

18 August 2026

Ms Anna Collyer
Chair, Australian Energy Market Commission
Level 15, 60 Castlereagh St
Sydney NSW 2000

Reference: ERC0417 & ERC0439

Dear Ms Collyer,

AEMO submission to consultation paper – Minimum System load governance and market arrangements

AEMO appreciates the opportunity to submit to the Consultation Paper (Paper) on:

- Clean Energy Council's (CEC) proposed new Minimum System Load (MSL) market ancillary service and
- the Reliability Panel's (Panel) proposed changes to the National Electricity Rules (NER) to introduce an MSL governance framework alongside a requirement to set the spot price at Market Floor Price (MFP).

AEMO has developed its existing published MSL framework over the last few years to support its responsibilities in maintaining power system security. The need for such a framework to maintain power system security was clear from the medium and long-term MSL outlooks that AEMO has published in recent years.

The MSL framework remains a work in progress, and AEMO intends to evolve it as it better understands the dynamics and options available to manage low demand conditions. It is important that this continues to occur. Similarly, industry and policy developments are favourably altering the MSL outlook. These developments will materially impact AEMO's publications from late 2026, mid-way through the rule change process. It is important that key decisions in the rule change process can take this updated information into account.

AEMO's assessment of the proposals in this Consultation Paper is guided by a principle that reforms should be proportionate to the maturity of the problem being addressed. Where operational risks are emerging, forecasts remain highly uncertain and market responses continue to develop rapidly, flexibility and optionality are likely to deliver greater long-term value than prescriptive regulatory solutions.

AEMO therefore supports progressing lower-regret reforms while preserving the ability to adapt as understanding knowledge of MSL conditions improves. An example of such a lower-regret reform is altering the sunset of Type 1 Transitional MSL contracts. AEMO has made this suggestion into the Security Frameworks Enhancement rule change and suggests the two rule change processes intersect on this matter.



Reliability Panel Proposal

The MSL framework was developed under AEMO's existing NER responsibilities to maintain power system security. AEMO considers elevating the MSL framework into the NER is not necessary, and, at this early stage, would inhibit its development.

AEMO agrees with the Panel that during extreme MSL conditions the spot price would be expected to approach the MFP. While recognising the economic merit in their suggestion, AEMO's focus is on the practicality of the trigger and whether it could cause unintended dispatch instability. AEMO suggests this be an early investigation of the rule change process.

AEMO agrees with the Paper that it would be impractical to trigger MFP on declaration of MSL3. Instead, AEMO considers it should be triggered by a physical action, noting the Market Price Cap (MPC) is triggered by instructed load-shedding rather than a Lack of Reserve (LOR) declaration. A suggested alternative physical trigger has been included.

The Paper's suggestion of the use of intervention pricing (which is not presently used for AEMO's MSL actions) has some theoretical advantages as an alternative to an MFP trigger. However, it also has serious practicality, accuracy and cost-recovery concerns.

AEMO understands the Paper's interest in upgrading STPASA to include forecasting of MSL conditions. Unfortunately, this would be a costly multi-year project impacting AEMO and participants. AEMO recommends delaying consideration of such a project until the long-term outlook forecasts are updated later in the rule change process.

CEC Proposal

A new ancillary service to manage MSL conditions would involve a major design exercise through the rule change followed by a multi-year implementation project. AEMO also notes that it remains unclear whether incentives created by negative spot prices, strengthened by the Panel's proposal, would be insufficient on their own to resolve MSL conditions.

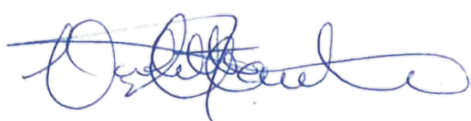
For these reasons AEMO recommends deferring consideration of the CEC proposal until later in the rule change process, after a direction has been determined on the Panel's more incremental proposal and long-term MSL forecasts have been updated.

Price cap consistency

In considering MSL scenarios AEMO has observed an inconsistency between the magnitude of the MFP (-\$1,000) and the price cap of Frequency Control Ancillary Services (FCAS) lower (+\$23,300). These can occur simultaneously in MSL conditions. The inconsistency could distort dispatch offers and may perversely discourage energy consumption during low demand. This issue was not raised by the Panel nor Paper, but AEMO encourages AEMC to consider it within the Rule change.

