

16 November 2022

Ms Anna Collyer  
Chair  
Australian Energy Market Commission  
South Sydney NSW 1235

By online submission: ERC0290

Dear Ms Collyer,

### **Draft Determination – Operational Security Mechanism**

AEMO welcomes the opportunity to provide feedback on the Draft Determination for the Operational Security Mechanism (OSM). AEMO recognises the OSM is intended to value, procure, and schedule essential system services. AEMO supports the introduction of the OSM and agrees that the benefits of having an additional mechanism outweigh the costs of its introduction. The OSM is an important reform that will support the National Electricity Market (NEM) system and market to operate through Australia's power system transformation.

Introduction of the OSM will allow participants providing essential system services to be remunerated via a market mechanism, an important step in recognising the value of resource operation that contributes to a secure system. The OSM provides an opportunity for staged introduction of unbundled services if advancements in engineering knowledge can enable their explicit specification and procurement. As the market matures and engineering understanding further evolves, the OSM could then assist progression to individual spot markets where this is practical and efficient.

AEMO commends the AEMC on developing a draft rule to introduce the OSM that improves certainty and transparency in the delivery of a secure system. AEMO also appreciates that the rule incorporates flexibility to allow the mechanism to evolve as the power system and market evolve. The rule does well to balance facilitating the market to act to provide security services with a practical approach that recognises the realities of the engineering feat required to transform the power system.

In this submission, AEMO discusses:

- The market aspects of the design that are intended to encourage competition and facilitate the market to provide security services.
- The practical features incorporated into the mechanism, including:
  - Those to manage the realities of the binary nature of commitments, including built-in 'aheadness' to the mechanism.
  - Allowance for operational timescale procurement of secure configurations or separate services, with the flexibility to progressively transition towards the latter as engineering knowledge evolves, and
  - Interactions with the existing central dispatch process.

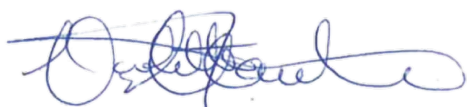
- The role, obligations, and incentives of Network Service Providers (NSPs) in the OSM and in complementary mechanisms:
  - Provision of limit advice that allows for the identification of secure system configurations.
  - Contributions from NSPs to support the move towards a service-led market.
  - Incorporation of contracts for system strength and Network Support Control Ancillary Services (NSCAS), and
  - Existing NSP processes, including, for example, planning processes, inertia support activities, and investing in and operating network assets.
- Considerations for the implementation of the OSM objective in maximising the expected value of spot market trade, having regard to the cost of the OSM procurement. This will allow the OSM to commit resources to provide security where this improves the overall value of trade.
- The setting of price caps and market power mitigation processes.
- Details of the settlement and cost recovery structure with an aim to limit complexity in the design while achieving the desired outcomes.
- The transparency arrangements, with a view to minimise the administrative burden while maximising transparency for the market.
- The scope for prototyping that AEMO will conduct to inform the settings of the scheduling parameters and implementation.

AEMO acknowledges the effective date in the draft determination of 1 October 2025 is based on preliminary assessments conducted for the basis of the NEM Reform Implementation Roadmap<sup>1</sup> and to ensure the OSM is in place by the effective date of the efficient system strength solutions, 1 December 2025. AEMO will work with the Reform Delivery Committee<sup>2</sup> to confirm the implementation date. It should be noted that the OSM forms part of the NEM 2025 Reform Program.

AEMO looks forward to continuing to work collaboratively with the AEMC and industry on the OSM towards final determination.

Should you wish to discuss any of the matters raised in this submission, please contact Kevin Ly, Group Manager - Reform Development and Insights at [kevin.ly@aemo.com.au](mailto:kevin.ly@aemo.com.au).

Yours sincerely,



Violette Mouchaileh  
**Executive Group Manager – Reform Delivery**

Attachments:

1. Comments on the design and approach
2. Comments on the draft rule

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<sup>1</sup> At <https://aemo.com.au/initiatives/major-programs/nem-reform-implementation-roadmap>

<sup>2</sup> The RDC has been established to work with industry to develop and maintain the “NEM Reform Implementation Roadmap that appropriately prioritises and sequences reform implementation. More information at: <https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/reform-delivery-committee>

## Attachment 1: Comments on the design and approach

### 1.1 Market aspects of the design

AEMO supports the overall approach of the design to promote competition in the delivery of a secure system at the operational timeframe (close to real-time) and efficient system operations that should reduce the need for directions. The design does this by:

- Allowing for re-bidding and iteration before the final cut-off time for an OSM enablement. The provisional OSM schedules published in the meantime will allow participants to react and update their OSM, energy and frequency control ancillary service (FCAS) bids based on revenue and operational expectations of the schedules. OSM (provisional and final) should result in a secure optimisation, in turn resulting in a secure pre-dispatch (PD) schedule. Iterative trading rounds (of OSM and PD) can then produce competitive, secure schedules, with the rounds leading to a competitive, secure equilibrium.
- Accounting for actual expected operational conditions in scheduling and pricing of the services. By allowing for a close-to real-time solution, the uncertainty in the forecast and conditions should be reduced, and the objective of maximising the expected value of trade can better reflect the actual value of trade.
- Having a common set of scheduling parameters for all providers, including gate-closure and the cut-off time for the enablement of security provision.
- Similar to energy bids, establishing provisions for OSM bidding to ensure bids are not false or misleading, do not allow for anti-competitive behaviour and should be expected to be provided with a genuine intent to provide at the offered price and within technical capabilities.

