

## Electricity Pricing Event Report – Tuesday 08 November 2016 to Wednesday 9 November 2016

**Market Outcomes:** South Australia Raise Regulation Frequency Control Ancillary Service (FCAS) prices ranged between \$304.41/MWh and \$7,331.95/MWh for 32 trading intervals (TIs) between TIs ending 2230 hrs on 8 November 2016 and 1900 hrs on 9 November 2016. South Australian Lower Regulation FCAS prices ranged between \$300.04/MWh and \$7,333.94/MWh for 55 TIs between TIs ending 0700 hrs on 8 November 2016 and 1900 hrs on 9 November 2016.

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

Actual Lack of Reserve Level 2 (LOR2) conditions had been declared for the South Australia region between 0600 hrs on 8 November 2016 and 2010 hrs on 9 November 2016 during the planned outage of the Heywood No.2 500 kV Bus and the Heywood - Mortlake 500 kV transmission line (Market Notices 55577 and 55615). During these LOR2 periods, there were sufficient capacity reserves in the South Australia region to meet electricity demand. However in the event of a credible contingency, whereby South Australia separated from the rest of the NEM, power interruptions would have been likely due to automatic under-frequency load shedding as a result of ramp rate limitations associated with dispatching additional generation in a short timeframe.

At 1830 hrs on 9 November 2016, the rolling sum of Raise Regulation FCAS price for the South Australia region for the previous 2,016 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 ancillary service prices in South Australia between DIs ending 1840 hrs on 9 November 2016 and 0400 hrs on 16 November 2016 (Market Notices 55612 and 55747).

**Detailed Analysis:** The 5-minute Raise Regulation FCAS prices ranged between \$326.48/MWh and \$11,496.69/MWh for 177 DIs within the high priced TIs. The 5-minute Lower Regulation FCAS prices ranged between \$300.29/MWh and \$11,508.64/MWh for 260 DIs within the high priced TIs. These high prices were mainly attributed to increased Regulation FCAS requirements within South Australia during a planned outage of Heywood No.2 500 kV Bus and the Heywood - Mortlake 500 kV line and limited availability of lower priced Regulation FCAS capacity in South Australia.

The Heywood No.2 500 kV Bus was on a planned outage from 0628 hrs on 8 November 2016 to 1955 hrs on 9 November 2016. The Heywood – Mortlake 500 kV line was on a planned outage from 0628 hrs to 1524 hrs on 8 November 2016 and from 0608 hrs to 1955 hrs on 9 November 2016. This outage increased the risk of electrical separation between South Australia and Victoria. The outage constraint sets F-V-HYMO, S-X\_BC\_CP, V-HYMO, F-I-HYSE, V-HYTX\_M12 and V-HY\_500BUS were invoked for the duration of the outage. The constraint equations F-S\_LREG\_0035 and F-S\_RREG\_0035 contained within the F-I-HYSE and F-V-HYMO constraint sets required 35 MW of Lower and Raise Regulation FCAS capacity to be sourced from within South Australia.

Regulation FCAS in South Australia during the outage period was provided by Torrens Island A PS, Torrens Island B PS, Quarantine PS and Pelican Point PS.

For all DIs between DI ending 0605 hrs on 8 November and 0400 hrs on 9 November, there was at least 35 MW of Regulation FCAS capacity offered in bands priced at \$350/MWh or below.

For DI ending 0405 hrs, AGL shifted 1 MW each of Regulation FCAS capacity from Torrens Island B PS units 1 and 3 from bands priced at \$299.57/MWh to \$6,489.91/MWh and above. This shift resulted in more expensive Raise and Lower Regulation capacity being sourced from these units to meet the 35 MW Regulation requirement. The Lower and Raise Regulation FCAS price remained between \$6,499/MWh and \$6,537.53/MWh between DIs ending 0405 hrs and 1410 hrs.

For DI ending 1415 hrs on 9 November, Raise and Lower Regulation FCAS price was \$11,496.69 and \$11,508.64/MWh, respectively. This can be attributed to Torrens Island B unit 1 being unavailable to provide Regulation FCAS for this DI. The Automatic Generation Control (AGC) status from the power station indicated the unit being unavailable to provide Regulation services. As a result, higher priced Regulation FCAS services had to be enabled for this DI, to meet the 35 MW Regulation FCAS requirements.

The Lower and Raise Regulation FCAS price reduced to \$6,499/MWh from DI ending 1420 hrs when Torrens Island B unit 1 became available for Regulation FCAS. The prices remained at that level until DI ending 1600 hrs. For DI ending 1605 hrs, Origin shifted 1 MW each of Raise and Lower Regulation capacity from Quarantine PS Unit 5 from \$0/MWh to bands priced at \$14,193.02/MWh. This caused the Regulation FCAS prices to increase to \$6,999/MWh between DIs ending 1605 hrs and 1830 hrs. By DI ending 1835 hrs on 9 November 2016, the prolonged high prices caused the rolling sum of Raise Regulation FCAS prices in the South Australia region for the previous 2,016 DIs to exceed six times the CPT, thus triggering an Administered Price Period (APP). An APC of \$300/MWh was applied to all ancillary service prices for the South Australia region from DI ending 1840 hrs on 9 November 2016.

Following the commencement of the APP, prices for Regulation FCAS remained at APC between DIs ending 1840 hrs and 1900 hrs.

At DI ending 1905 hrs Quarantine PS unit 5 rebid 12 MW of Regulation capacity from bands priced at \$14,193.03/MWh to bands priced at \$281.83/MWh. Prices remained below the APC threshold from DI ending 1905 hrs until 2010 hrs.

At DI ending 2015 hrs, the Raise and Lower Regulation FCAS price reduced to \$11.99/MWh and \$6.02/MWh, respectively, when the outage constraint sets F-I-HYSE and F-V-HYMO were revoked following the completion of the planned outages.

The APC was removed at 0400 hrs on 16 November 2016 when the cumulative sum of Lower and Raise Regulation FCAS prices reduced to below six times the CPT.

The high Regulation FCAS prices were forecast in all pre-dispatch schedules from 1300 hrs on 7 November 2016.