The attached submission expands on these issues in further detail. Should you wish to discuss any aspect of our submission, please contact Hannah Heath, Group Manager, Strategic Market Reform (Hannah.Heath@aemo.com.au).

Yours sincerely,



Violette Mouchaileh
Executive General Manager, Policy & Corporate Affairs

ATTACHMENT – Detailed submission

The following sections provide responses to the AEMC's questions as set out in the Paper.

1. Question 1 – The outlook for MSL events in the NEM in the context of the broader reform program

For several years AEMO has been publishing MSL outlooks in its key publications of the Electricity Statement of Opportunities (ESOO), Transition Plan for System Security (TPSS) and specific MSL material¹.

Appendix 3 of the TPSS² provides the most recent and detailed information yet published by AEMO, which assesses MSL risk across both typical system normal conditions and onerous conditions. This analysis projected that during typical system normal conditions, anticipated MSL events would be manageable through control room actions, while further action is needed to manage events during rare, but plausible, onerous system conditions.

AEMO notes that the MSL risk outlook is highly dynamic and sensitive to market developments. Since spring 2025, there have been material changes in market conditions and policy settings, in particular:

- Growth in large-scale Battery Energy Storage Systems (BESS);
- Take-up of the Commonwealth Cheaper Home Batteries Program;
- Acceleration of data centre connections and load forecasts;
- Introduction of the Solar Sharer Offer; and
- Acceleration in the rate of transport electrification.

Given the dynamic nature of MSL risks, AEMO recommends against committing to MSL reforms with long lead-times and high implementation costs until forecasts capture these materially changed circumstances, noting the ongoing need for operational capabilities such as active DER curtailment capabilities (emergency backstop), to maintain system security during onerous conditions³.

This is particularly pertinent in consideration of the CEC's MSL ancillary service market, as well as proposed upgrades to STPASA to incorporate forecasting of MSL conditions.

Each of these would involve a multi-year project for AEMO and participants with delivery expected no earlier than the end of the decade by which time MSL conditions on the power system may have changed. As such, AEMO discourages committing to, or designing, these two major reforms before AEMO has updated its relevant forecasts. Instead, it recommends deferring their detailed consideration until later in the rule change process. If at that time, with the benefit of an updated outlook, the AEMC considers they are justified, the rule change timetable can be extended to undertake the necessary development.

Importantly, deferring such reform decisions does not imply delaying action to maintain system security. AEMO will continue to evolve operational arrangements and utilise existing tools to manage emerging MSL risks. Reform deferral instead reduces the risk of consumers funding major market reforms whose benefits may materially diminish as new technologies, changing consumption patterns and evolving operational capabilities reshape the underlying problem. In AEMO's view,

¹ <https://www.aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/managing-distributed-energy-resources-in-operations/managing-minimum-system-load>.

² [2025-tpss-appendix-a3-msl-regional-assessments.pdf](#)

³ Such as unplanned outages and/or weather conditions with high MSL risk.

preserving optionality until the updated outlook is available is likely to promote more efficient long-term investment and market development.

Unlike those reforms identified above, AEMO notes the Panel's proposal is a less complex and shorter lead-time reform with less risk of regret. Thus, AEMO recommends the initial months of the rule change process be focussed upon it.

Type 1 MSL contracts

AEMO notes that it has recommended considering the sunset arrangements of Type 1 Transitional Services MSL contracts in its submission to the Security Frameworks Enhancement rule change⁴. AEMO understands that an extension or alternative is being considered in that forum.

These contracts are an important part of AEMO's MSL management in at least the short term. They pay suppliers based on actual usage, therefore not requiring a large upfront commitment funded by customers. AEMO considers that as this approach is already operating, an extension or similar would be a low regrets short-medium term option within the suite of MSL reforms being considered in this rule change. AEMO suggests the two rule change processes intersect:

- The MSL rule change should articulate to the security rule change how Type 1 contracts are a useful mechanism for managing MSL conditions while other reforms and market signals are developing; and
- Vice versa, the security rule change should indicate whether and how long an extension or similar will be granted in order that the other MSL reforms can be considered in their proper sequence.

