AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

NEM Lack of Reserve Framework Report

January 2021

Reporting period 1 October 2020 to 31 December 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 October 2020 to 31 December 2020.

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VERSION CONTROL

Version	Release date	Changes
1	27 January 2021	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 October 2020 to 31 December 2020 (Quarter 4 2020), AEMO declared 39 Lack of Reserve (LOR) conditions in the National Electricity Market (NEM)[1]:

- There were 15 forecast LOR1 conditions.
- There were 10 forecast LOR2 conditions.
- There were 13 actual LOR1 conditions.
- There was one actual LOR2 condition.

This compares with 11 LOR conditions declared in the previous reporting period (Quarter 3 2020), and 14 LOR conditions declared for the same period last year (Quarter 4 2019)[2].

Quarter 4 2020 covered the later spring months and the first month of summer. Conditions warmed through this period, peaking in December, which saw some heatwaves in Queensland and New South Wales. 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.

The LOR1 and LOR2 declarations in South Australia were forecast conditions due to extreme high demand forecast for a single very hot day (36°C in Adelaide). The conditions were forecast with long lead times, and did not eventuate to actual LOR conditions.

All the LOR declarations in Queensland were forecast LOR conditions, which occurred with long lead times and did not eventuate to actual LOR conditions due to increased generation availablity.

Most LOR conditions declared in New South Wales had effective periods during peak demand times (1600 hrs - 1700 hrs) on days with reduced generation availability. A large number of forecast LOR conditions arose with short lead times and these often turned to actual LOR conditions.

Of the 39 LOR declarations in Quarter 4 2020:

- For 28 declarations, the reserve requirement was set by the sum of the two Largest Credible Risks (LCR2, for LOR1 thresholds). There were four declarations where the reserve requirement was set by the Largest Credible Risk (LCR, for LOR2 thresholds). There were seven declarations where the reserve requirement was set by the Forecast Uncertainty Measurement (FUM), which resulted in forecast LOR2 declarations.
- This means 18% of LOR conditions were declared when the reserve requirement was being set by the FUM. For comparison, in Quarter 3 2020, the one forecast LOR2 condition was set by FUM (9%), and in Quarter 4 2019, three of the 14 (21%) of LOR conditions were set by the FUM.

The next report on the NEM Lack of Reserve Framework, for the reporting period 1 January 2021 to 31 March 2021, will be published by 30 April 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] In Quarter 3 2020, the declared LOR conditions were six forecast LOR1 conditions, one forecast LOR2 condition, four actual LOR1 conditions; in Quarter 4 2019 the declared LOR conditions were five forecast LOR1 conditions, four forecast LOR2 conditions, four actual LOR1 conditions and one actual LOR2 condition. 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 October 2020 to 31 December 2020 (Quarter 4 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 January 2021 to 31 March 2021, will be published by 30 April 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 January 2021 to include data up to 31 December 2020. The retraining involves a three-stage process:

1. Extract-Transform-Load (ETL) stage, to extract historical data up to 31 December 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.

AEMO is in the final stage of retraining, and plans to implement the retrained BBN into production around the end of January 2021, 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 October 2019 to September 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.

Changes in maximum and minimum FUM values between the existing and retrained BBN backcasts are common, as these are sensitive to single events during the retraining quarter. These changes are listed below. Large differences in mean FUM values indicate a sustained change in uncertainty for a particular forecast horizon. Where material changes in the mean FUM have been identified, these have been investigated and investigation results summarised below. Minor changes were identified for some other forecast horizons and distribution statistics but are not listed here.

- New South Wales – maximum FUM values increased by 243 megawatts (MW) for the 60 hours ahead forecast horizons. Mean FUM values increased by 135 MW for the 60 hours ahead and 96 MW for the 24 hours ahead forecast horizons.
  - The significant increase in mean FUM values is mostly attributed to a reduction in generation availability, due to delayed return-to-service (RTS) or unplanned outages, at forecast horizons greater than 24 hours ahead in Q4 2020.
  - The majority of LOR conditions in New South Wales were declared actual events and were forecast with less than 24 hours lead time. Reductions in generation availability within this horizon were the primary cause of many actual LOR conditions, including 12 October, 23 October, 10 December, 11 December, 17 December and 18 December 2020.

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

  - The increased uncertainty in generation availability compared to previous quarters resulted in an increase in FUM when introduced to the model training set.
- Queensland – maximum FUM values increased by 207 MW for the 60 hours ahead and by 26 MW for the 2 hours ahead forecast horizons.
- South Australia – maximum FUM values increased by 234 MW for the 2 hours ahead, 70 MW for the 12 hours ahead, and 59 MW for the 6 hours ahead forecast horizons. Minimum FUM values decreased by 32 MW for the 6 hours ahead forecast horizon.
- Tasmania – maximum FUM values increased by 45 MW for the 6 hours ahead, and decreased by 21 MW for the 12 hours ahead forecast horizons. Mean FUM values increased by 8 MW for the 6 hours ahead and decreased by 8 MW for the 12 hours ahead forecast horizons.
- Victoria – maximum FUM values decreased by 535 MW for the 24 hours ahead forecast horizon, and increased by 194 MW for the 12 hours ahead, 137 MW for the 60 hours ahead and 85 MW for the 6 hours ahead forecast horizons. Minimum FUM values decreased by 42 MW for the 60 hours ahead forecast horizon.

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 October 2020 to 31 December 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 the reporting period, AEMO determined 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 were 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 was 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.

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	
12/10/2020	NSW	1						A forecast LOR1 condition was declared with an effective period of 17:30-18:30 (3 minute lead time) due to sudden decrease in generation availblity. An actual LOR1 was later declared. Actual conditions existed from 17:30-18:30.
23/10/2020	NSW	1						An actual LOR1 was declared. No forecast LOR1 was observed prior to this event. The available reserve level materially decreased in this trading interval due to decreased generation availabity. Actual conditions existed from 16:30-17:30.
26/10/2020	NSW	1						A forecast LOR1 was declared with an effective period 17:30-19:30 (7 hour lead time). The reserve condition was mainly due to a increase in demand forecast. The forecast LOR1 condition was cancelled mainly due to increased generation availablity and decreased forecast demand. A forecast LOR1 was later redeclared with similar effective period (49 minutes lead time) due to sudden decrease in net import and an increase in forecast demand. An actual LOR1 was later declared. Actual conditions existed from 17:30-19:00. The actual LOR1 condition ended slightly earlier than expected due to decreased demand.
16/11/2020	NSW	1			1			A forecast LOR1 and LOR2 were declared on this effective date. Reserve conditions were across the effective period 15:30-18:00 (27 hour lead time). Both reserve conditions were due to reduced net import and a reduced generation availablity. Updates were issued due to worsened reserves for forecast LOR1 and LOR2 conditions due to a further decrease in net import and a decrease in generation availablity. The forecast LOR2 condition was downgraded to LOR1 condition due to a decreased required reserve level set by the FUM. An update was issued for improved LOR condition, LOR1 forecast with an effective period of 15:00-18:30. The forecast LOR1 condition was cancelled due to an increase in net import, an increase in generation availabity only to be later redeclared, the LOR1 condition was redeclared (1 hour lead time) for a similar period due to sudden increase in forecast demand. The forecast LOR1 condition was cancelled for the second time shortly afterwards due to an increase in net import. An actual LOR1 was declared and existed from 15:00-17:30.

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
20/11/2020	NSW		1					A forecast LOR1 was declared with an effective period 16:00-17:00 (40 minute lead time). This reserve condition was mainly due to sudden increase in demand forecast. The forecast LOR1 was cancelled mainly due to a decrease in demand forecast.
28/11/2020	NSW	1						A forecast LOR1 was declared with an effective period 17:00-18:00 (8 hour lead time). The reserve condition was due to an increase in forecast demand and a decrease in generation availablity. A update was issued due to worsened reserves while in forecast LOR1 due to a sudden increase in demand forecast. An actual LOR1 was later declared. Actual conditions existed from 16:30-18:00.
29/11/2020	NSW	1						A forecast LOR1 was declared with an effective period 15:30-17:30 (22 hour lead time). The reserve condition was mainly due to a high demand forecast. The forecast LOR1 condition was cancelled mainly due to increased generation availability and decreased forecast demand. A forecast LOR1 was then later redeclared (12 hour lead time) for the same period due to fluctuating forecast demand. An update was issued due to worsened reserves (6 hour lead time) while in forecast LOR1 due to a sudden increase in demand forecast Actual LOR1 conditions were declared for 16:30-17:30.
1/12/2020	NSW	1			1			A forecast LOR2 was initially declared with an effective time 16:00-17:30 (27 hour lead time). This reserve condition was mainly due to extremely high forecast demand and reduced generation availablity. The forecast LOR2 condition was later downgraded to LOR1 condition due to decreased forecast demand. The LOR1 condition was cancelled and redeclared due to fluctuations in demand forecast and partly due to changes in net import and generation availablity. Actual LOR1 conditions were declared for 17:30-19:00.
4/12/2020	NSW		1					A forecast LOR1 was declared with an effective period 16:30-17:30 (27 hour lead time). The reserve condition was mainly due to an increase in forecast demand and a decrease in generation availablity. The forecast LOR1 was cancelled mainly due to increased generation availability.

