Electricity spot prices above $5,000/MWh

New South Wales, 17 December 2020

24 February 2021

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1 Obligation

The Australian Energy Regulator (AER) 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 the performance of energy markets, including the annual State of the energy market report and biennial effective competition report, to assist stakeholders and the wider community.

The AER is required to publish a report whenever the electricity spot price exceeds $5,000 per megawatt hour ($/MWh) in accordance with clause 3.13.7 (d) of the National Electricity Rules.

The report:

- describes the significant factors contributing to the spot price exceeding $5,000/MWh, including withdrawal of generation capacity and network availability;
- assesses whether rebidding contributed to the spot price exceeding $5,000/MWh;
- identifies the marginal scheduled generating units; and
- identifies all units with offers for the trading interval equal to or greater than $5,000/MWh and compares these dispatch offers to relevant dispatch offers in previous trading intervals.

These reports are designed to examine market events and circumstances that contributed to wholesale market price outcomes and are not an indicator of potential compliance issues or enforcement action.

2 Summary

On 17 December 2020, the spot price in New South Wales exceeded $5,000/MWh for the 4 pm, 4.30 pm and 6 pm trading intervals driven by at least two dispatch intervals at or close to the price cap in each trading interval. AEMO forecasted high prices from earlier in the afternoon for both New South Wales and Queensland, though high prices did not eventuate in Queensland.

The high spot prices were a result of tight demand and supply conditions.

- Demand in New South Wales was relatively high at levels between 10,550 MW to 10,750 MW.
- New South Wales had limited access to capacity priced below $5,000/MWh.
  - Long-term planned outages on some black coal generators reduced their available capacity by around 2,900 MW (around 9,700 MW is installed), including a delay in the return to service of Bayswater unit 2.
  - Technical issues experienced by a number of generators, including a significant transformer incident at Liddell unit 3, reduced the amount of capacity priced below $5,000/MWh a further 520 MW.
  - There was also limited access to low-priced capacity from Queensland due to limits on imports from Queensland into New South Wales because of lightning around QNI in the afternoon.
- Due to the tight demand and supply conditions, rebidding of capacity from lower to higher prices and removal of capacity, even small volumes, contributed to the prices above $5,000/MWh.

During the high priced period around 87% of capacity offered by participants in New South Wales was priced below $5,000/MWh but given the limited access to cheap capacity from neighbouring regions and southern New South Wales, capacity priced above $5,000/MWh was required to meet demand.

There were reserve shortfall concerns with AEMO issuing market notices to elicit market responses for additional capacity or demand reductions. However, insufficient market response led to AEMO contracting off-market for increased capacity or reduced demand through the Reliability and Emergency Reserve Trader mechanism.

3 Analysis

The spot price in New South Wales reached $7,685/MWh, $10,034/MWh and $5,033/MWh for the 4 pm, 4.30 pm and 6 pm trading intervals respectively.

The following sections explore the factors that led to the high spot prices in detail. The combination of tight demand and supply conditions, network outages and low reserve levels in New South Wales meant AEMO had to intervene to ensure continued system security (see Section 3.5 below).

3.1 Reduced access to low-priced capacity

3.1.1 Within New South Wales

Long-term planned outages for upgrades or maintenance experienced by black coal generators meant about 2,900 MW of capacity was unavailable, out of approximately 9,700 MW of black coal installed capacity (Table 1). This included the delay in return to service of Bayswater 2.

Table 1: Offline and reduced availability baseload black coal generators in New South Wales

Participant	Station	Unit	Summer rating (MW)	Capacity available (MW)	Outage
AGL	Bayswater	Unit 2	680	0	Unplanned – 10 days and return to service delayed
AGL	Bayswater	Unit 4	655	85	Planned – 35 days
AGL	Liddell	Unit 1	450	0	Unplanned – 15 days
AGL	Liddell	Unit 2	450	0	Planned – 68 days
EnergyAustralia	Mt Piper	Unit 1	675	0	Planned – 82 days
Total			**2,910**	**85**	

A further 520 MW of capacity was removed by black coal generators from around 1.30 pm (Table 2). This included a unit trip at Liddell 3 around 1.30 pm.[1] The majority of this capacity was priced at the floor, further limiting the amount of low-priced capacity available (see section 3.1.3).

[1] AGL's Liddell unit 3 experienced a fire in the transformer during a change of an oil cooler filter, causing the transformer to be damaged and the unit to be shut down. The unit is expected to return to service in early 2021. https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2020/december/trading-update-and-revised-fy21-guidance

Table 2: Black coal generators removing capacity in the lead-up

Participant	Station	Unit	Summer rating (MW)	Capacity available (MW)	Outage
AGL	Liddell	Unit 3	450	0	Unplanned – transformer incident around 1.30 pm on the day
Origin	Eraring	Unit 2	680	640	No outage – reduced availability due to 'backpressure limitation'
Origin	Eraring	Unit 3	680	660	No outage – reduced availability due to 'ID fan limitation'
Origin	Eraring	Unit 4	680	670	No outage – reduced availability due to 'ID fan issue'
Total			**2,490**	**1,970**	

3.1.2 From other regions

From around 3.30 pm, imports from Queensland into New South Wales over the QNI interconnector were limited due to lightning in the area.[2] At the time of high prices the import limit into New South Wales was between 750 MW and 850 MW – down from its nominal limit of 1,000 MW. Flows were mostly at the limit, meaning that Queensland could not export any more lower-priced generation to help New South Wales. The forecast price sensitivities for the high-priced trading intervals indicated a net increase of even 100 MW of lower-priced imports from other regions could significantly change price outcomes in New South Wales (see section 3.1.3).

