AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

NEM Lack of Reserve Framework Report

29 October 2020

Reporting period 1 July 2020 to 30 September 2020

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 2020 to 30 September 2020 (Quarter 3 2020).

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VERSION CONTROL

Version	Release date	Changes
1	29 October 2020	Initial version

Executive summary

This report has been published in accordance with clause 4.8.4B of the National Electricity Rules (NER).

In the reporting period 1 July 2020 to 30 September 2020 (Quarter 3 2020), AEMO declared 11 Lack of Reserve (LOR) conditions in the National Electricity Market (NEM)[1]:

- There were six forecast LOR1 conditions.
- There was one forecast LOR2 condition.
- There were four actual LOR1 conditions.
- There were zero actual LOR2 conditions.

This compares with one LOR condition in the previous reporting period (Quarter 2 2020), and 17 LOR conditions for the same period last year (Quarter 3 2019)[2].

Quarter 3 2020 covered the mid-to late winter months and the first month of spring. Weather conditions were much cooler than the previous quarter, leading to 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 generator availability coinciding with the higher demand periods.

In 2020, Tasmania had relatively high demand periods in August compared to last year, when there were more high demand periods in June (Quarter 2 2019).

Of the 11 LOR declarations in Quarter 3 2020:

- For ten declarations, the reserve requirement was set by the sum of the two Largest Credible Risks (LCR2, for LOR1 thresholds). There was one declaration where the reserve requirement was set by the Forecast Uncertainty Measurement (FUM), which resulted in a forecast LOR2 declaration.
- This means 9% of LOR conditions were declared when the reserve requirement was being set by the FUM. For comparison, in Quarter 2 2020, the one LOR condition was not set by FUM (0%), and in Quarter 3 2019, five of the 17 (29%) of LOR conditions were set by the FUM.

The next report on the NEM Lack of Reserve Framework, for the reporting period 1 October 2020 to 31 December 2020, will be published by 31 January 2021.

[1] Forecast or actual LOR1, LOR2, or LOR3. LOR is described in clause 4.8.4 of the NER. AEMO's considerations and methodology, and the LOR levels, are outlined in AEMO's Reserve Level Declaration Guidelines, at https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Power-system-operation.

[2] The LOR condition in Quarter 2 2020 was a forecast LOR1; in Quarter 3 2019 the declared LOR conditions were 10 forecast LOR1 conditions and seven forecast LOR2 conditions. Previous quarterly reports are on AEMO's website at https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/power-system-operation/nem-lack-of-reserve-framework-quarterly-reports.

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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 (LOR) framework is operating. This report covers the period from 1 July 2020 to 30 September 2020 (Quarter 3 2020).

Unless otherwise noted, all times in this report are National Electricity Market (NEM) time (Australian Eastern Standard Time [AEST]).

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).
- **LOR conditions declared** – details of all LOR conditions declared or revised during the past quarter (based on market notices). For each condition declared, the report indicates the required reserve level and whether the requirement was set by the Forecast Uncertainty Measure (FUM), or the largest credible risk/s (LCR) in the region. The reserve requirement can be set by the largest credible risk (LCR, for LOR2 conditions) or the sum of the two largest credible risks (LCR2, for LOR1 thresholds). The FUM value for each relevant period is also provided.
- **Review of performance** – a review of the performance of the LOR 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 report on the NEM Lack of Reserve Framework, for the reporting period 1 October 2020 to 31 December 2020, will be published by 31 January 2021.

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 the retraining in October 2020 to include data up to 30 September 2020. The retraining involves a three-stage process:

1. Extract-Transform-Load (ETL) stage, to extract historical data up to 30 September 2020, perform data validation and cleansing, and compile the data into the structured format required to incorporate into the network.
2. Analysis and modelling stage, to update the network and compile the network nodes.
3. Test and verification stage, to ensure the retrained network is suitable for production implementation.

The re-training conducted in October 2020 included four minor updates to the FUM weather inputs, as listed below. These updates were made following weather forecast accuracy analysis and in recognition of the most representative weather stations for each region:

- Changed the temperature forecast provider following accuracy analysis.
- Updated the weather station used for New South Wales to Bankstown to align with the regional reference weather station.
- Updated the weather station used for Victoria to Melbourne Airport to align with the regional reference weather station.
- Updated the weather station used for South Australia to West Terrace due to the recent decommissioning of Kent Town[4], and to align with the regional reference weather station.

