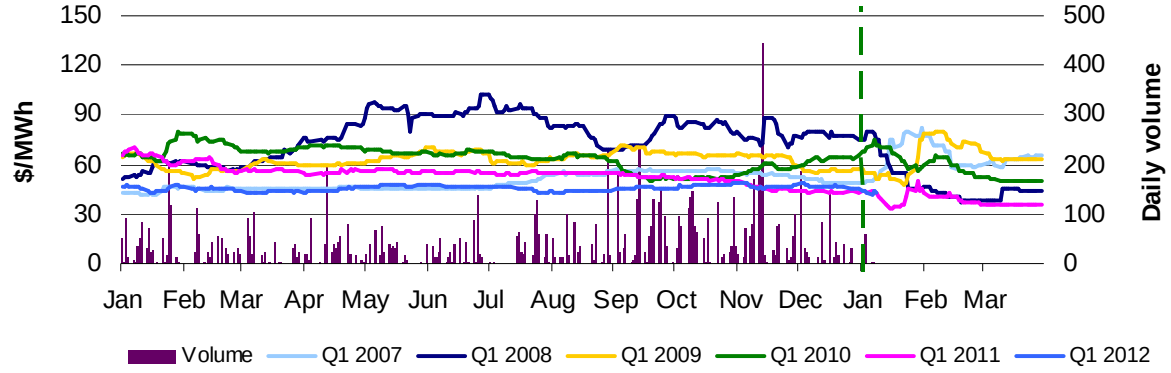
Source: d-cyphaTrade www.d-cyphatrade.com.au

Figure 7: New South Wales Q1 2007, 2008, 2009, 2010, 2011 and 2012



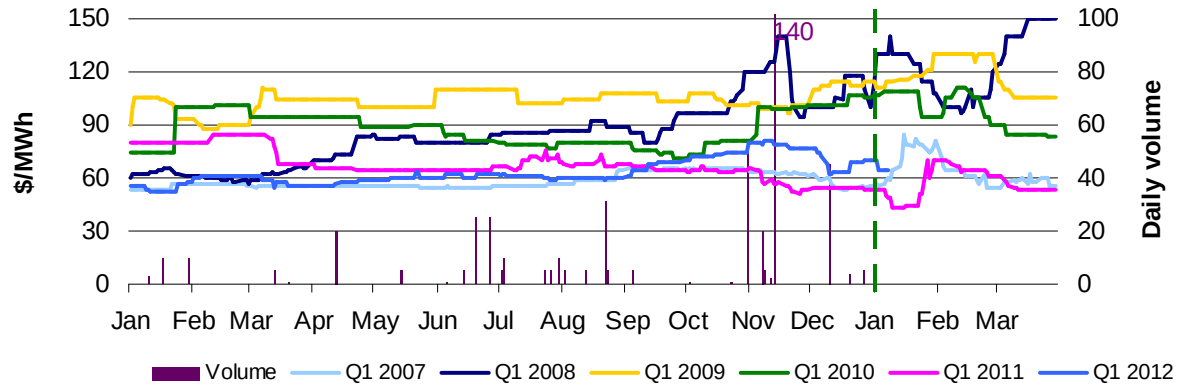
Source: d-cyphaTrade www.d-cyphatrade.com.au

Figure 8: Victoria Q1 2007, 2008, 2009, 2010, 2011 and 2012



Source: d-cyphaTrade www.d-cyphatrade.com.au

Figure 9: South Australia Q1 2007, 2008, 2009, 2010, 2011 and 2012



Source: d-cyphaTrade www.d-cyphatrade.com.au

*The daily volume scale for South Australia is smaller than for other regions to reflect the lower liquidity in the market in South Australia.

Spot market forecasting 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 as participants react to changing market conditions. There were 138 trading intervals throughout the week where actual prices varied significantly from forecasts[5]. This compares to the weekly average in 2010 of 57 counts and the average in 2009 of 103. Reasons for these variances are summarised in Figure 10[6].