3.1.3 Overview of actual and expected conditions

Table 3 shows the actual and forecast spot price, demand and generator availability for the high priced trading interval and shows:

- High spot prices were forecast 2 but not 4 hours ahead.
- Demand was between 234 MW to 548 MW lower than forecast, 2 hours ahead.
- Availability was between 447 MW lower to 132 MW higher than forecast, 2 hours ahead mainly due to the delay in the return to service of AGL's Bayswater unit 2 and the trip of AGL's Liddell unit 3 just after 1.30 pm.

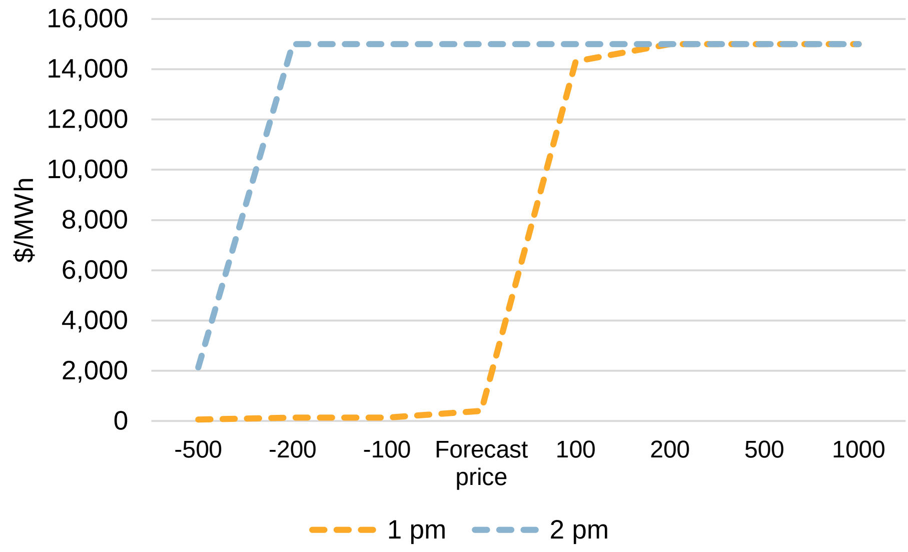
[2] Market notice 81340 at https://aemo.com.au/en/market-notices

Table 3: Actual and forecast spot price, demand and available capacity

Trading interval	Price ($/MWh)			Demand (MW)			Availability (MW)		
	Actual	2 hr forecast	4 hr forecast	Actual	2 hr forecast	4 hr forecast	Actual	2 hr forecast	4 hr forecast
4 pm	**7,685**	**14,313**	**136**	**10,553**	**10,787**	**10,363**	**11,625**	**12,072**	**12,051**
4.30 pm	**10,034**	**15,000**	**691**	**10,754**	**11,072**	**10,598**	**11,496**	**11,623**	**11,945**
5 pm	2,565	15,000	698	10,670	11,218	10,703	11,461	11,508	11,880
5.30 pm	2,613	15,000	1,751	10,708	11,242	10,756	11,479	11,347	11,849
6 pm	**5,033**	**15,000**	**1,829**	**10,634**	**10,939**	**10,708**	**11,277**	**11,176**	**11,743**

Figure 1 shows that conditions within New South Wales were such that the 1 pm forecast run for the 4 pm trading interval indicated only a 100 MW change in demand or availability was required for price to increase from $410/MWh (the forecast price) to $14,300/MWh. By 2 pm the change in demand and supply conditions resulted in a forecast price of $14,999/MWh. A greater than 500 MW decrease in demand or increase in availability would have been required for the price to be set lower than $5,000/MWh.

Figure 1: Forecast price and sensitivities for the 4 pm trading interval



Note – the changes along the horizontal axis refer to changes in MW of demand or availability. For example, 100 would mean a 100 MW increase in demand or a 100 MW decrease in availability.