AEMO agrees this approach should improve the optimality of the solution and long-term efficiency. These features are redolent of the Market Ancillary Service ('MAS') approach contemplated by the directions paper and should allow for competitive forces to act in the operational timeframe. Under a longer-term contracting approach, for example where services are procured over several weeks or months, providers would need to take into account a broad scope of operational conditions and ensure they are sufficiently remunerated across this scope. This would drive up the prices at which they would be willing to provide services. In contrast, under the MAS-like approach, services are committed on hourly timescales over which service providers are more confident of conditions. This can be expected to lower the risk premiums built into their OSM offers. Further, several iterations of re-bidding are possible, providing opportunities for competition to put downward pressure on prices as certainty increases towards real-time.

The common set of parameters also establishes a common playing field for all providers. AEMO acknowledges this means that the OSM does not de-risk commitment for all resources: a common cut-off time means the OSM will close before some providers have to physically commit and after others need to make this operational decision:

- For those that the decision to commit must come before the OSM cut-off time, commitment will inherently need to be based on provisional schedules and expectations. There may therefore be times when a provider decides to commit for security but does not receive an OSM enablement in the final schedule. With bidding rules in place to avoid anti-competitive behaviour, it is expected that such cases are a result of competition acting, and therefore in the interests of consumers and the market.
- On the other hand, some providers may receive a final OSM schedule to provide a service before they need to physically commit to provide the service and may have additional flexibility with which they could act after this time. Given the realities of security requirements (as described further in the next section), and the binary nature of choices like committing units or having them operate in discrete modes, AEMO sees this issue as inevitable, but manageable through configuration of scheduling parameters that relate to commitment timing. AEMO agrees that the benefits of a common cut-off time promoting competition outweigh the potential inefficiencies of not being able to maximise the flexibility of some resources.

The draft determination notes that AEMO has the ability to withhold OSM payment if a participant does not deliver the service for which they have been enabled. This creates an incentive for service delivery. However, AEMO considers that this incentive should be strengthened by allowing the AER to take compliance action, such as financial penalties, due to non-delivery. In considering this, AEMO recommends that the AEMC also consider how penalties may interact with participant incentives to maintain their plant. As the OSM commits resources over a forward horizon, there is a risk that cheap and unreliable service providers are scheduled in preference to relatively expensive and reliable providers, only for cheap providers to be unable to deliver after the time at which it would be possible for the OSM to schedule expensive providers as a substitute. This risk could be managed by non-delivery penalties that incentivise participants to deliver on their enablements.

AEMO supports the parameters of the scheduling approach and service definitions to be set through AEMO's Procedures. This supports flexibility in the design, allowing these parameters to evolve as the market evolves and as engineering knowledge develops and allows for separation of services, while maintaining consideration of the system as a whole. This will also build in additional flexibility to the scheduling process as appropriate. Those Procedures will be subject to the rules consultation process, allowing also for industry input.

AEMO notes the expectations the Commission has described in the draft determination for the initial settings of the scheduling parameters. In general, the determination assumes highly-granular enablement periods, short OSM blocks and a short cut-off time, with the only constraint on timing being OSM engine run time. AEMO would like to specifically highlight clause 3.7G.9(f), which requires AEMO to run the final OSM simulation "as close to dispatch...as is reasonably practicable".

AEMO notes that the full set of scheduling parameters<sup>3</sup> would influence how participants (each with unique resource characteristics) interact with the OSM, the resources committed and ultimately the implications for consumers. The timing of schedules with respect to dispatch is just one element influencing this. It is also the full set of parameters that determines the complexity of the scheduling algorithm and solver run-time, which in turn has a feedback loop to the practicality of the chosen set of scheduling parameters. AEMO therefore intends to consider the settings of scheduling parameters holistically so as to promote the best outcomes for consumers. In particular, as part of its consultation on OSM procedures, AEMO hopes to work with stakeholders to understand how resource flexibility interacts with the timing of scheduling parameters.

In section 1.8, AEMO proposes a preliminary set of criteria for assessment of scheduling parameters. AEMO is concerned that the drafting "as close to dispatch...as is reasonably practicable" may be too narrow to consider such criteria and may actually promote outcomes that are contrary to the AEMC's intent. For example, producing schedules close to dispatch in principle improves efficiency, as the OSM mechanism can take in more accurate forecast data. However, producing (and publishing) schedules too close to dispatch may undermine commitment certainty, and therefore offset efficiency improvements. Further, an OSM run time too close to dispatch may limit the opportunity for rebidding and competition in the energy market in response to the OSM final run and any further changes in conditions.

AEMO suggests broadening of the drafting to allow for consideration of criteria beyond simply timing with respect to dispatch, and to allow for factors such as resource characteristics of likely OSM participants to influence the chosen set of scheduling parameters. AEMO notes and commends that scheduling parameter configurability through procedure consultation is an inherent feature of the draft. AEMO suggests that best-practice in this regard is to update scheduling parameters on the basis of empirical observations of participant behaviour. The choice of scheduling parameters may also influence operation of the system, and consideration should be given to incentivise desired behaviours (such as flexible operation) for efficient and secure operation.

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<sup>3</sup> Block size, granularity of inputs, granularity of enablements, solve horizon, time between cut-off and block start time, time between gate closure and block start time

Figure 1 builds on the AEMC’s Figure 2 in the draft determination which describes the key components and interaction with pre-dispatch/dispatch to highlight the factors which are to be balanced to achieve an effective design of the OSM.