AEMO is in the final stage of retraining, and plans to implement the retrained BBN into production around the end of October 2020, 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 2019 to June 2020 inclusive using the existing BBN and the retrained BBN. The intention of the backcast is to provide an indication of the magnitude of changes to future maximum, minimum and mean FUM values.

The most material results from the retrained BBN are summarised below. There were minor changes for some other forecast horizons and distribution statistics:

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

[4] The Adelaide Kent Town weather station was decommissioned by the Bureau of Meteorology on 31 July 2020; see https://www.lga.sa.gov.au/news-and-events/news/latest-news/2020/july/media-release-end-of-an-era-for-adelaides-kent-town-weather-station.

- New South Wales – maximum FUM values decreased by 114 megawatts (MW) for the 60 hours ahead and 82 MW for the 6 hours ahead forecast horizons. The mean FUM value increased by 8 MW for the 60 hours ahead forecast horizon.
- Queensland – maximum FUM values increased by 133 MW for the 60 hours ahead and decreased by 26 MW for the 12 hours ahead forecast horizon.
- South Australia – maximum FUM value reduced by 299 MW for the 12 hours ahead, 155 MW for the 6 hours ahead and 64 MW for the 60 hours ahead forecast horizons. Mean FUM values decreased by 12 MW for the 60 hours ahead forecast horizon.
- Tasmania – maximum FUM values decreased by 35 MW for the 12 hours ahead and by 61 MW for the 60 hours ahead forecast horizons.
- Victoria – maximum FUM values decreased by 15 MW for the 6 hours ahead, 299 MW for the 12 hours ahead, and 64 MW for the 60 hours ahead forecast horizons.

3. Lack of Reserve conditions declared

Table 1 provides a high-level summary of the count of forecast and actual LOR conditions based on the declaration count principles.

Table 2 lists all market notice declarations of forecast and actual LOR conditions over the reporting period 1 July 2020 to 30 September 2020. 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 2, 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 1, during the reporting period there was one instance when AEMO declared an actual LOR1[5] which was found to be invalid due to input errors from SCADA, therefore this instance is not included in the LOR reporting for this quarter.

[5] Actual LOR1 Market notice: 76529 issued 0849 hrs on 4 August 2020.

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

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
24/08/2020	NSW		1		1			Forecast LOR1 and LOR2 were declared (45 hours lead time[6]). Both conditions due to decreased generation availability. The forecast LOR1 and LOR2 conditions were cancelled due to increased generation availability. A forecast LOR1 was then later redeclared for the similar period due to decreased generation availability and reduced net import into the New South Wales region. The forecast LOR1 condition was cancelled due to increased generation availability.
25/08/2020	NSW	1						A forecast LOR1 was declared in Pre-Dispatch (9 hours lead time) due to decreased generation availability and slight increase in forecast demand. An actual LOR1 was declared as generation availability did not increase after market notification. The actual LOR1 condition was cancelled when the effective period elapsed.
26/08/2020	NSW	1						A forecast LOR1 was declared in Pre-Dispatch (2 hours lead time) due to decreased generation availability. An actual LOR1 was declared as generation availability did not increase after market notification. Actual LOR1 condition worsened and effective period increased due to decreased generation availability and slight increase in demand forecast. The actual LOR1 condition was cancelled when the effective period elapsed.
15/07/2020	TAS		1					A forecast LOR1 condition was declared (50 hours lead time) due to reduced generation availability. The forecast LOR1 condition was cancelled due to increased generation availability.
16/07/2020	TAS		1					A forecast LOR1 condition was declared (66 hours lead time) due to reduced generation availability. The forecast LOR1 condition was cancelled due to increased generation availability.

[6] Lead time: The amount of warning time, from when a forecast LOR condition was first declared (Market Notice issued) to the start time of the LOR effective period.

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
07/08/2020	TAS		1					A forecast LOR1 condition was declared (138 hours lead time) due to reduced generation availability with an effective period of 08:00-08:30 (138 hours lead time). The forecast effective period changed in subsequent updates (07:30-09:00, 08:00-08:30, 07:30-09:00) due to fluctuating generation availability. The forecast LOR1 condition was cancelled due to increased generation availability.
10/08/2020[B]	TAS	1						Morning LOR condition: A forecast LOR1 was declared (113 hour lead time) then cancelled in the Short Term Projected Assessment of System Adequacy (ST PASA) timeframe, due to fluctuating generation availability. A forecast LOR1 was then declared in Pre-Dispatch due to an increase in forecast demand. An actual LOR1 was declared as generation availability did not increase after market notification. The actual LOR1 condition was cancelled when the effective period elapsed.
			1					Evening LOR condition: A forecast LOR1 was declared (170 hours lead time) then cancelled in the Short Term Projected Assessment of System Adequacy (ST PASA) timeframe, due to fluctuating generation availability. A forecast LOR1 was then later redeclared for the similar period due to fluctuating generation availability. The forecast LOR1 condition was cancelled due to increased generation availability.
11/08/2020	TAS	1						A forecast LOR1 was declared in Pre-Dispatch (2 hours lead time) due to decreased generation availability. An actual LOR1 was declared as generation availability did not increase after market notification. The actual LOR1 condition was cancelled when the effective period elapsed.
19/08/2020	TAS		1					A forecast LOR1 condition was declared (19 hours lead time) due to reduced generation availability. The forecast LOR1 condition was cancelled due to increased generation availability and slight decrease in demand forecast.

