17 November 2022

Amy Wiech
Australian Energy Market Commission
Submitted online at: www.aemc.gov.au

Dear Ms Wiech

Submission: Operational Security Mechanism Draft Determination

CS Energy welcomes the opportunity to provide a submission to the Australian Energy Market Commission's (**AEMC's**) Operational Security Mechanism Draft Rule Determination (**Draft Rule**).

About CS Energy

CS Energy is a Queensland energy company that generates and sells electricity in the National Electricity Market (**NEM**). CS Energy owns and operates the Kogan Creek and Callide B coal-fired power stations and has a 50% share in the Callide C station (which it also operates). CS Energy sells electricity into the NEM from these power stations, as well as electricity generated by other power stations that CS Energy holds the trading rights to.

CS Energy also operates a retail business, offering retail contracts to large commercial and industrial users in Queensland, and is part of the South-East Queensland retail market through our joint venture with Alinta Energy.

CS Energy is 100 percent owned by the Queensland government.

Key recommendations

It has long been acknowledged that as the NEM transitions to a market with more intermittent energy and an overall lower carbon footprint, frameworks that appropriately value all Essential System Services (**ESS**) will be paramount. CS Energy has been supportive of adaptive market and regulatory frameworks that price ESS. These will provide valuable information to the market about both the operational need in the near-term as well as establishing vital forward signals that will drive investment in the capability that is required in future as the existing ESS providers, coal generation, exit the market.

Presently, aside from frequency control services, the Australian Energy Market Operator (**AEMO**) largely relies on directions to ensure the required capability is online, with the

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experience in South Australia demonstrating the unsustainability of this approach. CS Energy does note that the introduction of new capability (synchronous condensers) in South Australia has reduced the quarterly duration of AEMO directions from 80% in Q4 2021 to 10% in Q2 2022[1]. This supports the underlying ambition to incentivise new capabilities into the NEM via a mechanism that values ESS.

Given the criticality of valuing ESS, CS Energy is extremely disappointed with the Draft Rule and the overall process to date which has lacked the valuable independence that usually characterises the AEMC's approach. Rather than apply due diligence in the consideration of the proponents' requests and the exploration of other options, it is possible to draw the conclusion that the Draft Rule presents a solution that has been advocated by AEMO to provide it with operational certainty without appropriate reference to the value that the relevant services will provide in the future NEM.

This concern has been reinforced by the unsubstantiated leap from the AEMC-AEMO *Joint Paper on Essential System Services and Inertia in the NEM*[2] (**Joint Paper**) immediately to the Draft Rule. As outlined in its submission[3], CS Energy considered the Joint Paper to be an unprecedented conflict of interest and without the required technical detail to support the development of specific ESS frameworks. This lack of information is also apparent in the Draft Rule which fails to present any genuine analysis, modelling or adequate detail as to why the Operational Security Mechanism (**OSM**) is the most efficient solution. CS Energy agrees that it may be more efficient than directions, but this does not automatically qualify it as more efficient than other potential options.

CS Energy appreciates the complexity in developing a mechanism or mechanisms to appropriately price ESS and is cognisant that potential approaches cannot be everything to all stakeholders at once. However, the Draft Rule highlights an apparent divergence in the strategic intent of the OSM and its operationalisation. The high-level objective focuses on the OSM providing investment signals and evolving to a services-based mechanism that unbundles ESS which CS Energy supports. CS Energy finds it difficult to reconcile this objective with the OSM's operationalisation as presented in the Draft Rule which appears to prioritise operational certainty over the valuing of ESS.

In CS Energy's opinion, the OSM as presented in the Draft Rule represents a lost opportunity for the development of frameworks to value and procure ESS now and into the future. CS Energy considers it to be a very rudimentary, 'black box' centralisation of needs that will jeopardise the future power system should it proceed given that, as CS Energy understands them, all aspects as proposed stymie the strategic intent:

- Given the lack of standards and operational metrics for ESS and the reliance on system combinations, it is unclear exactly what the OSM is procuring. If one works through the ESS and the requirements for a secure system[4], the services not already captured under the frequency control markets are inertia, system strength and voltage control. Given frameworks already exist for identifying shortfalls of these individual services, it is unclear what additional value is being delivered via bundling ESS or why markets can't be pursued for these unbundled services.