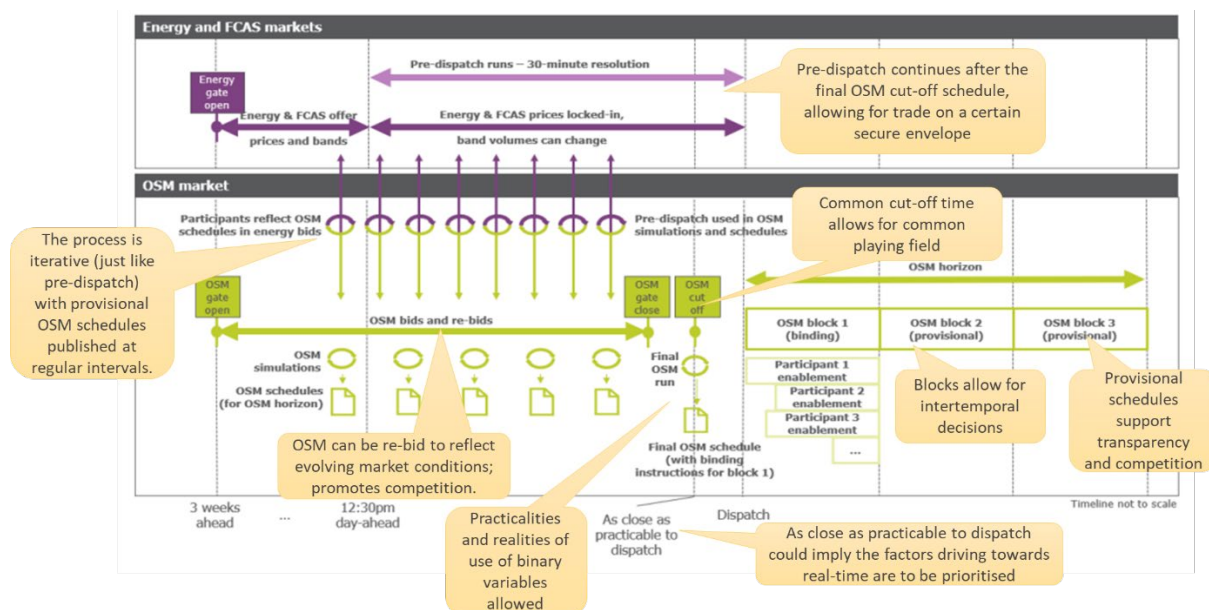


Figure 1: Operational processes and key features of the OSM schedule to be supported through judicious choice of scheduling parameters

## 1.2 Practical aspects of the design

### 1.2.1 Confidence that the system will be secure

Notwithstanding the comments made above where the design is intended to promote competition, the design also recognises the practical realities of managing the power system through the transition by:

- Providing certainty and stability in the solution from OSM cut-off to dispatch. The secure envelope will be established in the OSM by committing OSM facilities to operate in a mode in which they provide security. Setting this solution ahead of time is expected to reduce the need for directions and give AEMO and the market confidence that the system will be secure. This in turn allows for trading of services with real-time spot prices through the remaining pre-dispatch schedules after the cut-off time.
- Managing the practical realities of determining the optimal secure solution which necessarily involves consideration of binary variables (e.g., related to unit commitment or operation in discrete modes) and allow for use of intertemporal optimisation. For further discussion on these features, refer to section 1.6 of AEMO’s response to the AEMC’s directions paper.<sup>4</sup>
- Supporting OSM facilities to operate in a way that provides security, by remunerating resources for the provision of security services. The OSM design aligns financial incentives for participants to contribute to system security and recognises the limitations in defining those services at this time, as further described below.

### 1.2.2 Security services

AEMO supports the design allowing for both secure system configurations and separate services to be procured through the OSM.

<sup>4</sup> At <https://www.aemc.gov.au/sites/default/files/2021-10/AEMO.pdf>

As described in AEMO's submission to the AEMC's directions paper,<sup>5</sup> AEMO supports in principle the long-term vision for a service-based procurement model to meet secure system operations and continues to emphasise that the system and connecting equipment needs to be considered holistically. Operationally AEMO will always need to assess the security and stability of power system configurations.

There are significant engineering questions yet to be answered to facilitate the long-term vision, which will take time and experience to address. It will also take time to develop confidence in any unbundled service definition(s), ensuring they meet operational requirements and preserve the security of the system as a whole. If and where it is possible to unbundle services, consideration should be given to the complexity of separately valuing, procuring, and scheduling many individual services. AEMO refers to the description provided in the directions paper submission, particularly in response to Question 1.1 and 1.2, for further detail on AEMO's approach to characterising power system requirements and the need for an approach to determining secure system configurations.

AEMO expects that initially the OSM is likely to procure services associated with secure system configurations, with the framework for the OSM allowing for services to be separated as appropriate. At this stage, AEMO expects system configurations will also be used to operationalise system strength through the OSM, although this will be influenced by the way in which NSPs provide the associated limit advice and how System Strength Service Providers (SSSPs) meet their system strength obligations. System configurations allow for the system to be considered as a whole, which accommodates the system strength requirements in supporting a stable voltage waveform.

Through the development of the Security Services Guideline and associated consultation, AEMO will further describe the methodology associated with setting secure configurations for the purpose of the OSM, and for any unbundled services the process of determining the demand and specifying the supply. The methodology for defining services (configurations or separate services) will also need to consider how to apply the objective of the OSM to 'enable security services to achieve and maintain the power system security requirements as described in Chapter 4 and the power system security standards' as per clause 3.7G.2(a). Different regions and conditions may require different solutions that will be further informed by the relevant NSPs, and AEMO appreciates the flexibility that has been enabled through the Rules to allow the methodology to be described in the Guideline. AEMO also considers it appropriate for the System Security List, as developed using the Guideline, to be updated at any time without consultation to better facilitate identification of new configurations as entries, exits and outages occur.