2. Question 2: The case for including an MSL governance framework in the NEL

The Paper has correctly described AEMO's development of the MSL procedures over several years. These procedures are an appropriate, albeit initial, step in performing AEMO's responsibility for maintaining a secure power system state during low operational demand. Importantly, they remain a work in progress, with significant updates in the next few months, expected to be followed by more over time.

The Paper notes:

- The absence of an explicit MSL framework in the NER; and
- The three-tier MSL system is modelled on the lack-of-reserve (LOR) reliability framework explicitly described in the NER.

In response to the former, an unmanaged MSL condition would lead to an insecure power system, and, as it has an explicit NER responsibility to maintain a secure power system state, AEMO considers a head of power to develop MSL procedures already exists. This non-explicit governance has assisted AEMO by providing it flexibility to develop the procedures.

In response to the latter, AEMO considers that MSL and LOR conditions differ in both their drivers and their management.

The LOR regime was inherited at market start from the decades-old alert systems of the state power systems. It is for the purpose of maintaining a reliable operating state (as opposed to a secure operating state) and involves continuous calculation of real-time and forecast supply less demand using similar techniques to those used globally.

⁴ https://www.aemc.gov.au/sites/default/files/2026-04/aemo_0.pdf

In contrast the tools and methodologies used to assess and manage MSL conditions continue to evolve. The recently developed MSL framework uses offline studies to produce a best estimate of a secure threshold for the power system and incorporates a more limited set of real-time conditions compared to LOR. When the secure threshold (estimated by the MSL3 threshold) is breached, AEMO's present procedure is to instruct NSPs to increase demand to, and maintain demand at, the secure level. NSPs can increase demand through a variety of mechanisms including curtailing non-scheduled SCADA-controlled generators, load shifting (via hot water or network BESS), and active management of DER⁵.

A key challenge for market design is to find the right balance between prescription and flexibility. Prescription through the rules is beneficial for market confidence but, by design, restrains evolution and ability to respond quickly to changing industry conditions. The right balance must take account of the lifecycle stage of the mechanism. The LOR framework is mature and appropriately prescribed in the NEL.

The MSL framework is at the very early stages of its lifecycle and should be permitted to evolve further before it is locked down in the NER. This enables AEMO to continue to evolve a solution to a problem novel to large power systems – managing insufficient operational demand – at a time when the drivers creating that problem remain in great flux.

More broadly, AEMO notes that important aspects of the governance arrangements relevant to MSL management are being addressed through the broader reform program established under the National Consumer Energy Resources (CER) Roadmap⁶. Through the workstream on *Redefining roles and responsibilities for power system and market operations in a high CER future*⁷, led by the AEMC as part of the National CER Taskforce, governments and stakeholders considered the arrangements required to manage system security in a power system increasingly influenced by CER and concluded that immediate priority should be given to formalising and standardising the roles, responsibilities and accountabilities of the actors responsible for distribution and system operations (DSO).

The final recommendations focused on formalising DSO functions, establishing nationally consistent conformance and compliance arrangements, and recognising customer agents, aggregators, communication managers and other parties that influence CER behaviour within energy frameworks. These reforms are intended to ensure CER can be visible, predictable and capable of supporting system security and emergency management outcomes across a range of operational challenges, including MSL conditions. In AEMO's view, implementation of these reforms, which were endorsed by the Energy and Climate Ministers' Council (ECMC) in December 2025, should be prioritised before introducing a more prescriptive MSL governance framework in the NEL.

3. Question 3: The potential elements of an MSL governance framework in the NER

AEMO does not support elevating the MSL three tier framework into the NER at this time. However, assuming the AEMC substantively accepts the Panel's position that active management of Distributed Energy Resources (DER) (including rooftop solar interruption) should coincide with the MFP, then AEMO accepts some NER additions will be required.

⁵ Outlined further in pages 3-7 of Appendix A3 of the 2025 TPSS: https://www.aemo.com.au/-/media/files/major-publications/tpss/2025-tpss-appendix-a3-msl-regional-assessments.pdf?rev=475bfa4a721e4acdb03b30367e617226&sc_lang=en.

