

# Implementation of the National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020

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**Status as at 7 Aug 2020**

A report for the National Electricity Market

# Important notice

## PURPOSE

AEMO publishes this report to inform industry about AEMO's implementation of the National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020 (Mandatory PFR Rule).

This publication has been prepared by AEMO using information available at 17 July 2020. This information will be updated and superseded by future implementation reports until full implementation.

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# 1. Summary

This report provides information on the implementation of the National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020<sup>1</sup> (Mandatory PFR Rule) and will be updated periodically as implementation proceeds, at intervals of approximately three weeks.

The Mandatory PFR Rule affects all *Scheduled Generators* and *Semi-Scheduled Generators* (Affected Generators). They are required to demonstrate the ability of their *generating systems* (Affected GS) to provide *primary frequency response* (PFR) in accordance with the *primary frequency response parameters* (PFRP) specified in the interim *Primary Frequency Response Requirements* (IPFRR). Implementation of the Mandatory PFR Rule will be carried out in three tranches, as specified in the IPFRR.

While the results of the self-assessments (Results) for Tranche 1 Affected Generators are not due until 28 August 2020, AEMO has been in contact with several Affected Generators, who have provided draft Results and discussed issues associated with meeting the PFRP. Table 1 shows the number of Results, applications for variation and exemption received to date.

**Table 1 Incoming Results and Applications**

Number of Affected GS	Results	Applications for Variation	Applications for Exemption
Tranche 1	20	4	2
Tranche 2	0	0	0
Tranche 3	0	0	0

## 2. Self-Assessments

AEMO has received Results in respect of 20 dispatchable units (DUIDs) for Affected GS and has completed its review for 15 of those.

Several Affected Generators have provided AEMO with draft Results and sought to discuss the adequacy of the information provided with those Results and work through implementation plans.

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<sup>1</sup> Available at <https://www.aemc.gov.au/rule-changes/mandatory-primary-frequency-response>.

# 3. Applications for Variation

As at the date of this report, AEMO has received four applications for variation in relation to Affected GS, and has responded to two of these.

# 4. Applications for Exemption

AEMO has received and responded to two applications for exemption in respect of a Tranche 1 Affected GS. AEMO did not grant exemptions in either case.

AEMO also received one application for exemption in respect of an Affected GS in Tranche 3. This was subsequently withdrawn so it is not counted in Table 1.

# 5. Implementation Plan

AEMO's implementation plan is evolving as more information comes to hand through the self-assessment process. AEMO is cognisant of the need to review the Results before being more definitive about implementation.

## 5.1 Tranche 1 Implementation

AEMO is hopeful that a substantial proportion of Tranche 1 will have achieved significant progress towards the provision of PFR prior to Summer 2020-21.

AEMO is proposing two dates for the completion of changes to Tranche 1 Affected GS to achieve the PFRP (or any varied PFRP as applicable), which are:

- 30 September 2020
- 28 October 2020

This timing allows for staged changes in frequency response deadbands, which several Tranche 1 Affected Generators have indicated as their preference.

Both of these dates occur on a Wednesday, which AEMO considers will provide Affected Generators an opportunity to observe their Affected GS' operation following the changes before a weekend occurs and to make any adjustments, if necessary.

Based on information received to date, AEMO considers that the required changes should be achievable for a material proportion of Tranche 1 Affected GS by these dates, noting that this can only be confirmed once AEMO receives all Results expected from Tranche 1 Affected Generators.

## 5.2 Flexible Implementation Dates

The implementation dates referred to in section 5.1 are target dates.

Affected Generators will be required to have implemented agreed changes to their Affected GS by these dates, but may make those changes earlier, and in an incremental manner, provided they have notified AEMO and AEMO has agreed to the earlier implementation.

Where necessary, AEMO may also agree to later dates for making changes to Affected GS, for example, to accommodate planned generating unit outages.