Since the directions paper submission, AEMO has continued to work with industry and in particular, the relevant Network Service Providers (NSPs), to continue to improve a collective understanding of the requirements of the current and transforming power system, including but not limited to:

- The development of the updated System Strength Requirements Methodology and Power System Stability Guidelines associated with the implementation of the 'efficient management of system strength' rule change,<sup>6</sup>
- Development of the system strength and inertia reports in 2021 and 2022,<sup>7</sup>
- Exploration of how directions and synchronous generator requirements can be reduced with four synchronous condensers in operation in South Australia,<sup>8</sup>

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<sup>5</sup> At <https://www.aemc.gov.au/sites/default/files/2021-10/AEMO.pdf>

<sup>6</sup> Consultation material available at <https://aemo.com.au/consultations/current-and-closed-consultations/ssrmiag>

<sup>7</sup> Reports available at <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/system-security-planning>

<sup>8</sup> Description of approach available at <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/congestion-information-resource/related-resources/operation-of-davenport-and-robertstown-synchronous-condensers>



- Development of very fast FCAS markets,<sup>9</sup>
- Implementation of primary frequency control and associated development of frequency performance payments,<sup>10</sup>
- Implementation of the General Power System Risk Review,<sup>11</sup>
- Committed actions identified in the NEM Engineering Framework to develop a pathway toward technology agnostic service specification and provision.<sup>12</sup>

It is expected that these activities will contribute to our understanding of the requirements of the current and future system. The establishment of the OSM then provides a stepping-stone for separate services to be defined and procured in a market setting and to test the potential for the development of a spot market which can be co-optimised in real-time. Even for separable services, AEMO does not anticipate that it will necessarily be practical to procure for all power system requirements in real-time dispatch or necessarily lead to efficient market outcomes. AEMO emphasises that it will take time, experience, and a practical lens to effectively unbundle services if and where it is possible. The table below describes a hypothetical staged introduction for a separated service as the OSM and engineering understanding evolve and mature.

<p>Stage 1 – Procurement via system configurations in OSM</p>	<ul style="list-style-type: none"> <li>• Service is provided by resources within secure configurations that are an input to the OSM</li> <li>• <b>Procured in the OSM via system configuration services.</b></li> </ul>
<p>Stage 2 – Unbundled procurement in OSM</p>	<ul style="list-style-type: none"> <li>• Engineering knowledge progresses such that the delivery of the service can be measured from individual providers in isolation from other providers, and unbundled from other services</li> <li>• <b>The service can now be procured explicitly within the OSM</b></li> <li>• Participation in the market and the outcomes for system security under this framework can be studied.</li> </ul>
<p>Stage 3 – Unbundled procurement in real-time spot market</p>	<ul style="list-style-type: none"> <li>• AEMO is confident that system security has not been adversely affected by service unbundling</li> <li>• AEMO is confident that the service can be represented in real-time dispatch systems, and calculations can be carried out within 5-minute intervals</li> <li>• Appropriate consultation with current and prospective service providers has led to confidence that market efficiency will not be adversely affected by real-time procurement</li> <li>• Regulatory processes, including rule changes, have been followed to establish a new real-time market product</li> <li>• <b>The service is not procured within the OSM, but via a real-time market integrated with dispatch</b></li> </ul>

Table 1 - Progression of a hypothetical security service from provision within configurations to provision as explicit service

<sup>9</sup> Consultation material for the market ancillary service specification available at: <https://aemo.com.au/consultations/current-and-closed-consultations/amendment-of-the-mass-very-fast-fcas>

<sup>10</sup> Further information available at <https://aemo.com.au/en/initiatives/major-programs/primary-frequency-response>

<sup>11</sup> At <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/general-power-system-risk-review>

<sup>12</sup> At <https://aemo.com.au/-/media/files/initiatives/engineering-framework/2022/nem-engineering-framework-priority-actions.pdf?la=en&hash=F5297316185EDBD4390CDE4AE64F48BB>

### 1.2.3 Security and reliability

AEMO notes Clause 3.7G.3(f) requires that “AEMO must not enable a secure service for the sole purpose of achieving and maintaining a reliable operating state”. AEMO understands the intent of this clause is to prevent the OSM bringing on a facility for the sole purpose of delivering the energy that it necessarily provides when it provides security (as per its accreditation). AEMO agrees with the intent of this clause in restricting the use of the OSM to security purposes. It should be noted that in operational timeframes, a distinction between reliability and security is not always possible. For example, a security service may be required to provide a secure system, where alternatively load may need to be shed to protect the security of the system. In such circumstances, it is expected the OSM should enable a security service, as this would not be a case of having the sole purpose of reliability.

Similarly, if a unit is committed in the OSM for security, it may influence the availability of energy reserve in the system. In some scenarios, this could influence when AEMO intervenes through the Reliability Emergency Reserve Trader (RERT) mechanism or takes other actions. AEMO understands that the OSM would be used to target the provision of security services to facilitate pre-dispatch, and influence reserve management as a result. However, it is AEMO’s expectation that the OSM would not be used to directly resolve a supply shortfall in pre-dispatch.

### 1.2.4 Interaction between the OSM and central dispatch processes

The design of the OSM is expected to result in provisional and final OSM schedules and pre-dispatch and dispatch schedules that respect each other, and produce efficient, secure outcomes. To achieve this, the draft Rules require:

- Participants who receive a provisional OSM schedule to bid into pre-dispatch to reflect the OSM commitment (clause 3.7G.9(g))
- Participants who receive a final OSM schedule to bid into pre-dispatch and dispatch to reflect the OSM commitment (clause 3.7G.10(b))
- AEMO to determine the pre-dispatch schedule on the basis of the security schedules to be enabled (either on an indicative or final basis) (clause 3.3.20(c)(4)).

