

## Electricity Pricing Event Report – Wednesday 10 August 2016

**Market Outcomes:** South Australia Raise Regulation Frequency Control Ancillary Service (FCAS) price ranged between \$97.85/MWh and \$2,751.37/MWh for 34 trading intervals (TIs) between TIs ending 0730 hrs on 10 August 2016 and 0000 hrs on 11 August 2016. South Australia Lower Regulation FCAS price ranged between \$57.45/MWh and \$4,064.46/MWh for 29 TIs between TIs ending 1000 hrs on 10 August 2016 and 0000 hrs on 11 August 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 0745 hrs on 10 August 2016 and 1135 hrs on 10 August 2016 (Market Notice 54687 and 54689) and between 1630 hrs on 10 August 2016 and 1130 hrs on 12 August 2016 (Market Notice 54693 and 54710). 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 Victoria, power interruptions would have been likely, due to automatic under-frequency load shedding. This would have been triggered as a result of ramp rate limitations, associated with dispatching additional generation in a short timeframe.

**Detailed Analysis:** The 5-minute Raise Regulation FCAS prices in South Australia reached the Market Price Cap (MPC) of \$14,000/MWh for dispatch intervals (DIs) ending 1905 hrs and 2325 hrs. The 5-minute Lower Regulation prices were at \$12,000.00/MWh for DIs ending 1750 hrs and 1755 hrs and at \$13,799.99/MWh for DIs ending 1905 hrs and 2325 hrs. These high prices were mainly attributed to increased Regulation FCAS requirements within South Australia during a planned outage of Heywood No.1 500 kV bus and limitations associated with available Regulation FCAS during some DIs. For all other DIs between TIs ending 0730 hrs on 10 August and 0000 hrs on 11 August, Regulation FCAS prices were elevated, ranging between \$20.00/MWh and \$300.00/MWh.

The Heywood No 1 500 kV Bus was on a planned outage between 0708 hrs on 10 August 2016 and 1254 hrs on 12 August 2016. This outage increased the risk of electrical separation between South Australia and Victoria. The outage constraint sets F-I-HYSE, S-BOTH\_BLKRG\_C\_OS, 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 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 and Pelican Point PS.

For DI ending 1750 hrs, the Regulation FCAS enablement maximum limit (SCADA) for Pelican Point GT reduced from 235 MW to 146 MW. The enablement maximum limit of 146 MW was below Pelican Point's Regulation FCAS trapezium minimum enablement limit of 158 MW. As a result, for DI ending 1750 hrs, Pelican Point was unavailable for Regulation FCAS.

For DI ending 1755 hrs, the Regulation FCAS enablement maximum limit (SCADA) for Pelican Point GT reverted to 235 MW. The unit's output of 155 MW, however, was below the Regulation FCAS trapezium minimum enablement limit of 158 MW. As a result, for DI ending 1755 hrs, Pelican Point was stranded (unavailable) for Regulation FCAS.

For DIs ending 1750 hrs and 1755 hrs, due to the above limitations associated with providing Regulation FCAS by Pelican Point GT, additional Lower Regulation FCAS had to be sourced from Torrens Island B PS at more expensive price bands. Consequently, the 5-minute Lower Regulation FCAS price reached \$12,000.00/MWh for both DIs.

The Lower Regulation FCAS price reduced to \$96.69/MWh for DI ending 1800 hrs when Pelican Point GT became available (not limited) for Regulation FCAS again.

For DIs ending 1905 hrs and 2325 hrs, Quarantine PS Unit 5 output (73 MW) was below its Regulation FCAS trapezium minimum enablement limit of 74 MW. As a result, Quarantine PS Unit 5 was stranded (unavailable) for Regulation FCAS and additional Regulation FCAS capacity had to be sourced from Pelican Point GT and Torrens Island B PS at more expensive price bands. The 5-minute Lower and Raise Regulation FCAS prices for both DIs exceeded \$13,799.00/MWh.

The Lower and Raise Regulation FCAS prices reduced to \$98.00/MWh or below, for DIs ending 1910 hrs and 2330 hrs, when Quarantine PS Unit 5 became available (not limited) for Regulation FCAS again. For DI ending 2330 hrs, AGL rebid 20 MW of Raise Regulation capacity from \$97.86/MWh to \$8.99/MWh.

For the high price TIs, between 0730 hrs on 10 August and 0000 hrs on 11 August, between 24 MW and 41 MW of Lower Regulation FCAS and 24 MW and 66 MW of Raise Regulation FCAS was available for less than \$100.00/MWh. For the same TIs, between 1 MW and 8 MW of Lower Regulation FCAS and up to 5 MW of Raise Regulation FCAS was available between \$300.00/MWh and \$13,000.00/MWh, resulting in steep supply curves.

The high Regulation FCAS prices were forecast in all pre-dispatch schedules from 1300 hrs on 09 August 2016.