Figure 10: Reasons for variations between forecast and actual prices

	Availability	Demand	Network	Combination
% of total above forecast	5	39	0	11
% of total below forecast	20	22	0	3

[5] A trading interval is counted as having a variation if the actual price differs significantly from the forecast price either four or 12 hours ahead.

[6] 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.

Demand and bidding patterns

The AER reviews demand, network limitations and generator bidding as part of its market monitoring to better understand the drivers behind price variations. Figure 11 shows the weekly change in total available capacity at various price levels during peak periods[7]. For example, in Queensland 1555 MW more capacity was offered at prices under $20/MWh this week compared to the previous week. Also included is the change in average demand during peak periods, for comparison.

Figure 11: Changes in available generation and average demand compared to the previous week during peak periods

MW	<$20/MWh	Between $20 and $50/MWh	Total availability	Change in average demand
QLD	1555	-858	841	1203
NSW	253	226	512	-71
VIC	428	-209	-57	-578
SA	-232	-268	-346	-371
TAS	-127	-88	-165	27
TOTAL	1877	-1197	785	210

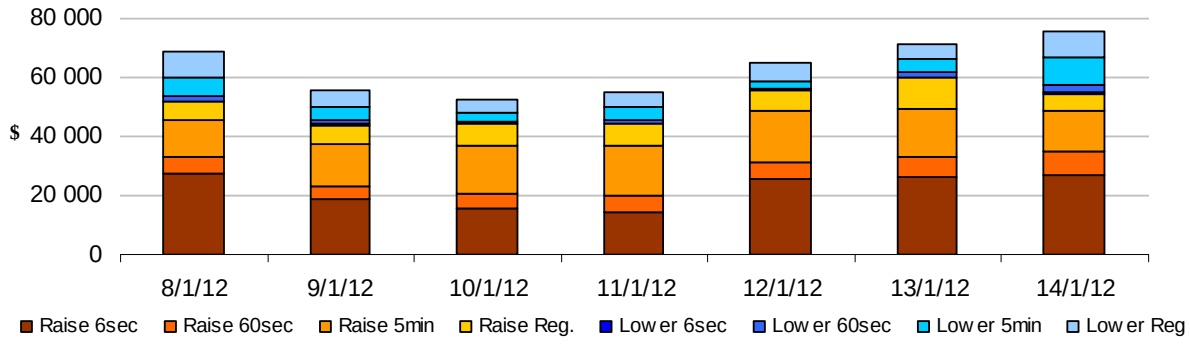
Ancillary services market

The total cost of frequency control ancillary services (FCAS) on the mainland for the week was $281 000 or less than one per cent of energy turnover on the mainland.

The total cost of FCAS in Tasmania for the week was $163 000 or two and a half per cent of energy turnover in Tasmania.

Figure 12 shows the daily breakdown of cost for each FCAS for the NEM.

Figure 12: Daily frequency control ancillary service cost



Australian Energy Regulator
February 2012

[7] A peak period is defined as between 7 am and 10 pm on weekdays.

Detailed Market Analysis

AUSTRALIAN ENERGY REGULATOR

8 January – 14 January 2012

Queensland:

There were seven occasions where the spot price in Queensland was greater than three times the Queensland weekly average price of $55/MWh and above $250/MWh.

Monday, 9 January

11:30 AM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	380.61	106.75	62.18
Demand (MW)	7864	7905	8044
Available capacity (MW)	10 537	10 756	11 246
12:30 PM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	387.62	99.58	165.27
Demand (MW)	8089	8104	8239
Available capacity (MW)	10 579	10 762	11 232

Conditions at the time saw high temperatures drive high levels of demand (but below that forecast). Available capacity was up to 219 MW below that forecast four hours ahead and up to 709 MW below that forecast twelve hours ahead.

At around 6 am a constraint managing the loading on the Calvale to Wurdong 275 kV line for the loss of the Calvale to Stanwell 275 kV line bound, limiting flows from New South Wales to Queensland across the QNI interconnector and constraining off Queensland generation. From around 8.30 am, and continuing throughout the time of high prices, a control system issue on the Terranora interconnector saw exports to New South Wales from Queensland limited to 60 MW.