AEMO supports the intention of these clauses, considers these are a good starting point for how the systems should interact, and welcomes the opportunity to consider these further with the AEMC and industry in working towards the final determination. Recognising that efforts have been made to design the OSM to avoid distortion of spot market outcomes, it should also be noted that the OSM scheduling is expected to affect those outcomes in a way in which commitments needed for security are accurately reflected into pre-dispatch. This is opposed to what may occur in the current framework when a commitment is made at the last-time to intervene, in effect undoing what had previously been traded through pre-dispatch. In general, this should result in spot market outcomes and the expected outcomes in pre-dispatch now reflecting a secure system, improving the overall solution.

It is expected that Projected Assessment of System Adequacy (PASA) processes should also reflect OSM enablements. Similar to the description above, this would be achieved through participants reflecting their OSM scheduling through their central dispatch bids. Further consideration is required in detailed implementation to ensure these processes work together across short-term (ST) PASA and PD timeframes.<sup>13</sup> Additional amendments may be required in the rules to give effect to these requirements.

However, concerns have been raised that, for a participant that necessarily provides energy with their security contribution, bidding at the market price floor may not result in dispatch – further consideration could be given

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<sup>13</sup> Note: AEMO is currently redeveloping the ST PASA system and so this consideration will need to be made with respect to the updated process. Further information available at <https://aemo.com.au/en/initiatives/trials-and-initiatives/st-pasa-replacement-project>



to whether an alternative approach may be required here. A possible alternative could be to constrain the relevant unit online, but further consideration is required for any unintended consequences, such as the ability for participants to reflect any technical parameters with their plant.

Further consideration could also be given to how provisional OSM schedules are to be reflected in pre-dispatch. It may be unreasonable to expect a participant to update their pre-dispatch bids to reflect their OSM commitments. Again, alternative approaches could be considered. AEMO expects to utilise its prototype of the OSM to help resolve these questions. Prototyping is also expected to better understand what additional information is needed for the OSM solver to recognise where a participant is self-committing into the energy market and in what mode. AEMO will work with the AEMC to ensure the Rules allow for these detailed design parameters to be further considered through implementation, with the appropriate guardrails to be in the Rules.

### 1.3 Role of the Network Service Providers

NSPs hold a number of roles important to facilitating the successful implementation and operation of the OSM, and it is therefore crucial that due consideration is given to the appropriate obligations and incentives associated with their contributions. These roles include:

- Provision of limit advice to determine the security services to be procured through the OSM, both for secure system configurations and for separate services. This will be important to:
  - Define the set of allowable system configurations at any one time.
  - Revise the set of system configurations with changing operational conditions, and
  - Define separate services for procurement through the OSM.
- Designing and entering into ancillary and system strength contracts to be scheduled through the OSM. In particular, where non-network solutions are identified by SSSPs to be the appropriate option to meet their obligations under the 'efficient management of system strength' rule change, these will need to be designed and entered into to allow for counterparties to participate in the OSM to operationalise those contracts. AEMO does not expect to approve any such contracts; rather these are to be designed in such a way that, in conjunction with the limit advice provided by NSPs, they can be enabled through the OSM, and counterparties will be expected to participate accordingly.

However, the importance in the design of the OSM scheduling to facilitate efficient contracting and to enable contracting options is recognised. AEMO looks forward to working with NSPs and potential counterparties through prototyping and eventual implementation of the OSM to design the appropriate parameters. The AEMC should consider if any further modifications are required to the OSM rule change to best facilitate the scheduling of contracts with the OSM and ensure the appropriate allocation of responsibilities.

AEMO considers that the OSM provides a valuable opportunity for NSPs to contract for non-network solutions more flexibly and more efficiently, particularly where working in conjunction with the rule change for efficient management of system strength. The OSM provides a means to operationalise contracts, where operational costs can be better determined by the conditions of the day (capped appropriately through the contract terms). This may allow contracting processes to focus on establishing commercial terms and price these, rather than needing to price all longer-term possibilities.

- Continued obligations and incentives to plan, build and maintain their network to support secure power system operations. The introduction of the OSM is intended to facilitate scheduling of network support contracts (including system strength) and may have the ability to manage system security due to outages (planned or unplanned) where these have not been accounted for in planning activities. Note, where NSPs

invest in their regulated asset base to meet these requirements the scheduling of those assets will not be optimised in the OSM.

- Continued obligations in facilitating connections and updating limit advice to represent any modifications to their network operation with respect to changing connections. This will also need to consider processes for OSM facilities to be accredited to participate in the OSM as they form part of a secure system configuration or have the ability to deliver a separate service (if applicable). The accreditation would take into account the technical parameters of the facility associated with delivery of the service, including any potential for the facility to operate in different modes. AEMO expects that the accreditation process is likely to require joint consideration with NSPs and will continue to work with the AEMC and NSPs to ensure this is appropriately reflected in the Rules and then on the detailed implementation of these processes.

AEMO welcomes the opportunity to work collaboratively with the AEMC, AER and NSPs to ensure the Regulatory framework adequately captures the above roles of NSPs and ensure the complementary processes are able to work effectively together in practice.

## 1.4 Practical implementation of the OSM engine

As discussed in Section 1.1, AEMO agrees with the AEMC's draft decision to introduce the OSM with a separate process from dispatch (a non-market ancillary service (NMAS) approach), while incorporating as many features of a MAS approach as possible. The separate process, and separate engine, enables consideration of binary choices, allows for a mixed-integer solver, and allows for consideration of intertemporal aspects. These features ensure the practical realities of managing system security through the transition can be better reflected in the OSM and it can account for the run-time of an engine incorporating these features.

AEMO also supports the objective of the OSM to maximise the expected value of spot market trading. This will allow for the OSM to commit resources to provide security where this overall improves the value of the energy market, up to the cost of the OSM procurement. AEMO notes stakeholders have raised concerns with potential gaming in this approach given the ahead nature of the solution. As discussed in Section 1.1 and 1.2, AEMO expects these should be managed through the iterative nature of the solution prior to the cut-off time, allowing for the provisional OSM schedules and pre-dispatch to reflect each other, as well as appropriate controls on participants to avoid anti-competitive behaviour.