## 5.3 Implementation of Subsequent Tranches

As outlined in the IPFRR, Tranche 2 and Tranche 3 Affected GS are required to complete their self-assessments by 19 November 2020, and 17 February 2021, respectively.

These self-assessments will be key to determining implementation dates that are compatible with the urgency of the required changes, but cognisant of the practicalities of undertaking the necessary work (especially around COVID-19 impacts) and the prevailing power system conditions.

Power system reliability and security concerns suggest that requiring control system setting changes across a large number of Affected GSs in the middle of Summer 2020/21 might not be prudent, during what is typically the most challenging period of the year for power system operations.

Noting these competing demands, it is currently proposed that implementation of setting changes would be required by the following dates:

- Tranche 2 (DUIDs 80 MW – 200 MW) – By 30 March 2021
- Tranche 3 (DUIDs below 80 MW) – By 30 June 2021

# 6. Implementation of PFR settings

## 6.1 Generation providing PFR prior to Mandatory PFR Rule

Previous surveys of generator active power controls, and more recent engagement with Affected Generators indicate that no large Affected GS were providing PFR that met the PFRP prior to the Mandatory PFR Rule.

AEMO is aware of a small number of, typically, smaller or low capacity factor Affected GS that are operating in a way that could meet the PFRP and may not need further changes to comply with the Mandatory PFR Rule. AEMO will confirm this after receiving and assessing the Results for those Affected GS and will report accordingly.

## 6.2 Early Implementation

Some Affected Generators have indicated that they wish to implement setting changes to their Affected GS earlier than AEMO's target implementation dates noted in Section 5.1. AEMO understands that, in some cases, this is due to the availability of specialist resources, or the need to coordinate the PFR setting changes with other planned works prior to Summer 2020-21.

To date, one Affected GS is already operating in accordance with the Mandatory PFR Rule. AEMO was advised that the Affected Generator opted to retain its setting changes after testing the Affected GS for the purposes of self-assessment.

# 7. Register of Affected GS

Table 2 details, for each Tranche 1 Affected GS, whether they have implemented the PFR settings in accordance with the PFRP, or whether AEMO has granted an exemption or variation. Where a variation has been granted, the table also indicates which PFRP has been varied.

**Table 2 Register of Tranche 1 Affected GS**

Station Name	DUID	Reg Cap (MW)	PFRP implemented by	Exemption	Variation	PFRP Varied
Ararat Wind Farm	ARWF1	241				
Barker Inlet Power Station	BARKIPS1	211				
Bayswater Power Station	BW01	660				
Bayswater Power Station	BW02	660				
Bayswater Power Station	BW03	660				
Bayswater Power Station	BW04	660				
Bogong / Mackay Power Station	MCKAY1	300				
Callide B Power Station	CALL_B_1	350				
Callide B Power Station	CALL_B_2	350				
Callide C Power Station	CPP_3	420				
Callide C Power Station	CPP_4	420				
Coopers Gap Wind Farm	COOPGWF1	452				
Darling Downs Power Station	DDPS1	644	15 Jun 20			
Darlington Point Solar Farm <sup>2</sup>	DARLSF1	324	30 Sep 20 <sup>3</sup>			
Eraring Power Station	ER01	720				

<sup>2</sup> Registration data obtained from AEMO Pre Production systems.

<sup>3</sup> Or upon reaching a 200 MW commissioning hold point, whichever date is later.