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
10/12/2020	NSW	2	1					A forecast LOR1 was declared with an effective period 16:00-17:00 (5 hour lead time). The reserve condition was mainly due to reduced generation availability from a generation event. The forecast LOR1 was cancelled mainly due to increased generation availablity. An actual LOR1 was declared. Prior to this event, no prior forecast LOR1 declaration had not been issued for this effective period. The available reserve level materially decreased in this trading interval due to a decrease in generation availability and demand forecast increased causing an actual LOR1 condition. Actual conditions existed from 13:30-14:00. An actual LOR1 was declared. No forecast LOR1 was observed prior to this event. The available reserve level materially decreased in this trading interval due to significant reduction in generation availability due to a generation event. Actual conditions existed from 22:30-00:00.
11/12/2020	NSW	1						A forecast LOR1 was declared with an effective period 05:30-10:00 (7 hour lead time). The reserve condition was mainly due to reduced generation availability from a generation event. The forecast LOR1 was cancelled mainly due to increased generation availablity. Actual conditions existed from 07:00-09:00. The available reserve level materially decreased in this trading interval due to a decrease in net import and generation availability causing an actual LOR1 condition.
16/12/2020	NSW		1		2			A forecast LOR2 was declared with an effective period 15:00-16:30 (68 hour lead time). The reserve condition was mainly due to reduced generation availability. The forecast LOR2 condition was cancelled mainly due to increased generation availability. Two separate forecast LOR2 conditions were declared along with LOR1 conditions with an effective period 8:30-16:30 (44 hour lead time). The reserve condition was mainly due to reduced generation availability. The forecast LOR2 conditions were downgraded to LOR1 condition due to a decreased required reserve level set by the FUM. An update was issued for improved LOR condition, LOR1 forecast with an effective period of 16:00-16:30 (24 hour lead time). A number of updates and cancellations, redeclarations were issued due to fluctuations in net import, demand forecast. The LOR1 condition was cancelled due to increased generation availability.

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
17/12/2020	NSW	1		1				A forecast LOR1 was declared with an effective period 16:00-18:00 (9 hour lead time). The reserve condition was mainly due to reduced generation availability from a generation event. The forecast effective period changed in subsequent updates due to fluctuating generation availability. LOR1 condition was upgraded to LOR2 condition (1 hour lead time) as reserves worsened due to an increase in forecast demand and a decrease in net import. Actual LOR1 and LOR2 conditions existed from 14:30-18:30. The available reserve level materially decreased in this trading interval due to a decrease in net import and generation availability. Actual LOR2 conditions were declared for 17:00-18:00.
18/12/2020	NSW	2						A forecast LOR1 was declared with an effective period 13:00-14:00 (4 hour lead time). The reserve condition was mainly due to reduced generation availability and sudden large increase in forecast demand. An actual LOR1 was later declared at 9:00 and expected to end at 14:30. Actual conditions existed from 9:00-11:30. The actual LOR1 condition ended earlier than expected due to decreased forecast demand. A forecast LOR1 was declared with an effective period 15:30-16:30 (1 hour lead time). The reserve condition was mainly due to adecrease in net import. Actual conditions existed from 14:30-15:30. The available reserve level materially decreased in this trading interval due to a decrease in net import and increase in demand forecast causing an actual LOR1 condition. The forecast and actual LOR1 conditions were cancelled due to increased net import and decreased forecast demand.
05/11/2020	QLD		1					A forecast LOR1 condition was declared with an effective period of 16:30-17:00 (145 hours lead time) due to reduced net import and slight increase in forecast demand. The forecast LOR1 condition was cancelled due to increased net import.
30/11/2020[B]	QLD		2		1			Two separate forecast LOR1 events were declared on the effective date, with an effective period of 14:30-16:00 (166 hours lead time) and 18:00-19:30 (170 hours lead time). The reserve conditions for both events were mainly due to increase in forecast demand and reduced net import. A forecast LOR2 was also declared with an effective period of 14:00-20:00 (165 hours lead time) due to increase in forecast demand and reduced net import. The forecast LOR1 and LOR2 conditions were cancelled due to increased generation availability.

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
01/12/2020	QLD		1		1			A forecast LOR1 event was declared with an effective period of 13:30-19:00 (166 hours lead time) due to decreased generation availability, increase in forecast demand and reduced net import. A forecast LOR1 was later redeclared with an effective period of 18:30-19:00 (6 hours lead time) due to decreased generation availability. The forecast effective period changed in subsequent updates due to fluctuating generation availability and net import. A forecast LOR2 was also declared with an effective period of 15:30-16:00 (168 hours lead time) due to decreased generation availability, increase in forecast demand and reduced net import. A forecast LOR2 was later redeclared for the similar period due to decreased generation availability, reduced net import and slight increase in forecast demand. The forecast LOR1 and LOR2 conditions were cancelled due to increased generation availability.
02/12/2020	QLD		2		1			Two separate forecast LOR1 events were declared on the effective date, with an effective period of 12:00-13:30 (164 hours lead time) and 16:00-21:00 (168 hours lead time). The reserve conditions for both events were mainly due to increase in forecast demand. The forecast effective period changed in subsequent updates due to fluctuating generation availability. Four more forecast LOR1 conditions were later redeclared with similar forecast effective periods due to fluctuating generation availability and forecast demand. A forecast LOR2 was declared with an effective period of 14:00-19:00 (166 hours lead time) due to increase in forecast demand and reduced net import. A forecast LOR2 was later redeclared with an effective period of 15:30-16:00 (99 hours lead time) due to decreased generation availability, reduced net import and slight increase in forecast demand. The forecast effective period changed in subsequent updates due to fluctuating generation availability, forecast demand and net import. The forecast LOR1 and LOR2 conditions were cancelled due to increased generation availability.
04/12/2020	QLD		1		1			A forecast LOR1 condition was declared with an effective period of 15:30-16:00 (49 hours lead time) due to reduced net import. A forecast LOR2 condition was later declared based on a different run with an effective period of 15:30-16:00 (41 hours lead time) due to reduced net import. The forecast LOR1 and LOR2 conditions were cancelled due to increased generation availability and increase in net import.

Effective date[A]	Region	LOR1		LOR2		LOR3		Cause and resolution
		Actual	Forecast	Actual	Forecast	Actual	Forecast	
06/12/2020	QLD		1					A forecast LOR1 condition was declared with an effective period of 17:00-20:00 (145 hours lead time) due to increase in forecast demand and decreased generation availability. A forecast LOR1 was later redeclared with an effective period of 17:00-19:30 (28 hours lead time) due to fluctuating generation availability and forecast demand. The forecast LOR1 condition was cancelled due to increased generation availability.
07/12/2020	QLD		1		1			A forecast LOR1 condition was declared with an effective period of 10:30-17:00 (140 hours lead time) due to increase in forecast demand and reduced net import. Two forecast LOR1 conditions were later redeclared with the effective period of 13:00-14:30 (24 hours lead time) and 16:30-17:00 (27.5 hours lead time) due to reduced net import and slight increase in forecast demand. A forecast LOR2 condition was also declared with an effective period of 15:00-17:30 (50 hours lead time) due to increase in forecast demand. The forecast LOR1 and LOR2 conditions were cancelled due to increased generation availability.
22/12/2020	QLD		1					A forecast LOR1 condition was declared with an effective period of 16:30-19:30 (28 hours lead time) due to decreased generation availability and increase in forecast demand. The forecast effective period changed in subsequent updates due to fluctuating generation availability. The forecast LOR1 condition was cancelled due to increased generation availability.
14/12/2020	SA		1		1			A forecast LOR1 condition was declared with an effective period of 18:30-19:30 (164 hours lead time) due to extremely high forecast demand and reduced net import. A forecast LOR2 condition was also declared later with an effective period of 18:00-19:00 (99 hours lead time) due to extremely high forecast demand and reduced net import. The forecast LOR1 and LOR2 conditions were cancelled due to increased net import and a decrease in forecast demand.
Total		**13**	**15**	**1**	**10**	**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 same effective date. Because there were two effective time periods of LOR for the effective date, these have been counted as two separate LOR conditions.