However, it should also be noted that there are potential practicalities in this approach that need to be further considered, associated with the complexity of the OSM solve and the run-time of the solution. These practicalities include the granularity of the solve, the length of the OSM optimisation, the granularity of the enablement and the constraints which are included in the OSM. As further discussed in Section 1.8, AEMO intends to embark on prototyping of the OSM engine to better understand these practicalities and to inform implementation. AEMO considers it may be necessary to allow for additional flexibility, so that it can achieve the objective 'to the extent practicable' – this wording could be added to clause 3.7G.2. This will allow AEMO to balance the practicalities discussed in this section alongside the factors described in Section 1.1 and 1.2. and the offer form and settlement framework discussed further in Section 1.6.

## 1.5 Price caps and market power mitigation

AEMO acknowledges the framework that has been built into the draft rule to manage concerns over market power in the OSM. Overall, AEMO supports this framework and again commends the flexibility this framework offers to allow the process to evolve with the OSM. AEMO offers the following suggestions:

- Where the AER identifies the appropriate market power mechanism is for price monitoring, AEMO expects that it would be the AER undertaking that price monitoring. The current drafting in section 3.7H is not clear

whether this would be AEMO or the AER. AEMO considers that price monitoring is a function best allocated to the AER as market regulator.

- Consideration should be given to whether the AER can calculate any required price caps as part of the review process, rather than having a two-step process whereby the AER recommends how AEMO is to set price caps. AEMO understands that the AEMC has suggested AEMO is the appropriate body to calculate the market price caps given information available to AEMO through other processes such as the Integrated System Plan, which considers costs of different plants. However, AEMO is unsure of the relevance of these processes, expects it would need to gather additional information to calculate the caps, and therefore queries if it may reduce administrative overhead of the collective market bodies if the AER could receive this information directly as part of its review. This would also maintain AEMO's independence in operating the OSM.

Aside from managing market power, AEMO suggests an overall price cap to be applied to limit the payment per enablement. An overall price cap could be used to manage:

- Errors in inputting data. AEMO is likely to need to set some cap for validation of bid data – it would be useful if this can be aligned to a market parameter, rather than an arbitrary figure set through consultation in the detailed technical implementation.
- Transient market power or unintended gaming opportunities– AEMO considers scarcity pricing should be allowed in the OSM but has concerns that without an overall price cap this could tend to infinity and should have some limit applied.

AEMO notes a floor and cap has been applied to OSM variable prices that are in \$/MWh to align this to the market price floor and cap respectively – further consideration should be given to whether these need to account for intra-regional loss factors, as per those applied for resources bidding in the spot market.

## 1.6 Settlement, compliance, and cost recovery aspects

AEMO understands the design of the settlement framework of the OSM is intended to remunerate participants for providing security with a pay-as-bid framework per enablement, made up of a combination of fixed (enablement) and variable costs. AEMO also understands the framework is designed to incentivise a participant to participate in the energy spot market (and provide security as a by-product) when the energy price is expected to be sufficient for their operational and commercial requirements.

Further consideration is required for the exact nature of the equations and definitions of relevant terms to give effect to this framework: while the intent of the equations in draft rule 3.15.6C reflects this framework, AEMO welcomes the opportunity to consider these in further detail with the AEMC. For example:

- The current equation for OSM settlement aligns to enablement periods of the OSM, which are within trading days. Energy is settled on calendar days, which may result in discrepancies for the settlement statements. Consideration should be given to aligning this equation with calendar days.
- The current equation does not apply a factor to consider transmission loss factors (TLFs) when calculating the amount payable for the system security price (SSP) for OSM facilities that must provide their variable price in \$/MWh. This may impact the relative incentives for the adjusted calculation.
- There is complexity associated with considering when a participant is entitled to receive its enablement price, as outlined below.
- The cost recovery framework provides for regional benefit factors to be applied per security service. OSM participants however will be settled per enablement period, which aligns with expectations that an OSM facility may be given an OSM enablement that could align with multiple different security services (configurations or separate services). As it stands, it will be difficult to reconcile the cost recovery

framework to the amount payable, and further consideration should be given to how to align the regional benefit factors to enablement of an OSM facility, rather than directly to security services.

AEMO notes that discretion has been given to AEMO to determine when an OSM participant is entitled to receive its OSM price, including when an enablement price should be added or deducted from the transaction amount, and when the payment should be withheld due to failure to deliver the service. This discretion has been given in draft rules clause 3.7G.11(b)(19) and will be determined through the OSM Procedures and in consultation with industry. AEMO suggests that further consideration is given to the appropriate compliance arrangements for an OSM facility that does not honour its OSM commitment, with relevant compliance action to be able to be taken to support the integrity of the framework.

AEMO also considers the design of the enablement price settlement to be particularly complex and highlights this will be a key area of consideration for detailed implementation. The enablement price is intended to allow for trade-offs to be made in the optimisation between enabling a unit to operate in a secure mode (where it was previously offline), extending a unit's commitment, or by avoiding a unit needing to change its enablement. It is expected that the OSM solver will take into account the enablement price in determining the optimal solution, and where that may be avoided. As such, further detail will need to be worked through in implementation as to how this parameter will be incorporated into the OSM solver, and how participants will be able to manage their OSM commitments with other commitments, while understanding what price they are entitled to receive.

## 1.7 Transparency arrangements

AEMO notes one objective in introducing the OSM is to increase transparency and supports the draft arrangements in that they balance administrative overhead with reporting on the performance of the mechanism:

- The ability for the system security list to be updated without consultation is important to allow for new information or changes in the network to be reflected in the system security configurations as soon as practicable.
- The annual cadence of reporting on the performance of the mechanism is appropriate.