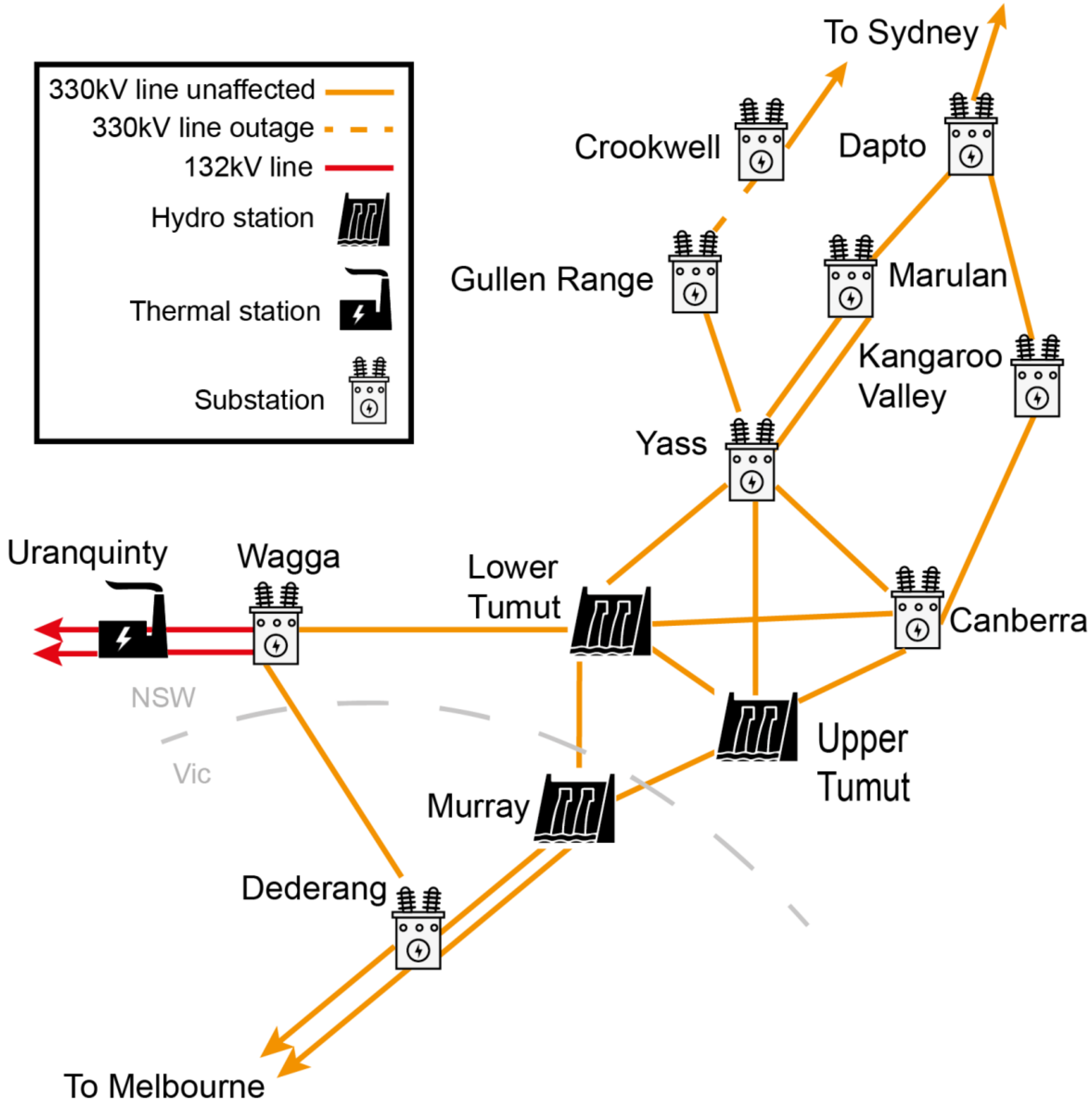
3.2 Planned network outages limited generation getting to load centres

This section examines the network capability in southern New South Wales and its contribution to price outcomes.

3.2.1 Network outages

There was a planned outage of the Crookwell to Gullen Range 330 kV line, which had begun the previous day. Figure 2 shows the affected network area, the significant generators, significant substations and the line that was out (yellow dashed). There is a significant amount of generation in the area and with the outages, the main transmission pathway for generation to get through to load centres in Sydney was through the Yass – Marulan 330 kV line. To manage the outage, AEMO invoked constraints from 16 December (discussed in the next section) affecting generation in southern New South Wales and flows on the VIC-NSW interconnector.

Figure 2: network diagram



3.2.3 Constraints

What is a constraint?

In optimising economic generation dispatch and interconnector flows, the National Electricity Market Dispatch Engine (NEMDE) formulates the maximum network capability for every five minute dispatch interval. These capabilities are used to form constraints that describe the maximum capability of each network element and include generator and interconnector coefficients.

Constraints contain a Left Hand Side (LHS) and a Right Hand Side (RHS). The RHS contains all of the inputs that cannot be varied by NEMDE. These inputs include demand and the rating of the relevant transmission line (i.e. how much energy the line can carry without damaging the line or causing unsafe conditions). The LHS contains all of the inputs that can be varied by NEMDE to deliver an outcome that satisfies the requirement of the RHS. These inputs include output from generators and flow on interconnectors. When the LHS equals the RHS then the constraint is binding.

To manage the outage of the Crookwell to Gullen Range line, AEMO imposed constraints to manage flows on the remaining lines, limiting the amount of capacity sent towards Sydney. To minimise the dispatch price, NEMDE schedules the cheapest generation sources to meet demand and maintain interconnector flows within limits, so if generation in southern New South Wales is cheaper than the imports from Victoria, it is dispatched before imports and vice versa. In this situation, because of the location of the generators and the transmission outage, if the VIC-NSW interconnector is at its adjusted limit then any excess generation in that area is forced south across the interconnector into Victoria, possibly counter-price (from a high to low priced region).[3]