⁶ [National Consumer Energy Resources \(CER\) Roadmap Implementation Plan Update August 2025](#)

⁷ [Redefining roles and responsibilities for power system and market operations in a high CER future - final report.pdf](#)

The Panel's rule change proposes setting MFP upon the declaration of MSL3. To do this, the NER would need to explicitly define an MSL3. However, the Panel's claim that their MSL3-MFP trigger is modelled on the MPC trigger is incorrect. MPC is legally triggered by *load shedding* at NER3.9.2(e)(1) rather than LOR3, notwithstanding that they generally occur simultaneously.

AEMO agrees with the Paper at section 4.2.1 "...our initial view is that it is not necessary or practical to define MSL3 conditions directly in the NER (as implied in the Panel's proposal). An alternative trigger could describe the conditions for application of the MFP in a similar way to the trigger for the MPC...."

AEMO suggests that if the MFP trigger were a more correct replica of the MPC trigger, i.e. being linked to a physical action rather than a condition declaration, then the need to define MSL levels in the NER is removed.

In section 4 below it is also explained why linking to a physical action is also more likely to better align settlement outcomes with actual system condition and reduce the risk of disorderly dispatch.

It is AEMO's preference that any NER additions remain minimalist to give effect to the substance of the Panel's pricing proposal, but to not, at this stage of its development, include a fulsome MSL framework and forecasting regime as anticipated by parts of section 3 of the Paper.

A minimalist approach could involve as little as three NER additions:

- As suggested at 3.4.1 of the Paper:
 - defining "lack of load reserve" or similar;
 - linking that term to the concept of "Probability of unscheduled generation shedding", noting "active curtailment of DER" may be a more appropriate term;
- Writing the MFP trigger in a physical manner similar to NER 3.9.2(e)(1), such as
 - "AEMO reasonably determines that to maintain lack of load reserves AEMO issues instructions that result in active curtailment of DER that is current for that trading interval".

With these minimalist NER additions, AEMO would continue to operate its MSL procedures and evolve them as appropriate. They will lay out a series of alerts and actions culminating in a physical action that would in turn invoke the pricing trigger.

Should the NER require forecasting of low demand conditions (MSL) through ST PASA?

AEMO agrees that forecasting mechanisms are beneficial and support the Panel's aim in alerting the market to the threat of MFP, thereby helping it to self-clear. The Paper correctly notes STPASAs are only designed to alert to supply/demand shortfall and does not explicitly signal MSL threat. Fortunately, however, a general indication of MSL risk can be inferred from the information that STPASAs and pre-dispatch already provides, and from the MSL tiered alerts themselves.

Unfortunately, extending STPASAs to explicitly forecast MSL would require a substantial upgrade of AEMO's and participants' systems and processes. STPASAs are coming to the end of a multi-year replacement project modernising AEMO's systems and processes to better capture network limits and probabilistic inputs to support improved operational decision-making, increase transparency and strengthen the overall reliability and security of the NEM⁸. Developing an MSL capability would be a different, but also very complex, task, and this project gives some idea of the significant costs and timeframes involved in redesigning STPASAs.

⁸ [AEMO | ST PASA Replacement](#)

Such an upgrade project would mostly impact AEMO, but also participants who would need to provide additional information on minimum generation and State of Charge (SOC) headroom, and, depending on design, potentially additional information on unscheduled load and generation.

In section one of this submission AEMO alerted to recent external drivers that will materially impact the long-term MSL outlook. This outlook will become clearer in its publications refreshed late in 2026. AEMO recommends the AEMC defer any detailed work or decision on STPASA until at least then, even if this requires extending the draft determination.

Not progressing STPASA MSL forecasting in this Rule Change would not be the final word. AEMO has an ongoing MSL development function which will consider various options to increase the visibility of forecast MSL conditions. Informed by this Rule Change and submissions, AEMO would retain the concept of integrating MSL into STPASA as a possible option, and re-initiate it once AEMO considers its benefits likely to exceed its costs.

4. Question 4: Is the NEM set up to provide effective price signals to support efficient operational and investment outcomes with respect to MSL conditions

Question 5: The Panel proposes that the NER requires that the energy price be set at the MFP during MSL3

At a theoretical level, AEMO agrees with the Panel that the market design should include a genuine risk of the spot price reaching MFP once MSL conditions reach a point at which AEMO is forced to take intervention actions of a “last resort” nature. AEMO shares the Panel’s observation that the small sample of past events have not coincided with prices close to that level.