Station Name	DUID	Reg Cap (MW)	PFRP implemented by	Exemption	Variation	PFRP Varied
Eraring Power Station	ER02	720				
Eraring Power Station	ER03	720				
Eraring Power Station	ER04	720				
Gladstone Power Station	GSTONE1	280				
Gladstone Power Station	GSTONE2	280				
Gladstone Power Station	GSTONE3	280				
Gladstone Power Station	GSTONE4	280				
Gladstone Power Station	GSTONE5	280				
Gladstone Power Station	GSTONE6	280				
Gordon Power Station	GORDON	432	Unit 1 – 11 Dec 20 Unit 2 – 30 Sep 20 Unit 3 – 30 Sep 20			
Hallett Power Station	AGLHAL	217	31 Oct 20 <sup>4</sup>			
Kogan Creek Power Station	KPP_1	744				
Liddell Power Station	LD01	500				
Liddell Power Station	LD02	500				
Liddell Power Station	LD03	500				
Liddell Power Station	LD04	500				
Limondale Solar Farm 1	LIMOSF11	275	30 Sep 20 <sup>5</sup>			
Lincoln Gap Wind Farm	LGAPWF1	212				
Loy Yang A Power Station	LYA1	560				
Loy Yang A Power Station	LYA2	530				
Loy Yang A Power Station	LYA3	560				
Loy Yang A Power Station	LYA4	560				
Loy Yang B Power Station	LOYB1	500				
Loy Yang B Power Station	LOYB2	500				
Macarthur Wind Farm	MACARTH1	420				
Millmerran Power Plant	MPP_1	426	30 Sep 20 28 Oct 20 <sup>6</sup>		Yes	Response time

<sup>4</sup> Applicable to one generating unit, remainder previously complied with the PFRP.

<sup>5</sup> Or upon reaching a 200 MW commissioning hold point, whichever date is later.

<sup>6</sup> Deadband to be adjusted in two stages.



Station Name	DUID	Reg Cap (MW)	PFRP implemented by	Exemption	Variation	PFRP Varied
Millmerran Power Plant	MPP_2	426	Upon returning from outage in Nov 2020.		Yes	Response time
Mortlake Power Station	MORTLK11	283				
Mortlake Power Station	MORTLK12	283				
Mt Piper Power Station	MP1	700	30 Sep 20 28 Oct 20 <sup>7</sup>			
Mt Piper Power Station	MP2	700	30 Sep 20 28 Oct 20 <sup>8</sup>			
Murra Warra Wind Farm	MUWAWF1	231				
Murray Power Station	MURRAY	1500				
Newport Power Station	NPS	500				
Pelican Point Power Station	PPCCGT	478				
Poatina Power Station	POAT220	200				
Sapphire Wind Farm	SAPHWF1	270				
Shoalhaven Power Station	SHGEN	240	Bendeela Unit 2 - 31 August 2021 Kangaroo Valley Unit 4 -31 August 2021 Bendeela Unit 1 – 31 October 2022 Kangaroo Valley Unit 3 -30 November 2023			
Stanwell Power Station	STAN-1	365				
Stanwell Power Station	STAN-2	365				
Stanwell Power Station	STAN-3	365				
Stanwell Power Station	STAN-4	365				
Swanbank E Gas Turbine	SWAN_E	385				
Tallawarra Power Station	TALWA1	440	31 Dec 2020			
Tamar Valley Combined Cycle Power Station	TVCC201	208				
Tarong North Power Station	TNPS1	443				
Tarong Power Station	TARONG#1	350				
Tarong Power Station	TARONG#2	350				
Tarong Power Station	TARONG#3	350				

<sup>7</sup> Deadband to be adjusted in two stages.

<sup>8</sup> Deadband to be adjusted in two stages.

Station Name	DUID	Reg Cap (MW)	PFRP implemented by	Exemption	Variation	PFRP Varied
Tarong Power Station	TARONG#4	350				
Torrens Island Power Station	TORRB1	200				
Torrens Island Power Station	TORRB2	200				
Torrens Island Power Station	TORRB3	200				
Torrens Island Power Station	TORRB4	200				
Tumut 3 Power Station	TUMUT3	1500				
Tumut Power Station	UPPTUMUT	616				
Vales Point "B" Power Station	VP5	660				
Vales Point "B" Power Station	VP6	660				
Wivenhoe Power Station	W/HOE#1	285				
Wivenhoe Power Station	W/HOE#2	285				
Yallourn "W" Power Station	YWPS1	360				
			30 Sep 20 <sup>9</sup>			
			28 Oct 20			
Yallourn "W" Power Station	YWPS2	360				
			30 Sep 20 <sup>10</sup>			
			28 Oct 20			
Yallourn "W" Power Station	YWPS3	380				
			30 Sep 20 <sup>11</sup>			
			28 Oct 20			
Yallourn "W" Power Station	YWPS4	380				
			30 Sep 20 <sup>12</sup>			
			28 Oct 20			