There is further consideration to be given to the description of the data to be reported in day-to-day and annual reporting. The current draft rules clauses 3.7G.12(b)(2) and 3.13.4 require the data to be in terms of 'volume' and 'quantity'. AEMO is not sure how this is to be interpreted with respect to security services and looks forward to working with the AEMC to improve the drafting of these clauses.

## 1.8 Prototyping to further develop scheduling design

AEMO is commencing work on developing and testing the OSM algorithm and systems. A key part of this work is prototyping the OSM scheduler. This will involve building a simplified model of the OSM algorithm, inputs and outputs and understanding the formulation for the design. This will support AEMO's implementation activities (as part of the NEM2025 program) and help to build a detailed implementation plan.

As well as preparing the implementation, the results of the prototyping are expected to inform regulatory discussions. The prototype is expected to be a vehicle for working through examples and testing different combinations of scheduling parameters, such as cut-off time, block length, OSM horizon.

The prototyping work can be grouped into three key tasks:

### 1. Solver formulation task

- Formulate and build a working model of the OSM as described in the AEMC's draft determination on the OSM and use it to answer the following questions:

- How does the OSM calculation interact with predispatch?
  - Sequencing of the OSM intaking PD bids
  - Consideration of resources that are valuable to a security configuration but also wish to self-commit in energy markets
- How do OSM solutions converge?

## 2. Design parameter analysis

- Determine the mix of detailed design settings that support a practicable approach to implementing a solver
- Design settings include:
  - Scheduling parameters
  - Constraint types (FCAS, network etc.)
- Assess settings against a set of criteria, such as:
  - Engine performance (e.g., runtime, software footprint)
  - Economic efficiency, including optimality of solution and ability to promote competition through iterative rounds.
  - Risk of security service shortfalls (e.g., due to forecast uncertainty between the OSM cut-off and real-time dispatch)
  - Simplicity
  - Predictability
  - Commitment certainty

## 3. Case studies

- Develop and report on examples to apply to the working prototype that address the following questions:
  - How many OSM schedules, bidding rounds are possible?
  - Should the OSM mechanism use bidding at the price floor in PD as an approach to ensure resources cleared in the OSM are scheduled in dispatch?
  - What are the mechanics of the OSM relieving IBR constraints for net market benefit?
  - What are the mechanics of the OSM unbundling system services from configurations?
  - How does the OSM treat units that can operate in multiple modes (e.g., fast-start units that can operate in synchronous condenser mode)?

AEMO will work with the AEMC and industry as it undertakes this prototyping.

## Attachment 2: Comments on the draft rule

AEMO provides comments on the draft rule in this appendix to complement the comments on design features above.

In general, AEMO supports the approach the AEMC has taken to introduce the OSM in a flexible manner where many of the specific details are left to AEMO Procedures and consultation.

While efforts have been made to review the draft Rules and comment on areas that require attention, AEMO expects the Rules may require further review and edits to give effect to the OSM. This review should also consider the comments AEMO has provided in Appendix 1 of this submission. AEMO also notes it is possible that AEMO uncovers infeasibilities in the OSM design that warrant further update to the Rules as it progresses through various phases of prototyping of the OSM engine. AEMO will continue to work with the AEMC to bring matters to their attention as it notices them and as the mechanism develops through to final determination.

### 2.1. Objective

- 3.7G.2 – AEMO agrees with the principle that the objective of the OSM is to maximise the expected value of spot market trade, subject to OSM costs. However, as discussed in section 1.4, AEMO is concerned that representing the entirety of the NEM dispatch (i.e., including all network and FCAS constraints) in the OSM solver may increase the run time of the solver and therefore limit the extent to which the OSM can operate effectively and how AEMO must define scheduling parameters. Additional flexibility in this clause, such as the introduction of the phrase ‘to the extent possible’ would assist in allowing for balancing the scheduling parameters with the intent of this clause.

### 2.2. Security services

- 3.7G.3(f) – AEMO understands the intent of this clause is to prevent the OSM being used to bring units online for the purpose of the energy they provide when providing security services. As discussed in section 1.2.3, AEMO suggests this clause could be redrafted to be clear that this is intended to prevent the OSM bringing a unit online for the by-product energy that it produces with the security service.
- 3.7G.4, 3.7G.5 – These clauses require AEMO to develop a System Security Guideline in consultation with industry. This guideline would set out the methodology by which AEMO will define system services (configurations and separate services). It would be helpful to consider how the draft rules may be clarified to ensure NSPs remain responsible for determining the limits applicable to their networks and will need to contribute to the definition of any system services (configurations or separate services) for the functioning of the OSM.

### 2.3. OSM participants

- 3.7G.6(c) – currently requires AEMO to establish a process, in accordance with the OSM Procedures by which OSM Participants can be accredited to provide security services. It would be helpful to clarify that AEMO can also establish a process whereby it can suspend OSM Participants from providing security services (e.g., where they are not meeting their technical accreditation).



- AEMO also notes that the ability for an OSM Participant to be accredited will be dependent on their being identified as being part of a system configuration (determined by NSPs).
- 3.7G.6(f) – AEMO is not clear what the draft Rules require of AEMO with respect to accrediting an OSM Participant to provide a contracted security service. AEMO understands the intent of the framework is to allow for contracted parties to be scheduled through the OSM, with the operational costs to be settled through the OSM framework. AEMO expects contracted parties should be treated no differently to uncontracted parties, however:
  - Clause 3.7G.6(f) potentially requires AEMO to be privy to the security service agreement arrangements and only accredit the provider if the conditions hold. AEMO considers it would be more appropriate to place those obligations on the counterparties of the agreement and limit AEMO's obligation with respect to what it can and should know of the agreement. This could be similar to how reserve contracts are treated in 3.20.3(i) and (l).
  - With this in mind, it is also not clear why in clause 3.7G.7 the need for a party to bid in accordance with contract terms is limited to the extent those terms have been registered with AEMO; AEMO would expect this would instead be managed through the contract itself.