Table 2 LOR notices declared during the reporting period 1 October to 31 December 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									
12/10/2020 17:30 - 18:30	78725	12/10/2020 17:26	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availablity.	1,360	1,217	356	LCR2
12/10/2020 17:30 - 18:30	78726	12/10/2020 17:52	LOR1	Actual	Actual LOR1 declared. Significant generation availability decreased quickly causing an actual LOR1 condition.	1,360	1,258	213	LCR2
12/10/2020	78728	12/10/2020 18:37	LOR1	Cancelled	This cancelled MN 78726. Actual LOR1 cancelled as condition cleared after effective period.	1,380	1,698	213	LCR2
23/10/2020 16:30 - 17:30	79130	23/10/2020 16:27	LOR1	Actual	Actual LOR1 declared. Significant generation availability decreased quickly causing an actual LOR1 condition. A forecast LOR1 was not observed prior to this event.	1,380	1,207	328	LCR2
23/10/2020	79137	23/10/2020 19:00	LOR1	Cancelled	This cancelled MN 79130. Actual LOR1 cancelled as condition cleared after effective period.	1,380	1,441	213	LCR2
26/10/2020 17:30 - 19:30	79262	26/10/2020 10:19	LOR1	Forecast	Forecast LOR1 declared due to sudden increase in forecast demand.	1,481	1,220	688	LCR2
26/10/2020	79273	26/10/2020 14:42	LOR1	Cancelled	This cancelled MN 79262. Forecast LOR1 cancelled due to increased generation availablity and decreased forecast demand.	1,416	1,493	603	LCR2
26/10/2020 17:30 - 19:30	79279	26/10/2020 16:41	LOR1	Forecast	Forecast LOR1 declared due to sudden decrease in net import and an increase in forecast demand.	1,423	1,233	429	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		
26/10/2020 17:30 - 19:00	79292	26/10/2020 17:41	LOR1	Actual	Actual LOR1 declared. Significant net import decreased causing an actual LOR1 condition.	1,444	1,313	345	LCR2
26/10/2020	79295	26/10/2020 18:09	LOR1	Cancelled	This cancelled MN 79292. Actual LOR1 cancelled due to decreased forecast demand and condition cleared after effective period.	1,450	1,479	328	LCR2
16/11/2020 15:30 - 17:00	79939	15/11/2020 12:55	LOR2	Forecast	Forecast LOR2 declared due to a decrease in net import and a decrease in generation availablity.	1,228	1,126	1,228	FUM
16/11/2020 17:00 - 18:00	79940	15/11/2020 12:56	LOR1	Forecast	Forecast LOR1 declared due to a decrease in net import and a decrease in generation availablity.	1,437	1,325	1,227	LCR2
16/11/2020 16:30 - 17:30	79942	15/11/2020 14:57	LOR2	Update	Update to MN 79939 due to change in effective period. LOR2 condition worsened due to a further decrease in net import and a decrease in generation availablity	1,076	1,004	1,076	FUM
16/11/2020 15:00 - 16:30, 17:30 - 18:30	79941	15/11/2020 14:55	LOR1	Update	Update to MN 79940 due to change in effective period. LOR1 condition worsened due to a further decrease in net import and a decrease in generation availablity	1,437	1,089	1,077	LCR2
16/11/2020	79948	15/11/2020 18:39	LOR2	Cancelled	This cancelled MN 79942. Forecast LOR2 cancelled due to a decrease in FUM.	914	1,053	914	FUM
16/11/2020 15:00 - 18:30	79949	15/11/2020 18:48	LOR1	Update	Update to MN 79941 due to change in effective period. LOR2 period downgraded to LOR1 as FUM decreased (FUM was setting the LOR2 trigger level). The number of trading intervals in Forecast LOR1 materially increased.	1,467	1,053	914	LCR2
16/11/2020 15:00 - 18:00	79955	16/11/2020 00:37	LOR1	Update	Update to MN 79949 due to change in effective period. LOR1 condition improved due to slight increase in available generation.	1,476	1,133	709	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		
16/11/2020	79990	16/11/2020 08:27	LOR1	Cancelled	This cancelled MN 79955. Forecast LOR1 cancelled due to an increase in net import, increase in available generation and a slight decrease in forecasted demand.	1,340	1,411	721	LCR2
16/11/2020 15:30 - 16:00	80040	16/11/2020 14:25	LOR1	Forecast	Forecast LOR1 declared due to sudden increase in forecast demand.	1,340	1,279	473	LCR2
16/11/2020	80041	16/11/2020 14:53	LOR1	Cancelled	This cancelled MN 80040. Forecast LOR1 cancelled due to an increase in net import.	1,340	1,354	406	LCR2
16/11/2020 15:00 - 17:00	80043	16/11/2020 15:26	LOR1	Actual	Actual LOR1 declared. Generation availability decreased and demand forecast increased causing an actual LOR1 condition.	1,320	766	242	LCR2
16/11/2020 15:00 - 17:30	80051	16/11/2020 16:19	LOR1	Update	Update to MN 80043 due to change in effective period. Actual LOR1 condition effective period extended due to increase in forecast demand.	1,360	945	242	LCR2
16/11/2020	80059	16/11/2020 17:30	LOR1	Cancelled	This cancelled MN 80051. Actual LOR1 cancelled as condition cleared after effective period.	1,360	1,559	222	LCR2
20/11/2020 16:00 - 17:00	80168	20/11/2020 15:19	LOR1	Forecast	Forecast LOR1 declared due to sudden increase in forecast demand.	1,400	1,184	450	LCR2
20/11/2020	80178	20/11/2020 16:14	LOR1	Cancelled	This cancelled MN 80168. Forecast LOR1 cancelled due to decreased forecast demand.	1,428	1,776	390	LCR2
28/11/2020 17:00 - 18:00	80399	28/11/2020 08:43	LOR1	Forecast	Forecast LOR1 declared due to an increase in forecast demand and a decrease in generation availablity.	1,340	1,215	837	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		
28/11/2020 16:30 - 18:30, 19:00 - 19:30	80405	28/11/2020 12:20	LOR1	Update	Update to MN 80399 due to change in effective period. LOR1 condition worsened due to a sudden increase in demand forecast.	1,360	1,082	624	LCR2
28/11/2020 16:30 - 18:00	80420	28/11/2020 17:01	LOR1	Actual	Actual LOR1 declared due to increase in forecast demand.	1,320	1,286	213	LCR2
28/11/2020	80429	28/11/2020 17:22	LOR1	Cancelled	This cancelled MN 80420. Actual LOR1 cancelled as condition cleared after effective period.	1,340	1,489	213	LCR2
28/11/2020	80430	28/11/2020 17:26	LOR1	Cancelled	This cancelled MN 80405. Forecast LOR1 cancelled due to increased generation availability.	1,340	1,489	213	LCR2
29/11/2020 15:30 - 17:30	80431	28/11/2020 17:40	LOR1	Forecast	Forecast LOR1 declared due to a sudden increase in forecast demand.	1,360	1,243	971	LCR2
29/11/2020	80433	28/11/2020 19:47	LOR1	Cancelled	This cancelled MN 80431. Forecast LOR1 cancelled due to increased generation availablity and decreased forecast demand.	1,360	1,497	787	LCR2
29/11/2020 15:30 - 17:30	80477	29/11/2020 3:09	LOR1	Forecast	Forecast LOR1 declared due to gradual and furture increase in forecast demand.	1,360	1,277	653	LCR2
29/11/2020 15:00 - 17:30	80481	29/11/2020 9:11	LOR1	Update	Update to MN 80431. Effective period in forecast LOR1 increased and available reserve decreased due to decreased generation availability and increasing demand forecast.	1,360	1,022	741	LCR2
29/11/2020 16:30 - 17:30	80502	29/11/2020 16:59	LOR1	Actual	Actual LOR1 declared. Generation availability decreased causing am actual LOR1 condition.	1,320	1,162	213	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		
29/11/2020	80503	29/11/2020 17:10	LOR1	Cancelled	This cancelled MN 80502. Actual LOR1 cancelled due to decreased forecast demand and condition cleared after effective period.	1,360	2,044	213	LCR2
1/12/2020 16:00 - 17:30	80507	30/11/2020 12:52	LOR2	Forecast	Forecast LOR2 declared due to extremely high forecasted demand and reduced generation availablity.	1,162	903	1,162	FUM
