NEM Lack of Reserve Framework Report

31 October 2019

Reporting period 1 July 2019 to 30 September 2019

Important notice

PURPOSE

AEMO has prepared this document under clause 4.8.4B of the National Electricity Rules to report on the operation of the NEM Lack of Reserve Framework for the period 1 July 2019 to 30 September 2019.

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VERSION CONTROL

Version	Release date	Changes
1	31 October 2019	Initial version

Executive summary

In the reporting period 1 July to 30 September 2019 (Quarter 3 2019), AEMO declared 17 Lack of Reserve (LOR) conditions[1]:

- There were 10 forecast LOR1 conditions.

- There were seven forecast LOR2 conditions.

- No actual LOR conditions were declared in this reporting period.

This compares with one LOR condition in the previous reporting period (Quarter 2 2019), and 17 LOR conditions for the same period last year (Quarter 3 2018)[2].

Quarter 3 2019 covered the later winter months and first month of spring, bringing much cooler conditions than the previous quarter and driving an increase in high demand periods, particularly across the morning peak. While demand was higher, the increase in the number of LOR conditions compared to the previous quarter was predominantly due to reduced net import into the affected region and reduced generator availability.

During the reporting period, the potential import into Victoria and Tasmania was reduced due to an outage of Basslink. The flow across the Basslink interconnector was reduced to zero between 21 August and 29 September 2019, which impacted the reserve conditions in the two regions.

Of the 17 forecast LOR conditions declared in Quarter 3 2019, five (29%) were set by the Forecast Uncertainty Measure (FUM). No LOR conditions were set by the FUM in Quarter 2 2019, and in Quarter 3 2018, 10 of the 17 LOR conditions (59%) were set by the FUM.

The next report on the NEM Lack of Reserve Framework will be published by 31 January 2020, for the reporting period 1 October 2019 to 31 December 2019.

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[1] Forecast or actual LOR1, LOR2, or LOR3.

[2] Published 31 October 2018, available on AEMO's website at https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/ Power_System_Ops/LOR-Framework-Quarterly-Reports/2018/NEM-Lack-of-Reserve-Framework-Report---quarter-ending-30-September-2018.pdf.

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1. Introduction

This report has been published in accordance with clause 4.8.4B of the National Electricity Rules (NER), to provide a high-level analysis of how the Lack Of Reserve framework is operating. This report covers the period from 1 July 2019 to 30 September 2019.

The report is divided into three sections:

- **Reserve Level Declaration Guidelines** – a summary of changes to the Guidelines over the past quarter, and the retraining of the Bayesian Belief Network (BBN).

- **Lack of Reserve (LOR) conditions declared** – details of all LOR conditions declared or revised during the past quarter (based on market notices), including an indication of the required reserve level and if the requirement was set by the Forecast Uncertainty Measure (FUM) or the largest credible risk/s (LCR) in the region. The FUM value for the respective period is also provided. Table 1 below provides a high-level summary of the LOR declarations and their causes.

- **Review of Performance** – a review of the performance of the lack of reserve framework and any observed trends, providing an assessment of FUM values compared to previous quarters, determinants of reserve level requirements, number of LOR declarations and leading factors or causes of LOR declarations.

Please direct all LOR inquiries to www.aemo.com.au/Contact-us. In the inquiry form field '*What is your enquiry regarding?*' write "**LOR Framework Report**".

The next LOR Framework report will be published by 31 January 2020, for the period 1 October 2019 to 31 December 2019.

Table 1   Summary of forecast and actual LOR conditions, with causing factors

Effective date*	Region	LOR1		LOR2		LOR3		Cause
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
26/08/2019	NSW		1		1			Forecast LOR1 and LOR2 conditions. Both conditions due to reduced generation availability and reduced net import into the region.
29/09/2019	NSW		1					Forecast LOR1 condition due to relatively high demand forecast driven by very cold conditions.
30/08/2019	TAS		1					Forecast LOR1 condition due to Basslink outage resulting in reduced import, relatively high demand forecast driven by very cold conditions, and reduced generation availability.
10/09/2019	TAS		1		1			Forecast LOR1 and LOR2. Both conditions due to Basslink outage resulting in reduced import, and reduced generation availability.
11/09/2019	TAS		1					Forecast LOR1 condition due to Basslink outage resulting in reduced import, and reduced generation availability.

Effective date*	Region	LOR1		LOR2		LOR3		Cause
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
17/09/2019	TAS				1			Forecast LOR2 condition due to Basslink outage resulting in reduced import, relatively high demand forecast, and reduced generation availability.
10/09/2019	VIC		2					Two forecast LOR1 conditions (18:30-19:30 and 20:00-20:30) due to Basslink outage resulting in reduced import, relatively high evening peak demand forecast, reduced generation availability, and reduced available net import into the region.
17/09/2019	VIC		1		2			Two forecast LOR2 conditions (18:30-19:30 and 20:00-20:30) and a forecast LOR1 condition. LOR2 conditions due to Basslink outage resulting in reduced import, reduced generation availability, and relatively high FUM value. LOR1 condition due to relatively high demand forecast.
18/09/2019	VIC		1		1			Forecast LOR1 and LOR2 conditions. Both conditions due to Basslink outage resulting in reduced import, reduced generation availability, and reduced available net import into the region.
23/09/2019	VIC		1		1			Forecast LOR1 and LOR2 conditions. LOR2 condition due to Basslink outage resulting in reduced import, reduced generation availability, and relatively high FUM value. LOR1 condition due to Basslink outage resulting in reduced import, reduced generation availability and reduced available import into the region.
Total		0	10	0	7	0	0	

* Effective date is the date on which the condition has or is expected to occur, and may differ from the date on which a market notice advising of the (forecast) condition is issued.

