Minimum System Load Thresholds

September 2025

Purpose

This document has been prepared as part of AEMO's spring readiness reporting, and summarises:

- indicative ranges for operational Minimum System Load (MSL) thresholds for each region of the National Electricity Market (NEM) in spring and summer of 2025, to support situational awareness for stakeholders, and
- estimates of the likelihood of MSL events for each region of the NEM in spring and summer of 2025.

AEMO published a report in December 2024[1] detailing strategies to manage MSL and providing background and a more detailed description of the security issues arising in MSL periods. The MSL thresholds in this document are an update from those provided in AEMO's December 2024 report, based on more recent information available to AEMO as of August 2025.

For more information on MSL, including factsheets, briefings and reports, visit AEMO's website at https://www.aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/managing-distributed-energy-resources-in-operations/managing-minimum-system-load.

MSL framework

The MSL framework is summarised in Table 1[2].

Table 1 – MSL Framework

	Definition	AEMO actions
MSL1	Demand is two credible load contingencies away from MSL3	Monitor the situation. Publish MSL market notice with MSL thresholds when forecast (can we up to a week ahead).
MSL2	Demand is one credible load contingency away from MSL3	Take available actions to clear the MSL2 condition if possible. Take actions required to land satisfactory and return to and remain secure within 30 minutes following a credible load contingency.
MSL3	Forecast demand is insufficient to maintain a secure operating state.	Additionally, instruct network service providers (NSPs) to maintain demand above the MSL3 threshold.

MSL thresholds

MSL thresholds change depending on real-time system conditions. MSL thresholds depend on network outages, the availability of power system elements such as reactive plant, the availability of lower contingency frequency control ancillary service (FCAS) providers, pumping load availability, the Minimum Safe Operating Levels (MSOLs) of the large

[1] AEMO (Q4 2024) *Supporting secure operation with high levels of distributed resources*, https://www.aemo.com.au/-/media/files/initiatives/der/managing-minimum-system-load/supporting-secure-operation-with-high-levels-of-distributed-resources-q4-2024.pdf?rev=8e7151f6e6134360b75f0d23bd6ad79f&sc_lang=en

[2] Actions taken at each MSL threshold are outlined in further depth in this fact sheet: AEMO, *Victorian Minimum System Load Procedure Overview*, https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/2024-11-01-vic-msl-procedure-factsheet_final.pdf?la=en. AEMO is working with network service providers (NSPs) towards MSL procedures in all regions that align with the Victorian procedure.

synchronous units operating in MSL periods, and the ability to export from the region (which can be impacted by interconnector limits, as well as low demand in neighbouring regions).

Table 2 provides indicative ranges for MSL thresholds anticipated in spring and summer 2025 (based on information available to AEMO as of August 2025). Indicative thresholds are provided for two possible scenarios:

- **Typical case –** this represents MSL thresholds for a typical period, with typical large synchronous units operating[3], full pumping load availability, and no significant line, network element, load, storage, or unit outages[4]. This threshold is indicative of typical MSL1 thresholds if there are no significant outages. It is also indicative of typical MSL2 and MSL3 thresholds if there is a sudden unplanned outage, with insufficient lead-time to implement management actions such as decommitment of large synchronous units. If there is adequate time for preparation, actions taken when demand is forecast below the MSL2 threshold may reduce MSL2 and MSL3 thresholds.
- **Onerous case** – this represents a more onerous but possible condition that assumes typical large synchronous units operating[3], with pumping loads unavailable and a possible combination of significant outages (of lines, units, storages, loads, or network elements) that escalate MSL levels[5]. It also assumes exports from the region are not possible (this could be due to interconnector outages, or insufficient demand in neighbouring regions).

Table 2 – Indicative MSL thresholds (as of August 2025)

Demand thresholds (MW) refer to operational demand less significant non-scheduled generation (SNSG)[A]		Typical case (MW)			Onerous case (MW)		
		MSL1	MSL2	MSL3	MSL1	MSL2	MSL3
New South Wales	System normal	2,090	1,740	1,240	3,090	2,740	2,240[D]
Queensland	System normal	2,600	2,050	1,450	3,660	3,260	2,860
	Credible risk of separation [B]	N/A	N/A	2,600	N/A	N/A	3,230
	Islanded [B]	N/A	N/A	2,850	N/A	N/A	3,480[E]
South Australia	System normal	132	-18	-370	380	230	80
	Credible risk of separation [B]	N/A	N/A	132	N/A	N/A	180
	Islanded [B]	N/A	N/A	270 (DPVC threshold is likely to be more onerous)	N/A	N/A	370[F] (DPVC threshold is likely to be more onerous)
Tasmania	System normal	N/A	N/A	N/A	N/A	N/A	N/A
Victoria	System normal	1,685	1,185	685	3,190	2,690	2,190[C]

DPVC: Distributed Photovoltaic (PV) Contingency.

A. AEMO, Operational demand data, https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/data-nem/operational-demand-data#:~:text=Operational%20Demand%20less%20SNSG%20in,of%20System%20Adequacy%20(PASA).

B. For at-risk and island thresholds, only the MSL3 threshold is listed because the present procedures only utilise one threshold. Where the location of the outage/separation influences the threshold, the most onerous threshold is listed.

C. Threshold has increased since AEMO's last advice due to assumption of reduced export capability from Victoria in this advice.