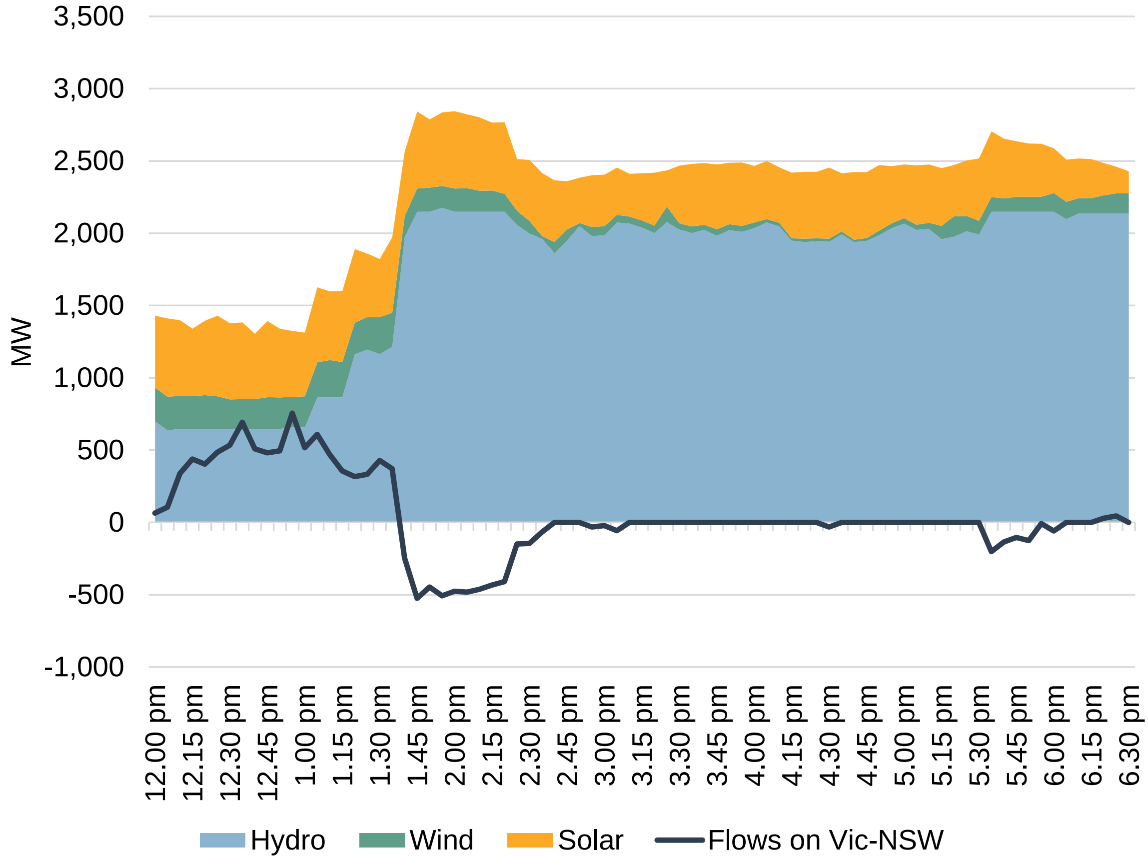
The output of generators on the LHS of the constraint is co-optimised with interconnectors on the LHS. The participants with the largest generator capacity that affect these particular constraints are Snowy Hydro (2,285 MW) and Origin (660 MW).[4] There are also a number of wind and solar farms, ranging from 45 MW to 320 MW that affect this constraint to a lesser degree.

Rebids by Snowy Hydro moved at least 1,300 MW of capacity from prices over $50/MWh to the floor. The rebids were in response to higher than forecast prices from the 2 pm trading interval onwards. This resulted in excess generation being forced south into Victoria and counter-price flows over the VIC-NSW interconnector (Figure 3).

3 https://www.aer.gov.au/wholesale-markets/performance-reporting/special-report-the-impact-of-congestion-on-bidding-and-inter-regional-trade-in-the-nem

4 On this constraint Snowy hydro controls Tumut (1,500 MW), Upper Tumut (616 MW), Blowering (80 MW), Guthega (60 MW) and Hume (29 MW) and Origin energy controls Uranquinty (660 MW)

Figure 3: Generation output and flow on the VIC-NSW interconnector



3.3 Rebids

In addition to the removal of capacity at Liddell unit 3 and Eraring, a number of other rebids occurred which contributed to and possibly prolonged the high prices. This included:

- Delta removed over 90 MW of capacity from Vales Point (30 MW priced at $14,288/MWh and the rest below $99/MWh) over a number of rebids from 1.32 pm due to technical issues.
- EnergyAustralia rebid 110 MW of capacity priced at $58/MWh to the cap at Tallawarra at 2.11 pm, giving the reason 1405~A~adj bands, +895 MW additional sch generation in NSW@hhe1430~~.

The rebids considered to have been material to the event are listed in Appendix A.

3.4 4 pm to 6 pm trading intervals

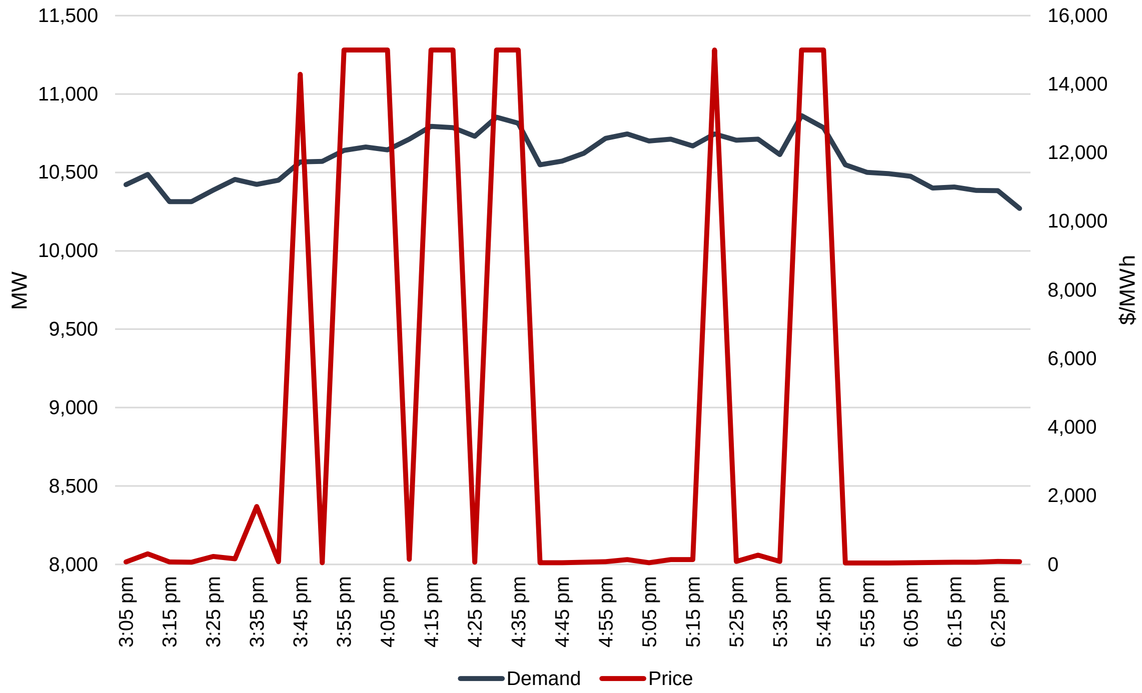
The combination of tight supply conditions (see section 3.5) and the lack of lower priced capacity (including rebids) detailed above meant there was no capacity offered between $39/MWh and $14,999/MWh in New South Wales. This meant small changes in demand or availability caused large fluctuations in price (see Figure 1). Demand was relatively high (see Table 3), so capacity priced above $5,000/MWh was required to be dispatched to meet demand.