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
Total		**4**	**6**	**0**	**1**	**0**	**0**	

A. Effective date is the date on which the condition occurred or was expected to occur, and may differ from the date on which a market notice advising of the forecast or actual condition was issued.
B. Multiple forecast LOR1 conditions were declared for the morning and evening peak demand periods due to reduced generation availability. Because there were two effective time periods of LOR for the effective date 10/08/2020, these have been counted as two separate LOR conditions.

Table 2 LOR notices declared during the reporting period 1 July to 30 September 2020

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									
24/08/2020 18:00 - 19:00	76982	22/08/2020 21:15	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availability.	1,368	1,214	1,368	FUM
24/08/2020 19:00 - 19:30	76983	22/08/2020 21:15	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	1,456	1,418	1,257	LCR2
24/08/2020	76984	22/08/2020 22:29	LOR2	Cancelled	This cancelled MN 76982. Forecast LOR2 cancelled due to increased generation availability.	1,216	1,638	1,216	FUM
24/08/2020	76985	22/08/2020 22:29	LOR1	Cancelled	This cancelled MN 76983. Forecast LOR1 cancelled due to increased generation availability.	1,449	1,638	1,216	LCR2
24/08/2020 18:00 - 19:00	76987	23/08/2020 12:56	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability and reduced net import into the region.	1,488	1,410	997	LCR2
24/08/2020	76988	23/08/2020 15:18	LOR1	Cancelled	This cancelled MN 76987. Forecast LOR1 cancelled due to increased generation availability.	1,468	1,579	942	LCR2
25/08/2020 17:30 - 20:00	77068	25/08/2020 8:54	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	1,400	1,009	751	LCR2
25/08/2020 18:00 - 19:00	77142	25/08/2020 18:09	LOR1	Actual	Actual LOR1 declared. Generation availability decreased and forecast demand gradually increased leading up to this event. A forecast LOR1 was observed prior to this event.	1,425	1,238	328	LCR2
25/08/2020	77143	25/08/2020 19:41	LOR1	Cancelled	This cancelled MN 77142. Actual LOR1 was cancelled when the effective period elapsed.	1,500	1,560	213	LCR2
26/08/2020 18:00 - 19:00	77168	26/08/2020 15:44	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	1,408	1,321	544	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		
26/08/2020 18:30 - 19:00	77171	26/08/2020 18:38	LOR1	Actual	Actual LOR1 declared. Generation availability gradually decreased leading up to this event. A forecast LOR1 was observed prior to this event.	1,551	1,516	213	LCR2
26/08/2020 18:30 - 20:00	77172	26/08/2020 19:39	LOR1	Update	Update to MN 77171. Effective period in actual LOR1 increased due to decreased generation availability and slight increase in demand forecast.	1,540	1,368	213	LCR2
26/08/2020	77173	26/08/2020 20:42	LOR1	Cancelled	This cancelled MN 77172. Actual LOR1 was cancelled when the effective period elapsed.	1,526	1,687	213	LCR2
Queensland region									
Nil									
South Australia region									
Nil									
Tasmania region									
15/07/2020 17:30-18:30	76293	13/07/2020 15:07	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	731	727	174	LCR2
16/07/2020 09:30-10:00	76293	13/07/2020 15:07	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	731	710	184	LCR2
15/07/2020	76309	14/07/2020 9:45	LOR1	Cancelled	This cancelled MN 76293. Forecast LOR1 cancelled due to increased generation availability.	731	741	165	LCR2
16/07/2020	76311	14/07/2020 14:44	LOR1	Cancelled	This cancelled MN 76309. Forecast LOR1 cancelled due to increased generation availability.	731	851	175	LCR2
07/08/2020 08:00-08:30	76504	1/08/2020 14:29	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	731	725	n/a – forecast > 72 hrs 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		
07/08/2020 07:30-09:00	76508	2/08/2020 15:32	LOR1	Update	Update to MN 76504. Effective period in forecast LOR1 increased due to decreased generation availability.	731	703	n/a – forecast > 72 hrs ahead	LCR2