1/12/2020	80518	30/11/2020 19:56	LOR2	Cancelled	This cancelled MN 80507. Forecast LOR2 cancelled due to decreased forecast demand.	969	1,050	969	FUM
1/12/2020 16:00 - 18:00	80519	30/11/2020 20:00	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	1,360	1,050	969	LCR2
1/12/2020	80536	01/12/2020 10:42	LOR1	Cancelled	This cancelled MN 80519. Forecast LOR1 cancelled due to decreased forecast demand.	1,360	1,448	710	LCR2
1/12/2020 17:00 - 19:00	80587	01/12/2020 16:59	LOR1	Forecast	Forecast LOR1 declared due to a decrease in net import and a decrease in generation availablity.	1,458	1,087	372	LCR2
1/12/2020 17:30 - 19:00	80602	01/12/2020 17:32	LOR1	Actual	Actual LOR1 declared. Net import and generation availability decreased causing an actual LOR1 condition.	1,447	1,340	213	LCR2
1/12/2020	80604	01/12/2020 18:06	LOR1	Cancelled	This cancelled MN 80602. Actual LOR1 cancelled due to decreased forecast demand and condition cleared after effective period.	1,436	1,555	213	LCR2
4/12/2020 16:30 - 17:30	80671	03/12/2020 14:00	LOR1	Forecast	Forecast LOR1 declared due to an increase in forecast demand and a decrease in generation availablity.	1,445	1,379	1,151	LCR2
4/12/2020	80675	03/12/2020 16:04	LOR1	Cancelled	This cancelled MN 80671. Forecast LOR1 cancelled due to increased generation availability.	1,448	1,793	936	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		
10/12/2020 16:00 - 17:00	80984	10/12/2020 10:37	LOR1	Forecast	Forecast LOR1 declared due to sudden decreased generation availablity.	1,422	1,238	649	LCR2
10/12/2020	80985	10/12/2020 12:38	LOR1	Cancelled	This cancelled MN 80984. Forecast LOR1 cancelled due to increased generation availablity.	1,421	1,508	590	LCR2
10/12/2020 13:30 - 14:00	80988	10/12/2020 13:52	LOR1	Actual	Actual LOR1 declared. Generation availability decreased and demand forecast increased causing an actual LOR1 condition.	1,360	1,322	222	LCR2
10/12/2020	80989	10/12/2020 14:20	LOR1	Cancelled	This cancelled MN 80988. Actual LOR1 cancelled due to increased generation availablity and condition cleared after effective period.	1,427	1,454	497	LCR2
10/12/2020 22:30 - 24:00	80999	10/12/2020 22:44	LOR1	Actual	Actual LOR1 declared. Significant generation availability decreased quickly causing an actual LOR1 condition. A forecast LOR1 was not observed prior to this event.	1,300	944	213	LCR2
10/12/2020	81002	11/12/2020 00:12	LOR1	Cancelled	This cancelled MN 80999. Actual LOR1 cancelled as condition cleared after effective period.	1,320	1,476	213	LCR2
11/12/2020 05:30 - 10:00	81001	10/12/2020 22:56	LOR1	Forecast	Forecast LOR1 declared due to sudden decreased generation availablity.	1,340	984	636	LCR2
11/12/2020	81006	11/12/2020 05:43	LOR1	Cancelled	This cancelled MN 81001. Forecast LOR1 cancelled due to increased generation availablity.	1,340	1,407	388	LCR2
11/12/2020 07:00 - 07:30	81010	11/12/2020 07:18	LOR1	Actual	Actual LOR1 declared. Net import and generation availability decreased causing an actual LOR1 condition.	1,340	1,311	222	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		
11/12/2020	81012	11/12/2020 07:41	LOR1	Cancelled	This cancelled MN 80420. Actual LOR1 cancelled as condition cleared after effective period.	1,340	1,381	222	LCR2
11/12/2020 08:00 - 09:00	81026	11/12/2020 08:21	LOR1	Actual	Actual LOR1 declared. Net import and generation availability decreased causing an actual LOR1 condition.	1,340	1,258	222	LCR2
11/12/2020	81036	11/12/2020 08:38	LOR1	Cancelled	This cancelled MN 80420. Actual LOR1 cancelled as condition cleared after effective period.	1,340	1,363	213	LCR2
16/12/2020 15:00 - 16:30	81125	13/12/2020 19:27	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availablity.	1,278	1,246	1,278	FUM
16/12/2020	81128	13/12/2020 21:26	LOR2	Cancelled	This cancelled MN 81125. Forecast LOR2 cancelled due to increased generation availablity.	1,303	2,136	1,303	FUM
16/12/2020 10:00 - 12:00	81150	14/12/2020 13:55	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availablity.	1,477	1,072	1,477	FUM
16/12/2020 12:30 - 15:00	81150	14/12/2020 13:55	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availablity.	1,373	1,301	1,373	FUM
16/12/2020 8:30 - 10:30	81153	14/12/2020 14:51	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availablity.	1,465	1,381	1,331	LCR2
16/12/2020 12:30 - 13:00	81153	14/12/2020 14:51	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availablity.	1,469	1,368	1,364	LCR2
16/12/2020 15:00 - 16:30	81153	14/12/2020 14:51	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availablity.	1,483	1,422	1,398	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		
16/12/2020 11:30 - 12:00	81155	14/12/2020 16:46	LOR2	Update	Update to MN 81150 due to change in effective period. Effective period decreased only because of reduction in FUM, the reserve did not change much.	1,249	1,151	1,249	FUM
16/12/2020	81171	14/12/2020 23:19	LOR2	Cancelled	This cancelled MN 81155. Forecast LOR2 cancelled due to decrease in FUM.	1,043	1,240	1,043	FUM
16/12/2020 13:30 - 16:30	81172	14/12/2020 23:27	LOR1	Update	Update to MN 81153 due to change in effective period. LOR2 period downgraded to LOR1 as FUM decreased – the FUM was setting the LOR2 trigger level.	1,476	1,240	1,043	LCR2
16/12/2020	81186	15/12/2020 14:51	LOR1	Cancelled	This cancelled MN 81172. Forecast LOR1 cancelled as ST PASA moved on to the next day. Effective period no longer simulated in STPASA.	NA	NA	NA	NA
16/12/2020 16:00 - 16:30	81201	15/12/2020 15:51	LOR1	Forecast	Forecast LOR1 declared due to decrease in net import.	1,479	1,448	928	LCR2
16/12/2020 15:30 - 17:30	81247	16/12/2020 13:51	LOR1	Update	Update to MN 81201 due to change in effective period. Forecast LOR1 condition worsened due to a gradual increase in demand forecast.	1,441	1,242	571	LCR2
16/12/2020 16:30 - 17:00	81257	16/12/2020 15:20	LOR1	Update	Update to MN 81247 due to change in effective period. Forecast LOR1 condition improved due to an increase in generation availablity.	1,409	1,362	493	LCR2
16/12/2020	81263	16/12/2020 16:52	LOR1	Cancelled	This cancelled MN 81257. Forecast LOR1 cancelled due to increased generation availablity.	1,370	1,587	450	LCR2
17/12/2020 16:00 - 18:00	81289	17/12/2020 07:29	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availablity.	1,449	1,336	719	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		
17/12/2020 15:30 - 18:00	81298	17/12/2020 12:49	LOR1	Update	Update to MN 81201 due to change in effective period. Forecast LOR1 condition worsened due to a sudden decrease in generation availablity.	1,415	1,160	590	LCR2
17/12/2020 15:30 - 17:30	81318	17/12/2020 14:11	LOR2	Forecast	Forecast LOR2 declared due to an increase in forecast demand and a decrease in net import.	743	471	519	LCR2
17/12/2020 14:30 - 15:30, 17:30 - 20:00	81331	17/12/2020 14:35	LOR1	Actual	Actual LOR1 declared.	814	686	382	LCR2
17/12/2020	81344	17/12/2020 16:47	LOR2	Cancelled	This cancelled MN 81318. Forecast LOR2 cancelled due to decreased forecast demand.	680	692	213	LCR
17/12/2020 17:00 - 18:30	81347	17/12/2020 17:19	LOR2	Actual	Actual LOR2 declared. Net import and generation availability decreased causing an actual LOR2 condition.	680	588	213	LCR
