

Electricity Pricing Event Report – Tuesday 8 March 2016

Market Outcomes: South Australian spot prices reached \$1,215.77/MWh, \$1,867.72/MWh and \$1,505.98/MWh for trading intervals (TI) ending 1630 hrs, 1700 hrs and 1830 hrs, respectively. Victorian spot prices reached \$2,031.00/MWh, \$2,108.55/MWh and \$1,973.94/MWh for the same TIs.

Counter price flows caused negative settlement residues of approximately \$957,000 to accumulate on the Victoria to New South Wales directional interconnector between 1630 hrs and 1900 hrs. AEMO managed these from 1625 hrs to 1720 hrs (Market Notices 52258 and 52266) and from 1820 hrs to 1925 hrs (Market Notices 52273 and 52278). AEMO also managed accumulation of negative residues on the South Australia to Victoria directional interconnector between 1805 hrs to 1845 hrs (Market Notices 52271 and 52277).

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

Detailed Analysis: The 5-Minute dispatch price in South Australia was between \$10,410.66/MWh and \$13,004.66/MWh for dispatch intervals (DI) ending 1605 hrs, 1655 hrs and 1805 hrs. The 5-Minute dispatch price in Victoria was between \$11,500.81/MWh and the Market Price Cap (MPC) of \$13,800.00/MWh for the same DIs.

These high prices can be attributed to a steep supply curve during a high demand period, rebidding of generation capacity and limited interconnector support. The negative prices, following the high prices, can be attributed to rebidding to lower priced bands resulting in excess cheaper priced generation.

Victorian demand peaked at 9,363 MW for TI ending 1700 hrs and South Australian demand peaked at 2,573 MW for the same TI. Melbourne Airport and Adelaide Airport reached maximum temperatures of 40°C and 34°C, respectively. During the high priced TIs, wind generation in South Australia was moderate, between 414 MW and 574 MW.

For all the high priced DIs, South Australian generation capacity was offered at less than \$371/MWh or above \$10,759/MWh. For the same DIs, Victorian generation capacity was offered at less than \$31/MWh or above \$10,751/MWh, resulting in a steep supply curve.

For DI ending 1605 hrs, in South Australia, Lumo Generation and AGL shifted or rebid 211 MW of generation capacity from bands priced below \$300/MWh to bands priced at or above \$10,759.99/MWh. For the same DI, South Australia demand increased by 69 MW when non-scheduled generation reduced output by 47 MW. Cheaper priced generation was available, but were limited by ramp rates (Dry Creek GT Unit 3, Torrens Island PS Units A2, A4, B1, B2, B3 and B4), or required more than one DI to synchronise (Dry Creek GT units 1 and 2). Some cheaper priced generation was constrained off by the outage thermal constraint equation $S \gg BWMP_MKRB_BRTW$ (Snowtown North, Snowtown South and Hallett 1 wind farms, Hallett GT, Northern PS unit 1). The $S \gg BWMP_MKRB_BRTW$ constraint equation prevents the overload of Brinkworth - Templers West 275kV line for the loss of Mokota - Robertstown 275kV line during the outage of a Blyth West-Munno Para 275kV line.

For the same DI, in Victoria, Snowy Hydro and Origin Energy shifted 452 MW of generation capacity from bands priced at or below \$289.99/MWh to the MPC.

For DI ending 1605 hrs, The target flow towards Victoria on the Murraylink interconnector was limited to 73 MW, by the thermal constraint equations $V \gg V_NIL_1B$ and $S \gg BWMP_MKRB_BRTW$.

The V>>V_NIL_1B system normal constraint equation avoids the overload of Dederang to Murray No.2 330kV line for the loss of the parallel Dederang to Murray No.1 330kV line. The target flow towards Victoria on the VIC-NSW interconnector was also limited to 128 MW by the V>>V_NIL_1B constraint equation.