Figure 4 shows the outcomes in price as demand and participant offers changed. Instances where demand increased by over 100 MW in a five minute interval appear to be related to changes in rooftop PV, as rooftop PV generation is treated as negative demand by NEMDE.

Availability also varied between certain five minute intervals. For example, during the 4 pm dispatch interval availability decreased by over 160 MW. This is related to variations in solar generation.

To address the tight supply conditions, AEMO activated/dispatched the Reliability and Emergency Reserve Trader (RERT) mechanism and therefore applied intervention in the market from 5.20 pm (see section 3.5). This resulted in the price for the 5.45 pm dispatch interval reaching $14,999/MWh.[5]

Figure 4: Dispatch price and demand



Appendix B details the generators involved in setting the price during the high-price periods, and how that price was determined by the market systems.

The closing bids for all participants in New South Wales with capacity priced at or above $5,000/MWh for the high-price periods are set out in Appendix C.

[5] The intervention price provisions of the National Electricity Rules form an important component of pricing in the NEM. These are implemented during periods when AEMO intervenes in the NEM by issuing a direction in accordance with NER clause 4.8.9 or exercising RERT provisions in NER rule 3.20. In accordance with NER clause 3.9.3(b), AEMO must set the energy and ancillary service prices during intervention at the prices that would have applied had the intervention not occurred.

3.5 Lack of Reserve and Reliability and Emergency Reserve Trader

When demand and supply conditions are tight AEMO notifies the market through lack of reserve (LOR) notices to elicit a market response to increase generation or reduce demand. LORs have three levels – LOR 1, 2 and 3 with LOR 1 being the least severe and LOR 3 meaning there is not enough supply to meet demand. LOR 3 requires AEMO to shed load (commercial and industrial first then residential customers if required) in order to maintain power system security.

At 12.49 pm, AEMO forecasted a LOR 1 from 3.30 pm to 6 pm.[6] An increase in forecast demand and removal of capacity (see section 3.1.3) resulted in AEMO forecasting an LOR 2 at 2.11 pm for the period from 3.30 pm to 5.30 pm, and then declaring an actual LOR 1 from 2.35 pm which stayed in place until 8.35 pm.[7]

In response to the forecast LOR 2, AEMO advised the market of its intention to commence RERT contract negotiations for the period from 2.40 pm to 6.30 pm.[8] The RERT allows AEMO to contract for emergency services such as generation or demand response that are not otherwise available in the market. This helps alleviate any shortfall in market reserves that were forecast.

At 3.22 pm, AEMO reclassified the Bulli Creek to Dumaresq 8L and 8M 330 kV lines from a non-credible contingency to a credible contingency for potential loss due to lightning. Constraints invoked to manage this decreased the limit of imports over the QNI interconnector from Queensland and impacted New South Wales reserve levels (see section 3.1.2).

This saw an actual LOR 2 declared in New South Wales by AEMO from 5.10 pm and RERT dispatched from 5.20 pm. Due to activation/dispatch of RERT an intervention event was declared by AEMO from 5.20 pm.[9]

Although there were no more high prices after 5.45 pm, there continued to be an actual LOR 2 until 6.05 pm (the start of the 6.30 pm trading interval). RERT and intervention continued to be applied until 6.30 pm when both were cancelled.[10] Detail on AEMO's decision to activate/dispatch RERT and intervene in the market is in their RERT Quarterly Report Q4 2020.[11]

Australian Energy Regulator

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6 Market notice 81298 at https://aemo.com.au/en/market-notices

7 Market notices 81318 and 81329 for the forecast LOR 2, and market notices 81331 and 81333 for the actual LOR 1 at https://aemo.com.au/en/market-notices

8 Market notice 81332 at https://aemo.com.au/en/market-notices

9 Market notices 81339, 81343, and 81347 at https://aemo.com.au/en/market-notices.

10 Market notices 81366 and 81367 at https://aemo.com.au/en/market-notices

11 AEMO RERT Quarterly Report Q4 2020 https://aemo.com.au/-/media/files/electricity/nem/emergency_management/rert/2020/rert-quarterly-report-q4-2020.pdf?la=en

Appendix A: Significant Rebids

The rebidding tables highlight the relevant rebids submitted by generators that impacted on market outcomes during the time of high prices. It details the time the rebid was submitted and used by the dispatch process, the capacity involved, the change in the price of the capacity was being offered and the rebid reason.

