

Electricity Pricing Event Report – Tuesday 20 December 2016

Market Outcomes: Spot price in South Australia reached \$2,604.47/MWh and \$2,223.87/MWh for trading intervals (TIs) ending 0100 hrs and 0230 hrs. Spot price in Victoria reached -\$150.11/MWh for TI ending 0100 hrs. Spot price in Tasmania reached \$2,120.26/MWh for TI ending 1000 hrs.

Energy prices in other regions were not affected, during these TIs, by these events. FCAS prices in all regions were not affected, during these TIs, by these event.

Detailed Analysis: The 5-Minute dispatch Energy price in South Australia and Victoria reached \$13,998.99/MWh and -\$1,000/MWh, respectively, for dispatch interval (DI) ending 0055 hrs. The high price in South Australia can mainly be attributed to limited lower priced generation within SA during a period of limited import from Victoria due to a low inertia condition in SA. This resulted in excess generation in Victoria.

At DI ending 0035 hrs Pelican Point CCGT reduced their maximum availability from 230 MW to 0 MW. During the period from DI ending 0035 hrs to 0050 hrs the unit was ramping down, reaching a target of 0 MW at DI ending 0050 hrs. This resulted in lower level of inertia on the power system in South Australia at the start of the DI ending 0055 hrs.

Between DI ending 0050 hrs and 0055 hrs the target flow on the Heywood interconnector reduced by 168 MW from 545 MW to 377 MW towards South Australia. This exceeded the limit of 353.16 MW set by the constraint equation V_S_NIL_ROCOF causing it to violate. This Rate of Change of Frequency (RoCoF) constraint equation limits flow on the VIC to SA Heywood interconnector to prevent the RoCoF exceeding 3 Hz/sec in SA immediately following the loss of the Heywood interconnector.

At DI ending 0050 hrs Murraylink was exporting 90 MW towards Victoria. At DI ending 0055 hrs this reduced to 11 MW and was limited by the constraint equation VSML_ROC_80. This ramping constraint specifies the rate of change on the flow from VIC to SA on Murraylink be up to 80 MW/5 min.

Lower priced generation was available in South Australia, but was limited by ramp rates (Hallet PS) or required more than one DI to synchronise (Dry Creek GT unit 2).

Flow on the Basslink interconnector between DI ending 0050 hrs and 0055 hrs reduced by 3 MW to reach 460 MW towards Tasmania, limited by the constraint equation V_T_NIL_FCSPS. This constraint equation specifies the Basslink limit from VIC to TAS for load enabled for FCSPS. Between these DIs flow from Victoria to New South Wales also reduced by 117 MW and was limited by the transient stability constraint equation V::N_NIL_V2. This equation prevents transient instability for fault and trip of a Heywood to South Morang 500 kV line in Victoria. This resulted in excess generation in the Victoria region.

The 5-minute price was \$1,498.80/MWh in South Australia and \$9.20/MWh in Victoria for DI ending 0100 hrs when lower priced generation became available in South Australia and flow out of Victoria towards South Australia and New South Wales increased by 65 MW and 70 MW, respectively.

The high 30-minute spot price for South Australia and Victoria was not forecast in the latest pre-dispatch schedules as the pre-dispatch formulation of constraint equation V_S_NIL_ROCOF was not as restrictive. It allowed flows of more than 500 MW into South Australia.

The 5-Minute dispatch Energy price in South Australia reached \$13,300.20/MWh for dispatch interval (DI) ending 0205 hrs. This high price can mainly be attributed to shifting of capacity to higher price bands when Murraylink was unavailable due to an unplanned transmission outage.

Between DIs ending 0200 hrs and 0205 hrs, demand in South Australia increased by 32 MW to reach 1,156 MW and wind generation decreased by 24 MW to reach 363 MW at DI ending 0205 hrs.

At DI ending 0205 hrs Synergen Power and Snowy Hydro shifted 41 MW and 20 MW, respectively, from the Market Floor Price (MFP) of -\$1000/MWh to bands priced at \$1,498.20/MWh and above.

At 0147 hrs an unplanned transmission outage of the Murraylink interconnector occurred with the interconnector returning to service at 0710 hrs (Market Notice 56336). During this time Murraylink was unable to transfer flow between Victoria and South Australia.

Flow on the Heywood interconnector reduced by 6 MW between DI ending 0200 hrs and 0205 hrs from 393 MW to 387 MW towards South Australia, and constrained by the upper limit of 387 MW specified by the constraint equation V_S_NIL_ROCOF.

Lower priced generation was available but was limited by ramp rates (Hallet PS).

The 5-minute price reduced to \$11.98/MWh at DI ending 0210 hrs when 516 MW of capacity was rebid from bands priced at \$79.99/MWh and above to the MFP.

The high 30-minute spot price for South Australia was not forecast in the latest pre-dispatch schedules as it was a result of rebidding and unplanned transmission outage.

The 5-Minute dispatch Energy price in Tasmania reached \$12,677.95/MWh for dispatch interval (DI) ending 0945 hrs. This high price can mainly be attributed to non-credible contingency events leading to loss of lines and generation.

At 0933 hrs the Sheffield - George Town No.1 and No.2 220 kV lines tripped simultaneously. At 0939 hrs the following generators tripped in the Tasmania region: Wilmot, Lemonthyme, Cethana, Devils Gate and Fisher. The constraint set T-X_GTSH was invoked from DI ending 0945 hrs until DI ending 1100 hrs (Market Notices 56344, 56357 to 56360).

At DI ending 0945 hrs the constraint equations $T > T_NIL_BL_IMP_5F$ and $T_X_GTSH_1$ were violating. The thermal constraint equation $T > T_NIL_BL_IMP_5F$ avoids the overload of the Hadspen to Georgetown No.1 220 kV line for the trip of the Hadspen to Georgetown No.2 220 kV line. The $T_X_GTSH_1$ constraint equation (part of the T-X_GTSH constraint set) limits West Coast and Sheffield generation to be less than the sum of west coast and northwest load and 10 MW during the outage of both Georgetown to Sheffield 220 kV lines.

As a result of these constraint equations violating, 331 MW was constrained down (Bastyan Hydro, John Butters Hydro, Mackintosh Hydro, Musselroe Wind Farm (WF), Reece Hydro units 1 & 2, Trevallyn Hydro, Tribute Hydro and Gordon Hydro).

At DI ending 0940 hrs flow on Basslink was 122 MW towards Victoria and at DI ending 0945 hrs, the flow was 154 MW towards Tasmania. This was limited by the constraint equation VTBL_ROC. This constraint equation specifies the rate of change on the Basslink interconnector from Victoria to Tasmania to be 200 MW/5 minutes.

Lower priced generation was available - from Tamar Valley OCGT units 1 – 4 but required more than one DI to synchronise.

The 5-minute price reduced to \$9.88/MWh for DI ending 0950 hrs when demand in Tasmania reduced by 169 MW (contributed by major industrial load reductions), T>T_NIL_BL_IMP_5F was no longer binding and lower priced generation became available.

The high 30-minute spot price for Tasmania was not forecast in the latest pre-dispatch schedules as it was a result of an unplanned outage.