10/08/2020 17:30-19:00	76527	3/08/2020 15:19	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	731	703	n/a – forecast > 72 hrs ahead	LCR2
10/08/2020	76534	4/08/2020 15:20	LOR1	Cancelled	This cancelled MN 76527. Forecast LOR1 cancelled due to increased generation availability.	731	846	n/a – forecast > 72 hrs ahead	LCR2
07/08/2020 08:00-08:30	76551	5/08/2020 15:32	LOR1	Update	Update to MN 76508. Effective period in forecast LOR1 decreased due to increased generation availability.	731	727	174	LCR2
10/08/2020 08:00-08:30	76551	5/08/2020 15:32	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	731	720	n/a – forecast > 72 hrs ahead	LCR2
10/08/2020 18:00-19:00	76551	5/08/2020 15:32	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	731	707	n/a – forecast > 72 hrs ahead	LCR2
07/08/2020 07:30-09:00	76566	6/08/2020 13:03	LOR1	Forecast	Update to MN 76551. Effective period in forecast LOR1 increased due to decreased generation availability.	656	616	152	LCR2
7/08/2020	76568	6/08/2020 14:33	LOR1	Cancelled	This cancelled MN 76566. Forecast LOR1 cancelled due to increased generation availability.	636	691	152	LCR2
10/08/2020 07:30-09:30	76567	6/08/2020 14:35	LOR1	Update	Update to MN 76551. Effective period in forecast LOR1 increased due to decreased generation availability.	730	666	n/a – forecast > 72 hrs ahead	LCR2
10/08/2020	76580	7/08/2020 14:32	LOR1	Cancelled	This cancelled MN 76567. Forecast LOR1 cancelled due to increased generation availability.	731	800	183	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		
10/08/2020 07:30-09:00	76597	10/08/2020 6:55	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability and relatively high demand forecast.	731	681	81	LCR2
10/08/2020 07:30-09:00	76598	10/08/2020 8:00	LOR1	Actual	Actual LOR1 declared. Generation availability gradually decreased leading up to this event. A forecast LOR1 was observed prior to this event.	731	690	63	LCR2
11/08/2020 07:30-09:00	76599	11/08/2020 5:40	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability and relatively high demand forecast.	731	695	93	LCR2
11/08/2020 07:30-08:30	76600	11/08/2020 7:39	LOR1	Actual	Actual LOR1 declared. Generation availability gradually decreased leading up to this event. A forecast LOR1 was observed prior to this event.	731	703	32	LCR2
11/08/2020	76601	11/08/2020 8:30	LOR1	Cancelled	This cancelled MN 76600. Actual LOR1 was cancelled when the effective period elapsed.	731	744	63	LCR2
19/08/2020 11:00-11:30	76793	18/08/2020 16:19	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	600	584	130	LCR2
19/08/2020	76810	18/08/2020 17:28	LOR1	Cancelled	This cancelled MN 76793. Forecast LOR1 cancelled due to increased generation availability and decrease in demand forecast.	600	646	140	LCR2
Victoria region									
Nil									

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 compares the average, minimum, and maximum FUM values for this reporting period to those for each quarter from Quarter 3 2019 to Quarter 3 2020 (see Figures 1 through 5 below).

The most material changes in FUM values between Quarter 2 2020 and Quarter 3 2020 are summarised below. For forecast horizons not mentioned below, the changes from Quarter 2 2020 were minor:

- New South Wales – the maximum and average FUM values decreased for the 2 hours ahead forecast horizon and increased for the 48 and 60 hours ahead horizons. The minimum FUM value increased for the 60 hours ahead forecast horizon.
- Queensland – the maximum FUM value increased for the 6 and 24 hours ahead forecast horizons.
- South Australia – the maximum FUM value increased for the 2 hours ahead forecast horizon. The minimum FUM value increased for the 60 hours ahead forecast horizon.
- Tasmania – the average FUM value decreased for the 6, 24 and 60 hours ahead forecast horizons. Maximum FUM values decreased for the 2 and 6 hours ahead forecast horizons, while minimum FUM values also decreased for the 12 and 24 hours ahead forecast horizons.
- Victoria – the maximum FUM value decreased for the 60 hours ahead forecast horizon.