D. Threshold has decreased since AEMO's last advice due to refined analysis and updated modelling assumptions.

E. Threshold has increased since AEMO's last advice. The previous QLD MSL island threshold was a static estimate, and this has now been updated to a dynamic estimate based on system conditions. Typical values are close to the previous static estimate, but more recent studies indicate that MSL thresholds can increase significantly in a scenario with unavailability of a significant Battery Energy Storage System (BESS) and pumping loads, as assumed in this onerous case.

F. Threshold has increased since AEMO's last advice. The previous SA MSL island threshold was a static estimate, and this has now been updated to a dynamic estimate based on system conditions. More recent studies indicate that MSL thresholds can increase in a scenario with a significant South Australian BESS and Murraylink out of service, as assumed in this onerous case.

[3] Typical large synchronous units operating at MSOL, as observed in historical low demand periods in 2024 (2024 median aggregate MSOL).

[4] Export limits from the region are typical of those observed in previous minimum demand periods, pumping loads are fully available, significant lower contingency FCAS providers are fully available.

[5] Assumes pumping loads are not available, and significant lower contingency FCAS providers are not available.

MSL thresholds are subject to change as system parameters continuously change. AEMO will monitor operational thresholds based on the latest available information as necessary. AEMO will publish a Market Notice if demand is forecast below the MSL1 threshold for the region (this may be up to a week ahead). This Market Notice will contain information on the forecast MSL1, MSL2 and MSL3 thresholds for the region based on the system conditions at the time, and the latest information available to AEMO. This provides the most up-to-date information for market participants on the MSL thresholds applicable for the relevant system conditions. The thresholds listed in Table 2 are provided as indicative ranges only, for stakeholder general awareness, and should not be used to inform operational actions.

Incidence of demand below MSL thresholds

System normal

Table 3 shows the forecast incidence of demand below the indicated Typical case system normal MSL thresholds, based on demand forecasts from the 2025 *Electricity Statement of Opportunities* (ESOO)[6]. The actual incidence of demand below MSL thresholds will depend on system conditions on the day, and the amount of time available to prepare for the operational scenario. Unplanned outages can mean that an MSL situation arises suddenly.

Table 3 – Number of days below Typical case MSL thresholds based on ESOO forecast (for period 1 Sept – 31 Dec 2025)

		MSL1 (Typical case)	MSL2 (Typical case)	MSL3 (Typical case)
New South Wales	System normal	0-2	0	0
Queensland	System normal	4-30	0-6	0
South Australia	System normal	56-86	39-64	0
Tasmania	System normal	N/A	N/A	N/A
Victoria	System normal	10-35	0-2	0

Queensland and South Australia when operating at credible risk of separation or islanded

Table 4 provides an indication of the forecast incidence of demand falling below the MSL3 thresholds for operation at credible risk of separation, or operation as an island in Queensland and South Australia (based on the 2025 ESOO forecasts for the period 1 Sept to 31 Dec 2025). This is indicative of the number of days in the period 1 Sept – 31 Dec 2025 where an unplanned interconnector outage would lead to demand falling below the relevant island/credible risk MSL3 threshold.

Table 4 – Number of days below MSL thresholds based on ESOO forecast (for period 1 Sept – 31 Dec 2025)

		MSL3 (Typical case)
Queensland	Credible risk of separation	3 – 26
	Islanded	12 – 39
South Australia	Credible risk of separation	56 – 86
	Islanded	66 – 95 (DPVC is likely to affect a higher proportion of days)

The actual incidence of demand below MSL thresholds will depend on the duration of the unplanned outage[7] that causes the at-risk or island condition and the amount of time available to prepare for the operational scenario.

[6] At https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/nem-electricity-statement-of-opportunities-esoo. Based on the *Step Change* scenario 50% probability of exceedance operational demand (as-generated) traces. The range reflects the incidence of demand below MSL thresholds across all ESOO weather reference years.

[7] Based on present procedures, AEMO will not allow planned network outages to proceed if they result in MSL2 or MSL3 conditions arising, or make an existing MSL2 or MSL3 condition worse for the outage duration.

Distributed Photovoltaic Contingency (DPVC) for South Australia

DPVC conditions arise when distributed photovoltaic (DPV) generation is so high that the power system cannot be securely operated to handle the trip of a large generating unit plus the coincident “shake-off” of some distributed PV following a transmission network fault. Currently, DPVC is only an issue for South Australia when islanded, or at credible risk of separation from the rest of the NEM.

DPVC thresholds depend on distributed PV generation levels, underlying demand, sub-regional loads, BESS availability, the number of synchronous units online in South Australia, lower and very fast raise (R1) contingency FCAS availability, and locations of the largest generating unit and the at-risk outage (risk of separation) or the point of separation (islanded).

When fully commissioned, EnergyConnect will provide a new interconnection between New South Wales and South Australia, which is expected to significantly reduce the risk of South Australia operating at credible risk of separation, or operating as an island. This should reduce challenges currently associated with managing DPVC and MSL in South Australia.

When South Australia is islanded, DPVC is generally more onerous than MSL. When South Australia is at credible risk of separation, the most onerous condition can vary depending on the at-risk outage and system conditions on the day.

AEMO is currently updating the South Australia island and South Australia at-risk DPVC thresholds and procedures.

AEMO will publish a Market Notice if demand is forecast below the DPVC threshold in South Australia (this may be up to a week ahead). This Market Notice will contain information on the forecast DPV generation and DPV limit in South Australia based on the system conditions at the time, and the latest information available to AEMO. This provides the most up-to-date information for market participants on the DPVC thresholds applicable for the relevant system conditions.