Table 4: Significant energy rebids for 4 pm

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
6.23 am		AGL Energy	Bayswater	-400	-1,000	N/A	0618~P~020 reduction in avail cap~208 RTS later than exp~
11.58 am		Origin Energy	Eraring	-10	39	N/A	1154P change in avail - fd fan limitation SL
1.32 pm		AGL Energy	Liddell	-325	-1,000	N/A	1330~P~020 reduction in avail cap~204 unit trip ~
1.32 pm		Delta Electricity	Vales Point	-60	>99	N/A	1325~P~milling limit~
2.11 pm		Energy Australia	Tallawarra	110	58	15,006	1405~A~adj bands, +895 MW additional sch generation in NSW@hhe1430~~
3.03 pm		Origin Energy	Eraring	-10	39	N/A	1501P change in avail - backpressure limitation SL
3.29 pm	3.40 pm	Delta Electricity	Vales Point	-10	-1,000	N/A	1525~P~milling/feeder limit~
3.53 pm	4 pm	Delta Electricity	Vales Point	-20	-1000	N/A	1550~P~pa fan limit~

Table 5: Significant energy rebids for 4.30 pm

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
6.23 am		AGL Energy	Bayswater	-460	-1,000	N/A	0618~P~020 reduction in avail cap~208 RTS later than exp~
1.32 pm		AGL Energy	Liddell	-325	-1000	N/A	1330~P~020 reduction in avail cap~204 unit trip ~
1.32 pm		Delta Electricity	Vales Point	-60	>99	N/A	1325~P~milling limit~

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
2.11 pm		Energy Australia	Tallawarra	110	58	15,006	1405~A~adj bands, +895 MW additional sch generation in NSW@hhe1430~~
3.29 pm		Delta Electricity	Vales Point	-10	-1,000	N/A	1525~P~milling/feeder limit~
3.53 pm		Delta Electricity	Vales Point	-20	14,288	N/A	1550~P~pa fan limit~

Table 6: Significant energy rebids for 6 pm

Submitted time	Time effective	Participant	Station	Capacity rebid (MW)	Price from ($/MWh)	Price to ($/MWh)	Rebid reason
11.58 am		Origin Energy	Eraring	-10	39	N/A	1154P change in avail - fd fan limitation SL
1.32 pm		AGL Energy	Liddell	-325	-1000	N/A	1330~P~020 reduction in avail cap~204 unit trip ~
1.32 pm		Delta Electricity	Vales Point	-60	>99	N/A	1325~P~milling limit~
2.11 pm		Energy Australia	Tallawarra	110	58	15006	1405~A~adj bands, +895 mw additional sch generation in NSW@hhe1430~ ~
3.03 pm		Origin Energy	Eraring	-10	39	N/A	1501P change in avail - backpressure limitation SL
3.29 pm		Delta Electricity	Vales Point	-10	-1000	N/A	1525~P~milling/feeder limit~
3.53 pm		Delta Electricity	Vales Point	-20	14288	N/A	1550~P~pa fan limit~
4.37 pm		Delta Electricity	Vales Point	-10	-1000	N/A	1635~P~mill/feeder limit revised~
4.46 pm		Delta Electricity	Vales Point	-10	-1000	N/A	1645~P~pa fan limit revised~
5.14 pm		Delta Electricity	Vales Point	-10	-1000	N/A	1710~P~milling/feeder limit revised~
5.44 pm	5.55 pm	Delta Electricity	Vales Point	-10	-1000	N/A	1740~P~pa fan limit revised~

Appendix B: Price setter

The following tables identify for the trading interval in which the spot price exceeded $5,000/MWh, each five minute dispatch interval price and the generating units involved in setting the energy price. This information is published by AEMO.[12] The 30-minute spot price is the average of the 6 dispatch interval prices.

Table 7: Price setter for the 4 pm trading interval

DI	Dispatch price ($/MWh)	Participant	Unit	Service	Offer price ($/MWh)	Marginal change	Contribution
3.35 pm	$1,691.39	CS Energy	GSTONE2	Energy	$1,449.73	0.38	$550.90
		CS Energy	GSTONE3	Energy	$1,449.73	0.38	$550.90
		CS Energy	GSTONE6	Energy	$1,449.73	0.38	$550.90
		Snowy Hydro	MURRAY	Energy	$35.51	1.14	$40.48
		Engie	LOYYB1	Energy	$0.02	-1.14	-$0.02
		Hydro Tasmania	GORDON	Raise 5 min	$0.90	-1.14	-$1.03
		Engie	LOYYB1	Raise 5 min	$0.00	1.14	$0.00
		CS Energy	GSTONE2	Raise 60 sec	$1.73	-0.38	-$0.66
		CS Energy	GSTONE3	Raise 60 sec	$1.73	-0.38	-$0.66
		CS Energy	GSTONE6	Raise 60 sec	$1.73	-0.38	-$0.66
		Engie	LOYYB1	Raise 60 sec	$0.00	1.14	$0.00
		CS Energy	GSTONE2	Raise 6 sec	$1.73	-0.38	-$0.66
		CS Energy	GSTONE3	Raise 6 sec	$1.73	-0.38	-$0.66
		CS Energy	GSTONE6	Raise 6 sec	$1.73	-0.38	-$0.66
		Engie	LOYYB1	Raise 6 sec	$0.00	1.14	$0.00
3.40 pm	$78.22	AGL (SA)	TORRB1	Energy	$63.00	1.13	$71.19
		Hydro Tasmania	GORDON	Energy	$38.60	-0.76	-$29.34
		Origin Energy	DDPS1	Energy	$36.69	1.13	$41.46
		Basslink	T-V-MNSP1,TAS1	Energy	$0.00	0.76	$0.00
		Energy Australia	BALBL1	Lower 5 min	$0.79	0.76	$0.60
		Origin Energy	ER03	Lower 60 sec	$1.03	-0.77	-$0.79
		AGL (SA)	TORRB1	Lower 60 sec	$0.03	1.54	$0.05
		AGL Energy	LYA4	Lower 6 sec	$0.20	-0.18	-$0.04
		AGL (SA)	TORRB1	Lower 6 sec	$0.00	0.94	$0.00
		Hydro Tasmania	GORDON	Raise 5 min	$0.90	-0.76	-$0.68
		Hydro Tasmania	GORDON	Raise reg	$8.00	0.76	$6.08
		AGL (SA)	TORRB1	Raise reg	$7.98	1.13	$9.02
		Origin Energy	DDPS1	Raise reg	$0.01	-1.13	-$0.01

