Electricity Pricing Event Reports

FEBRUARY 2016

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Market Outcomes: Queensland spot price was $2,264.21/MWh for trading interval (TI) ending 1830 hrs.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $12,947.51/MWh for dispatch interval (DI) ending 1830 hrs. The high price can be attributed to high demand and rebidding.

Queensland demand peaked at 9,154 MW for TI ending 1700 hrs. The maximum temperature in Brisbane was 38 degrees.

Between DIs ending 1825 hrs and 1830 hrs, Stanwell and CS Energy rebid 473 MW of generation capacity from bands priced at less than $260/MWh to the Market Price Cap (MPC) of $13,800/MWh. Cheaper priced generation was available but limited due to ramp rates (Mt Stuart PS unit 2 and Millmerran unit 2). For DI ending 1825 hrs, Yarwun PS withdrew 18 MW of generation capacity with reason of "ALUMINA REFINERY CONSTRAINTS".

During the high priced interval, the target flow on the QNI interconnector was limited up to 167 MW towards Queensland by the system normal thermal constraint equation, N>>N-NIL__3_OPENED. This constraint equation prevents the overload of Liddell – Muswellbrook 330 kV transmission line for the loss of the Liddell – Tamworth 330 kV transmission line. The target flow on the Terranora interconnector was constrained to 0 MW by the outage constraint equation, N_X_MBTE2_A. This constraint equation manages the outage of two Directlink cables.

The 5-minute price reduced to $49/MWh in the subsequent DI to the high priced interval when 311 MW of demand decreased in Queensland and 484 MW of generation capacity shifted/rebid from bands priced at above $12,945/MWh to bands priced at less than $260/MWh.

The high 30-minute spot price for Queensland was not forecast in the predispatch schedules as it was a result of lower demand forecast and rebidding of generation capacity.

Tuesday 02 February 2016 – High Energy price QLD

Market Outcomes: Spot prices in Queensland were between $1,845.54/MWh and $3,982.97/MWh for 5 trading intervals (TIs) between 1100 hrs and 1700 hrs.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $13,799.99/MWh for Dispatch Interval (DI) ending 1100 hrs, $10,500.1/MWh for DIs ending 1430 hrs, 1555 hrs, 1620 hrs and 1655 hrs, $12,890/MWh for DI ending 1700 hrs. The high prices can be attributed to high demand and rebidding of generation capacity.

Queensland demand peaked at 9,066 MW for TI ending 1400 hrs. The maximum temperature in Brisbane was 36.1 degrees.

Between DIs ending 1055 hrs and 1100 hrs, CS Energy and Intergen rebid 193 MW of generation capacity from bands priced below $300/MWh to $13,799.98/MWh or Market Price Cap ($13,800/MWh). The rebids were submitted at 1047 hrs (CS Energy) and 1053 hrs (Millmerran) with the reasons '*1047A DISPATCH PRICE HIGHER THAN 30MIN FORECAST-SL'* and '*1052A RRP ABOVE PD'* respectively.

For DI ending 1430 hrs, Stanwell rebid 399 MW of generation capacity from bands priced below $298/MWh to bands priced above $12,889/MWh.). The rebid was submitted at 1419 hrs with the reason '*1415A MATERIAL CHANGE IN QLD DEMAND PD1420*'.

For DI ending 1555 hrs, CS Energy rebid 100 MW of generation capacity from bands priced below $300/MWh to bands priced at Market Price Cap. The rebid was submitted at 1548 hrs with the reason '*1547A DISPATCH PRICE HIGHER THAN 5MIN FORECAST-SL*.'

For DI ending 1620 hrs, CS Energy and Intergen rebid 90 MW of generation capacity from bands priced below $7/MWh to bands priced at or above $13,799.98/MWh. The rebid was submitted at 1612 hrs with the reason '*1611A RRP BELOW 5 MIN PD*.'

Between DIs ending 1655 hrs and 1700 hrs, CS Energy, Stanwell and Intergen rebid 306 MW of generation capacity from bands priced below $300/MWh to Market price cap. Intergen and CS Energy rebids were submitted at 1646 hrs and 1647 hrs, with the reasons '*16:45 A SIG CHANGE IN 5MIN PD RRP FROM VOLL TO 300 DI 16:50*' and '*1646A DISPATCH PRICE LOWER THAN 5MIN FORECAST-SL*' respectively. The Stanwell rebids were submitted at 1649 hrs with the reason '*1650A MATERIAL INCREASE IN QLD GENERATION DI1650: GLADSTONE PS.'*

During the high priced intervals, the target flow on the QNI interconnector was limited up to 234 MW towards Queensland by the outage constraint equation, N^^Q_LS_VC_B1. This constraint equation prevents voltage collapse in New South Wales for the loss of Kogan Creek power station during the outage of the Lismore SVC. The target flow on the Terranora interconnector was limited upto 4 MW by the outage constraint equation, N_X_MBTE2_A. This constraint equation manages the outage of two Directlink cables.