## 8. Impact on Frequency Performance

AEMO provides detailed reporting on power system frequency performance in its Frequency and Time Error Monitoring reports<sup>13</sup> that are published quarterly. The next report is due to be published during August 2020.

<sup>9</sup> Deadband to be adjusted in two stages.

<sup>10</sup> Deadband to be adjusted in two stages.

<sup>11</sup> Deadband to be adjusted in two stages.

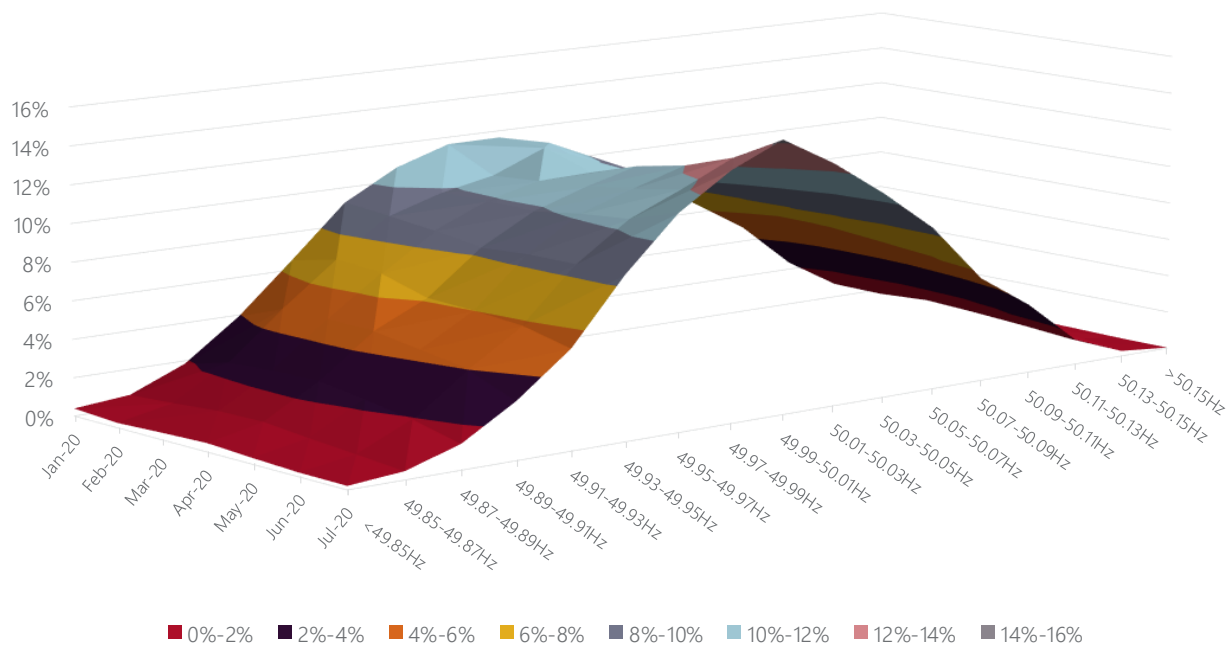
<sup>12</sup> Deadband to be adjusted in two stages.

<sup>13</sup> Available at <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/system-operations/ancillary-services/frequency-and-time-deviation-monitoring>.