## 2.4. OSM bidding

- 3.7G.7(c)(2) – This clause limits OSM variable bids that are in \$/MWh to be between the market price floor and market price cap. Consideration should be given as to whether this should be adjusted for loss factors, like is done for spot market bidding.
- Further consideration should be given to an overall payment limit that can be applied per enablement.

## 2.5. OSM simulations, scheduling, and enablement

- AEMO appreciates and agrees with the way the scheduling parameters have been described in the draft rule (clauses 3.7G.8 and 3.7G.9) as flexible and left to AEMO Procedures to set those parameters (following the rules consultation process).
- As described in Appendix 1, AEMO is intending to prototype the OSM engine. This prototyping is expected to inform the settings of scheduling parameters.
- 3.7G.9(g) – Concerns have been raised regarding whether it will be possible for OSM Participants to reflect indicative schedules in the central dispatch process. Alternatives could be considered such as constraining the unit online or introducing automatic adjustments of participant bids to ensure provisional OSM schedules are reflected in central dispatch as soon as possible. Consideration could also be given to shifting the way in which a participant must react to their provisional schedule to be described in the OSM Procedures.
- Similarly, AEMO is keen to work with industry and AEMC to understand how a final enablement should be reflected in central dispatch to achieve the appropriate objectives (clause 3.7G.10(b)).

## 2.6. OSM procedures

- AEMO agrees that much of the detail has been put into the OSM Procedures and will consult with participants to determine these settings. The information that will be in OSM Procedures will initially be informed by the prototyping work, and where (if) that raises any considerations for the rules regarding the procedures, AEMO will immediately raise that with industry and AEMC.

- 3.7G.11(b)(19) – AEMO requests clarification of the requirements described for when an OSM Participant is ‘entitled to recover its OSM price’
  - AEMO is unsure of the use of the word ‘recover’ – should this just be that an OSM participant is entitled to ‘receive’ its OSM price?
  - Does the drafting in sub-clause (i) allow AEMO to both withhold payments and clawback payments when these have been paid in error (or when ex post processes show that the participant has not provided the security service)?

## 2.7. Market power

- 3.7H.1(c), 3.7H.1(e), 3.7H.2, 3.7H.3(a) – it is not clear whether, if it is recommended, AER or AEMO would be the party responsible for conducting price monitoring. AEMO suggests this would be best placed with the AER, not AEMO.
- 3.7H.1(e)(7) – it is not clear if it is the structure of the price cap that should vary with changing market conditions or if the price cap should be structured so that the cap is variable. The current drafting implies the former.
- 3.7H.1(f) – suggest price caps could also apply to ‘classes of OSM Participants’.
- 3.7H.2 – suggest re-phrased to be such that AEMO may be required by the AER ‘in’ a market power review, rather than ‘by’ a market power review.
- 3.7H.3(b) – the drafting should make it clear that the AER should provide guidance on how AEMO would exercise its discretion to vary the price caps. This could be done by including the following phrase ‘in accordance with the methodology’ at the end of this clause.

## 2.8. Market Information

- 3.13.4(q),(r) – AEMO requests clarification for what is expected to be published under these clauses: in particular, how ‘quantity’ is to be interpreted.

## 2.9. Settlement

- 3.15.6C – as described in section 1.6, AEMO suggests these clauses are further reviewed for clarity and alignment with existing settlement processes. These points are repeated here and complemented by other suggestions for improved clarity in this drafting.
  - 3.15.6C(b) - The equation for OSM settlement aligns to enablement periods of the OSM, which are within trading days. Energy is settled on calendar days, which may result in discrepancies for the settlement statements. Consideration should be given to aligning this equation with calendar days. To do this, it may be that enablement payments will need to be divided across how many intervals the enablement was made for, and then spread across the relevant time period.
  - 3.15.6C(b) - The equation does not apply a factor to consider transmission loss factors (TLFs) when calculating the amount payable for the system security price (SSP). This may impact the relative incentives for the adjusted calculation.
  - 3.15.6C(b) – the definition of SSV refers to the ‘volume’ of security service – it is not immediately clear what this volume is, although AEMO interprets this as the MWh associated with the variable price where relevant, hours if not.

- 3.15.6C(c)(1) – makes references to paragraph (h) – AEMO suggests this should be (g).
- 3.156C(c)(2) – makes reference to TSS<sub>EP</sub> and paragraph (i) – AEMO suggests these should be TA<sub>EP</sub> and (h) respectively.
- 3.15.6C(g) - The cost recovery framework provides for regional benefit factors to be applied per security service. OSM participants however will be settled per enablement period, which aligns with expectations that an OSM facility may be given an OSM enablement that could align with multiple different security services (configurations or separate services). As it stands, it will be difficult to reconcile the cost recovery framework to the amount payable, and further consideration should be given to how to align the regional benefit factors to enablement of an OSM facility, rather than directly to security services.

## 2.10. Instructions to enable system strength services

- AEMO notes that clause 3.7G.10(e) allows AEMO to enable a contracted security service that is a system strength service in accordance with the OSM despite clause 4.4.5(b) and for a range and quantity greater than that required to maintain the minimum three phase fault level at the relevant system strength node. AEMO requests the AEMC consider whether clause 4.4.5(a) should have a similar amendment to clarify that AEMO may enable system strength services above the minimum subject to the OSM.