Cheaper priced generation was available but required more than one DI to synchronise (Mt Stuart 1, Townsville GT).

The 5-minute prices in Queensland reduced below $70/MWh in the DIs subsequent to the high priced intervals, when demand decreased by upto 345 MW. Upto 340 MW of generation capacity was also rebid from bands priced above $10,500/MWh to lower priced bands.

The high Queensland spot prices for TIs ending 1600 and 1700 hrs were forecast in the predispatch schedules.

Monday 15 February 2016 – High Energy price QLD

Market Outcomes: Queensland spot price was $2,537.78/MWh for trading interval (TI) ending 1730 hrs.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $12,888.65/MWh for dispatch interval (DI) ending 1730 hrs. The high price can be attributed to high demand and rebidding of generation capacity.

Queensland demand peaked at 8,419 MW for TI ending 1700 hrs. The maximum temperature in Brisbane was 34 degrees.

Between DIs ending 1705 hrs and 1730 hrs, Stanwell, CS Energy and Millmerran shifted or rebid 520 MW of generation capacity from bands priced at less than $300/MWh to bands priced above $13,799/MWh. Cheaper priced generation was available but limited due to ramp rates (Stanwell PS unit 1, 2 and 3) or required more than one DI to synchronise (Townsville GT unit 1) or FCAS profiles (Gladstone PS unit 1, 3 and 6).

During the high priced interval, the target flow on the QNI interconnector was limited up to 138 MW towards Queensland by the system normal thermal constraint equation, N>>N-NIL__3_OPENED. This constraint equation prevents the overload of Liddell – Muswellbrook 330 kV transmission line for the loss of the Liddell – Tamworth 330 kV transmission line. The target flow on the Terranora interconnector was limited up to 33 MW towards Queensland by the outage constraint equation, N>N-BAMB_132_OPEN_A. This constraint equation prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel Lismore – Dunoon line during the outage of a Ballina – Mullumbimby 132 kV transmission line.

The 5-minute price reduced to $35.94/MWh in the subsequent DI to the high priced interval when demand in Queensland reduced by 294 MW and 520 MW of generation capacity shifted from bands priced above $13,799/MWh to bands priced at less than $300/MWh.

The high 30-minute spot price for Queensland was not forecast in the predispatch schedules as it was due to rebidding of generation capacity.

Tuesday 16 February 2016 – High Energy price QLD

Market Outcomes: Spot prices in Queensland were between $598.03/MWh and $4,095.99/MWh for 5 trading intervals (TIs) between 1400 hrs and 1930 hrs.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $1,399.60/MWh or $1,399.65/MWh for Dispatch Intervals (DIs) ending 1350, 1355, 1400, 1915 and 1920 hrs. 5-Minute dispatch price also reached $12,888.65/MWh for DIs ending 1615, 1635 and 1715 hrs and reached $11,530.80/MWh for DI ending 1645 hrs. The high prices can be attributed to high demand and rebidding of generation capacity.

Queensland demand peaked at 8,645 MW for TI ending 1700 hrs. The maximum temperature in Brisbane was 37.5 degrees.

Between DIs ending 1350 hrs and 1400 hrs, Stanwell, CS Energy and Millmerran rebid 241 MW of generation capacity from bands priced below $60/MWh to bands priced above $1399/MWh. CS Energy and ERM Power also withdrew a total of 114 MW with the reasons '*1353A MILL TRIP UNIT 4*' and '*1351P AMBIENT CONDITIONS - MATCH AVAIL TO EXPECTED UNIT OUTPUT*'.

For DI ending 1615 hrs, CS Energy rebid 160 MW of generation capacity from bands below $300/MWh to the Market Price Cap (MPC) of $13,800/MWh.

Between DIs ending 1635 hrs and 1645 hrs, Arrow Energy and Stanwell shifted/rebid 146 MW of generation capacity from bands priced at below $201/MWh to bands priced above $12,945.11/MWh or the MPC. Origin Energy withdrew 15 MW with the reasons '*1631A UNFORECAST MPC SPIKE SL'*.

Between DIs ending 1705 hrs and 1715 hrs, Arrow Energy, Stanwell, CS Energy and Millmerran shifted/rebid 792 MW of generation capacity from bands priced below $300/MWh to bands priced above $12,888.65/MWh or the MPC.

