Electricity Pricing Event Report - Thursday 9 February 2017

Market Outcomes: Spot prices in New South Wales (NSW), Queensland (QLD) and South Australia (SA) were between $2,322.15/MWh and $8,957.71/MWh for all trading intervals (TIs) between TIs ending 1630 hrs and 1730 hrs. For TI ending 1830 hrs, spot price in SA reached $9,509.52/MWh while spot prices in Tasmania (TAS) and Victoria (VIC) reduced to -$149.43/MWh and -$154.64/MWh respectively.

Raise Regulation prices in mainland NEM reached $302.54/MWh for TI ending 1500 hrs. FCAS prices in Tasmania were not materially affected.

A direction in accordance to clause 4.8.9 of the NER was issued to Pelican Point GT unit 12 from 1505 hrs to 1900 hrs in order to maintain the power system in a reliable operating state (Market Notices No. 57312 and 57347). Intervention pricing was implemented between dispatch intervals (DIs) ending 1550 hrs when the directed unit synchronised, and 1900 hrs (Market Notice No. 57321).

Detailed Analysis: AEMO forecasted LOR2 conditions in SA from early morning (Market Notices 57295 and 57307) and with no significant market response received, AEMO issued a direction to Pelican Point GT from 1505 hrs to 1900 hrs. Intervention pricing was implemented from DI ending 1550 hrs for all NEM regions when the unit synchronised and the prices from the pricing run are referenced in this report. A separate report on the directions will be issued.

AEMO is required to intervene in the market when issuing a direction, or exercising a reserve contract, by setting the energy and ancillary service prices to what AEMO determines they would have been if the intervention had not occurred (NER Clause 3.9.3 (b)). Since the intervention run is simulating a hypothetical scenario, the initial MW loading of each generator and interconnector for each DI is assumed to be the same as the target calculated in the DI before. However, all other inputs such as bids, offers, network constraints, demand and line flows are retained from the dispatch run. As an intervention progresses over time, the values derived in the intervention run may differ significantly from the values of the corresponding inputs used in the dispatch run, with this difference potentially increasing the longer the intervention continues.

The 5-minute dispatch energy prices in NSW, QLD and SA were between $11,501.50/MWh and the Market Price Cap (MPC) of $14,000/MWh for up to eight DIs between DIs ending 1630 hrs and 1720 hrs. Between DIs ending 1805 hrs and 1825 hrs, energy prices in SA were approximately $13,160/MWh for another four DIs. For DI ending 1825 hrs, energy prices in TAS and VIC reduced to -$919.41/MWh and the Market Floor Price (MFP) of -$1,000/MWh respectively. The high prices can be attributed to high demand during the intervention pricing period while interconnector support was constrained.

Demand in NSW, QLD and SA were high during the heatwave period where:

- NSW demand reached 12,690 MW for TI ending 1700 hrs while the temperature at Observatory Hill peaked at 30.9 degrees
- QLD demand reached 8,633 MW for TI ending 1930 hrs while the temperature at Archerfield Airport peaked at 32.6 degrees, and
- SA demand reached 3,041 MW for TI ending 1830 hrs while the temperature at Adelaide Airport peaked at 39.2 degrees.

For some high priced DIs in SA, generation capacity of up to 95 MW was shifted or rebid by several generators from the MFP to bands priced at $13,100.02/MWh and above. During the high priced intervals, cheaper priced generation were available but were limited due to ramp rates, FCAS profiles or required more than one DI to synchronise.

For some high priced DIs in NSW, generation capacity of up to 531 MW was shifted or rebid by a number of generators from lower priced bands to bands priced at $13,999/MWh. In QLD, generation capacity of up to 160 MW was shifted or rebid by a number of generators from lower priced bands to bands priced at MPC. Limited cheaper priced generation were available in both regions but were constrained due to ramp rates, FCAS profiles or required more than one DI to synchronise.

Prices in VIC and TAS reduced to -$919.14/MWh and -$1,000/MWh respectively for DI ending 1825 hrs due to excess generation in Victoria in the pricing run. During that DI, Murray PS rebid 300 MW of generation capacity from band priced at $0/MWh to band priced at $75/MWh. As the target output of Murray PS and the flow on the VIC-NSW interconnector is managed by the same system normal constraint equation V>>SML_NIL_8, the flow on the VIC-NSW interconnector reversed with a target of 562 MW towards VIC when Murray PS target output decreased. This resulted in an additional 759 MW of flow into VIC. The V>>SML_NIL_8 system normal constraint equation prevents overloading of the Ballarat – Bendigo 220 kV line for loss of the Shepparton – Bendigo 220 kV line.

The interconnector flow between VIC and the interconnected regions NSW and SA were constrained during the high priced intervals by constraint equations V>>SML_NIL_8, V:S_600_HY_TEST_DYN, V:S_600_HY_TEST, V^SML_NSWRB_2 and V>>V_NIL_5. The V:S_600_HY_TEST_DYN constraint equation limits the dynamic headroom for the upper transfer limit on the VIC to SA Heywood interconnector to 600 MW. Once the 600 MW flow limit is exceeded by more than 10 MW, the limit is temporarily reduced by the amount of exceedance. The V:S_600_HY_TEST constraint equation limits the upper transfer limit on the VIC to SA Heywood interconnector to 600 MW. The V^SML_NSWRB_2 voltage stability constraint equation avoids voltage collapse in Victoria for loss of the Darlington - Buronga (X5) 220 kV line. The V>>V_NIL_5 system normal constraint equation avoids the overload of either Mount Beauty – Dederang 220 kV line (flow to North) for the loss of the parallel line.

The 5-minute energy spot prices in NSW and QLD reduced to below $96/MWh from DI ending 1725 hrs when demand reduced, extra generation capacity was offered, and generation capacity was rebid from higher to the lower priced bands. The 5-minute energy prices in SA reduced to $369.02/MWh for DI ending 1830 hrs when demand decreased.

The high 30-minute spot prices for SA were forecast in the pre-dispatch schedules. However, the high 30-minute spot prices in NSW and QLD were not forecast due to differences in demand.

The 5-minute Raise Regulation price for mainland NEM was between $287.98/MWh and $338.64/MWh for DIs ending 1435 hrs to 1500 hrs. This high price can be attributed to an increase in the Mainland Raise Regulation requirement due to an increasing time error.

Coincident with the high demand across the NEM in the afternoon, the accumulated time error in the Mainland fell below -1.5 sec during the high priced DIs, reaching a low of -3.66 sec. To manage the time error, the amount of Raise Regulation FCAS enabled in the Mainland was elevated above the base requirement of 130 MW. The increased Mainland Raise Regulation FCAS requirement was managed by constraint equation F_MAIN+NIL_DYN_RREG. This constraint equation increases the Mainland Raise Regulation Requirement by 60 MW for each 1 sec of time error below -1.5 sec. The additional Raise Regulation had to be sourced from more expensive generating units.

The Mainland FCAS prices for Raise Regulation and Delayed Raise services reduced to $287.98/MWh or below in the DIs subsequent to the high priced DIs, when the time error gradually reduced towards -1.5 sec.

The high Raise FCAS prices on the Mainland were not forecast in pre-dispatch schedules as the increased time error occurred within TI ending 1500 hrs and the constraint equation F_MAIN+NIL_DYN_RREG that manages the Mainland Raise Regulation FCAS requirement was not modelled in pre-dispatch.