17/12/2020	81366	17/12/2020 18:09	LOR2	Cancelled	This cancelled MN 81347. Actual LOR2 cancelled as condition cleared after effective period.	776	905	213	LCR
17/12/2020	81376	17/12/2020 20:42	LOR1	Cancelled	This cancelled MN 81331. Actual LOR1 cancelled as condition cleared after effective period.	1,465	1,525	213	LCR2
18/12/2020 13:00 - 14:00	81381	18/12/2020 08:42	LOR1	Forecast	Forecast LOR1 declared due to sudden large increase in forecast demand and gradual decrease in generation availablity.	1,442	1,324	721	LCR2
18/12/2020 9:00 - 14:30	81382	18/12/2020 09:08	LOR1	Actual	Actual LOR1 declared. Generation availability decreased and demand forecast increased suddenly causing an actual LOR1 condition at short notice.	1,451	925	268	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		
18/12/2020	81406	18/12/2020 11:43	LOR1	Cancelled	This cancelled MN 80602. Actual LOR1 cancelled due to decreased forecast demand.	1,424	1,544	450	LCR2
18/12/2020	81407	18/12/2020 11:49	LOR1	Cancelled	This cancelled MN 80602. Forecast LOR1 cancelled due to decreased forecast demand.	1,424	1,544	450	LCR2
18/12/2020 15:30 - 16:30	81425	18/12/2020 14:12	LOR1	Forecast	Forecast LOR1 declared due to decrease in net import.	1,438	1,329	466	LCR2
18/12/2020 14:30 - 16:30	81430	18/12/2020 14:38	LOR1	Actual	Actual LOR1 declared. Net import decreased and demand forecast increased causing an actual LOR1 condition.	1,453	1,274	213	LCR2
18/12/2020	81433	18/12/2020 15:44	LOR1	Cancelled	This cancelled MN 81430. Actual LOR1 cancelled due to increased net import and decreased forecast demand.	1,467	1,614	372	LCR2
18/12/2020	81434	18/12/2020 15:48	LOR1	Cancelled	This cancelled MN 81425. Forecast LOR1 cancelled due to increased net import and decreased forecast demand.	1,467	1,614	372	LCR2
Queensland region									
05/11/2020 16:30 - 17:00	79475	30/10/2020 15:39	LOR1	Forecast	Forecast LOR1 declared due to reduced net import and slight increase in forecast demand.	797	756	n/a – forecast > 72 hrs ahead	LCR2
05/11/2020	79511	31/10/2020 16:36	LOR1	Cancelled	This cancelled MN 79475. Forecast LOR1 cancelled due to increased net import.	763	863	n/a – forecast > 72 hrs ahead	LCR2
30/11/2020 14:30 - 16:00	80269	23/11/2020 16:05	LOR1	Forecast	Forecast LOR1 declared due to increase in forecast demand and reduced net import.	870	756	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		
30/11/2020 18:00 - 19:30	80269	23/11/2020 16:05	LOR1	Forecast	Forecast LOR1 declared due to increase in forecast demand and reduced net import.	700	588	n/a – forecast > 72 hrs ahead	LCR2
30/11/2020 14:00 - 20:00	80270	23/11/2020 17:15	LOR2	Forecast	Forecast LOR2 declared due to increase in forecast demand and reduced net import.	406	187	n/a – forecast > 72 hrs ahead	LCR
30/11/2020	80282	24/11/2020 13:07	LOR2	Cancelled	This cancelled MN 80270. Forecast LOR2 cancelled due to increased generation availability.	420	1191	n/a – forecast > 72 hrs ahead	LCR
30/11/2020 15:30 - 16:00	80287	24/11/2020 15:54	LOR1	Update	Update to MN 80269. Effective period in forecast LOR1 decreased due to increased generation availability.	840	636	n/a – forecast > 72 hrs ahead	LCR2
30/11/2020 15:30 - 16:00	80325	25/11/2020 16:20	LOR1	Update	Update to MN 80287. Forecast reserve increased due to slight decrease in forecast demand.	840	666	n/a – forecast > 72 hrs ahead	LCR2
30/11/2020 15:30 - 16:00	80356	26/11/2020 15:47	LOR1	Update	Update to MN 80325. Forecast reserve increased due to slight decrease in forecast demand.	840	740	n/a – forecast > 72 hrs ahead	LCR2
01/12/2020 15:30 - 16:00	80294	24/11/2020 15:56	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availability, increase in forecast demand and reduced net import.	570	464	n/a – forecast > 72 hrs ahead	LCR
01/12/2020 13:30 - 19:00	80296	24/11/2020 15:56	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability, increase in forecast demand and reduced net import.	830	415	n/a – forecast > 72 hrs ahead	LCR2
01/12/2020 13:30 - 19:30	80325	25/11/2020 16:20	LOR1	Update	Update to MN 80296. Effective period in forecast LOR1 increased due to slight decrease in net import.	816	408	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		
01/12/2020 15:30 - 18:30	80356	26/11/2020 15:47	LOR1	Update	Update to MN 80325. Effective period in forecast LOR1 decreased due to increased generation availability.	840	681	n/a – forecast > 72 hrs ahead	LCR2
01/12/2020	80318	25/11/2020 08:55	LOR2	Cancelled	This cancelled MN 80294. Forecast LOR2 cancelled due to increased generation availability.	420	496	n/a – forecast > 72 hrs ahead	LCR
01/12/2020 15:30 - 16:00	80320	25/11/2020 11:23	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availability, reduced net import and slight increase in forecast demand.	570	536	n/a – forecast > 72 hrs ahead	LCR
01/12/2020	80323	25/11/2020 13:18	LOR2	Cancelled	This cancelled MN 80320. Forecast LOR2 cancelled due to increased generation availability.	411	411	n/a – forecast > 72 hrs ahead	LCR
01/12/2020 18:30 - 19:00	80542	01/12/2020 11:53	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	732	725	403	LCR2
01/12/2020 17:00 - 19:00	80552	01/12/2020 12:47	LOR1	Update	Update to MN 80542. Effective period in forecast LOR1 increased due to decreased generation availability.	700	601	418	LCR2
01/12/2020	80561	01/12/2020 15:03	LOR1	Cancelled	This cancelled MN 80552. Forecast LOR1 cancelled due to increased generation availability.	728	737	408	LCR2
02/12/2020 14:00 - 19:00	80327	25/11/2020 16:19	LOR2	Forecast	Forecast LOR2 declared due to increase in forecast demand and reduced net import.	570	151	n/a – forecast > 72 hrs ahead	LCR
02/12/2020 12:00 - 13:30	80325	25/11/2020 16:20	LOR1	Forecast	Forecast LOR1 declared due to increase in forecast demand.	844	422	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		
02/12/2020 16:00 - 21:00	80325	25/11/2020 16:20	LOR1	Forecast	Forecast LOR1 declared due to increase in forecast demand.	734	367	n/a – forecast > 72 hrs ahead	LCR2
02/12/2020 14:30 - 18:00	80334	26/11/2020 08:43	LOR2	Update	Update to MN 80327. Effective period in forecast LOR2 decreased due to increased generation availability.	570	30	n/a – forecast > 72 hrs ahead	LCR
02/12/2020 15:30 - 16:00	80340	26/11/2020 11:26	LOR2	Update	Update to MN 80334. Effective period in forecast LOR2 decreased due to increased generation availability.	570	324	n/a – forecast > 72 hrs ahead	LCR
02/12/2020 13:30 - 19:30	80356	26/11/2020 15:47	LOR1	Update	Update to MN 80325. Effective period in forecast LOR1 decreased due to increased generation availability.	700	375	n/a – forecast > 72 hrs ahead	LCR2
02/12/2020	80358	26/11/2020 16:50	LOR2	Cancelled	This cancelled MN 80340. Forecast LOR2 cancelled due to increased generation availability.	420	480	n/a – forecast > 72 hrs ahead	LCR
02/12/2020 15:00 - 16:00	80367	27/11/2020 11:07	LOR1	Update	Update to MN 80356. Effective period in forecast LOR1 decreased due to increased generation availability.	840	535	n/a – forecast > 72 hrs ahead	LCR2
02/12/2020 15:00 - 16:00	80372	27/11/2020 14:54	LOR1	Update	Update to MN 80367. Forecast reserve decreased due to slight increase in forecast demand.	761	380	n/a – forecast > 72 hrs ahead	LCR2
