# Review of NEM load relief

## November 2019 update

As part of a review of Contingency FCAS requirements, AEMO has been progressively reducing assumed mainland load relief from 1.5% to 0.5%. The first reduction was made on 12 September 2019, and as of 7 November 2019, load relief has now been reduced to 1%. Further analysis has been performed during this period, indicating that AEMO should continue to decrease load relief to 0.5%.

### Background – load relief

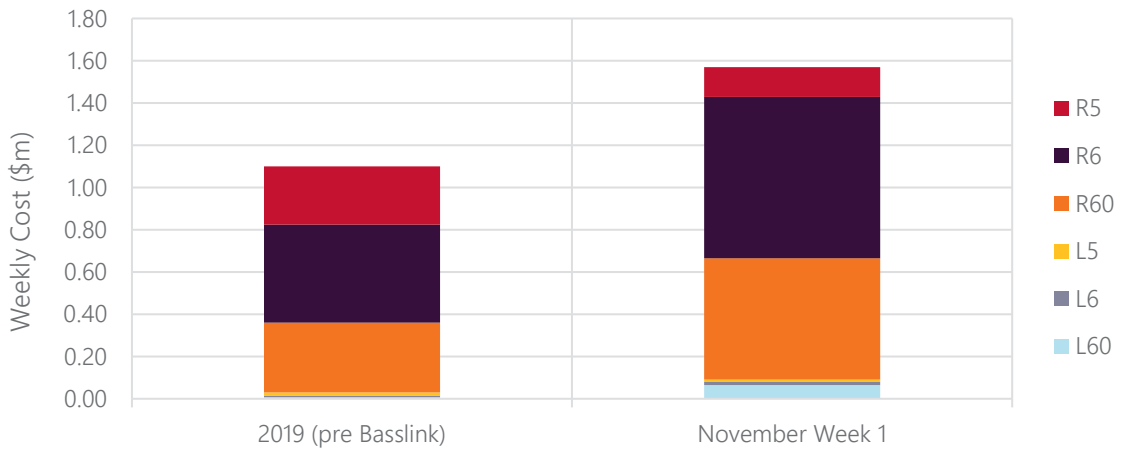
The amount of Contingency FCAS procured is equal to the size of the largest credible contingency minus assumed **load relief**. **Load relief** is an assumed change in load that occurs when power system frequency changes. It relates to how particular types of load (such as traditional motors, pumps, and fans which use induction machines) draw less power when frequency is low, and more power when frequency is high.

As load is becoming less dependent on frequency (for instance, motor load is increasingly connected via variable speed drives that decouple the speed of the motor from system frequency), load relief has been declining. To compensate for the reduction in load relief AEMO began increasing the amount of contingency FCAS enabled on 12 September 2019.

### Changes to FCAS Prices

FCAS prices during the first week of November were 150% of the weekly average prior to any changes to load relief (adjusted for coal-fired generation outages). This is consistent with AEMO's original estimates of costs due to decreasing load relief. The main price increases have occurred in the raise 6 and raise 60 second markets.