The count of LOR conditions uses the methodology defined in Section 3.

2. Reserve Level Declaration Guidelines

2.1 Changes in the reporting period

During the reporting period, there were no changes to the Guidelines[3].

2.2 Retraining of the Bayesian Belief Network

The BBN is the algorithm which determines the FUM, which in turn can determine LOR levels. This process is summarised in the Guidelines.

The intention of retraining the BBN is to update the network to include recent historical data since the last retraining. AEMO commenced retraining of the BBN in October 2019 to include data up to 30 September 2019. The retraining involves a three-stage process:

1. An Extract-Transform-Load (ETL) stage, to extract historical data up to 30 September 2019, perform data validation and cleansing, and compile the data into the structured format required to incorporate into the network.

2. An analysis and modelling stage, to update the network and compile the network nodes.

3. A test and verification stage, to ensure the retrained network is suitable for production implementation.

AEMO is in the final stage of the retraining process and plans to implement the retrained BBN into production in November 2019, pending final verification and readiness checks in the pre-production environment.

2.2.1 Results from retraining

To verify the retraining, AEMO completed a backcast of all forecast intervals from July 2018 to June 2019 using the existing BBN and the retrained BBN.

The results of this comparison indicate multiple changes to expected future FUM values. The results from the retrained BBN are:

*   New South Wales – minor decreases in mean FUM values were observed across all forecast horizons, with the greatest decrease being 12 MW at the 2 hours ahead horizon. There were very minor changes (+/- 2 MW) to minimum FUM values for all but the 60 hours ahead forecast horizon. The 60 hours ahead minimum FUM value increased by 52 MW. Minor changes (+/- 7 MW) were observed to maximum FUM values for all forecast horizons.

*   Queensland – the mean FUM values for all but the 24 hours ahead horizon remained relatively unchanged. The 24 hours ahead mean FUM value decreased by 30 MW. The minimum FUM values decreased across all but the 60 hours ahead horizon, which increased by 30 MW. The maximum FUM values were seen to increase in all but the 24 hours ahead horizon, with the greatest increase being 142 MW at 12 hours ahead. The maximum FUM value in the 24 hours ahead horizon remained relatively unchanged.

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[3] The Guidelines are published on AEMO's website at http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Power-system-operation.

- South Australia – minor changes (+/- 10 MW) were observed across both the mean and the minimum FUM values. The maximum FUM values decreased up to 98 MW between the 2 hours ahead and the 24 hours ahead forecast horizons. Beyond this timeframe, values remained relatively unchanged.

- Tasmania – mean and minimum FUM values are expected to be relatively unchanged across all forecast horizons. The maximum FUM values are relatively unchanged for all but the 60 hours ahead horizon. The 60 hours ahead maximum FUM value decreased by 129MW.

- Victoria – the mean FUM values for all but the 24 hours ahead horizon remained relatively unchanged. The 24 hours ahead mean FUM value increased by 25 MW. Similarly, the minimum FUM values for all but the 6 hours ahead horizon remained relatively unchanged, with the 6 hours ahead value increasing 38 MW. The maximum FUM values for all but the 12 hours ahead horizon remained relatively unchanged. The 12 hours ahead mean FUM value decreased by 244 MW.

3. Lack of Reserve conditions declared

Table 2 lists the declarations of forecast and actual LOR conditions over the reporting period from 1 July 2019 to 30 September 2019. Table 2 also identifies the market notices that communicated updates to, and cancellation of, either forecast or actual LOR conditions.

Declaration count principles

For each reporting period, AEMO determines the total count for LOR conditions based on the following principles:

- All market notices making the initial declaration of a forecast or actual LOR condition with an effective date during the reporting period were counted.

- Any market notices which updated previously issued forecast or actual LORs for a given effective date (in relation to the reserve requirement, reserve capacity available or effective period) were not counted, to prevent double-counting of a continuing condition.

- In cases where forecast LORs were cancelled but subsequently re-issued with approximately the same effective period, re-issues were not counted, to prevent double-counting of effective periods.

- Updates to existing LOR conditions where the LOR level changed were counted as separate LOR conditions.

- Any forecast LORs which were subsequently declared as actual LORs at the same LOR level are counted once. In Table 1, these are shown as actual conditions only.

For example, where a forecast LOR1 was issued and later an actual LOR1 was declared for a similar period, only the actual LOR1 is counted. But if the initial forecast was for a forecast LOR2 condition and this was later declared as an actual LOR1, this would be counted as two LOR conditions, due to the differing LOR levels.

In addition to the LOR conditions listed in Table 2, during the reporting period there was one instance of a suspect forecast LOR3[4]. In this instance, the condition was found to be invalid due to input errors. AEMO will review and update its procedures to communicate the purpose and process for advising of suspect LOR conditions.

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[4] Suspect LOR3 Market notices: 70181 issued 23/09/2019 at 1431 hrs and 70183 issued 23/09/2019 at 1655 hrs.