02/12/2020 15:30 - 16:00	80407	28/11/2020 12:38	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availability, reduced net import and slight increase in forecast demand.	570	557	n/a – forecast > 72 hrs ahead	LCR
02/12/2020 14:00 - 15:30	80412	28/11/2020 14:54	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability, reduced net import and slight increase in forecast demand.	700	353	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		
02/12/2020 16:30 - 17:30	80412	28/11/2020 14:54	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability and slight increase in forecast demand.	700	661	n/a – forecast > 72 hrs ahead	LCR2
02/12/2020	80462	29/11/2020 00:24	LOR2	Cancelled	This cancelled MN 80407. Forecast LOR2 cancelled due to increased generation availability.	520	520	n/a – forecast > 72 hrs ahead	LCR
02/12/2020 15:30 - 16:00	80500	29/11/2020 15:29	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability and slight increase in forecast demand.	700	556	n/a – forecast > 72 hrs ahead	LCR2
02/12/2020 15:00 - 16:00	80505	30/11/2020 06:38	LOR2	Forecast	Forecast LOR2 declared due to increase in forecast demand.	680	449	679	LCR
02/12/2020	80511	30/11/2020 15:43	LOR1	Cancelled	This cancelled MN 80500. Forecast LOR1 cancelled due to increased generation availability.	700	477	644	LCR2
02/12/2020 14:00 - 18:30	80553	01/12/2020 12:59	LOR2	Forecast	Forecast LOR2 declared due to decreased generation availability.	618	190	618	FUM
02/12/2020 18:30 - 19:00	80554	01/12/2020 13:15	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	826	622	585	LCR2
02/12/2020 14:00 - 18:00	80564	01/12/2020 15:27	LOR2	Update	Update to MN 80553. Effective period in forecast LOR1 decreased due to increased generation availability.	640	347	640	FUM
02/12/2020	80592	01/12/2020 17:25	LOR2	Cancelled	This cancelled MN 80564. Forecast LOR2 cancelled due to increased generation availability.	643	1,339	643	FUM
02/12/2020	80601	01/12/2020 17:26	LOR1	Cancelled	This cancelled MN 80554. Forecast LOR1 cancelled due to increased generation availability.	700	1,338	601	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		
02/12/2020 16:30 - 17:30	80632	02/12/2020 10:38	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	700	626	423	LCR2
02/12/2020	80635	02/12/2020 13:40	LOR1	Cancelled	This cancelled MN 80632. Forecast LOR1 cancelled due to increased generation availability and decrease in forecast demand.	700	891	385	LCR2
04/12/2020 15:30 - 16:00	80639	02/12/2020 14:56	LOR1	Forecast	Forecast LOR1 declared due to reduced net import.	756	721	700	LCR2
04/12/2020	80678	03/12/2020 21:40	LOR1	Cancelled	This cancelled MN 80639. Forecast LOR1 cancelled due to increased generation availability and increase in net import.	716	1119	549	LCR2
04/12/2020 15:30 - 16:00	80662	02/12/2020 22:29	LOR2	Forecast	Forecast LOR2 declared due to reduced net import.	649	623	649	FUM
04/12/2020	80670	03/12/2020 12:51	LOR2	Cancelled	This cancelled MN 80662. Forecast LOR2 cancelled due to increased generation availability and increase in net import.	616	1026	616	FUM
06/12/2020 17:00 - 20:00	80512	30/11/2020 15:44	LOR1	Forecast	Forecast LOR1 declared due to increase in forecast demand and decreased generation availability.	700	553	n/a – forecast > 72 hrs ahead	LCR2
06/12/2020 16:30 - 20:00	80558	01/12/2020 14:57	LOR1	Update	Update to MN 80512. Effective period in forecast LOR1 increased due to increase in forecast demand.	724	456	n/a – forecast > 72 hrs ahead	LCR2
06/12/2020 17:00 - 19:30	80764	05/12/2020 13:09	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability and increase in forecast demand.	700	627	608	LCR2
06/12/2020	80766	05/12/2020 14:43	LOR1	Cancelled	This cancelled MN 80764. Forecast LOR1 cancelled due to increased generation availability.	700	708	569	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		
07/12/2020 10:30 - 17:00	80558	01/12/2020 14:57	LOR1	Forecast	Forecast LOR1 declared due to increase in forecast demand and reduced net import.	870	478	n/a – forecast > 72 hrs ahead	LCR2
07/12/2020 15:30 - 16:00	80639	02/12/2020 14:56	LOR1	Update	Update to MN 80558. Effective period in forecast LOR1 decreased due to increased generation availability.	840	785	n/a – forecast > 72 hrs ahead	LCR2
07/12/2020 15:30 - 16:00	80678	03/12/2020 21:40	LOR1	Update	Update to MN 80639. Forecast reserve decreased due to increase in forecast demand and reduced net import.	826	580	n/a – forecast > 72 hrs ahead	LCR2
07/12/2020 15:30 - 16:00	80708	04/12/2020 15:52	LOR1	Update	Update to MN 80678. Forecast reserve increased due to increased generation availability and increased net import.	870	765	n/a – forecast > 72 hrs ahead	LCR2
07/12/2020 15:00 - 17:30	80760	05/12/2020 12:40	LOR2	Forecast	Forecast LOR2 declared due to increase in forecast demand.	675	350	675	FUM
07/12/2020 15:00 - 16:00	80768	05/12/2020 16:31	LOR2	Update	Update to MN 80760. Effective period in forecast LOR2 decreased due to increased generation availability.	653	386	653	FUM
07/12/2020 13:00 - 14:30	80831	06/12/2020 13:02	LOR1	Forecast	Forecast LOR1 declared due to reduced net import.	710	618	611	LCR2
07/12/2020 16:30 - 17:00	80831	06/12/2020 13:02	LOR1	Forecast	Forecast LOR1 declared due to reduced net import and slight increase in forecast demand.	710	675	612	LCR2
07/12/2020 14:30 - 16:00	80832	06/12/2020 13:02	LOR2	Forecast	Forecast LOR2 declared due to reduced net import and slight increase in forecast demand.	618	353	618	FUM
07/12/2020	80833	06/12/2020 14:48	LOR2	Cancelled	This cancelled MN 80832. Forecast LOR2 cancelled due to increase in net import.	587	833	587	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		
07/12/2020 13:30 - 14:00	80834	06/12/2020 14:49	LOR1	Update	Update to MN 80831. Effective period in forecast LOR1 decreased due to increased generation availability.	710	692	556	LCR2
07/12/2020 16:30 - 17:00	80834	06/12/2020 14:49	LOR1	Update	Update to MN 80831. Forecast reserve increased due to decrease in forecast demand.	710	691	583	LCR2
07/12/2020	80836	06/12/2020 15:45	LOR1	Cancelled	This cancelled MN 80834. Forecast LOR1 cancelled due to increased generation availability.	710	742	597	LCR2
22/12/2020 16:30 - 19:30	81538	21/12/2020 12:47	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability and increase in forecast demand.	936	662	600	LCR2
22/12/2020 17:00 - 18:30	81542	21/12/2020 16:53	LOR1	Update	Update to MN 81538. Effective period in forecast LOR1 decreased due to increased generation availability.	946	690	601	LCR2
22/12/2020	81543	21/12/2020 19:40	LOR1	Cancelled	This cancelled MN 81542. Forecast LOR1 cancelled due to increased generation availability.	963	1,020	608	LCR2
22/12/2020 17:00 - 18:30	81553	22/12/2020 08:46	LOR1	Forecast	Forecast LOR1 declared due to decreased generation availability.	939	848	375	LCR2
22/12/2020	81555	22/12/2020 11:48	LOR1	Cancelled	This cancelled MN 81553. Forecast LOR1 cancelled due to increased generation availability.	928	1,060	424	LCR2
South Australia region									
14/12/2020 18:30 - 19:30	80924	07/12/2020 22:36	LOR2	Forecast	Forecast LOR2 declared due to extremely high forecasted demand and reduced net import.	221	214	n/a – forecast > 72 hrs ahead	LCR