[12] Details on how the price is determined can be found at www.aemo.com.au

DI	Dispatch price ($/MWh)	Participant	Unit	Service	Offer price ($/MWh)	Marginal change	Contribution
		Hydro Tasmania	GORDON	Raise 60 sec	$4.49	-1.54	-$6.91
		AGL (SA)	TORRB1	Raise 60 sec	$0.00	1.54	$0.00
		Energy Australia	BALBG1	Raise 6 sec	$13.25	-0.94	-$12.46
		AGL (SA)	TORRB1	Raise 6 sec	$0.50	0.94	$0.47
3.45 pm	$14,288.00	Delta Electricity	VP6	Energy	$14,288.00	1.00	$14,288.00
3.50 pm	$52.24	Origin Energy	ER03	Energy	$39.12	1.00	$39.12
		Hydro Tasmania	GORDON	Raise 5 min	$0.90	1.00	$0.90
		Origin Energy	ER03	Raise 5 min	$0.00	-1.00	$0.00
		Hydro Tasmania	GORDON	Raise 60 sec	$4.49	1.00	$4.49
		Origin Energy	ER03	Raise 60 sec	$0.00	-1.00	$0.00
		CS Energy	GSTONE6	Raise 6 sec	$7.73	1.00	$7.73
		Origin Energy	ER03	Raise 6 sec	$0.00	-1.00	$0.00
3.55 pm	$14,999.99	Snowy Hydro	CG1	Energy	$14,999.99	1.00	$14,999.99
4 pm	$14,999.99	Snowy Hydro	CG1	Energy	$14,999.99	1.00	$14,999.99
Total	**$7,685**						

Table 8: Price setter for the 4.30 pm trading interval

DI	Dispatch price ($/MWh)	Participant	Unit	Service	Offer price ($/MWh)	Marginal change	Contribution
4.05 pm	$14,998.89	Energy Australia	TALWA1	Energy	$14,998.89	1.00	$14,998.89
4.10 pm	$146.47	Manildra Prop	MANSLR1	Energy	-$11.46	1.16	-$13.29
		Snowy Hydro	UPPTUMUT	Energy	-$1,000.00	-0.16	$160.00
4.15 pm	$14,998.89	Energy Australia	TALWA1	Energy	$14,998.89	1.00	$14,998.89
4.20 pm	$14,998.89	Energy Australia	TALWA1	Energy	$14,998.89	1.00	$14,998.89
4.25 pm	$63.59	Origin Energy	ER01	Energy	$39.12	0.50	$19.56
		Origin Energy	ER04	Energy	$39.12	0.50	$19.56
		Enel X Australia	VENUS1	Raise 5 min	$1.00	1.00	$1.00
		Origin Energy	ER01	Raise 5 min	$0.00	-0.50	$0.00
		Origin Energy	ER04	Raise 5 min	$0.00	-0.50	$0.00
		Hydro Tasmania	GORDON	Raise 60 sec	$8.49	1.00	$8.49
		Origin Energy	ER01	Raise 60 sec	$0.00	-0.50	$0.00
		Origin Energy	ER04	Raise 60 sec	$0.00	-0.50	$0.00

DI	Dispatch price ($/MWh)	Participant	Unit	Service	Offer price ($/MWh)	Marginal change	Contribution
		Infigen	LBBG1	Raise 6 sec	$14.98	1.00	$14.98
		Origin Energy	ER01	Raise 6 sec	$0.00	-0.50	$0.00
		Origin Energy	ER04	Raise 6 sec	$0.00	-0.50	$0.00
4.30 pm	*$15,000.00*	Spark Infrastructure	BOMENSF1	Energy	-$66.87	88.56	-$5,922.01
		Snowy Hydro	UPPTUMUT	Energy	-$1,000.00	-87.56	$87,560.00
Total	**$10,034**						