Between DIs ending 1910 hrs and 1920 hrs, Alinta, Stanwell, CS Energy and Millmerran shifted/rebid 165 MW of generation capacity from bands priced below $1400/MWh to bands priced above $12,945.11/MWh.

During the high priced intervals, the target flow on the QNI interconnector was limited up to 105 MW towards Queensland by the voltage stability constraint N^Q_NIL_A, and the system normal constraints N>>N-NIL__3_OPENED and N^^Q_NIL_B1. N^Q_NIL_A constraint prevents voltage collapse on the loss of Liddell-Muswellbrook 330kV line. N>>N-NIL__3_OPENED constraint manages the post-contingent flow on the Liddell-Muswellbrook no.83 330 kV line on trip of the Liddell-Tamworth no.84 330 kV line. N^^Q_NIL_B1 constraint prevents voltage collapse in New South Wales for tripping of the Kogan Creek PS.

The target flow on the Terranora interconnector was limited up to 0 MW by the system normal constraint equations N^Q_NIL_A, N>>N-NIL__3_OPENED, N^^Q_NIL_B1 and the outage constraint equation, N>N-BAMB_132_OPEN_A. N>N-BAMB_132_OPEN_A constraint prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel line during the outage of the Ballina – Lennox Head 132 kV transmission line.

Cheaper priced generation was available but limited due to ramp rates (Tarong PS unit 1, 3 and 4 and Millmerran PS unit 1 and 2) or constrained off by thermal constraint equation Q>NIL_MRTA_B. This constraint equation limits the output of Oakey PS to prevent overloading of a Middle Ridge – Tangkam 110 kV line.

The 5-minute prices in Queensland reduced to below $301/MWh in the DIs subsequent to the high priced intervals, when demand decreased and generation capacity was also rebid from higher price bands to lower price bands.

The high Queensland spot prices for TIs ending 1630, 1700 and 1730 hrs were forecast in the predispatch schedules.

Wednesday 17 February 2016 – High Energy price QLD

Market Outcomes: Spot prices in Queensland were between $2,177.44/MWh and $2,397.94/MWh for eight trading intervals (TIs) between 1430 hrs and 2000 hrs.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $12,888.65/MWh for eight

Dispatch Intervals (DIs) between DIs ending 1430 hrs and 1955 hrs. These high prices can be attributed to high demand and rebidding of generation capacity.

Queensland demand peaked at 8,558 MW for TI ending 1700 hrs. The maximum temperature in Brisbane was 35 °C.

Between DIs ending 1415 hrs and 1430 hrs, CS Energy and Millmerran rebid 100 MW of generation capacity from bands priced below $7/MWh to bands priced above $13,799.99/MWh or the Market Price Cap (MPC) of $13,800/MWh. Origin Energy also withdrew a total of 14 MW generation capacity with the reasons '*1405P CHANGE IN AVAIL - AMBIENT CONDITIONS SL*' and '*1410P CHANGE IN AVAIL - BACKPRESSURE ISSUES SL*'.

Between DIs ending 1525 hrs and 1530 hrs, CS Energy and Millmerran rebid 100 MW of generation capacity from bands priced below $7/MWh to bands priced above $13,799.99/MWh or the MPC.

For DI ending 1535 hrs, Stanwell shifted 96 MW of generation capacity from bands priced below $25/MWh to bands priced above $12,888.65/MWh or the MPC. For DI ending 1550 hrs, the 5 minute demand also increased by 97.26 MW.

Between DIs ending 1605 hrs and 1630 hrs, Arrow Energy, CS Energy, Millmerran, Origin Energy and QGC shifted/rebid 544 MW of generation capacity from bands priced below $36/MWh to bands priced above $11,530.80/MWh or the MPC. CS Energy, Origin Energy and AGL also withdrew a total of 28 MW generation capacity with the reasons '*1602P COAL QUALITY-SL'*, *'1557P CHANGE IN AVAIL - AMBIENT CONDITIONS SL*' and '*1605~P~020 REDUCTION IN AVAIL CAP~206 UNEXP AMBIENT TEMP EFFECTS 3MW*'.

For DI ending 1705 hrs, Stanwell and Origin Energy shifted 161 MW of generation capacity from bands priced below $30/MWh to bands priced above $12,888.65/MWh or the MPC.

For DI ending 1835 hrs, Alinta, CS Energy, Stanwell, Origin Energy and Millmerran shifted/rebid 209 MW of generation capacity from bands priced below $34/MWh to bands priced at or above $12,888.65/MWh or the MPC.

