

Electricity Pricing Event Report – Wednesday 31 August 2016 to Friday 02 September 2016

Market Outcomes: South Australia Raise and Lower Regulation Frequency Control Ancillary Service (FCAS) prices ranged between \$286/MWh and \$12,899.99/MWh for all trading intervals (TIs) between TI ending 0730 hrs and 1730 hrs on the 31 August and 1 September and between TIs ending 0730 hrs and 1600 hrs on 02 September 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) condition had been declared for the South Australia region between:

- 0720 hrs and 1651 hrs on 31 August 2016 (Market Notices 54805 and 54811).
- 0710 hrs and 1709 hrs on 1 September 2016 (Market Notices 54820 and 54828).
- 0700 hrs and 1605 hrs on 2 September 2016 (Market Notices, 54833 and 54835).

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 1635 hrs on 1 September 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 for DIs ending between 1640 hrs on 01 September 2016 and 0400 hrs on 09 September 2016 (Market Notice 54827 and 54877).

Detailed Analysis: The 5-minute Raise Regulation FCAS prices ranged between \$98/MWh and \$12,899.99/MWh for all DIs between 0705 hrs and 1700 hrs on 31 August 2016 and 1 September 2016, and 0705hrs and 1600 hrs on 2 September 2016. The 5-minute Lower Regulation FCAS prices ranged between \$286/MWh and \$12,035.03/MWh for the same DIs.

These high prices were mainly attributed to the application of local Regulation FCAS requirements within South Australia during a planned outage of the Moorabool – Tarrone No.1 500kV line and rebidding, resulting in limited availability of lower priced Regulation FCAS capacity in South Australia.

The Moorabool – Tarrone No.1 500kV line was on a planned outage between 0700 hrs and 1700 hrs on 31 August 2016 and 1 September 2016, and 0700 hrs and 1600 hrs on 2 September 2016. This outage increased the risk of synchronous separation between South Australia and Victoria. The outage constraint sets F-V-MLTR, S-BOTH_BLKRG_C_OS, V-MACARTHUR_ZERO and V-MLTR were invoked for the duration of the outage on each day. The constraint equations F_S+LREG_0035 and F_S+RREG_0035 contained within the F-V-MLTR constraint set 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 B PS, Quarantine PS unit 5 (QPS5) and Pelican Point PS.

31 August 2016

On 31 August, until DI ending 0850 hrs, sufficient Raise and Lower Regulation capacity was offered in relatively lower price bands. Resultantly, prices in these markets ranged between \$300/MWh and \$519.70/MWh between DIs ending 0705 hrs and 0850 hrs.

For DI ending 0855 hrs, AGL rebid 11 MW each of Raise and Lower Regulation capacity from Torrens Island B PS from \$299.58/MWh to bands priced at \$9,986.02/MWh or above. This resulted in more expensive Raise and Lower Regulation capacity being sourced from Pelican Point PS and Torrens Island B unit 1 to meet the 35 MW Regulation requirement. The 5-min Raise and Lower Regulation prices ranged between \$12,000/MWh and \$12,899.99/MWh between DIs ending 0855 hrs and 0930 hrs.

For DI ending 0900 hrs, Origin bid 9 MW of generation capacity from QPS5 into the Raise and Lower Regulation FCAS markets. Due to QPS5's fast start inflexibility profile, the units output was below the Regulation FCAS trapezium minimum enablement limit of 74 MW until DI ending 0930 hrs. As a result, QPS5 could not provide Regulation FCAS until DI ending 0935 hrs. For DI ending 0935 hrs, Raise and Lower Regulation prices reduced to \$474.70/MWh and \$300/MWh, respectively. Regulation FCAS prices remained between \$286.69/MWh and \$373.16/MWh until DI ending 1700 hrs, when the Moorabool – Tarrone No.1 500kV line outage ended for the day.

01 September 2016

On 1 September, after the re-commencement of the Moorabool – Tarrone No.1 500kV line outage at 0700 hrs, sufficient Raise and Lower Regulation capacity was offered in relatively lower price bands, such that the 5-min prices for Raise and Lower Regulation FCAS ranged between \$300/MWh and \$530.46/MWh until DI ending 0720 hrs.

For DI ending 0725 hrs, AGL rebid 4 MW each of Raise and Lower Regulation capacity from Torrens Island B PS from bands priced at \$299.58/MWh to bands priced at \$9,986.02/MWh or above. The rebid resulted in more expensive Regulation capacity being sourced from Pelican Point at \$9,999.69/MWh to meet the 35 MW regulation requirement for SA. The 5-min Regulation prices remained between \$8,900.00/MWh and \$9,999.69/MWh until DI ending 1635 hrs.

By DI ending 1640 hrs on 1 September 2016, the prolonged high prices caused the rolling sum of Raise Regulation FCAS prices in the South Australia region over 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 1640 hrs on 1 September 2016.

For DI ending 1650 hrs, Origin rebid 36 MW each of Raise and Lower Regulation capacity from bands priced at \$11,626.12/MWh or above to \$292.98/MWh. As a result, the 5-min price for both Raise and Lower Regulation FCAS reduced to \$289/MWh. For DI ending 1655 hrs, AGL rebid 15 MW of Raise and Lower Regulation capacity from bands priced at \$9,986.02/MWh or above to bands priced at \$299.58/MWh or below. For this DI and the next, the Raise Regulation price reduced to \$98/MWh.

The Moorabool – Tarrone No.1 500kV line outage ended for the day at 1700 hrs.

02 September 2016

On 2 September 2016, the APC continued to apply since the cumulative sum of both Lower and Raise Regulation FCAS prices remained above the CPT. The 30-min Regulation FCAS prices ranged between \$286/MWh and \$300/MWh for all DIs between DI ending 0705 hrs to 1605 hrs.

At DI ending 1610 hrs, the Raise and Lower Regulation FCAS price reduced to \$25/MWh and \$6/MWh, respectively, when the outage constraint set F-V-MLTR was revoked following completion of the outage for the day.

The APC was removed at 0400 hrs on 09 September 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 the latest pre-dispatch schedules, except for TIs ending 0930 hrs on 31 August and 0730 hrs on 1 September, due to rebidding within the affected TI, and TI ending 1700 hrs on 1 September, due to application of the APC during the TI.