Figure 1 New South Wales region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters

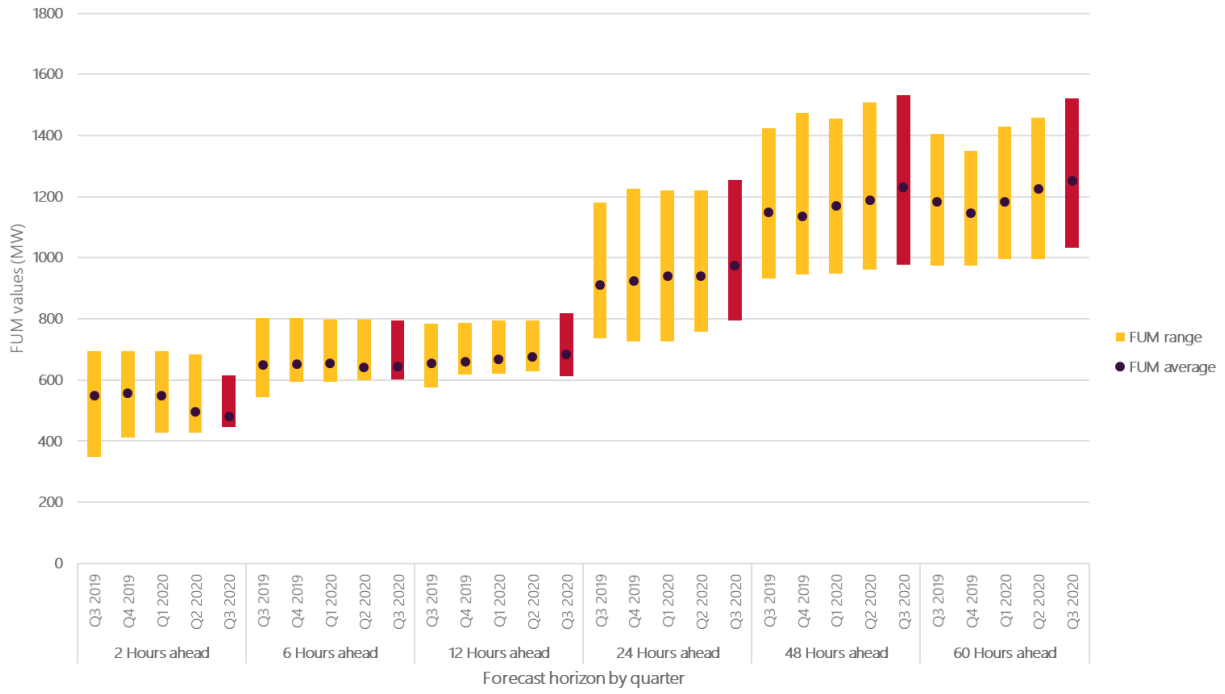


Figure 2 Queensland region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters

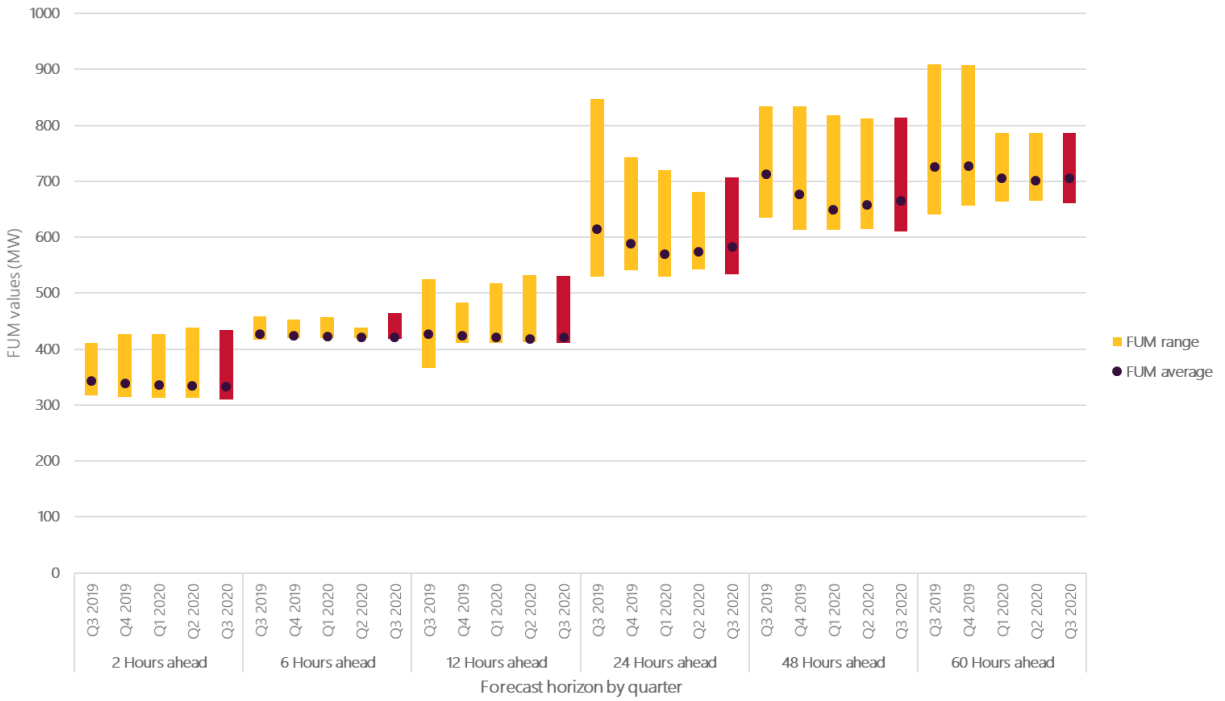


Figure 3 South Australia region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters

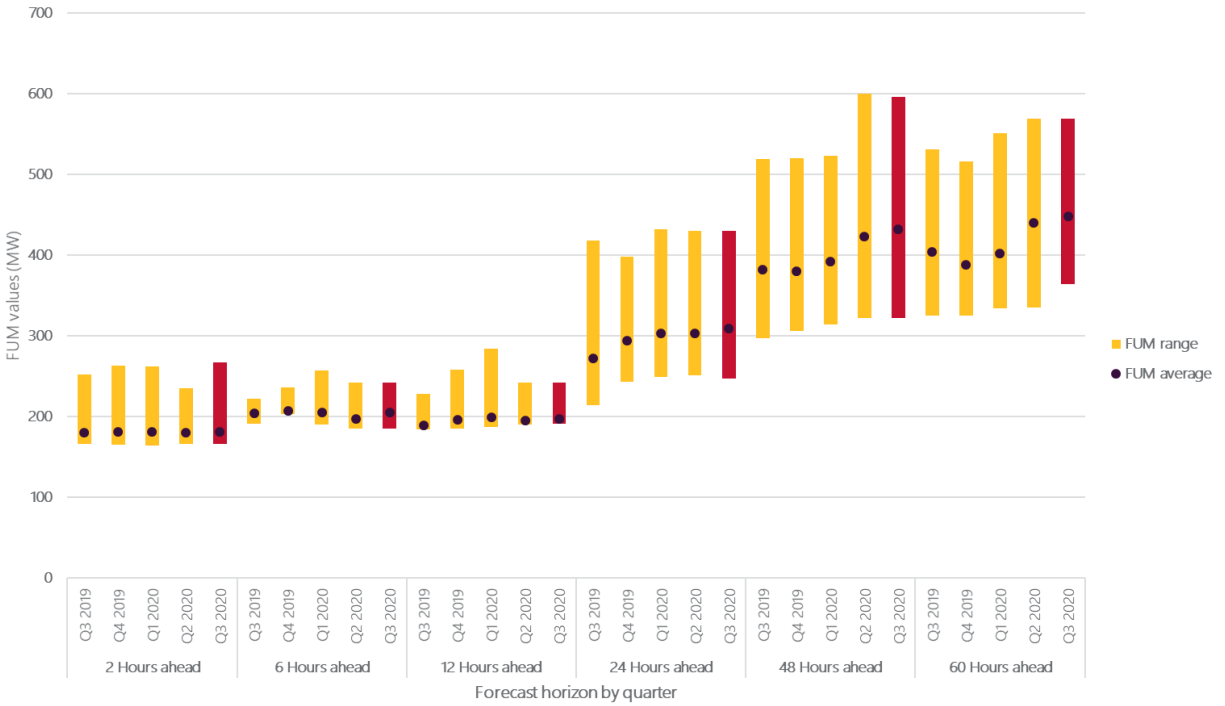


Figure 4 Tasmania region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters

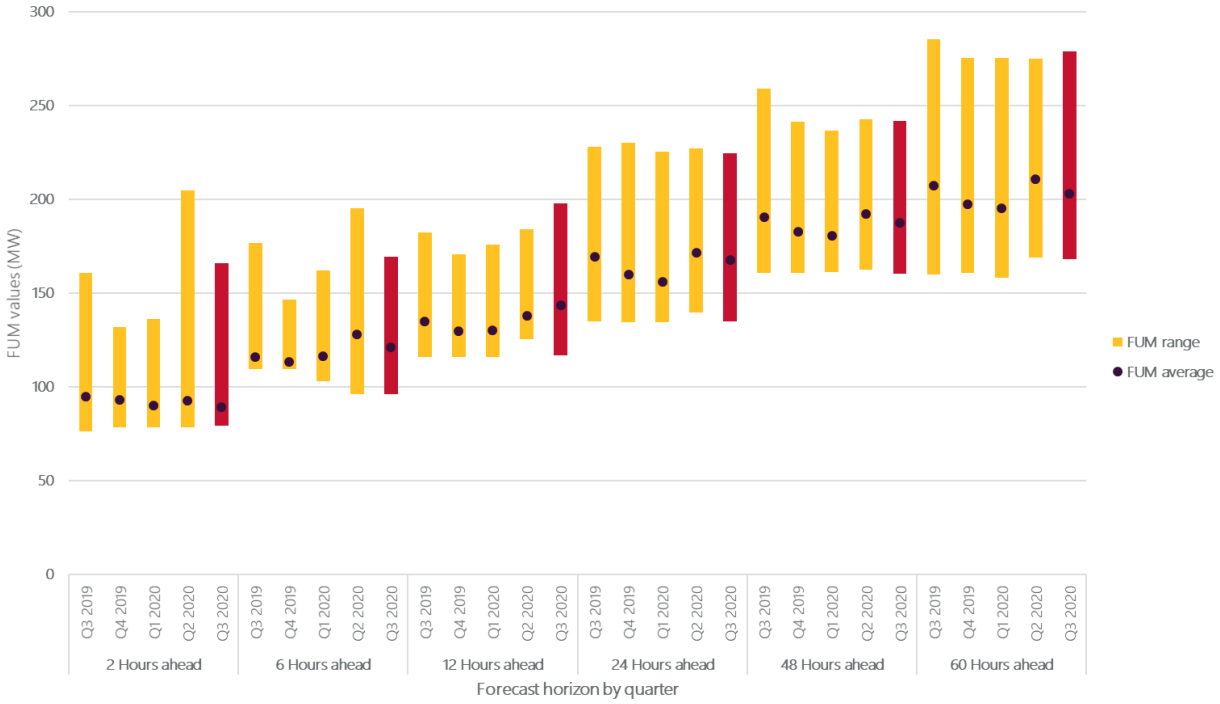
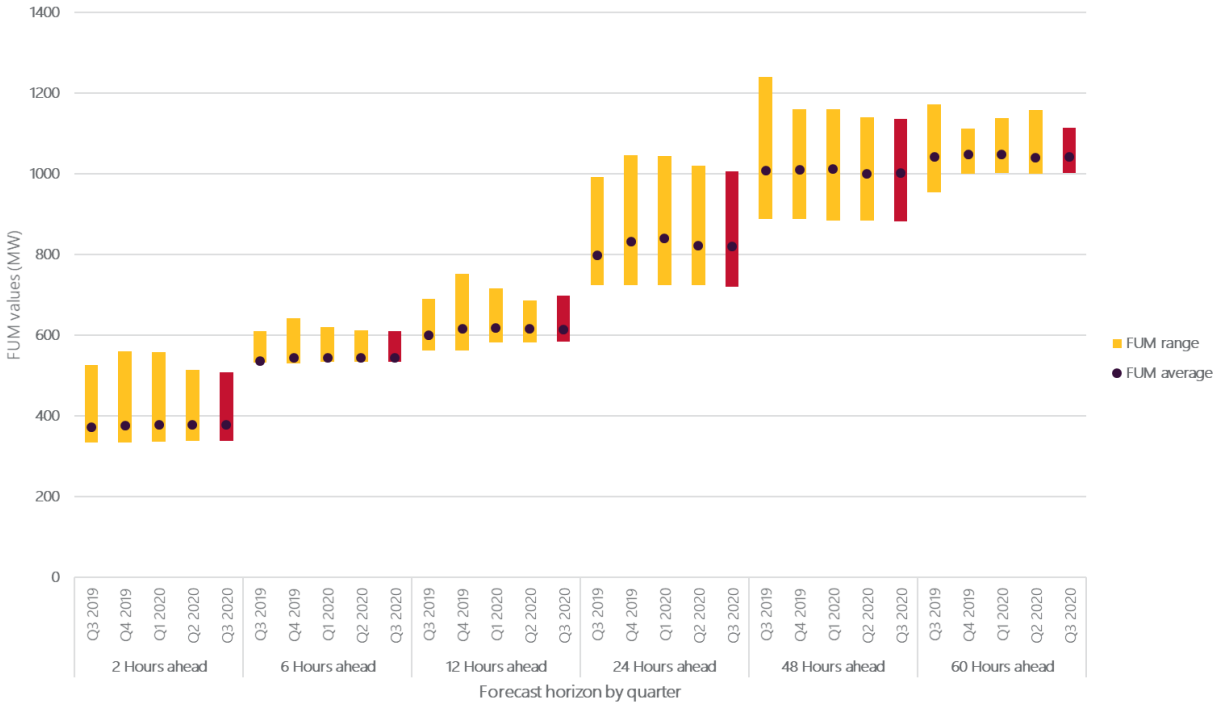