This report will focus on a sub-set of the matters raised in the quarterly report. It will provide some information focusing on relatively recent frequency performance to help capture impacts on power system frequency that are (at least in part) associated with the implementation of the Mandatory PFR rule.

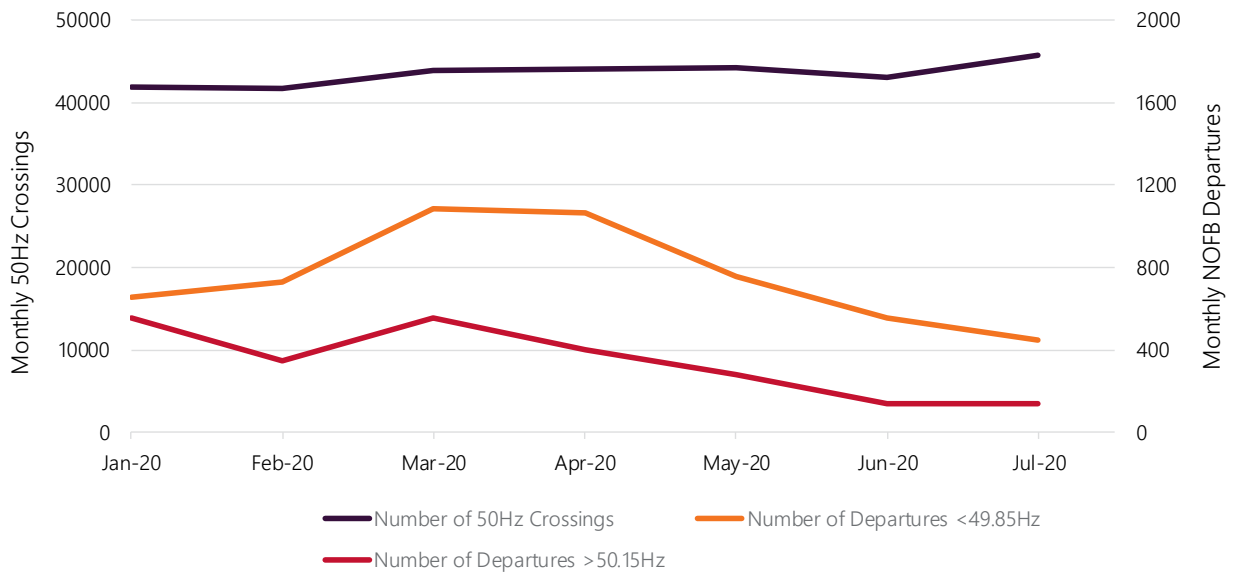
Figure 1 shows the monthly frequency distribution for the last six months (1 Jan 2020 to 30 Jul 2020). A slight peaking at the end suggests a potential improvement, however, more time is required to monitor how this develops.

**Figure 1 Monthly frequency distribution (six-month rolling, Jan 2020 to Jul 2020)**



The total number of departures from the normal operating frequency band (NOFB) and the number of times frequency crossed the nominal 50 Hz is shown in Figure 2. A clear downtrend is observed from May onwards, however, it remains to be seen to what level this will continue.

**Figure 2 Monthly frequency crossings – under 49.85 Hz, across 50 Hz, beyond 50.15 Hz**



# Glossary

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

<b>Term</b>	<b>Definition</b>
Affected Generator	As defined in the IPFRR.
Affected GS	As defined in the IPFRR.
IPFRR	Interim Primary Frequency Response Requirements.
Mandatory PFR Rule	National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2020.
NOFB	<i>normal operating frequency band.</i>
PFR	<i>primary frequency response.</i>
PFRP	<i>primary frequency response parameters.</i>
Results	As defined in the IPFRR.
Tranche 1	Affected GS with a <i>nameplate rating</i> of >200 MW.
Tranche 2	Affected GS with a <i>nameplate rating</i> between 80 MW and 200 MW.
Tranche 3	Affected GS with a <i>nameplate rating</i> of <80 MW.