Between DIs ending 1905 hrs and 1915 hrs, Arrow Energy, CS Energy and Millmerran shifted/rebid 612 MW of generation capacity from bands priced below $300/MWh to bands priced at or above $12,947.50/MWh. Millmerran also withdrew a total of 20 MW generation capacity with the reason '*18:58 P: BAGHOUSE LIMIT*'.

Between DIs ending 1935 hrs and 1955 hrs, Arrow Energy, CS Energy, Origin Energy, ERM Energy, AGL and Millmerran shifted/rebid 572 MW of generation capacity from bands priced below $300/MWh to bands priced at or above $12,888.68/MWh. Ergon Energy also withdrew a total of 34 MW generation capacity with the reason '*17/02/2016 18:30 A: HIGHER PD PRICES*'.

During the high priced intervals, the target flow on the QNI interconnector was limited up to 237 MW towards Queensland by the system normal constraint equation N>>N-NIL__3_OPENED and the voltage stability constraint equations N^Q_NIL_A, and N^^Q_NIL_B1. N>>N-NIL__3_OPENED constraint equation manages the post-contingent flow on the Liddell-Muswellbrook no.83 330 kV line on trip of the Liddell-Tamworth no.84 330 kV line. N^Q_NIL_A constraint equation prevents voltage collapse on the loss of Liddell-Muswellbrook 330kV line. N^^Q_NIL_B1 constraint equation prevents voltage collapse in New South Wales for tripping of the Kogan Creek PS.

The target flow on the Terranora interconnector was limited up to 9 MW towards Queensland by the system normal constraint equation N^Q_NIL_A and the outage constraint equation N>N-BAMB_132_OPEN_A. N>N-BAMB_132_OPEN_A constraint equation prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel line during the outage of the Ballina – Lennox Head 132 kV transmission line.

Cheaper priced generation was available but limited due to ramp rates (Gladstone PS unit 1, 3, 5 and 6 and Callide B PS unit 1), or required more than one DI to synchronise (Townsville GT unit 1 and Mt Stuart PS unit 3), or FCAS profiles (Gladstone PS unit 1, 3, 5 and 6) or constrained off by thermal constraint equation Q>NIL_MRTA_A. This constraint equation limits the output of Oakey PS to prevent overloading of a Middle Ridge – Tangkam 110 kV line.

The 5-minute prices in Queensland reduced to below $39.63/MWh in the DIs subsequent to the high priced DIs, when demand decreased and generation capacity was also rebid from higher price bands to lower price bands.

The high Queensland spot prices for TIs ending 1600, 1630 and 1730 hrs were forecast in the predispatch schedules.

Thursday 18 February 2016 – High Energy price QLD

Market Outcomes: Queensland spot prices were between $1,449.90/MWh and $2,251.59/MWh for 8 trading intervals (TIs) between 1600 hrs and 2030 hrs.

Queensland FCAS prices as well as energy and FCAS prices in other regions were not affected.

Counter price flows caused negative settlement residues of approximately $621,000 to accumulate on the Queensland to New South Wales directional interconnector between TIs ending 1430 hrs and 1700 hrs. AEMO managed negative settlement residues from 1555 hrs to 1630 hrs (Market Notices No. 51954 and 51957), 1725 hrs to 1830 hrs (Market Notices No. 51961 and 51974) and 1910 hrs to 1950 hrs (Market Notices No. 51980 and 51983).

Further information is provided below.

Detailed Analysis: 5-Minute dispatch prices in Queensland reached $12,700.10/MWh or $12,700.30/MWh for 8 dispatch intervals (DIs) between 1535 hrs and 2005 hrs. These high prices can be attributed to high demand and rebidding.

Queensland demand peaked at 8,678 MW for TI ending 1700 hrs. The maximum temperature in Brisbane was 34.3 ^{o}C.

Generation capacity of up to 784 MW was shifted/rebid during the high priced DIs from lower priced bands to bands priced above $12,700.10/MWh or the Market Price Cap (MPC) of $13,800/MWh. These rebids were submitted by a range of market participants. The rebids of 250 MW from Wivenhoe PS unit 1 or 2 (ramp down rate of 120 MW per minute) for most of the high priced DIs, resulted in sudden decreases of 250 MW of target generation in Queensland which also contributed to the high prices.

Cheaper priced generation was available but limited due to ramp rates (Tarong PS unit 4, Millmerran unit 1 and 2, Callide B PS unit 1 and 2 and Callide B PP unit 3) or the unit required more than one DI to synchronise (Mt Stuart PS unit 1) or FCAS profile (Callide B PS unit 1 and 2). In addition 137 MW of

capacity was made unavailable at Mt Stuart PS unit 1 for DI ending 1850 hrs with the reason "1840P UNIT SHUTDOWN AND LOCKOUT SL".