Figure 5 Victoria region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters



4.2 Forecast and actual LOR declarations

A summary of the count and causes of forecast and actual LOR declarations can be found in Table 1 in Section 3 of this report.

During the reporting period 1 July 2020 to 30 September 2020, there were 11 LOR declarations. Of these declarations, seven were for forecast LOR conditions:

- Six forecast declarations were for LOR1 conditions.
- One forecast LOR2 event was declared.
- The one forecast LOR2 condition was set by FUM.

A total of four actual LOR1 declarations were made during the reporting period:

- All four were observed as forecast LOR1 prior to being declared as actual, therefore not counted as forecast declarations based on the declaration count principles outlined in Section 3.
- One actual declaration was forecast in Short Term Projected Assessment of System Adequacy (ST PASA) and three were only forecast in Pre-Dispatch Projected Assessment of System Adequacy shortly before the actual declaration.

During the reporting period, Reliability and Emergency Reserve Trader (RERT) services were not activated.

By comparison, one LOR declaration was made in Quarter 2 2020 (one forecast LOR event) and 17 LOR declarations were made in Quarter 3 2019 (17 forecast LOR events and zero actual LOR events).

As there was only one LOR2 declaration in the reporting period, and it was set by the FUM, the percentage of LOR conditions where the FUM set the reserve requirement is 9%. In Quarter 2 2020 the percentage was 0%, and it was 29% in Quarter 3 2019.

There were no actual LOR2 conditions and no forecast or actual LOR3 conditions during the current reporting period. This outcome indicates that there was sufficient generation to meet demand during Quarter 3 2020.

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

Effective period	LOR1	LOR2	LOR3
New South Wales (NSW)			
24/08/2020	Forecast	Forecast	
25/08/2020	Forecast then Actual		
26/08/2020	Forecast then Actual		
Tasmania (TAS)			
15/07/2020	Forecast		
16/07/2020	Forecast		
07/08/2020	Forecast		
10/08/2020	Forecast then Actual / Forecast		
11/08/2020	Forecast then Actual		
19/08/2020	Forecast		
Queensland (QLD), Victoria (VIC), South Australia (SA)			
Nil			

Note. Yellow shading indicates the requirement was set by the LCR or LCR2, and orange indicates the requirement was set by the FUM.

4.3 LOR declaration of reserve requirement

No forecast or actual LOR3 conditions were declared.

One forecast LOR2 condition was declared.

Ten forecast LOR1 conditions were declared; of these, four resulted in an actual LOR1 condition.

Six forecast LOR1 conditions did not develop into actual LOR conditions, due to market response following the issue of the forecast market notice. The market response generally took the form of increased available generation.

4.4 Number and cause of LOR declarations

As summarised in Table 1, a total of 11 LOR conditions were declared during the current reporting period: seven forecast and four actual LOR conditions.

This is significantly higher than the one LOR declaration recorded in the previous reporting period (1 April to 30 June 2020).

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 in Tasmania.

While demand was higher than the previous quarter, the main driver of most LOR declarations in this reporting period was reduced generation availability coinciding with the higher demand periods.

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 Reserve Level Declaration Guidelines[7] for further information.

Term	Definition
AEMO	Australian Energy Market Operator Limited
BBN	Bayesian Belief Network
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 – the single largest credible risk in the region
LCR2	Largest Credible Risk 2 – 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.
NEM	National Electricity Market
NER	National Electricity Rules
PASA	Projected Assessment of System Adequacy
RERT	Reliability and Emergency Reserve Trader

[7] See AEMO's reserve level declaration guidelines, at https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/reserve-level-declaration-guidelines.pdf