Table 9: Price setter for the 6.30 pm trading interval

DI	Dispatch price ($/MWh)	Participant	Unit	Service	Offer price ($/MWh)	Marginal change	Contribution
5.35 pm	$84.01	CS Energy	GSTONE2	Energy	$72.73	0.39	$28.36
		CS Energy	GSTONE3	Energy	$72.73	0.39	$28.36
		CS Energy	GSTONE6	Energy	$72.73	0.39	$28.36
5.40 pm	$15,000.00	Snowy Hydro	CG4	Energy	$15,000.00	1.00	$15,000.00
5.45 pm	$14,998.89	Energy Australia	TALWA1	Energy	$14,998.89	1.00	$14,998.89
5.50 pm	$39.48	Stanwell	STAN-1	Energy	$34.95	0.28	$9.79
		Stanwell	STAN-2	Energy	$34.95	0.28	$9.79
		Stanwell	STAN-3	Energy	$34.95	0.28	$9.79
		Stanwell	STAN-4	Energy	$34.95	0.28	$9.79
5.55 pm	$39.12	Origin Energy	ER01	Energy	$39.12	0.50	$19.56
		Origin Energy	ER04	Energy	$39.12	0.50	$19.56
6 pm	$39.21	Stanwell	STAN-1	Energy	$34.95	0.28	$9.79
		Stanwell	STAN-2	Energy	$34.95	0.28	$9.79
		Stanwell	STAN-3	Energy	$34.95	0.28	$9.79
		Stanwell	STAN-4	Energy	$34.95	0.28	$9.79
Total	**$5,033**						

Appendix C: Closing bids

Figures C1 to C3 highlight the half hour closing bids for participants in New South Wales with significant capacity priced at or above $5,000/MWh during the periods in which the spot price exceeded $5,000/MWh. They also show generation output and the spot price.

Figure C1 - EnergyAustralia (Mt Piper, Tallawarra) closing bid prices, dispatch and spot price

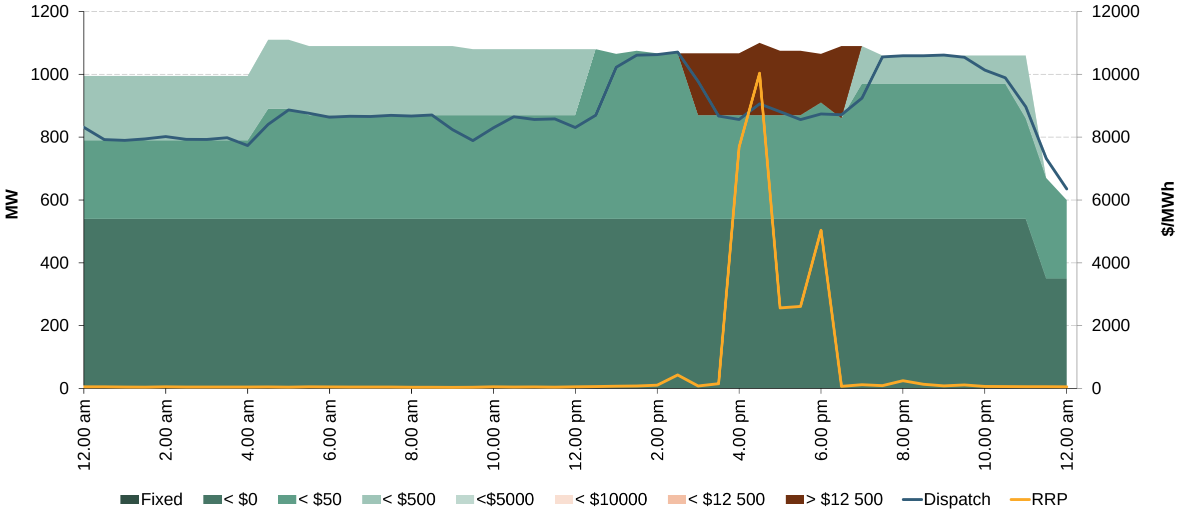

Figure C2 - Origin (Eraring, Shoalhaven, Uranquinty) closing bid prices, dispatch and spot price

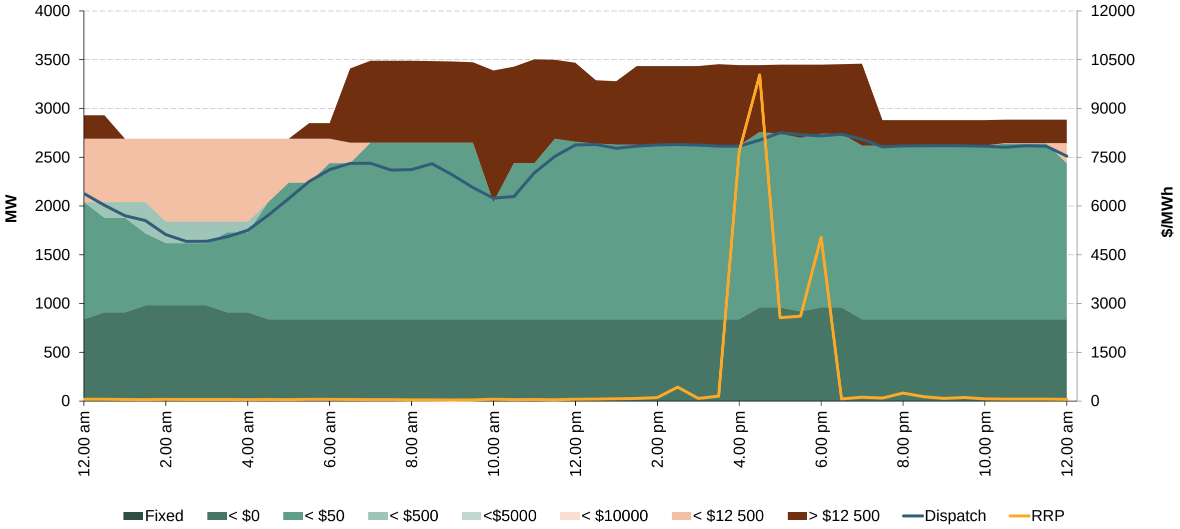

Figure C3 – Snowy Hydro (Colongra, Tumut, Upper Tumut, Guthega, Blowering) closing bid prices, dispatch and spot price