The 5-minute price in South Australia reduced to \$298.61/MWh in the subsequent interval, DI ending 1610 hrs, then collapsed to bands priced at or below -\$998.30/MWh for four DIs between DI ending 1615 hrs and 1630 hrs. During these intervals, up to 1,246 MW of generation capacity was rebid from higher priced bands to bands priced below -\$991.08/MWh or the MFP. By DI ending 1610 hrs, 46 MW of non-scheduled generation came online and continued to generate at that level till DI ending 1630 hrs.

Between DIs ending 1645 hrs and 1655 hrs, in South Australia, AGL rebid 310 MW of generation capacity from bands priced below \$300/MWh to bands priced at or above \$10,759.99/MWh or the MPC. Cheaper priced generation was available but limited due to ramp rates (Dry Creek GT Units 1, 2 and 3, Mintaro, and Pelican Point) and FCAS profiles (Northern PS unit 1).

Between DIs ending 1635 hrs and 1645 hrs, in Victoria, AGL, Origin and Snowy Hydro shifted 487 MW of generation capacity from bands priced at the MFP to bands priced at \$11,746.25/MWh or the MPC.

For DI ending 1655 hrs, the target flow on the Murraylink interconnector was limited to 26 MW towards South Australia by the V>>V_NIL_1B and V^SML_NSWRB_2 constraint equations. The V^SML_NSWRB_2 is a system normal voltage stability constraint equation that avoids voltage collapse in Victoria for the loss of Darlington Point to Buronga (X5) 220 kV line. For the same DI, the target flow on the VIC-NSW interconnector was limited to 147 MW towards Victoria by the V>>V_NIL_1B constraint equation.

For DI ending 1805 hrs, in Victoria, AGL withdrew 539 MW of generation capacity from Dartmouth, Eildon, McKay and West Kiewa power stations with the reasons '1740~A~050 CHG IN AEMO PD~55 5MIN PD PRICE INCREASE VIC \$2067 18:05' and '1755~A~060 UNFCAS NETWORK CONSTRAINT~61 CONSTR ON OUT OF MERIT ORDER V>>V_NIL_4A'. The withdrawal of generation capacity for these power stations caused the thermal constraint equation V>>V_NIL_4A to bind. The V>>V_NIL_4A system normal constraint equation manages the pre-contingent flow on the Dederang H1 330/220kV transformer. This binding constraint forced the target flow on the VIC-NSW interconnector to reverse from 196 MW towards Victoria for DI ending 1800 hrs to 38 MW towards New South Wales in the high priced DI ending 1805 hrs. The reversed flow on the VIC-NSW interconnector resulted in counter-price flow across the Victoria to New South Wales directional interconnector.

To manage accumulation of negative residues, the negative settlement residue management (NRM) constraint equation NRM_VIC1_NSW1 was invoked for 24 DIs between DIs ending 1630 hrs and 1925 hrs.

For the same DI, South Australia demand increased by 41 MW when non-scheduled generation reduced output by 54 MW. Cheaper priced generation was available but limited due to ramp rates (Northern PS Unit 2, Torrens Island PS Units A2, A3, A4, B1, B2, B3 and B4) or FCAS profiles (Northern PS unit 1).

For DI ending 1805 hrs, the target flow on the Murraylink interconnector was limited to 129 MW towards Victoria by the system normal thermal constraint equations S>NIL_NIL_NWMH2 and V>>V_NIL_4A. The S>NIL_NIL_NWMH2 constraint equation avoids pre-contingent overload of the North West Bend-Monash no.2 132kV line.

Following the high prices at DI ending 1805 hrs, between DIs ending 1815 hrs and 1830 hrs, the South Australian 5-minute dispatch price collapsed to the MFP, when 929 MW of generation capacity was rebid from bands priced above \$79/MWh to the MFP. Between DIs ending 1825 hrs and 1830 hrs, the Victorian 5-minute dispatch price also collapsed to the MFP, after 1661 MW of generation capacity was rebid from bands priced above \$0MWh to the MFP. Prices returned to normal in South Australia and Victoria for DI ending 1835 hrs when generation capacity was shifted or rebid to higher priced bands.

The high 30-minute spot price for TIs ending 1630 hrs and 1830 hrs in South Australia and Victoria were forecast in the pre-dispatch schedules.