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		
14/12/2020	80926	08/12/2020 02:17	LOR2	Cancelled	This cancelled MN 80924. Forecast LOR2 cancelled due to increased net import and a decrease in forecast demand.	221	246	n/a – forecast > 72 hrs ahead	LCR
14/12/2020 18:00 - 19:00	80991	10/12/2020 15:26	LOR1	Forecast	Forecast LOR1 declared due to extremely high forecasted demand and reduced net import.	453	446	n/a – forecast > 72 hrs ahead	LCR2
14/12/2020	81060	11/12/2020 14:36	LOR1	Cancelled	This cancelled MN 80991. Forecast LOR1 cancelled due to increased net import and a decrease in forecast demand.	600	1,111	n/a – forecast > 72 hrs ahead	LCR2
Tasmania region									
Nil									
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 mean, minimum, and maximum FUM values for this reporting period to those for each quarter from Quarter 4 2019 to Quarter 4 2020 (see Figures 1 through 5 below).

The most material changes in FUM values between Quarter 3 2020 and Quarter 4 2020 are summarised below. For forecast horizons not mentioned below, the changes from Quarter 3 2020 were minor:

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

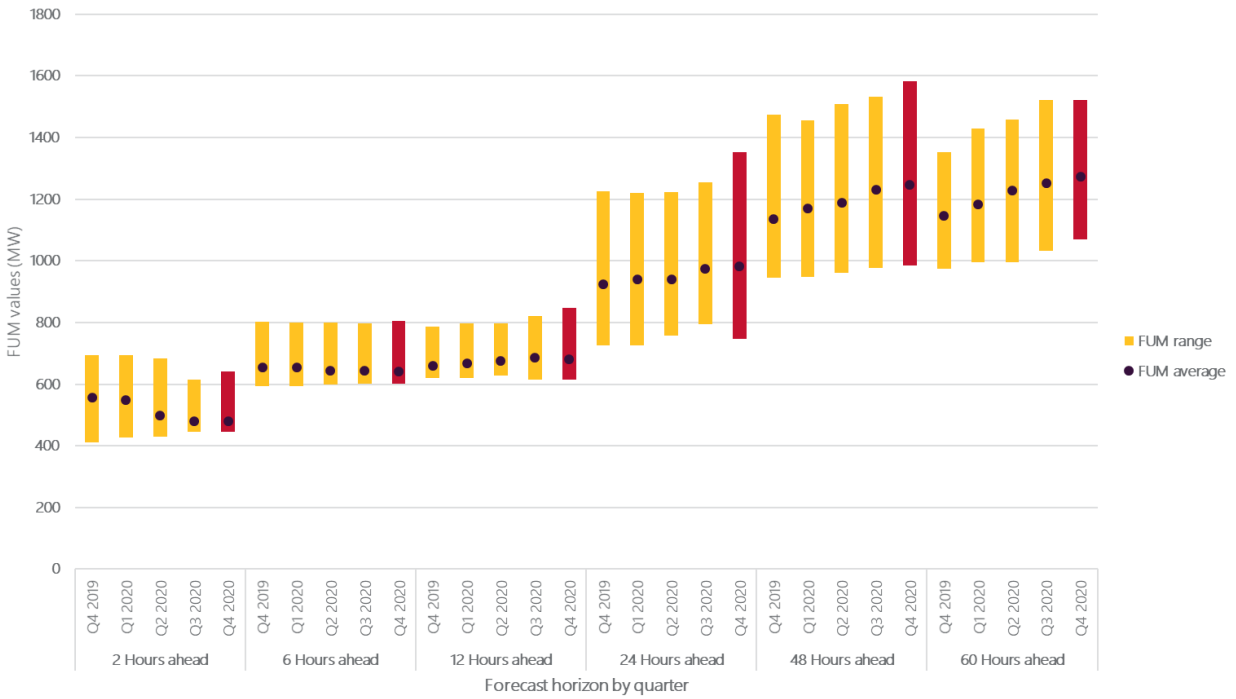


Figure 2 Queensland region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters

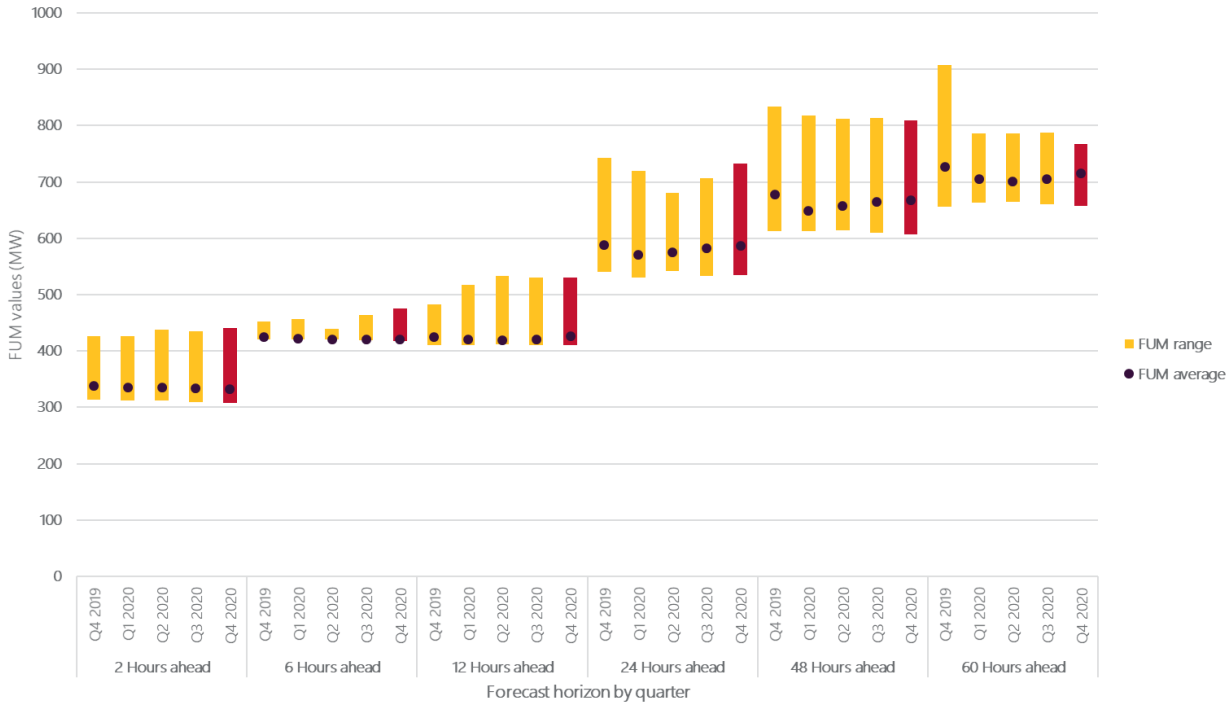


Figure 3 South Australia region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters

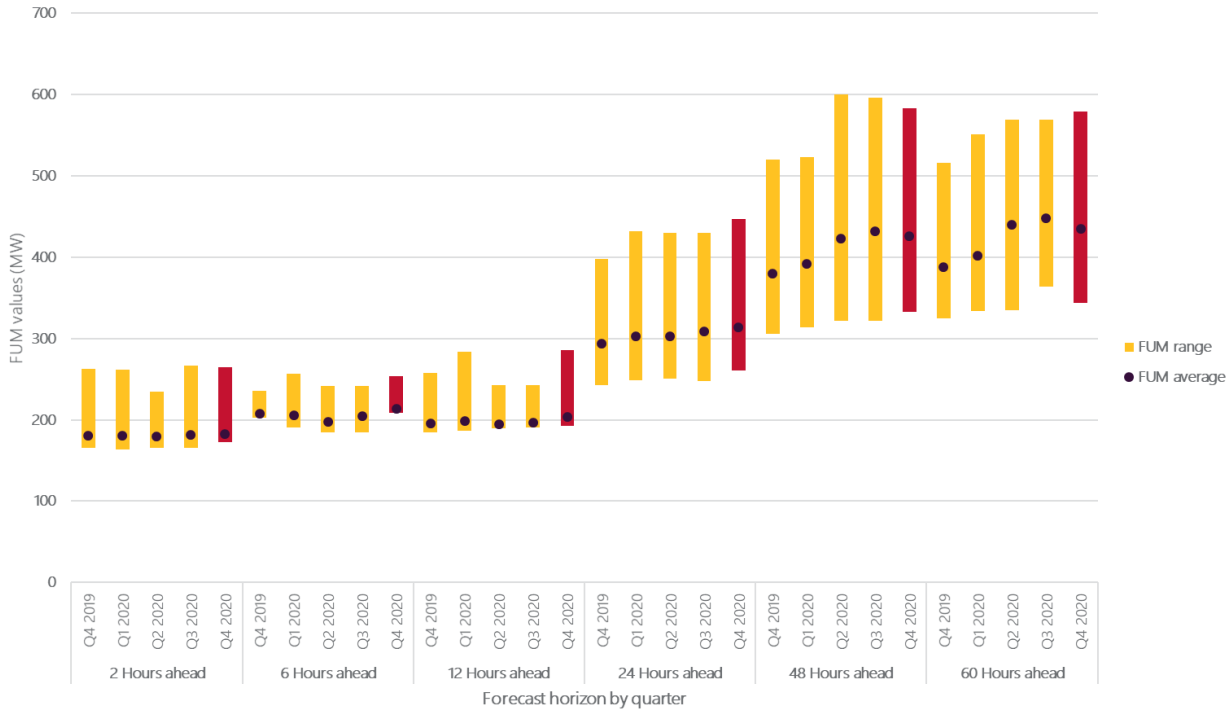


Figure 4 Tasmania region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters

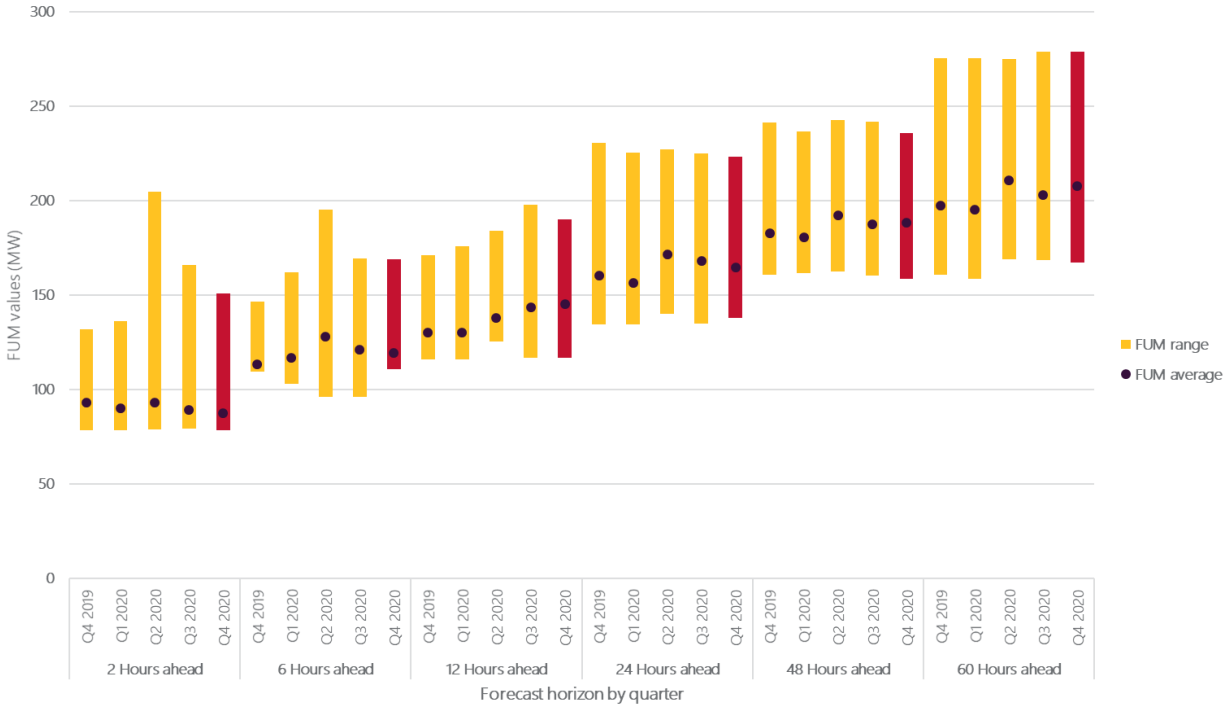
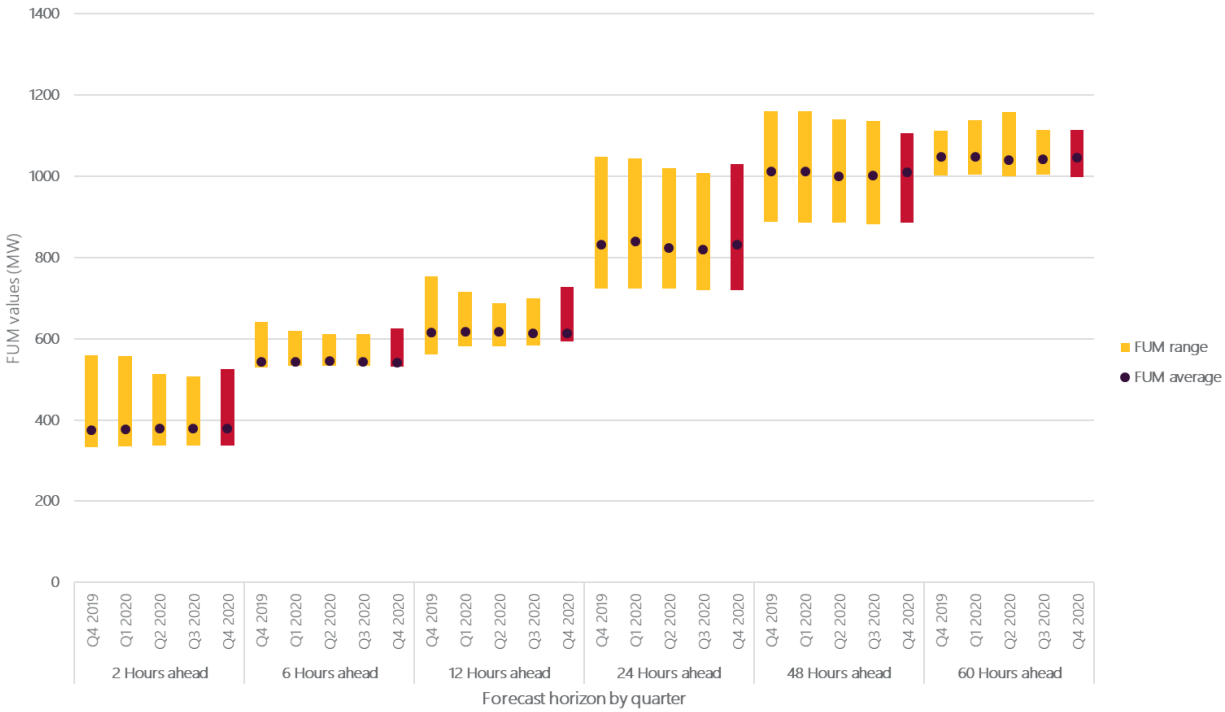


Figure 5 Victoria region: maximum, minimum, and average FUM values for the reporting period, and compared to previous four quarters



4.2 Forecast and actual LOR declarations

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

During the reporting period 1 October 2020 to 31 December 2020, there were 39 LOR declarations. Of these declarations, 25 were for forecast LOR conditions:

- 15 forecast LOR1 conditions were declared.
- Ten forecast LOR2 conditions were declared.
- Seven forecast LOR2 conditions were set by FUM.

A total of 13 actual LOR1 conditions were declared during the reporting period:

- Ten 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.
- No actual LOR1 conditions were forecast in the Short Term Projected Assessment of System Adequacy (ST PASA). Ten were only forecast in the Pre-Dispatch Projected Assessment of System Adequacy (PD PASA) shortly before the actual declaration.

Only one actual LOR2 condition was declared during the reporting period:

- It was observed as a forecast LOR2 prior to being declared as actual, therefore not counted as a forecast declaration based on the declaration count principles outlined in Section 3.
- The LOR condition was not forecast in ST PASA. It was only forecast in PD PASA shortly before the actual declaration.

During the reporting period, Reliability and Emergency Reserve Trader (RERT) services were activated on 17 December[4]. The RERT was activated after an actual LOR2 condition was declared, which assisted in reducing the shortfall below LOR2 requirement.

By comparison, 11 LOR declarations were made in Quarter 3 2020 (seven forecast LOR events and four actual LOR events) and 14 LOR declarations were made in Quarter 4 2019 (nine forecast LOR events and five actual LOR events).

As seven LOR declarations in the reporting period were set by the FUM, the percentage of LOR conditions where the FUM set the reserve requirement was 18%. In Quarter 3 2020 the percentage was 9%, and it was 21% in Quarter 4 2019.

There was one actual LOR2 condition 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 4 2020.

[4] See AEMO's report for RERT contracted on 17 December 2020 at https://aemo.com.au/-/media/files/electricity/nem/emergency_management/rert/2020/rert-contracted-for-17-december-2020.pdf?la=en.

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

Effective period	LOR1	LOR2	LOR3
New South Wales (NSW)			
12/10/2020	Forecast then Actual		
23/10/2020	Actual		
26/10/2020	Forecast then Actual		
16/11/2020	Forecast then Actual	Forecast	
20/11/2020	Forecast		
28/11/2020	Forecast then Actual		
29/11/2020	Forecast then Actual		
01/12/2020	Forecast then Actual	Forecast	
04/12/2020	Forecast		
10/12/2020	Forecast / Actual / Actual		
11/12/2020	Forecast then Actual		
16/12/2020	Forecast	Forecast / Forecast	
17/12/2020	Forecast then Actual	Forecast then Actual	
18/12/2020	Forecast then Actual / Forecast then Actual		
Queensland (QLD)			
05/11/2020	Forecast		
30/11/2020	Forecast / Forecast	Forecast	
01/12/2020	Forecast	Forecast	
02/12/2020	Forecast / Forecast	Forecast	
04/12/2020	Forecast	Forecast	
06/12/2020	Forecast		
07/12/2020	Forecast	Forecast	
22/12/2020	Forecast		
South Australia (SA)			
14/12/2020	Forecast	Forecast	
Tasmania (TAS), Victoria (VIC)			
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.

Ten forecast LOR2 conditions were declared.

There were 25 forecast LOR1 conditions declared; of these, 10 resulted in actual LOR1 conditions.

There were 15 forecast LOR1 conditions that did not develop into actual LOR1 conditions, due to either changes to the demand forecast or 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 39 LOR conditions were declared during the current reporting period: 25 forecast and 14 actual LOR conditions.

This is significantly higher than the 11 LOR declarations recorded in the previous reporting period (1 July to 30 September 2020).

Quarter 4 2020 covered the later spring months and first month of summer. Conditions warmed through this period peaking in December.

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.

The LOR1 and LOR2 declarations in South Australia were forecast conditions due to extreme high demand forecast for a single very hot day (36°C in Adelaide). The conditions were forecast with long lead times, and did not eventuate to actual LOR conditions.

All the LOR declarations in Queensland were for forecast LOR declarations with long lead times, which did not eventuate to actual LOR conditions due to increased generation availablity.

Most LOR conditions declared in New South Wales had effective periods during peak demand times (1600 hrs - 1700 hrs) on days with reduced generation availability. Some declared LOR conditions were due to generation events resulting in reduced generation availability. Some declared LOR conditions were due to sudden changes in demand forecast. A large number of forecast LOR conditions arose with short lead times and these often turned to actual LOR conditions.

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[5] 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

[5] 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.