Table 2   LOR notices declared during the reporting period 1 July 2019 and 30 September 2019

Effective date and time	Market Notice ID	Issue date and time	Level	Actual, forecast, update or cancel	Comments	Reserve requirement (MW)[A]		FUM value (MW)[B]	Reserve requirement set by
						Required	Available		
New South Wales Region									
26/08/2019 18:30 - 19:00	69473	25/08/2019 13:55	LOR2	Forecast	Forecast LOR2 due to reduced generation availability and reduced net import.	883	835	883	FUM
26/08/2019 17:30 - 20:30	69474	25/08/2019 13:55	LOR1	Forecast	Forecast LOR1 due to reduced generation availability.	1,444	942	883	LCR2
26/08/2019	69478	25/08/2019 16:41	LOR2	Cancelled	This cancelled MN 69473. Forecast LOR2 cancelled mainly due to an increase in generation availability.	929	1,005	929	FUM
26/08/2019 18:00 - 19:30	69479	25/08/2019 16:45	LOR1	Update	Update to MN 69474 due to change in effective period. Reserve condition improved, LOR2 periods downgraded to LOR1 and some previous LOR1 periods remain.	1,425	1,005	929	LCR2
26/08/2019	69480	25/08/2019 17:41	LOR1	Cancelled	This cancelled MN 69479. Forecast LOR1 was cancelled mainly due to an increase in net import.	1,438	1,573	853	LCR2
26/08/2019 18:00 - 19:30	69493	25/08/2019 23:21	LOR1	Forecast	Forecast LOR1 due to reduced net import.	1,405	1,123	662	LCR2
26/08/2019	69494	26/08/2019 06:40	LOR1	Cancelled	This cancelled MN 69493. Forecast LOR1 was cancelled mainly due to an increase in net import.	1,400	1,511	703	LCR2
26/08/2019 18:00 - 20:00	69510	26/08/2019 09:50	LOR1	Forecast	Forecast LOR1 due to reduced generation availability and reduced net import.	1,400	929	686	LCR2
26/08/2019	69511	26/08/2019 12:41	LOR1	Cancelled	This cancelled MN 69510. Forecast LOR1 cancelled mainly due to an increase in net import and generation availability.	1,400	1,516	652	LCR2
29/08/2019 18:00 - 19:00	69588	29/08/2019 15:41	LOR1	Forecast	Forecast LOR1 due to relatively high demand forecast.	1,420	1,257	617	LCR2

Effective date and time	Market Notice ID	Issue date and time	Level	Actual, forecast, update or cancel	Comments	Reserve requirement (MW)[A]		FUM value (MW)[B]	Reserve requirement set by
						Required	Available		
Queensland Region									
Nil									
South Australia Region									
Nil									
Tasmania Region									
30/08/2019 07:00 - 09:00	69585	29/08/2019 13:09	LOR1	Forecast	Forecast LOR1 due to relatively high demand forecast, Basslink outage resulting in reduced import and reduced generation availability.	242	200	128	LCR2
30/08/2019	69586	29/08/2019 14:48	LOR1	Cancelled	This cancelled MN 69585. Forecast LOR1 cancelled mainly due to an increase in energy limited generation availability.	261	378	134	LCR2
10/09/2019 09:30 - 10:00	69830	06/09/2019 15:23	LOR2	Forecast	Forecast LOR2 due to Basslink outage resulting in reduced import, and reduced generation availability.	142	123	N/A - forecast > 72hrs ahead	LCR
10/09/2019 10:00 - 12:00	69831	06/09/2019 15:24	LOR1	Forecast	Forecast LOR1 due to Basslink outage resulting in reduced import, and reduced generation availability.	261	168	N/A - forecast > 72hrs ahead	LCR2
10/09/2019	69847	07/09/2019 06:13	LOR2	Cancelled	This cancelled MN 69830. Forecast LOR2 cancelled mainly due to an increase in generation availability.	142	255	N/A - forecast > 72hrs ahead	LCR
10/09/2019	69863	07/09/2019 14:14	LOR1	Cancelled	This cancelled MN 69831 for 10/09/2019. Forecast LOR1 cancelled mainly due to an increase in generation availability.	261	270	182	LCR2

Effective date and time	Market Notice ID	Issue date and time	Level	Actual, forecast, update or cancel	Comments	Reserve requirement (MW)[A]		FUM value (MW)[B]	Reserve requirement set by
						Required	Available		
11/09/2019 10:00 - 11:00	69831	06/09/2019 15:24	LOR1	Forecast	Forecast LOR1 due to Basslink outage resulting in reduced import, and reduced generation availability.	261	222	N/A - forecast > 72hrs ahead	LCR2
11/09/2019	69863	07/09/2019 14:14	LOR1	Cancelled	This cancelled MN 69831 for 11/09/2019. Forecast LOR1 cancelled mainly due to an increase in generation availability and decrease in demand forecast.	261	372	N/A - forecast > 72hrs ahead	LCR2
17/09/2019 08:30 - 09:00	69937	12/09/2019 12:59	LOR2	Forecast	Forecast LOR2 due to Basslink outage resulting in reduced import, reduced generation availability and relatively high demand forecast.	142	134	N/A - forecast > 72hrs ahead	LCR
17/09/2019	69941	12/09/2019 16:27	LOR2	Cancelled	This cancelled MN 69937. Forecast LOR2 cancelled mainly due to an increase in generation availability.	142	360	N/A - forecast > 72hrs ahead	LCR
Victoria Region									
10/09/2019 18:30 - 19:30	69832	06/09/2019 15:24	LOR1	Forecast	Forecast LOR1 due to Basslink outage resulting in reduced import, reduced generation availability and relatively high demand forecast.	1,140	1,063	N/A - forecast > 72hrs ahead	LCR2
10/09/2019 20:00 - 20:30	69832	06/09/2019 15:24	LOR1	Forecast	Forecast LOR1 due to Basslink outage resulting in reduced import, and reduced generation availability.	1,140	1,126	N/A - forecast > 72hrs ahead	LCR2
10/09/2019	69864	07/09/2019 14:13	LOR1	Cancelled	This cancelled MN 69832 (both periods). Forecast LOR1 conditions cancelled mainly due to an increase in generation availability and net import.	1,140	1,561	N/A - forecast > 72hrs ahead	LCR2