AEMO further recognises that its own actions to manage MSL can perversely raise the spot price. While this effect has not been material to date, it could lead participants to assume that the effective market floor (i.e. inclusive of AEMO action) is actually higher than MFP.

But there is also grounds for optimism. Since these past events, there has been considerably greater investment in scheduled large-scale BESS. Management of their limited SOC headroom should result in them presenting to the dispatch process a graduated demand curve of negative prices. We would expect to see some battery storage SOC headroom “shadowing” the MFP, as we do with supply “shadowing” the MPC. This would lead to progressively stronger negative prices as the system approaches MSL conditions. Ideally these developments could render an MFP trigger redundant.

While agreeing with the economic merits of the Panel’s proposal, AEMO’s concerns relate to practicality and the risk of disorderly market behaviour as discussed in the Paper’s section 4.2.3. AEMO is particularly concerned that the trigger, if not carefully designed, could over-signal; surprising the market by triggering earlier than genuinely extreme conditions, and/or releasing too late. The Panel’s initial suggestion of making the MFP automatic on MSL3 declaration could have done this, as the existing design of MSL3 results in it being declared for longer than actual DER active management. Were it to over-signal in this way, the disorderly and cyclic situations warned by stakeholders could well result.

AEMO suggests that the trigger structure it proposed at section 3 reduces this risk by requiring that MFP is only set:

- *in that trading interval* meaning AEMO will only apply it during those trading intervals where NSPs are indicating to AEMO that actual DER active management is actually occurring, and

- *when AEMO issues instructions* meaning that, should the market respond to the MFP, the instruction and MFP can be quickly rescinded without waiting for the actual DER to be restored.

5. Question 6: Alternative and complementary reforms to improve pricing in MSL conditions

The Paper asks the important question of whether intervention pricing could be used to achieve the Panel's objectives of strengthening market price signals during MSL conditions and correctly notes that the NER does not presently anticipate its use during MSL interventions.

Intervention pricing has several theoretical superiorities to the Panel's MFP setting proposal. With NER changes, it could be applied to a number, or potentially all, of the actions AEMO takes under its MSL procedures. It would seek to avoid the perverse outcome of these actions *raising* the settled spot price and would more gradually move the price toward MFP than the trigger proposal. This would resolve the concerns raised in section 4 about over-signalling and disorderly market behaviour.

Unfortunately, intervention pricing works better in theory than practice. The dispatch process relies heavily on physical measurements made just prior to iteration, particularly generator output and network flows. A "what-if" pricing run has no such physical measurements to rely on, instead it must substitute them with the dispatch targets of the interval prior, meaning it assumes perfect conformance.

As a simple example, in cases where intervention pricing has been used to reflect an LOR intervention, if a large generator trips the "dispatch run" will identify this in the next dispatch interval while the "what if" assumes it remains fully operational until rebid. This can perversely produce "what if" run prices *less extreme* than the "dispatch run" prices.

As time passes, the assumptions behind the "what if" run become ever more problematic. It operates with the same input bids as being presented to the "dispatch run". But were the "what if" run conditions playing out, these bids be different. For example, BESS continuously adjusts its bids to manage its SOC, but the SOC itself will be an outcome of the "dispatch run".

The inaccuracies of intervention pricing are greatest when:

- There are a large number of operating generators and binding network constraints, which may be less of a concern during MSL conditions than LOR conditions;
- The volume of intervention cannot be accurately represented by a "what-if" run MW offset, which is a serious concern regarding DER active management and SOC headroom intervention;
- The period of intervention is extended beyond a few hours, meaning the "what if" assumptions have more time to diverge from reality. This could be the case if used for the full suite of MSL actions.

During intervention pricing, compensation is paid to "affected units" being those scheduled and semi-scheduled assets run out of merit by the dispatch run with respect to the intervention run price. This compensation is recovered from customers in the relevant region(s) pro-rata to energy consumption at the time. While this is appropriate for interventions to manage peak demand, it seems inappropriate for low demand.