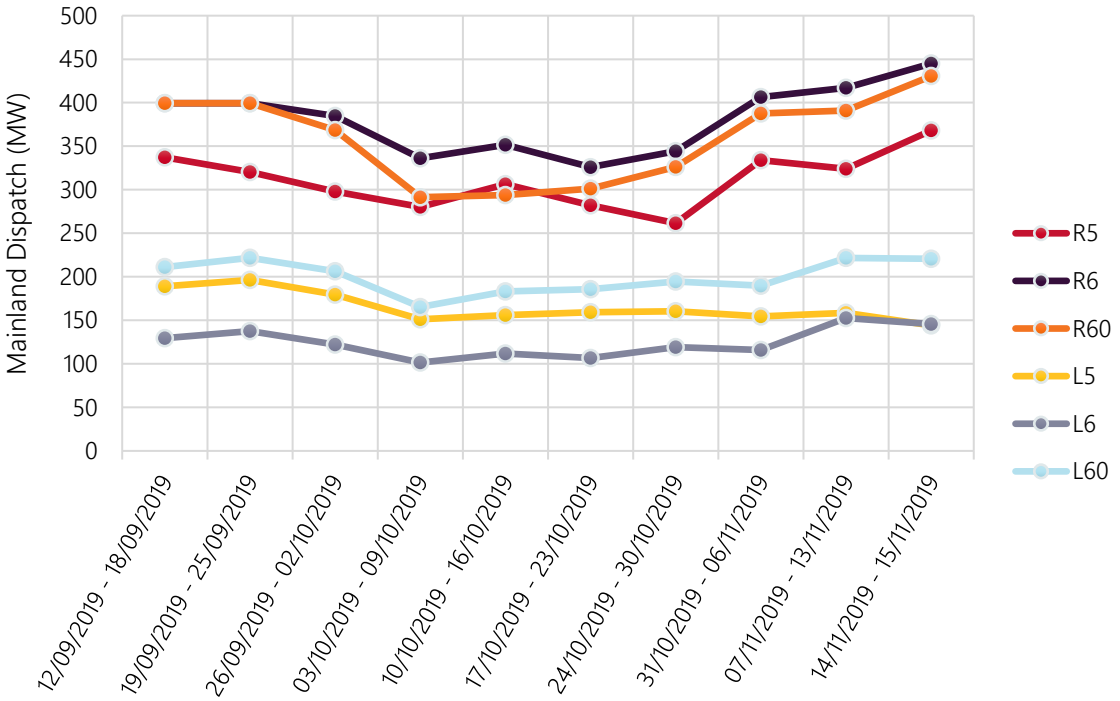
**Figure 1 Average Weekly FCAS Prices**



## Changes to FCAS volumes

The following chart shows the changes to Mainland FCAS volumes since the first load relief reduction on 12 September 2019. Average FCAS dispatch has been steadily increasing following restoration of Basslink at the beginning of October 2019. The main volume increases have occurred in the raise 6 and raise 60 second markets.

**Figure 2 FCAS volumes, 12 September 2019 to 15 November 2019**




## Review of events

Two generation events that occurred recently were analysed to determine apparent load relief. Both events had a large frequency deviation, and in both cases the starting frequency was above 50 Hz.

| Date | Event | Starting Frequency | Frequency Deviation |
|---|---|---|---|
| **09/10/2019** | Trip of Kogan Creek from 735MW | 50.05Hz | 0.45Hz |
| **26/10/2019** | Trip of Bayswater 3 from 630MW | 50.07Hz | 0.45Hz |

During these two events, high speed data was collected for several connection points in Victoria. These connection points contain a mix of residential, industrial and commercial load, and as such give a reasonable approximation for total NEM aggregated response.

The measured load was compared to a simulation using a simple model which considered responses due to voltage, frequency, load inertia and load relief.

Load relief was found to vary based on the time of day and connection point, averaging at around 0.5%.

The following two graphs show the response from the Rowville connection point which contains load from the Rowville, Cranbourne, East Rowville and Springville zones. The response to these two events is consistent with a load relief value of around 0.5% after adjusting for observed load disconnections.