Effective date and time	Market Notice ID	Issue date and time	Level	Actual, forecast, update or cancel	Comments	Reserve requirement (MW)[A]		FUM value (MW)[B]	Reserve requirement set by
						Required	Available		
17/09/2019 18:30 - 19:30	69988	16/09/2019 11:18	LOR2	Forecast	Forecast LOR2 due to Basslink outage resulting in reduced import, and reduced generation availability.	955	851	955	FUM
17/09/2019 20:00 - 20:30	69988	16/09/2019 11:18	LOR2	Forecast	Forecast LOR2 due to Basslink outage resulting in reduced import, and reduced generation availability.	960	893	960	FUM
17/09/2019	69989	16/09/2019 12:24	LOR2	Cancelled	This cancelled MN 69988 (both periods). Forecast LOR2 conditions cancelled mainly due to an increase in generation availability and decrease in reserve requirement set by the FUM.	927	1,624	927	FUM
17/09/2019 19:00 - 19:30	70004	16/09/2019 16:47	LOR1	Forecast	Forecast LOR1 due to Basslink outage resulting in reduced import, reduced generation availability and relatively high demand forecast.	1,120	1,099	762	LCR2
17/09/2019 18:30 - 19:30	70011	17/09/2019 12:09	LOR1	Update	Update to MN 70004 due to change in effective period. LOR1 condition worsened due to slight increase in demand forecast.	1,118	1,020	542	LCR2
17/09/2019	70017	17/09/2019 18:54	LOR1	Cancelled	This cancelled MN 70011. Forecast LOR1 cancelled mainly due to a decrease in demand forecast.	1,120	1,203	395	LCR2
18/09/2019 06:30 - 08:30	70005	16/09/2019 19:01	LOR2	Forecast	Forecast LOR2 due to Basslink outage resulting in reduced import, and reduced generation availability.	900	649	900	FUM
18/09/2019	70006	16/09/2019 21:47	LOR2	Cancelled	This cancelled MN 70005. Forecast LOR2 cancelled mainly due to an increase in generation availability.	891	1144	891	FUM
18/09/2019 06:30 - 07:00	70018	18/09/2019 01:56	LOR1	Forecast	Forecast LOR1 due to Basslink outage resulting in reduced import and reduced available net import.	1,120	1,087	523	LCR2
18/09/2019	70021	18/09/2019 06:13	LOR1	Cancelled	This cancelled MN 70018. Forecast LOR1 cancelled mainly due to an increase in net import and decrease in forecast demand.	1,120	1,378	232	LCR2
23/09/2019 19:00 - 19:30	70137	21/09/2019 15:20	LOR2	Forecast	Forecast LOR2 due to Basslink outage resulting in reduced import, and reduced generation availability.	1,011	914	1,011	FUM

Effective date and time	Market Notice ID	Issue date and time	Level	Actual, forecast, update or cancel	Comments	Reserve requirement (MW)^A		FUM value (MW)^B	Reserve requirement set by
						Required	Available		
23/09/2019 19:30 - 20:30	70138	21/09/2019 15:22	LOR1	Forecast	Forecast LOR1 due to Basslink outage resulting in reduced import, reduced generation availability and reduced available net import.	1,140	1,044	1,003	LCR2
23/09/2019	70144	21/09/2019 18:31	LOR2	Cancelled	This cancelled MN 70137. Forecast LOR2 cancelled mainly due to an increase in net import and semi-scheduled availability and decrease in reserve requirement set by the FUM.	994	1,090	994	FUM
23/09/2019	70157	22/09/2019 14:10	LOR1	Cancelled	This cancelled MN 70138. Forecast LOR1 cancelled mainly due to increase in generation availability, net import, and semi-schedule availability.	1,140	1,737	859	LCR2

A. Reserve Required and Reserve Available are the values that correspond to the trading interval in the effective period with the lowest reserve available.

B. The value in this field represents the FUM value for the trading interval during which the minimum available reserve occurred (see Reserve Requirement (MW) – Available field).

4. Review of performance

4.1   Forecast Uncertainty Measure values

This section details the average, minimum, and maximum FUM values for this reporting period, compared with the periods quarter 3 2018 through quarter 2 2019. The relative changes in the FUM value distributions for this reporting period, when compared to previous reporting periods, can be seen in Figure 1 to Figure 5 below, and are summarised as follows:

- In New South Wales, the average and maximum FUM values increased across all forecast horizons relative to quarter 2 2019. Changes to the minimum FUM values relative to quarter 2 2019 were minor.

- In Queensland, a decrease was observed in the minimum FUM values in all horizons except for 12 hours ahead, relative to quarter 2 2019. Maximum FUM values generally decreased when compared with the same period, however there was a notable increase for the 24 hours ahead forecast horizon. Changes to the average FUM values relative to quarter 2 2019 were minor.

- For South Australia, the largest changes relative to quarter 2 2019 were the increases in maximum and average FUM values for the 48 hours ahead and 60 hours ahead horizons. Other changes to FUM values relative to quarter 1 2019 are minor.