While intervention pricing systems are already in place, so the proposal appears low cost, AEMO alerts that the settlement process of paying compensation to affected units remains a time-consuming manual process. For the same reasons as listed above regarding the accuracy of “what if” prices, in an extended intervention pricing period these payments could become erratic, particularly for energy-limited assets such as BESS.

6. Question 7: The case for change to the NER to support the provision of load reserves to manage MSL conditions

Question 8: The CEC’s proposed new MSL market ancillary service

AEMO considers that, while awaiting updated forecasts discussed in section 1, there is insufficient rationale for an immediate major change in approach to managing MSL conditions beyond:

- Addressing the sunset of Type 1 MSL contracts as discussed in section 1; and
- Strengthening existing energy spot price signals along the lines of the Reliability Panel’s proposal.

AEMO considers management of MSL does not fit the concept of a “missing market” as discussed by the Energy Security Board⁹ when it contemplated where new ancillary services markets are required. This is because energy surplus is expected to be reflected in negative energy spot prices. Thus, we would expect the market already has at least some incentive to react to and resolve MSL.

The need for a new ancillary service would normally arise when:

- There is a system need for a service that is clearly unpriced by existing markets; or
- Price caps or other limitations mean that the signals in these existing markets are weaker than the value of the system need.

The former does not appear to be the case with respect to MSL. With respect to the latter, AEMO notes the MFP’s magnitude of minus \$1,000/MWh, assuming it is set during MSL conditions, appears to be strong enough to encourage a response from those market-exposed actors who have developed a capability to respond.

Section 4.2.3 of the Paper notes that CS Energy took the view that rooftop solar, being the cause of MSL, has no price sensitivity, and therefore energy prices cannot provide the solution. Meanwhile Shell Energy had the opposite concern that Virtual Power Plants (VPPs) may be so sensitive to spot price that setting MFP would create a dispatch instability.

AEMO considers that work and market developments in Consumer Energy Resources (CER) gives some optimism that CER price responsiveness will play a material part in balancing the energy market in future years. Were it to become so responsive that it threatened dispatch stability, this would be best addressed through the Market Visibility Framework.

Should the AEMC choose to progress it, the CEC’s new market ancillary service will require considerable projects to:

- Design its characteristics, which the CEC acknowledged would be required through the rule change consultation; and

⁹ See section 4 of [Post 2025 Market Design Final Advice to Energy Ministers Part A 0.pdf](#)

- Build the systems for its implementation. The new ancillary service would be very different to the existing Frequency Control Ancillary Services (FCAS), so it should not be assumed that the project would be a straightforward expansion as was the case for Very Fast FCAS. Similarly to an STPASA upgrade, delivery should not be expected before the end of the decade.

AEMO suggests that the early stages of the Rule Change Process should instead be focussed upon the lower regrets Panel rule change, its practicalities, and those of intervention pricing.

Consideration of the CEC proposal should be deferred until the publication of updated long-term MSL outlooks. If updated forecasts ultimately demonstrate that:

- MSL risks are increasing despite evolving market responses;
- energy price signals are insufficient to encourage efficient behavioural change; and
- operational mechanisms incur increasing frequency or cost,

then a dedicated market mechanism may warrant further consideration. In AEMO's view, however, the evidence required to support such a conclusion is not yet available.

7 Other matters

In considering MFP scenarios a potential inconsistency has emerged between the magnitude of the energy floor price, of $-\$1,000/\text{MWh}$, and the Lower FCAS services price cap of $+\$23,200/\text{MWh}$. During some extreme MSL conditions there would be expected convergence between the positive price of the FCAS lower service and the negative price of energy.

The inconsistency has two potential concerns:

- As the lower FCAS services price can have 23 times the incentive, there becomes an incentive for those assets participating in both the FCAS and energy markets to distort bids such that they are selected for FCAS, even if that dispatch worsens the energy surplus.
- As the FCAS contingency lower services are recovered from customers, during a period of naturally low demand, customer exposure to the very high FCAS settlement could swamp the negative value of MFP priced energy and perversely discourage discretionary demand.

While it is clear that FCAS *raise* services should be capped at MPC, it is unclear why *lower* services need be capped higher than the positive value of the MFP. This may have been an oversight when the FCAS market design was originally prepared.

The AEMC is encouraged to consider this matter and whether it can be addressed within the scope of this rule change.