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Dear Nicola

Response to ERA's report on the 2019-20 Ancillary Services Requirements

Thank you for the opportunity to provide further clarity on the 2019-20 Ancillary Services Report.

Load Rejection Reserve (LRR)

LRR Service is the service of holding capacity associated with a Scheduled Generator in reserve so that the Scheduled Generator can reduce output rapidly in response to a sudden decrease in SWIS load [WEM Rule 3.9.6]. The standard for LRR is the level sufficient to keep over-frequency below 51 Hz for all credible load rejection events [WEM Rule 3.10.4].

The maximum credible load rejection event is 120 MW, and this has set the LRR requirement for many years, despite the fact that power system conditions are dynamic. Recently, particularly at times of low demand, maintaining a static LRR requirement has impacted upon Power System Security. As such, AEMO has determined that the actual LRR requirement in real-time can be offset by a number of factors[1] while still maintaining Power System Security. A dynamic approach will provide further flexibility for AEMO and allow improved compliance with the WEM Rules.

AEMO is trialling a dynamic methodology which varies the LRR requirement within the relevant Trading Interval based on real-time information. However, until the trial is complete, there is insufficient information to determine a flexible requirement to apply for the whole of 2019-20. As such, AEMO has set the LRR requirement to be "up to 120 MW" which will allow AEMO to modify the requirement in different ex-ante time frames as information becomes available.

[1] Discussed in section 2.4 of the 2019 Ancillary Services Report.

Inclusion of Load Following (LFAS) quantities in Spinning Reserve (SRAS)

Section 1.3 of the Ancillary Services Report indicates AEMO's approach to determining the Spinning Reserve requirement in line with WEM Rule 3.10.2(b). AEMO wishes to provide further clarification.

Facilities that provide capacity to meet the LFAS requirement are considered as providing part of the SRAS requirement where those Facilities have the technical capability and control systems to provide SRAS.

The technical capabilities to provide SRAS differ from LFAS. Facilities providing SRAS are required to respond and meet the required quantity within 6 seconds and, sustain or exceed the requirement for 15 mins or until frequency is within the normal operating band. This is done by means of the Facility's local control system which automatically responds to frequency deviation.[2] A response slower than 6 seconds will endanger Power System Security, and can lead to load shedding or, in extreme situations, a black-out.

LFAS Facilities respond to frequency changes by following commands from the automatic generation control (AGC). Facilities respond to AGC commands in up to 10 seconds in small increments. Further, the AGC system provides a gradual response to frequency change and therefore the ramp rate of LFAS Facilities is low compared to the automatic response of a Facility providing SRAS, which can be up to 50 times as fast. A fast ramp rate is required to arrest frequency decline before under frequency load shedding occurs.

As a practical example, the graph in Attachment A relates to an actual event which resulted in instantaneous loss of about 200 MW of generation, and demonstrates that Facilities providing LFAS are not, in of themselves, capable of providing SRAS. As such, AEMO separately certifies Facilities to provide LFAS and SRAS[3]. Facilities certified for SRAS include most of the Balancing Portfolio[4] and all Facilities party to an Ancillary Services Contract for SRAS. Currently, Facilities certified for both LFAS and SRAS are all Balancing Portfolio Facilities.

Please do not hesitate to contact me if you have any queries.

Yours sincerely

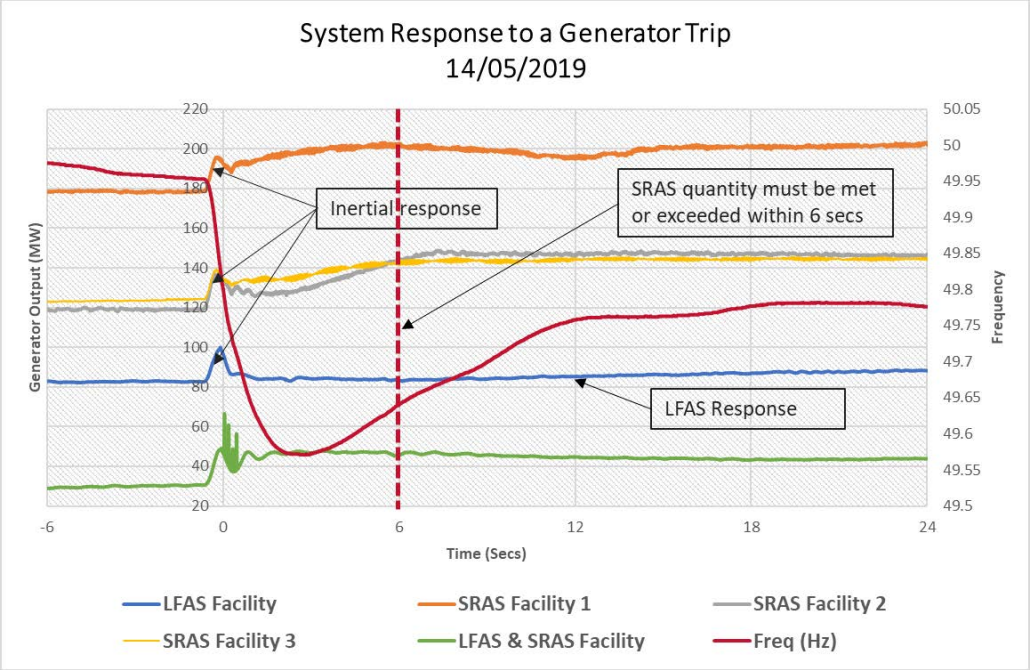
C Parrotte

Cameron Parrotte
Executive General Manager – Western Australia

[2] Known as governor droop.
[3] AEMO certifies Facilities either by means of a test or analysing Facility response to historic system events.
[4] Synergy's Cockburn Facility is certified to provide LFAS but not SRAS. However, this Facility rarely provides LFAS.

ATTACHMENT A – Actual SRAS event

The graph below demonstrates an actual event which resulted in instantaneous loss of about 200 MW of generation.



The red solid line indicates system frequency. The blue line indicates a Facility providing LFAS only. The green line indicates a Facility providing both LFAS and SRAS. The red dotted line indicates the time (6 secs) within which SRAS quantity must be met or exceeded. The remaining lines indicate Facilities providing SRAS only.

At 0 seconds, 200 MW of generation was lost, and the frequency declined. All synchronous Facilities responded immediately to the frequency excursion. This momentary response (inertial response) is a result of the release of kinetic energy stored in the Facility. The inertial response lasts for about a second, which slows the frequency decline. To sustain the inertial response the Facility will have to increase generation. The increase and sustenance of the generation output within 6 seconds is critical to Power System Security as it prevents the frequency from declining to a level where involuntary load shedding will occur.

After the inertial response, Facilities providing SRAS increased and sustained their output until the frequency returned to the normal operating band.[5] In contrast, the Facility providing LFAS only (the blue line) reduced its output immediately after the inertial response. This is because the control system has not been configured to provide SRAS, which requires the Facility to initiate immediate increase in power output of the Facility after the frequency deviates outside a given dead band.[6]

[5] Note the green Facility provides both LFAS and SRAS. This response is appropriate.
[6] Note the Technical Rules requires all Facilities to provide governor droop response. However, the Facility's increase in output is only required to be sustained for 10 seconds where the output before the event is less than 85% of its capacity. This does not meet the SRAS technical specification which requires a response for up to 15 minutes.

The Facility providing LFAS only (blue line) did not assist in preventing frequency decline, responding only to AGC commands at the 12 second mark. Its response at the 6 second mark was negligible. If this Facility's LFAS quantity was included in the SRAS requirement, the frequency would have declined further and may have jeopardised Power System Security.