- For Tasmania, a decrease was observed in the minimum FUM values for all horizons relative to quarter 2 2019. A notable increase in the maximum FUM values was observed in the 2 hours ahead, 6 hours ahead, and 12 hours ahead horizons, relative to quarter 2 2019. Changes to the average FUM values relative to quarter 2 2019 were minor.

- In Victoria, the average FUM values decreased for all forecast horizons relative to quarter 2 2019. Similarly, the minimum FUM values generally decreased when compared to quarter 2 2019. Changes to the maximum FUM values relative to quarter 2 2019 were minor.

The large changes to FUM values for this reporting period relative to the corresponding period in 2018 are consistent with the expected changes published in the 2018 consultation on changes to the Reserve Level Declaration Guidelines[5].

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[5] Refer to the Update Paper published during the Consultation, at http://aemo.com.au/Stakeholder-Consultation/Consultations/Changes-to-Reserve-Level-Declaration-Guidelines?Convenor=AEMO%20NEM. Effective 10 December 2018.

Figure 1   New South Wales region: maximum, minimum, and average FUM values for the reporting period
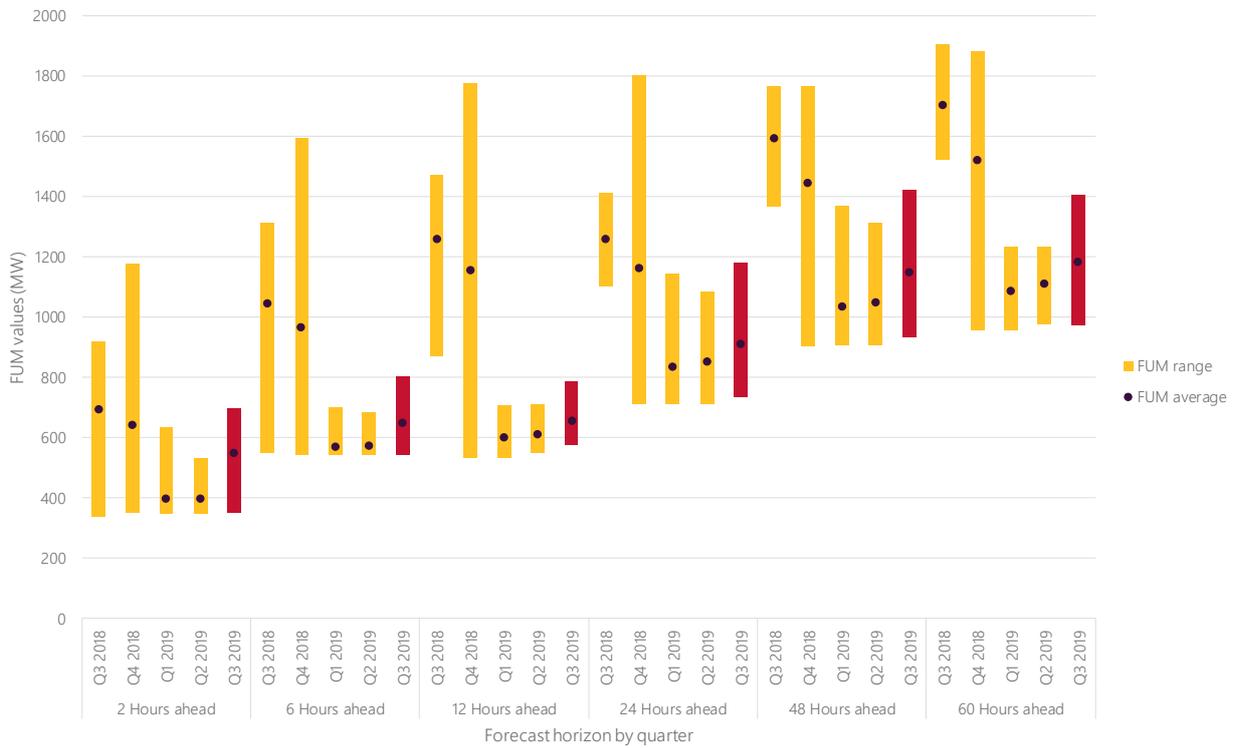

