

Electricity Pricing Event Report – Wednesday 30 November 2016

Market Outcomes: South Australia (SA) spot price reached \$4,605.06/MWh for trading interval (TI) ending 1100 hrs.

SA Raise Regulation Frequency Control Ancillary Service (FCAS) prices and SA Lower Regulation FCAS prices ranged between \$299/MWh and \$300/MWh for all TIs between TI ending 0630 hrs on 30 November 2016 and 0000 hrs on 01 December 2016. SA Fast Lower FCAS prices, SA Slow Lower FCAS prices and SA Delayed Lower FCAS prices ranged between \$149.22/MWh and \$300/MWh for TIs ending 1100 hrs and 1130 hrs on 30 November 2016.

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

Actual Lack of Reserve Level 2 (LOR2) conditions had been declared for the SA region between 0700 hrs on 30 November 2016 and 2145 hrs on 01 December 2016 (Market Notices 55904, 56025 and 56079). During the LOR2 period, there were sufficient capacity reserves in the SA region to meet electricity demand. However the planned outage of the Heywood No.2 500 kV Bus and Heywood – APD2 – Mortlake No.2 500 kV line means that a credible contingency could separate South Australia from the rest of the NEM. Power interruptions would have been likely as it may not have been possible to bring the required additional capacity into service in time to avoid automatic under-frequency load shedding.

At 1135 hrs on 25 November 2016, the rolling sum of Raise Regulation FCAS price for the SA region for the previous 2016 dispatch intervals (DIs) exceeded six times the cumulative price threshold (CPT) of \$210,100. As a result, an administered price cap (APC) of \$300/MWh was applied to all FCAS prices in SA for DIs ending between 1140 hrs on 25 November 2016 and 0400 hrs on 03 December 2016 (Market Notices 55840 and 56132).

Detailed Analysis: The 5-minute energy dispatch price reached the Market Price Cap (MPC) of \$14,000/MWh and \$13,998.99/MWh in SA for DIs ending 1050 hrs and 1055 hrs. This high price can be mainly attributed to rebidding of generation capacity during a period of low wind generation and limited interconnector support.

The 5-minute SA Raise Regulation and Lower Regulation FCAS prices ranged between \$299/MWh and \$300/MWh for all DIs between DIs ending 0605 hrs on 30 November 2016 and 0000 hrs on 01 December. The 5-minute SA Fast Lower FCAS prices, SA Slow Lower FCAS prices and SA Delayed Lower FCAS prices ranged between \$295.19/MWh and \$300/MWh for all DIs between DIs ending 1050 hrs and 1130 hrs on 30 November 2016. These high FCAS prices are mainly attributed to the application of local Regulation FCAS requirements within SA during a planned outage of the Heywood No. 2 500 kV Bus and Heywood – APD2 – Mortlake No. 2 500kV line. Other contributing factors include shifting and withdrawal of generation capacity and limitations associated with available Regulation FCAS during some DIs.

Concurrent planned outages of the Heywood No. 2 500 kV Bus and Heywood – APD2 – Mortlake No. 2 500kV line took place between 0602 hrs on 30 November 2016 and 0429 hrs on 01 December. The outage constraint sets F-I_HYSE, F-V-HYMO, S-X_BC_CP, V-HYTX_M12, V-HY_500BUS and V-HYMO were invoked for the duration of these outages. These outages increased the risk of synchronous separation between SA and Victoria. The constraint equations F_S+LREG_0035 and F_S+RREG_0035 contained within the F-V-HYMO and F-I_HYSE constraint sets required 35 MW of Lower and Raise Regulation FCAS capacity to be sourced from within SA.

The SA wind generation was low at approximately 164.31 MW for the high priced TI.

For DI ending 1045 hrs, in SA Energy Australia rebid 35 MW of generation capacity from band priced at \$578.81/MWh to band priced at \$13,998.99/MWh.

For DI ending 1050 hrs, the target flow on the Heywood interconnector reversed from 250 MW towards SA to 147 MW towards VIC due to the outage constraint equation V_HYMO2_1. This constraint equation prevents excessive voltage unbalance at APD 500 kV bus during the outage of Heywood – Mortlake No.2 500 kV line when one of the Mortlake units is in service. This constraint was binding between DI ending 1050 hrs and 1135 hrs when Mortlake GT unit 2 came online, forcing flow from SA to VIC. Mortlake GT unit 2 rebid 150 MW of generation capacity from the MPC to the Market Floor Price (MFP) of -\$1,000/MWh by Origin at DI ending 1040 hrs.

The target flow towards SA on the Murraylink interconnector was limited to 220 MW by the upper transfer limit constraint equation, VSML_220.

For the high energy priced DIs, cheaper priced generation was available but limited due to ramp rates (Snuggery and Torrens B unit 2, 3 and 4) or required more than one DI to synchronise (Dry Creek GTs, Ladbroke PS, Mintaro GT, Port Lincoln GTs, Quarantine PS unit 1, 2, 3 and 4 and Snuggery PS).

For DI ending 1050 hrs, additional generation had to be sourced from Osborne PS unit 5, Pelican Point PS and Torrens Island B PS at more expensive price bands. The increased dispatch in the Energy market reduced Osborne PS unit 5, Torrens Island B unit 2, 3 and 4 availability in the Raise Regulation FCAS market to zero. This violated the F_S+RREG_0035 constraint equation as only 1.35 MW of Raise Regulation capacity was available in South Australia, below the 35 MW required by the constraint equation. Between DIs ending 1050 hrs and 1135 hrs, the F_S++HYSE_L6_1 constraint equation was also violated as Heywood interconnector reversed direction to flow towards VIC.

For DI ending 1100 hrs, the 5-minute price reduced to -\$1,000/MWh when Energy Australia rebid 23 MW of generation capacity from bands priced at \$13,998.99/MWh to bands priced at -\$1,000/MWh. Demand reduced by 68 MW between DI ending 1055 hrs and 1100 hrs.

The 5-minute price increased to \$148.08/MWh for DI ending 1105 hrs when Energy Australia, ENGIE, Origin and AGL rebid a total of 622 MW of generation capacity from bands priced at -\$1,000/MWh to bands priced at \$79.988/MWh or above.

The high 30-minute spot price for SA was not forecast in the pre-dispatch schedules as it was a result of generator rebidding. The high FCAS prices were forecast in pre-dispatch schedules published from the 1100 hrs run on 30 November 2016.