During the 11.30 am and 12.30 pm trading intervals, flows from New South Wales on the QNI interconnector were constrained to 244 MW or less and a number of generators in South-East Queensland were constrained off.

With interconnector flows limited and lower priced generation either fully dispatched or constrained by ramp rate limits, higher priced generation offers were required to meet increases in demand. As a result, the five minute price reached $1682/MWh at 11.30 am and $1672/MWh at 12.30 pm.

At 5.50 am, first effective for the 6.30 am trading interval, Stanwell Corporation reduced the available capacity of Stanwell unit four by 365 MW to zero following the loss of the unit (around 230 MW was priced below $30/MWh). The reason given was “0549P unit trip on control system - est rts 7hrs - sl”.

Through a number of rebids from 3.31 am, CS Energy reduced availability at its Callide and Kogan Creek Power Stations by 180 MW, all of which was priced below $20/MWh. The reasons given were "CALL_B & KPP ambient conditions max avail limits sl" and "CALL_B_2 unit availability poor vacuum sl". A separate rebid at 9.28 am saw 60 MW of capacity priced below $30/MWh at its Gladstone Power Station rebid into price bands above $10 900/MWh. The reason given was "0924A G/STONE interconnector constraint sl". These offers were involved in setting the high dispatch prices at 11.30 am and 12.30 pm.

At 12.12 pm, effective from 12.20 pm, Origin Energy reduced the available capacity of Mt Stuart unit two by 142 MW to zero following the loss of the unit (45 MW was priced at $0/MWh). The reason given was "1210P change in avail - unit trip rts unknown sl".

There was no other significant rebidding.

Tuesday, 10 January

2:00 PM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	2892.65	31.89	254.73
Demand (MW)	8363	8275	8533
Available capacity (MW)	10 767	10 959	11 107
2:30 PM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	311.81	33.11	285.00
Demand (MW)	8325	8210	8588
Available capacity (MW)	10 750	10 929	11 102

Conditions at the time saw demand up to 115 MW higher and available capacity up to 192 MW lower than that forecast four hours ahead. The continuation of hot weather from the previous day again drove significantly high demand in the region.

From around 1.20 pm, the constraint equation managing the loading on the Calvale to Stanwell 275 kV line for the loss of the Calvale to Wurdong 275 kV line bound. The constraint equation affects the majority of Queensland generators.

At 1.44 pm, effective from 1.55 pm, Stanwell Corporation reduced the available capacity of Tarong unit one from 350 MW to 210 MW (a majority of which was priced below $300/MWh). The reason given was "1344P mill trip -est 1/2hr rts".

At 1.55 pm, a 50 MVA reduction in the dynamic rating of the Calvale to Stanwell 275 kV line saw a step change of around 420 MW in the export limit on the QNI interconnector for the 2 pm dispatch interval, forcing imports counter-price into New South Wales. In response to the step change, a number of Queensland generators were constrained down and others required to increase their output but were either limited by their ramp rate or trapped in frequency control ancillary services. The change in Queensland generation dispatch was not sufficient to meet the step change in the limit and as a result the QNI limit was violated at 2 pm by around 420 MW.

With lower priced generation either ramp rate limited or trapped in frequency control ancillary services, higher priced generation offers were dispatched and as a result, the five minute price reached around $4577/MWh at 1.55 pm and increased to the price cap at 2 pm. In response, from around 2.05 pm, close to 750 MW of capacity was rebid into prices close to

the price floor by a number of Queensland generators. This saw prices return to below $30/MWh from the 2.15 pm dispatch interval.

There was no other significant rebidding.

Thursday, 12 January

10:00 AM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	1757.40	28.83	25.47
Demand (MW)	7153	7431	7487
Available capacity (MW)	11 291	11 450	11 465

Conditions at the time saw demand up to around 280 MW lower and available capacity up to 273 MW lower than that forecast four hours ahead.