Figure 2   Queensland region: maximum, minimum, and average FUM values for the reporting period
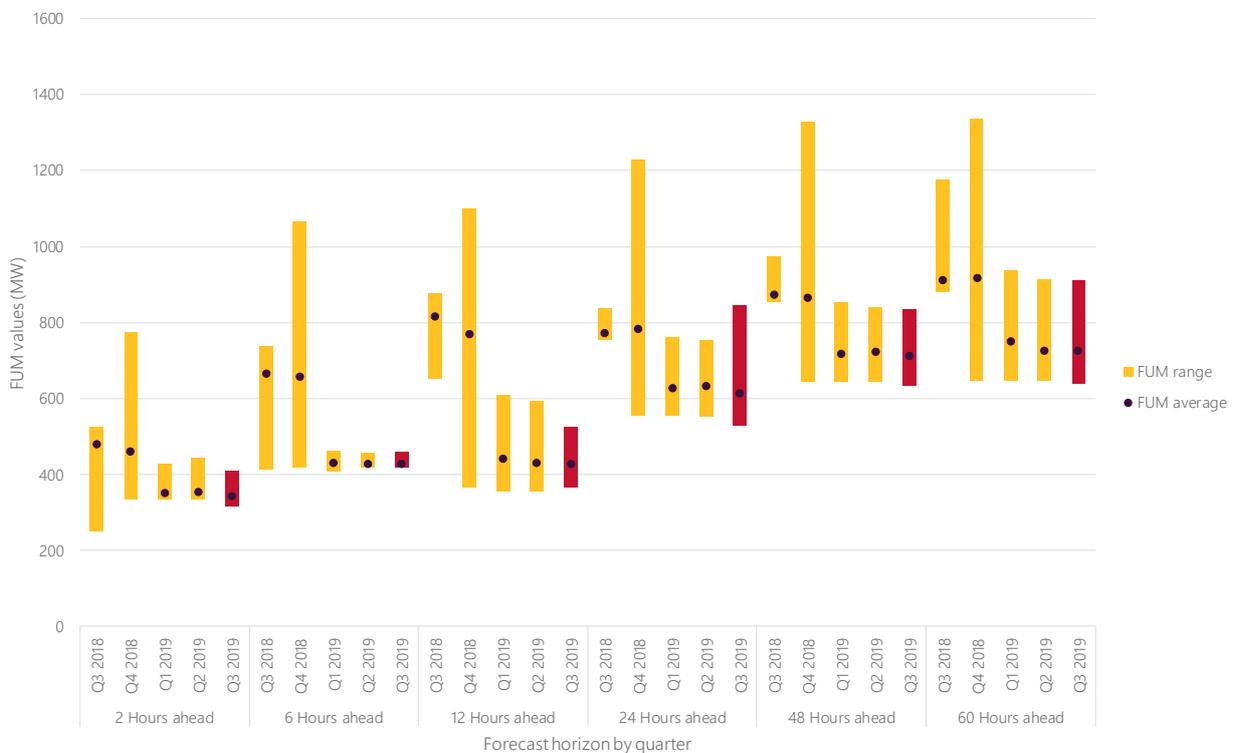
Figure 3   South Australia region: maximum, minimum, and average FUM values for the reporting period
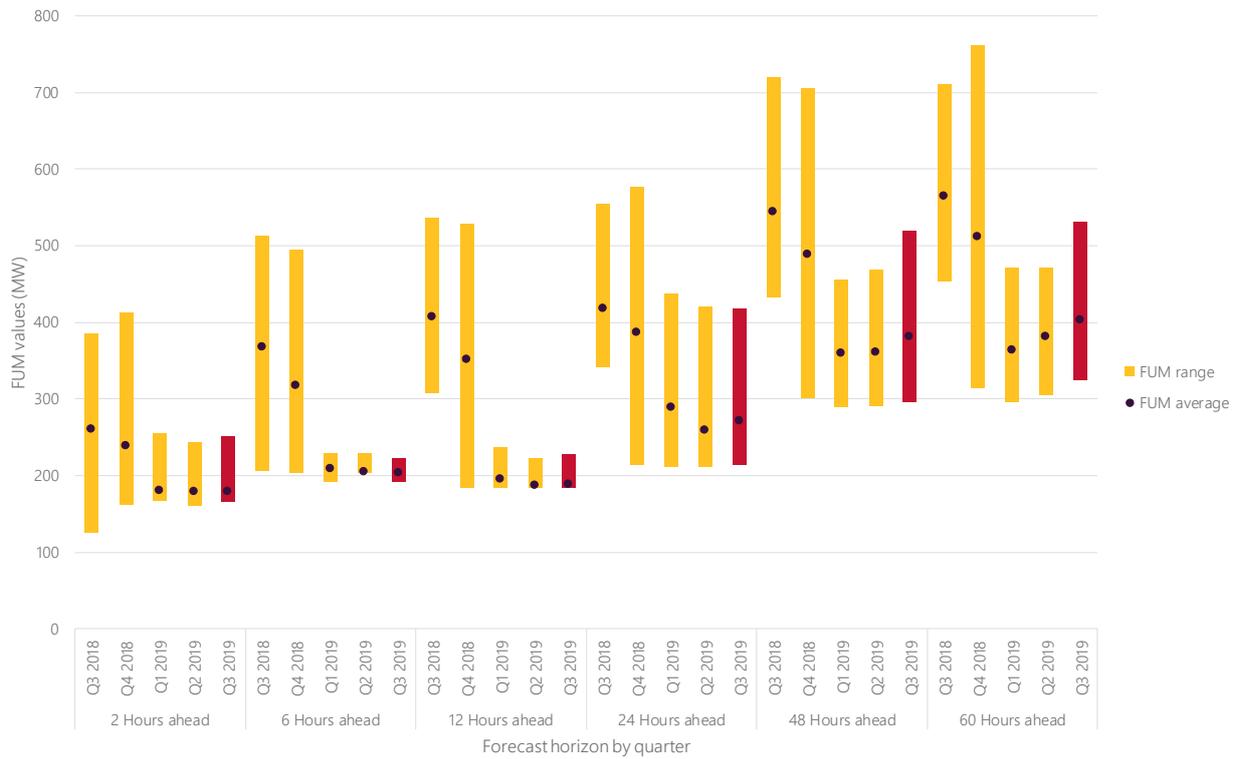