**Figure 3 Kogan trip – Rowville load**

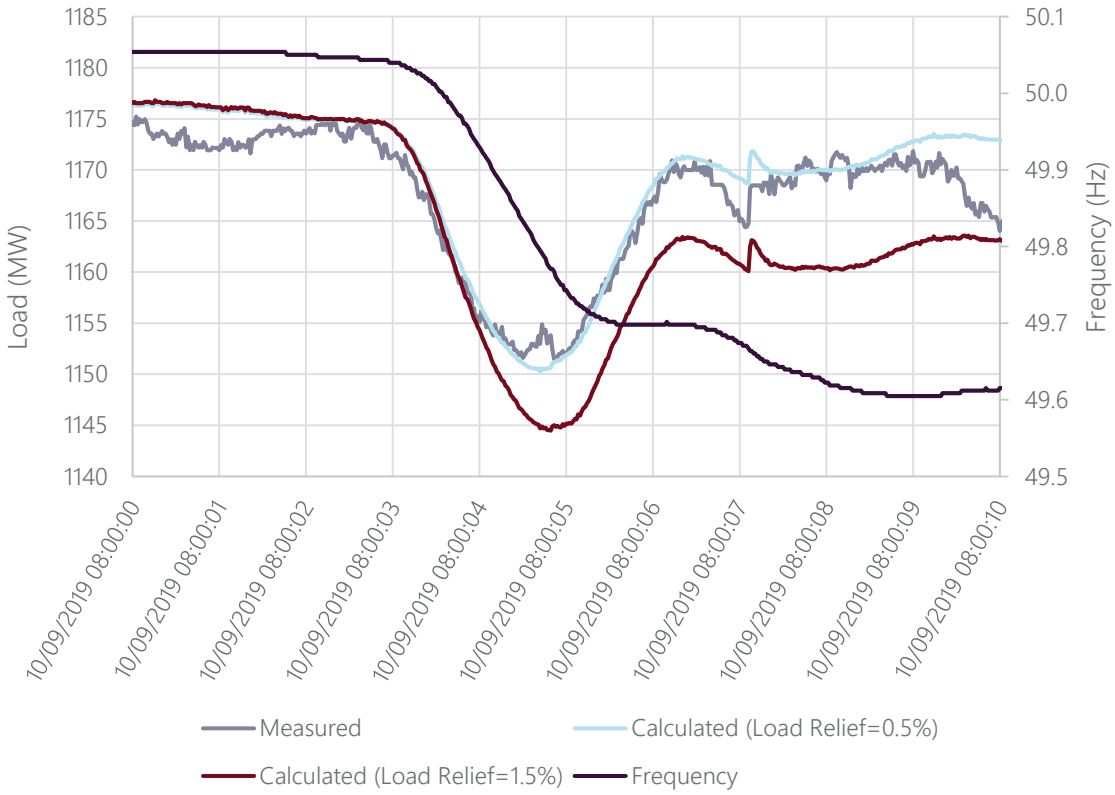
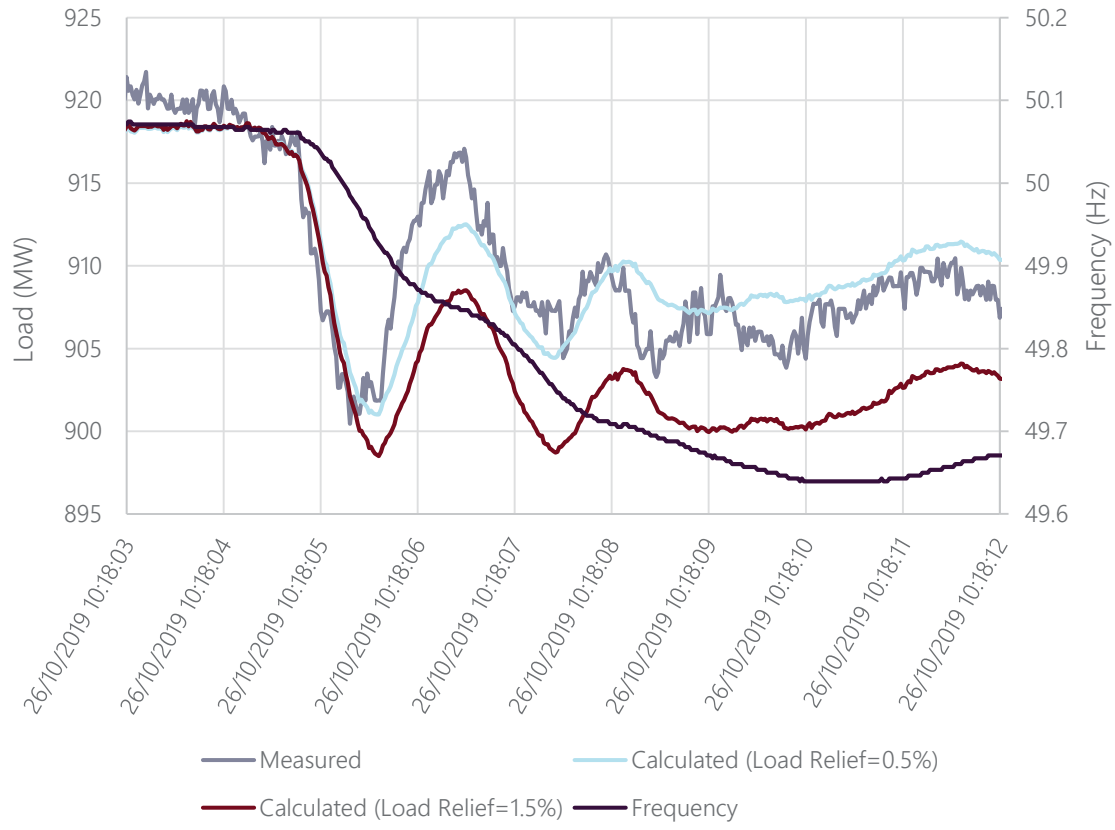



**Figure 4 Bayswater 3 trip – Rowville load**



## Next steps

- AEMO will continue to reduce mainland load relief from 1% in 0.1% increments every two weeks until the target value of 0.5% is reached. Market notices advising of fortnightly changes will continue to be issued.
- Tasmanian load relief is to be reviewed. Tasmania has a different load composition than the mainland and there is a different methodology for determining FCAS requirements.
- AEMO will continue to monitor mainland load relief and advise of further changes if required.
- An investigation into the impact of distributed energy resources (DER) such as rooftop solar is underway. A high penetration of DER will result in a large aggregated response to system events, and as such will need to be taken into consideration when determining contingency FCAS requirements.
- AEMO will continue to extend coverage of high-speed data to other parts of the NEM, both for event analysis and real-time monitoring.