During the high priced intervals, the target flow on the QNI interconnector was limited up to 177.5 MW towards Queensland by the voltage stability constraint equations N^Q_NIL_A and N^^Q_NIL_B1 and the system normal thermal constraint equation N>>N-NIL__3_OPENED. N^Q_NIL_A constraint equation prevents voltage collapse on the loss of Liddell-Muswellbrook 330kV line. N^^Q_NIL_B1 constraint equation prevents voltage collapse in New South Wales for tripping of the Kogan Creek PS. N>>N-NIL__3_OPENED constraint equation manages the post-contingent flow on the Liddell-Muswellbrook no.83 330 kV line on trip of the Liddell-Tamworth no.84 330 kV line.

The target flow on the Terranora interconnector was limited up to 6.6 MW towards Queensland by the voltage stability constraint equations N^Q_NIL_A and N^^Q_NIL_B1 and the outage constraint equation N>N-BAMB_132_OPEN_A. N>N-BAMB_132_OPEN_A constraint equation prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel line during the outage of the Ballina – Lennox Head 132 kV transmission line.

A negative settlement residues management constraint equation was invoked for 28 DIs between DIs ending 1600 hrs and 1950 hrs. This is due to excess cheaper generation in Queensland when a large amount of generation capacity rebid from higher priced bands to lower priced bands or the MFP.

The 5-minute prices in Queensland reduced to below $35.18/MWh in the DIs subsequent to the high priced intervals, when demand decreased and generation capacity was also rebid from higher price bands to lower price bands. Between DIs ending 1745 hrs and 1800 hrs, excess cheaper generation in Queensland caused 5-minute dispatch prices in Queensland to collapse to below -$999.71/MWh.

The high Queensland spot prices for TIs ending 1630 and 1730 hrs were forecast in the predispatch schedules.

Thursday 19 February 2016 – High Energy price QLD

Market Outcomes: Spot prices in Queensland were between $1,794.65/MWh and $2,227.36/MWh for 6 trading intervals (TIs) between 1400 hrs and 1900 hrs.

Queensland FCAS prices as well as energy and FCAS prices in other regions were not affected.

Counter price flows caused negative settlement residues of approximately $468,000 to accumulate on the Queensland to New South Wales directional interconnector between TIs ending 1400 hrs and 1930 hrs. AEMO managed negative residues from 1720 hrs to 1825 hrs (Market Notices 52000 and 52008).

Further information is provided below.

Detailed Analysis: 5-Minute dispatch prices in Queensland were between $12,700.10/MWh and $12,888.65/MWh for 6 dispatch intervals (DIs) between 1340 hrs and 1845 hrs. These high prices can be attributed to high demand and rebidding.

Queensland demand peaked at 8,430 MW for TI ending 1700 hrs. The maximum temperature in Brisbane was 33.6 °C.

Between DIs ending 1335 hrs and 1340 hrs, Stanwell and CS Energy shifted/ rebid 268 MW of generation capacity from bands priced below $300/MWh to the Market Price Cap (MPC) of $13,800/MWh.

Between DIs ending 1505 hrs and 1520 hrs, Stanwell and CS Energy rebid 95 MW of generation capacity from bands priced at or below $36.01/MWh to bands priced at $13,799.99 or the MPC.

Between DIs ending 1535 hrs, Arrow Energy, CS Energy, Stanwell and Origin Energy shifted/rebid 337 MW of generation capacity from bands priced below $25/MWh to bands priced at or above $12,700.10/MWh or the MPC.

Between DIs ending 1605 hrs and 1610 hrs, Arrow Energy, CS Energy, Millmerran and Origin Energy shifted/rebid 354 MW of generation capacity from bands priced below $12/MWh to bands priced at or above $12,700.10 or the MPC. In addition, for DI ending 1605 hrs CS Energy injected 125 MW of generation capacity with the reason '1556A PRICE IN 5MIN PD HIGHER THAN 30MIN PD-SL', but withdrew it at 1610 hrs with the reason '1601P ASHING SYSTEM PROBLEM-SL'.

For DI ending 1705 hrs, 191 MW of generation capacity was shifted by Stanwell and Origin Energy from bands priced below $30/MWh to bands priced at or above $12,888.60 or the MPC.

Between DIs ending 1835 hrs and 1845 hrs, Stanwell, Millmerran and Alinta Energy shifted/rebid 158 MW of generation capacity from bands priced below $351/MWh to bands priced above $12,888.65 or the MPC. In addition, between DIs ending 1835 hrs and 1840 hrs Alinta Energy, Arrow Energy and Origin Energy withdrew 316 MW of generation capacity with the reasons '1800~P~GAS LINEPACK MANAGEMENT~', '1830P PIPELINE PRESSURE LOWER THAN EXPECTED SL' and '1830P UNIT SHUTDOWN AND LOCKOUT SL'.