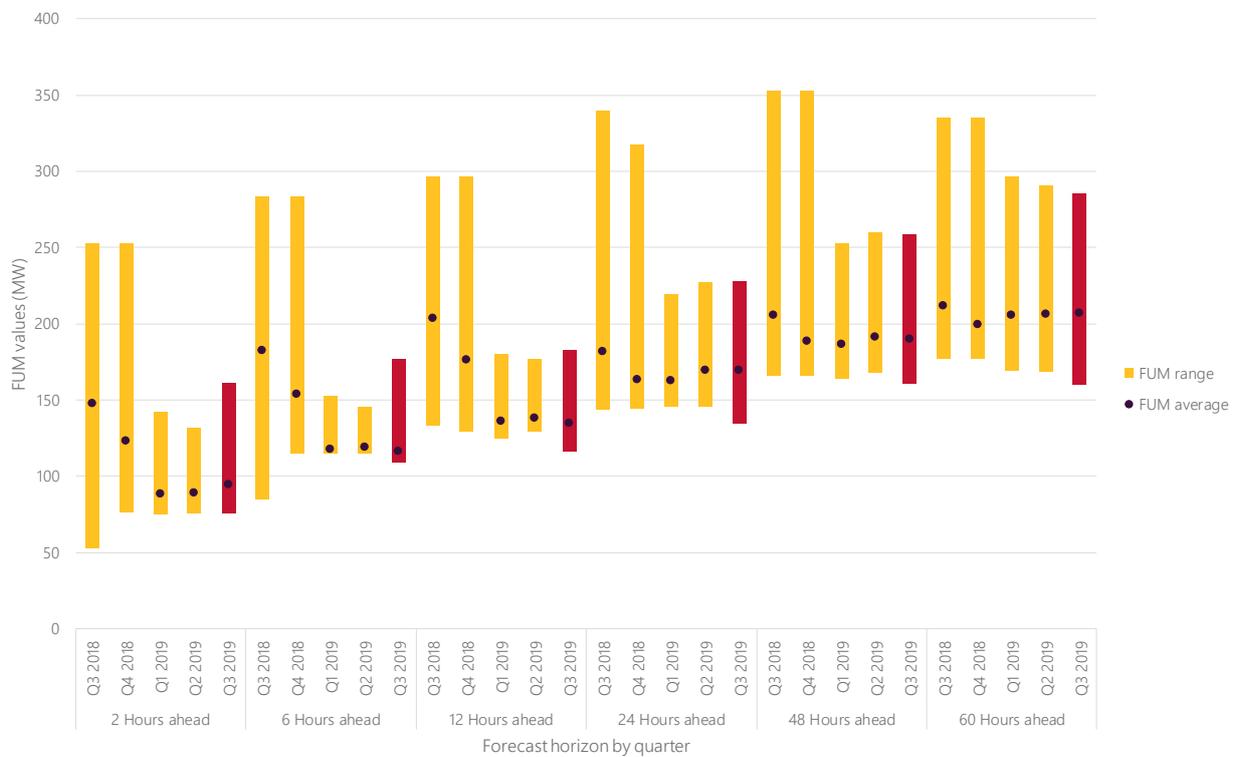**Figure 4   TAS region: maximum, minimum, and average FUM values for the reporting period**
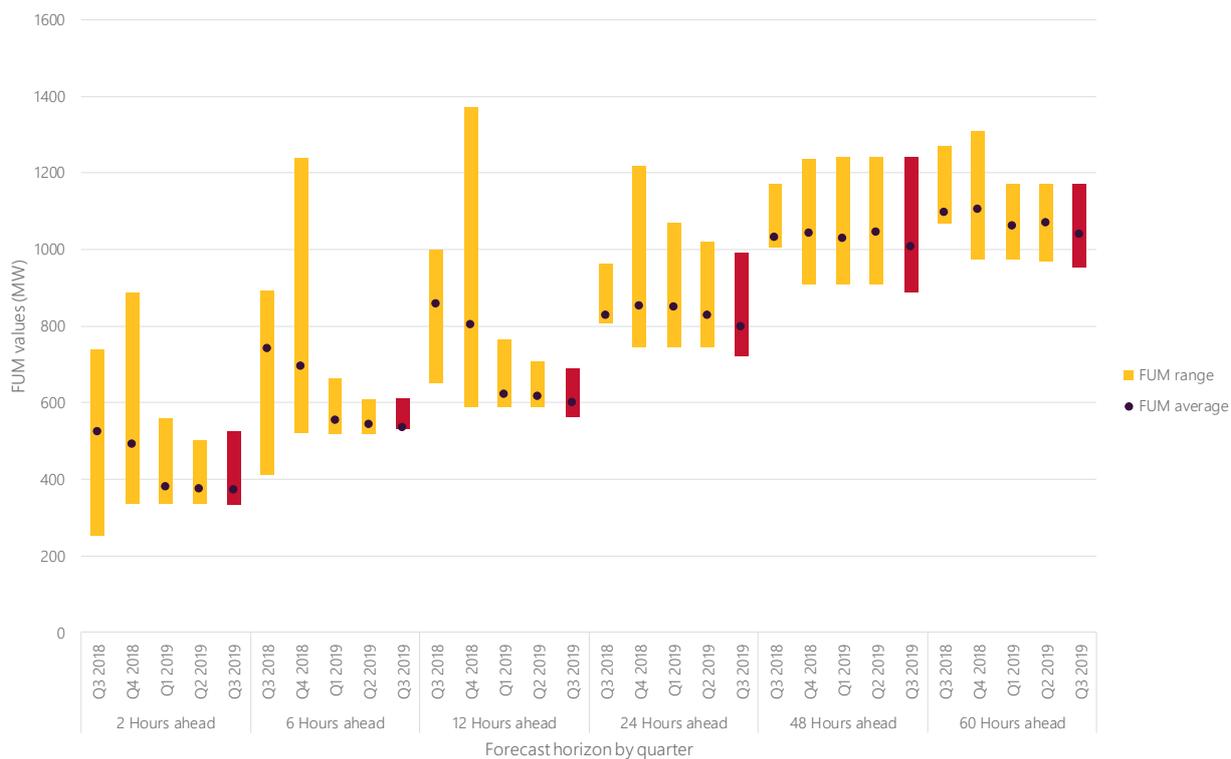
Figure 5   Victoria region: maximum, minimum, and average FUM values for the reporting period

4.2   LOR declaration reserve requirements

Of the 17 forecast LOR declarations in Quarter 3 2019, there were five conditions where the reserve requirement was set by the FUM, and for the remaining 12 conditions the reserve requirements were set by either the LCR or LCR2.