At 9.05 am, effective from 9.15 am, CS Energy reduced the available capacity of Callide B unit two from 350 MW to 130 MW (all of which was priced below $20/MWh). The reason given was “0924P CALL_B_2 unit availability condenser sl”.

At around 9.30 am, an 86 MVA reduction in the dynamic rating of the Calvale to Wurdong 275 kV line again saw the constraint managing the post-contingent loading of the line for the loss of the Calvale to Stanwell 275 kV line bind. This saw a step change in the export limit on the QNI interconnector of around 90 MW, forcing increased imports into New South Wales (counter-price) and the constraint violated at 9.35 am.

As a result of lower priced Queensland generation either ramp rate limited or trapped in frequency control ancillary services, higher priced offers set the five minute price at the price cap at 9.35 am. The counter-priced flows saw negative settlement residues accumulate on the interconnector.

By 9.55 am, in response to the high price, a number of Queensland generators rebid a total of around 3300 MW of capacity to prices at or close to the price floor. This saw the five minute price fall to the price floor for two dispatch intervals at 9.55 am and 10 am before returning to prices around $20/MWh by 10.05 am.

There was no other significant rebidding.

2:30 PM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	459.47	24.40	32.03
Demand (MW)	7432	7519	7889
Available capacity (MW)	11 005	11 278	11 413

At 2.05 pm, a step change in the export limit on the QNI interconnector of around 350 MW again saw a number of Queensland generators constrained by their ramp rate limits or trapped in frequency control ancillary services. As a result, the five minute price reached $1387/MWh at 2.05 pm and $1368/MWh at 2.10 pm.

Negative settlement residues again accumulated on the interconnector for the 2.05 pm and 2.10 pm dispatch intervals and the total of all negative settlement residues reached around $850 000 for the day.

Friday, 13 January

10:00 AM	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	333.00	29.01	28.57
Demand (MW)	6957	7176	7098
Available capacity (MW)	11 073	11 278	11 358

Conditions at the time saw demand and available capacity around 200 MW below that forecast four hours ahead.

The constraint managing the post-contingent loading on the Calvale to Wurdong 275 kV line again bound from 7.50 am.

At around 9.25 am, first effective at 9.35 am and in response to being constrained on, CS Energy rebid a total of 880 MW of capacity at Gladstone units 1, 2, 5 and 6 from prices between $0/MWh and $80/MWh to prices either close to the price floor (440 MW) or around $11 000/MWh (440 MW). The reason given was "0925A G/STONE intraconnector constraint 855_871 sl". This rebid led to a reduction in dispatch at Gladstone, which resulted in a step change in the export limit on the QNI interconnector of around 240 MW and saw several Queensland generators constrained at their ramp rate limits. Generation at Gladstone Power Station has the greatest impact to alleviate the binding constraint. The higher priced generation offers at Gladstone Power Station were dispatched and involved in setting the price at $1415/MWh at 9.35 am.

In response, 666 MW of capacity was rebid into negative prices by Queensland generators which saw prices fall below $30/MWh from 10.05 am.

There was no other significant rebidding.

South Australia:

There were three occasions where the spot price in South Australia was less than -$100/MWh.

Sunday, 8 January

8:00 AM	Actual	4 hr forecast	12 hr forecast
Price ($/MWh)	-139.85	11.93	11.74
Demand (MW)	918	972	971
Available capacity (MW)	2623	2731	2724

Conditions at the time saw demand and available capacity lower than that forecast four hours ahead.

Low demand and a significant volume of capacity offered at negative prices (1340 MW) contributed to the five minute price falling to -$909/MWh for one dispatch interval at 7.40 am. At the time, wind generation totalled around 850 MW, which led to falling "scheduled" demand (caused by an increase in non-scheduled wind generation).

The high wind generation in the South East caused a reduction in the export limit (to Victoria) across the Heywood interconnector. Similarly, high wind generation in the Mid North caused a reduction in the export limit across Murraylink. The combined effect was a maximum export to Victoria of around 225 MW, compared to a limit of around 620 MW earlier in the day. With excess generation capacity in South Australia, a number of generators received targets to reduce their output and this saw negatively priced generation offers setting the price.