Cheaper priced generation was available but limited due to ramp rates (Mt Stuart PS unit 3) or FCAS profiles (Callide B PS unit 2) or required more than one DI to synchronise (Mt Stuart PS unit 3).

During the high priced DIs, the target flow on the QNI interconnector was limited up to 145 MW towards Queensland by the system normal constraint equation N>>N-NIL__3_OPENED and the voltage stability constraint equation N^Q_NIL_A. The constraint equation N>>N-NIL__3_OPENED manages the post-contingent flow on the Liddell – Muswellbrook No.83 330 kV line on trip of the Liddell – Tamworth no.84 330 kV line. The N^Q_NIL_A constraint equation prevents voltage collapse on the loss of Liddell – Muswellbrook 330kV line.

The target flow on the Terranora interconnector was limited up to 0 MW towards Queensland by the outage constraint equation, N>N-BAMB_132_OPEN_A and the system normal constraint equation N^Q_NIL_A. The constraint equation N>N-BAMB_132_OPEN_A prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel line during the outage of the Ballina – Lennox Head 132 kV transmission line.

A negative settlement residues management constraint equation was invoked for 13 DIs between DIs ending 1725 hrs and 1825 hrs. This is due to excess cheaper generation in Queensland when a large amount of generation capacity rebid from higher priced bands to lower priced bands or the MFP.

The 5-minute prices in Queensland reduced to below $72.33/MWh in the DIs subsequent to the high priced DIs, when demand decreased and generation capacity was also rebid from higher price bands to lower price bands. For DIs ending 1725 hrs and 1730 hrs, excess cheaper generation in Queensland caused 5-minute dispatch prices in Queensland to collapse to below -$998/MWh.

The high Queensland spot prices for TIs ending 1600, 1630 and 1730 hrs were forecast in the predispatch schedules.

Sunday 21 February 2016 – Negative Energy price SA

Market Outcomes: South Australia spot price was -$151.29/MWh for trading interval (TI) ending 0030 hrs.

South Australia FCAS prices as well as energy and FCAS prices in other regions were not affected.

Further details are provided below.

Detailed Analysis: 5-Minute dispatch price in South Australia decreased to the Market Floor Price (MFP) of -$1,000/MWh for dispatch interval (DI) ending 0010 hrs. The negative price can be attributed to excess generation in South Australia during a short-notice outage of APD potline 1.

APD potline 1 commenced a short-notice outage at 0000 hrs. The potline consumption reduced from 230 MW at 2359 hrs to 0 MW at 0000 hrs. The outage of the potline increased the flow across the South Morang F2 500/330 kV transformer from 963 MVA at 0000 hrs to 1096 MVA at 0005 hours, exceeding the 1000 MVA continuous rating of the transformer.

The increased loading on the transformer caused the thermal constraint equation V>>V_NIL_2A_R to bind. This constraint equation prevents the overload of South Morang F2 500/330 kV transformer under system normal conditions. The binding constraint equation resulted in the target flow towards South Australia on the Heywood interconnector to increase from 134 MW at DI ending 0005 hrs to 421 MW at DI ending 0010 hrs.

With excess cheaper priced generation available from Victoria during the low demand period, the South Australia price decreased to the MFP for DI ending 0010 hrs.

The target flow on the Murraylink interconnector was limited up to 125 MW towards Victoria by the thermal constraint S>V_NIL_NIL_RBNW. This constraint equation prevents the overload of Robertstown - North West Bend No.1 or 2 132kV lines under system normal conditions.

The 5-minute price in South Australia increased to $13.50/MWh for the subsequent DI when the South Morang F2 500/330 kV transformer loading decreased to 830 MVA and the target flow towards South Australia on the Heywood interconnector reduced to 120 MW.

The negative spot price for South Australia was not forecast in the pre-dispatch schedules, as it was a result of a short-notice potline outage.

Friday 26 February 2016 – High Energy price QLD

Market Outcomes: Queensland spot price reached $2,309.86/MWh and $2,163.68/MWh for trading intervals (TIs) ending 1300 hrs and 1630 hrs.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $12,947.50/MWh and $12,499.11/MWh for dispatch intervals (DIs) ending 1255 hrs and 1630 hrs. The high price can be attributed to rebidding of generation capacity during a period of high demand.