Five of the forecast LOR2 conditions occurred when the FUM was setting the reserve requirement. The remaining two forecast LOR2 conditions occurred when forecast horizon exceeded 72 hours, therefore the reserve requirement was being set by the LCR. All 10 forecast LOR1 conditions occurred when the reserve requirement was being set by the LCR2.

There were no actual LOR1, LOR2, or LOR3 conditions declared during Quarter 3 2019, indicating that there was sufficient generation to meet demand during this period.

There were 29% of LOR conditions in Quarter 3 2019 set by the FUM, no LOR conditions were set by the FUM in Quarter 2 2019, and in Quarter 3 2018 10 of the 17 LOR conditions (59%) were set by the FUM.

Table 3   LORs declared during the reporting period by trigger (FUM or LCR)

Effective date	LOR1	LOR2	LOR3
New South Wales (NSW)			
26/08/2019	Forecast	Forecast	
29/08/2018	Forecast		
Tasmania (TAS)			
30/08/2019	Forecast		
10/09/2019	Forecast	Forecast	

Effective date	LOR1	LOR2	LOR3
11/09/2019	Forecast		
17/09/2019		Forecast	
Victoria (VIC)			
10/09/2019	Forecast		
17/09/2019	Forecast	Forecast	
18/09/2019	Forecast	Forecast	
23/09/2019	Forecast	Forecast	

Note. Yellow shading indicates the requirement was set by the LCR, and orange indicates the requirement was set by the FUM.

4.3   Forecast and actual LOR declarations

During the reporting period, there were 17 forecast LOR declarations. This included 10 forecast LOR1 and seven forecast LOR2. Of the seven forecast LOR2 declarations, none were subsequently declared as actual LOR2 conditions. On six occasions, the forecast LOR2 conditions were subsequently downgraded to forecast LOR1 conditions before clearing.

Of the 10 forecast LOR1 declarations, none were subsequently declared as actual LOR1 conditions. None of the forecast LOR1 conditions were subsequently updated to forecast LOR2 conditions.

No actual LOR conditions were declared in this reporting period. By comparison, Quarter 3 2018 saw three actual LOR1 conditions.

Where the forecast LOR conditions did not result in an actual LOR, the main causes of the cancellations were market response resulting in increased available generation and increased net import, and in some cases a reduction in forecast demand and reduction in FUM value.

4.4   Number and cause of LOR declarations

As summarised in Table 1, a total of 17 LOR conditions were declared during the reporting period, all of which were forecast conditions. This is an increase from the previous reporting period (Quarter 2 2019), which declared one LOR condition.

This reporting period covered the coldest months of the year, July through September, which saw elevated demands driven by heating load, particularly across the morning peak, compared to the previous quarter. This led to an increase in LOR declarations with effective periods in the morning. All LOR declarations in Tasmania and two LOR declarations in Victoria were during the morning period.

While demand was higher than the previous quarter, it was not the largest driver of many LOR declarations in this reporting period. The main causes for LOR declarations were reduced net import into the affected region and reduced generator availability.

During the reporting period, the potential import into Victoria and Tasmania was reduced due to the outage of Basslink, which reduced flow across the Basslink interconnector to zero between 21 August and 29 September 2019. This outage had a large impact on the reserve levels in the two regions and increased reliance on local generation.

All LOR conditions in Victoria and Tasmania were declared during the Basslink outage period. As there was no concurrency between LOR events in these regions, many of the LOR conditions declared may have been avoided if Basslink was available. Basslink was available during the same quarter last year.

Reduced non-energy limited generation capacity, reduced net import, and relatively high demand forecasts due to cold conditions were the main drivers for the LOR declarations in New South Wales.

In Quarter 3 2018, there were also 17 LOR conditions declared. However, three forecast LOR1 events in this period were subsequently declared as actual LOR1 events. No forecast LOR declarations during the current reporting period were subsequently declared as actual LOR events.

Glossary

This document uses many terms that have meanings defined in the National Electricity Rules (NER). The NER meanings are adopted unless otherwise specified.

For each of the terms below, refer to the Guidelines for further information.

Term	Definition
FUM	Forecast Uncertainty Measure. The number of MW representing the level of forecasting uncertainty.
Guidelines	The Reserve Level Declaration Guidelines published by AEMO under clause 4.8.4A of the NER
LCR	Largest Credible Risk. This is the single largest credible risk in the region.
LCR2	Largest Credible Risk 2. This is the sum of the two largest credible risks in the region.
LOR1	Lack of Reserve level 1. The threshold for an LOR1 is determined by the larger value of either the FUM or the sum of the two largest credible risks in the region (LCR2).
LOR2	Lack of Reserve level 2. The threshold for an LOR2 is determined by the larger value of either the FUM or the largest credible risk in the region (LCR).
LOR3	Lack of Reserve level 3. The threshold for an LOR3 condition is when the forecast reserve for a region is at or below zero.