There was no significant rebidding.

Wednesday, 11 January

4:30 AM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	-152.60	8.26	4.92
Demand (MW)	939	965	919
Available capacity (MW)	2488	2536	2576
5:00 AM	**Actual**	**4 hr forecast**	**12 hr forecast**
Price ($/MWh)	-161.36	7.91	8.02
Demand (MW)	966	945	948
Available capacity (MW)	2462	2525	2578

Conditions at the time saw demand and available capacity close to forecast. Low demand and a significant volume of negatively priced generation capacity (around 1400 MW) drove the low prices.

During the 4.05 am and 4.50 am dispatch intervals, wind generation increased to around 930 MW and, as occurred on 8 January, constraints bound limiting total exports to Victoria to around 180 MW at 4.05 am and 150 MW at 4.50 am. With excess generation capacity in South Australia, a number of generators received targets to reduce their output and this saw negatively priced generation offers setting the price at -$923/MWh at 4.05 am and at the price floor at 4.50 am.

There was no significant rebidding.

Detailed NEM Price and Demand Trends

for Weekly Market Analysis
8 January - 14 January 2012

AUSTRALIAN ENERGY REGULATOR

Table 1: Financial year to date spot market volume weighted average price

Financial year	QLD	NSW	VIC	SA	TAS
2011-12 ($/MWh) YTD	30	31	27	34	31
2010-11 ($/MWh) YTD	22	27	23	26	32
Change*	37%	13%	18%	32%	-4%
2010-11 ($/MWh)	34	43	29	42	31

Table 2: NEM turnover

Financial year	NEM Turnover** ($, billion)	Energy (TWh)
2011-12 (YTD)	$3.210	108
2010-11	$7.445	204
2009-10	$9.643	206

Table 3: Recent monthly and quarterly spot market volume weighted average price and turnover

Volume weighted average ($/MWh)	QLD	NSW	VIC	SA	TAS	Turnover ($, billion)
Sep-11	29	29	28	40	27	0.427
Oct-11	28	29	24	43	33	0.421
Nov-11	35	40	27	32	31	0.512
Dec-11	26	26	23	25	26	0.369
Jan-12 (MTD)	41	24	23	25	37	0.199
Q1 2012	41	24	23	25	37	0.219
Q1 2011	33	32	27	28	25	0.229
Change*	27%	-24%	-17%	-9%	45%	-4.11%

Table 4: ASX energy futures contract prices at end of 16 January 2012

	QLD		NSW		VIC		SA	
Q1 2012	Base	Peak	Base	Peak	Base	Peak	Base	Peak
Price on 09 Jan ($/MWh)	49	77	47	75	44	73	70	130
Price on 16 Jan ($/MWh)	44	70	43	69	43	71	65	130
Open interest on 16 Jan	1351	310	2403	620	2187	314	294	5
Traded in the last week (MW)	106	15	179	36	97	0	0	0
Traded since 1 Jan 11 (MW)	11035	371	12854	1453	9942	1255	493	5
Settled price for Q1 11($/MWh)	57	96	68	118	35	51	53	93

Table 5: Changes to availability of low priced generation capacity offered to the market

Comparison:	QLD	NSW	VIC	SA	TAS	NEM
November 11 with November 10						
MW Priced <$20/MWh	-961	-2254	-1184	-182	-523	-5105
MW Priced $20 to $50/MWh	165	1274	938	174	374	2926
December 11 with December 10						
MW Priced <$20/MWh	-767	-1462	-931	-239	-401	-3799
MW Priced $20 to $50/MWh	65	971	767	134	164	2100
January 12 with January 11 (MTD)						
MW Priced <$20/MWh	506	1431	54	-391	-387	1213
MW Priced $20 to $50/MWh	140	-23	300	17	47	481

*Note: These percentage changes are calculated on VWA prices prior to rounding
** Estimated value