Queensland demand peaked at 8,257 MW for TI ending 1630 hrs. The maximum temperature in Brisbane was 33.8 °C.

Between DIs ending 1245 hrs and 1255 hrs, Arrow Energy, CS Energy and Millmerran rebid 461 MW of generation capacity from bands priced at less than $346/MWh to bands priced above $12,947/MWh or the Market Price Cap (MPC) of $13,800/MWh. For DI ending 1245 hrs, Braemar 2 PS unit 7 withdrew 173 MW of generation capacity with the reason "1234P UNIT TRIP SL". Millmerran Power Plant also withdrew 10 MW of generation with reason of "12:36 P: CONDENSATE POLISHER INLET TEMPERATURE". For DI ending 1255 hrs, Darling Downs PS withdrew 15 MW of generation with reason of "1245P CHANGE IN AVAIL - AMBIENT CONDITIONS SL". Cheaper priced generation was available but limited due to ramp rates (Oakey PS unit 1 and Tarong PS unit 1 and 4) or required more than one DI to synchronise (Mt Stuart PS unit 2 and 3).

For DI ending 1630 hrs, Alinta rebid 140 MW of generation capacity from bands priced at less than $34/MWh to bands priced above $12,499/MWh. Gladstone PS unit 2 and Yarwun PS withdrew a total of 45 MW generation capacity with reasons of "1619P UNIT RAMPING REBID TO MATCH-SL" and "ALUMINA REFINERY CONSTRAINTS" respectively. Cheaper priced generation was available but required more than one DI to synchronise (Townsville GT unit 1).

For the high priced TIs, the target flow on the QNI interconnector was limited up to 139 MW towards Queensland by the system normal thermal constraint equation, N>>N-NIL__3_OPENED. This constraint equation prevents the overload of Liddell – Muswellbrook 330 kV transmission line for the loss of the Liddell – Tamworth 330 kV transmission line. The target flow on the Terranora interconnector was limited to 12 MW by the outage constraint equation, N>N-BAMB_132_OPEN_A. This constraint equation prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel Lismore – Dunoon 132 kV transmission line during the outage of the Ballina – Lennox Head 132 kV transmission line.

The 5-minute prices reduced to below $35.44/MWh in the subsequent DIs to the high priced intervals when demand in Queensland reduced by up to 355 MW and up to 443 MW of generation capacity was rebid or withdrew from higher price bands.

The high 30-minute spot price for Queensland was not forecast in the predispatch schedules as it was a result of rebidding of generation capacity.

Saturday 27 February 2016 – High Energy price QLD

Market Outcomes: Spot price in Queensland reached $2,323.21/MWh for trading interval (TI) ending 2300 hrs.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $13,788.88/MWh for Dispatch Interval (DI) ending 2235 hrs. The high price can be attributed to rebidding of generation capacity.

For DI ending 2235 hrs, Alinta, CS Energy and ERM Power rebid 355 MW of generation capacity from bands at or below $36.10/MWh to bands priced at or above $12,499.11/MWh or the Market Price Cap (MPC) of $13,800/MWh.

During DI ending 2235 hrs, the target flow on the QNI interconnector was limited up to 326 MW towards Queensland by the system normal voltage stability constraint equation N^Q_NIL_A. The N^Q_NIL_A constraint equation prevents voltage collapse in New South Wales for the loss of Liddell – Muswellbrook no. 83 330kV transmission line. The target flow on the Terranora interconnector was limited up to 0 MW towards Queensland by the same voltage stability constraint equation.

Cheaper priced generation was available but limited due to ramp rates (Condamine PS A unit 1, Oakey PS unit 2 and Stanwell PS unit 2) or required more than one DI to synchronise (Braemar 2 PS units 5 and 6).

The 5-minute prices in Queensland reduced to $33.98/MWh in the DI subsequent to the high priced interval, when 574 MW of generation capacity was rebid from bands priced at or above $12,499.11/MWh to bands priced at or less than $33.98/MWh.

The high Queensland spot prices for TI ending 2300 hrs was forecast in the predispatch schedules.

Sunday 28 February 2016 – High Energy price QLD

Market Outcomes: Queensland spot price reached $2,155.04/MWh for trading interval (TI) ending 2230 hrs.

Queensland FCAS prices and energy and FCAS prices in the other NEM regions were not affected.

Counter price flows caused negative settlement residues of approximately $487,000 to accumulate on the Queensland to New South Wales directional interconnector between TIs ending 2230 hrs and 2300 hrs. AEMO managed negative settlement residues from 2220 hrs to 2315 hrs (Market Notices No. 52080 and 52089).

Detailed Analysis: 5-Minute dispatch prices reached $12,888.69/MWh for dispatch interval (DI) ending 2205 hrs. This high price can be attributed to rebidding of generation capacity.

For the DI ending 2205 hrs, Alinta, CS Energy, ERM Power and Stanwell shifted or rebid a total generation capacity of 1,218 MW from bands priced below $1,400.00/MWh to bands priced at or above $12,499.11/MWh or the Market Price Cap (MPC) of $13,800.00/MWh.

Cheaper priced generation was available but limited due to ramp rates (Condamine PS unit A, Darling Downs PS unit 1, Oakey PS Unit 2) or required more than one DI to synchronise (Braemar 2 PS unit 6).

The target flow on the QNI interconnector was limited to 297 MW towards Queensland by the voltage stability constraint equation, N^^Q_NIL_B1. This system normal constraint equation prevents voltage collapse in New South Wales for the loss of Kogan Creek PS. The target flow on the Terranora interconnector was limited to 43 MW towards Queensland by the outage constraint equation, N>N-BAMB_132_OPEN_A. The N>N-BAMB_132_OPEN_A constraint equation prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel Lismore – Dunoon 132 kV transmission line during the outage of the Ballina – Lennox Head 132 kV transmission line.

The negative settlement residue management constraint equation, NRM_QLD1_NSW1, was invoked for 11 DIs between DIs ending 2225 hrs and 2315 hrs. Rebidding of generation capacity in Queensland during this period caused the flows on QNI to change direction rapidly, resulting in intervals when negative residues accumulated.

The 5-minute prices in Queensland reduced to $18.41/MWh in the DI subsequent to the high priced interval, when demand reduced by 365 MW and 650 MW of generation capacity was rebid from bands priced above $12,888.00/MWh or the MPC to bands priced at or below $0.00/MWh.

The high Queensland spot prices for TI ending 2230 hrs was not forecast in the pre-dispatch schedules as it was a result of rebidding of generation capacity.

Monday 29 February 2016 – High Energy price QLD

Market Outcomes: Spot prices in Queensland reached $2,342.03/MWh and $2,122.26/MWh for trading intervals (TIs) ending 0700 hrs and 1900 hrs, respectively.

FCAS prices in all regions and Energy prices for the other NEM regions were not affected by this event.

Detailed Analysis: 5-Minute dispatch price in Queensland reached $13,788.88/MWh for the dispatch interval (DI) ending 0650 hrs and reached $12,499.10/MWh for the DI ending 1840 hrs. These high prices can be attributed to rebidding of generation capacity during a period of high demand.

Queensland demand peaked at 8,322 MW for TI ending 1700 hrs. The maximum temperature in Brisbane was 32.5°C.

Between DIs ending 0635 hrs and 0650 hrs, CS Energy, Stanwell and Millmerran shifted or rebid 390 MW of generation capacity from bands priced below $25.00/MWh to bands priced at or above $13,788.87/MWh.

For the DI ending 1840 hrs Stanwell rebid 120 MW of generation capacity from bands priced below $49.00/MWh to the Market Price Cap (MPC) of $13,800/MWh.

During the high priced intervals, the target flow on the QNI interconnector was limited up to 178 MW towards Queensland by the voltage stability constraint equation N^^Q_NIL_B1. The N^^Q_NIL_B1 constraint equation prevents voltage collapse in New South Wales for the loss of Kogan Creek PS. The target flow on the Terranora interconnector was limited up to 18 MW towards Queensland by the voltage stability constraint equation N^^Q_NIL_B1 and the outage constraint equation N>N-BAMB_132_OPEN_A. The N>N-BAMB_132_OPEN_A constraint equation prevents the overload of a Lismore – Dunoon 132 kV transmission line for the trip of the parallel Lismore – Dunoon 132 kV transmission line during the outage of the Ballina – Lennox Head 132 kV transmission line.

Cheaper priced generation was available but limited due to ramp rates (Condamine PS A, Oakey PS unit 1, Braemar PS unit 3) or FCAS profiles (Callide B PS unit 2) or required more than one DI to synchronise (Roma GT unit 7 and 8 and Braemar PS unit 2 and 5) or was constrained off by the voltage constraint equation N^^Q_NIL_B1 (Kogan Creek PS unit 1).

The 5-minute prices in Queensland reduced to below $75.00/MWh in the DIs subsequent to the high priced intervals, when demand reduced by up to 204 MW and up to 500 MW of generation capacity was rebid from bands priced at or above $12,947.52/MWh to the Market Floor Price (MFP) of -$1,000/MWh.

The high Queensland spot prices were not forecast in the pre-dispatch schedules, as the high prices were due to rebidding of generation capacity.