  CS Energy would like clarity on what exactly the OSM is intended to procure that necessitates the system configuration approach. If for example, the procurement of system combinations provides AEMO with a level of system operationality and certainty

[1] AEMO, *SA minimum synchronous generator requirements – stakeholder update package*, September 2022, p.3
[2] AEMC-AEMO *Joint Paper on inertia and essential system services*, June 2022
[3] CS Energy submission to *AEMC-AEMO Joint Paper on inertia and essential system services*, July 2022
[4] See for example, AEMO, *Power System Requirements*, July 2020

that is valuable above and beyond the provision of ESS, then this should be made explicit and incorporated like any other market parameter. This would allow the OSM to operate more efficiently, but would also ensure the appropriate trade-offs are transparent and represent the long-term interests of consumers;

- The lack of operational metrics provides challenges in both the governance of the mechanism but also the provision of the market signals that are necessary to incentivise the capability required; and

- System services are **not** valued by the OSM. In addition to the lack of transparency, the pay-as-bid pricing structure, use of system configurations and scheduling approach more closely reflect a formalised directions framework with the provision of ESS compensated through the OSM. This does not establish the necessary signals to the market to invest in the required capability, potentially placing the system at risk as coal plant exit.

Given the focus of jurisdictional policies on the entrance of new renewable capacity, the need for clear market signals for ESS is critical to securing the future NEM. The OSM, at a minimum, needs to:

- If the use of system configurations proceeds, include a sunset clause the timing of which is aligned to a clear and explicit roadmap of technical work to develop standards and operational metrics. Any amendment or removal of the sunset clause would need to have oversight by the Reliability Panel to ensure appropriate due diligence and avoid the negative experience of the sunset clause that was established and removed for mandatory Primary Frequency Response (**PFR**);

- Adopt scarcity pricing for ESS which appropriately values the services providing the market with both transparency and clear incentives. This would have the added benefit of resolving the AEMC's market power concerns;

- Provide greater certainty for existing and new assets. For the former, gate closure should not be universal but should acknowledge technology limitations. One potential approach would be to reconcile gate closure with recall times in the enhanced Medium-Term Projected Assessment of System Adequacy (**MT PASA**).

  New assets currently do not have certainty that they will meet the black box requirements of a system configuration nor understand the longer-term opportunities. The Draft Rule provides no apparent link to established network planning frameworks or the Electricity Statement of Opportunities (**ESOO**) which is concerning given its role in providing clear investment signals to the market;

- Be subject to independent, technical and economic assessment;

- Establish a compliance and transparency framework within the National Electricity Rules (**NER**) that places stronger obligations on AEMO than currently proposed. CS Energy appreciates the AEMC's reasoning for providing a level of flexibility and discretion to AEMO however, appropriate market governance requires independent oversight. The roles of the Reliability Panel and the Australian Energy Regulator (**AER**) need to be clearly articulated across all stages of the OSM, and clear reporting obligations on AEMO must be established; and

- Reporting obligations including clear information requirements should commence upon the final Rule determination not upon implementation of the OSM so that market participants and AEMO alike can increase their understanding.

CS Energy acknowledges the value of the OSM in scheduling assets that have contracts with Transmission Network Service Providers (**TNSPs**) under the system strength planning framework and suggests the AEMC continue to explore this aspect. TNSPs will have a large role in the OSM with AEMO indicating in the forums that they are responsible for the system configurations through their limits advice. Given the locational aspects of many ESS, and the existing minimum inertia and system strength obligations on TNSPs, it is reasonable to consider an ESS network planning obligation and potential competitive local markets with any contracts then scheduled through an OSM.

Irrespective, the AEMC would ideally take the opportunity to reassess its priorities and objective in valuing ESS, and challenge whether the OSM can deliver on these effectively and efficiently. If not, there is a risk that the mechanism will not perform its stated intent, risking the future security of the NEM and imposing an unnecessary cost impost on consumers.

Various other options, including those posited by the proponents, should also be explored. CS Energy has outlined in Appendix A three potential options that it believes have merit for further consideration in the development of mechanisms to appropriately value, procure and schedule ESS. These include enhancements to existing frameworks (and those currently in progress), the role of TNSPs and amendments to the OSM. Should the OSM proceed, Appendix A also provides a summary of recommendations for the AEMC to address.

Further detail on CS Energy's concerns of the OSM design as presented in the Draft Rule is set out in Appendix B. Comment on the Rule drafting has not been provided given CS Energy does not consider the proposal to be sufficiently advanced to warrant draft determination status.

If you would like to discuss this submission, please contact either myself on 0407 548 627 or ademaria@csenergy.com.au or Henry Gorniak on hgorniak@csenergy.com.au or 0418 380 432.

Yours sincerely

Dr Alison Demaria
Head of Policy and Regulation

APPENDIX A

By definition ESS are critical components of the power system, responsible for the safety, stability and security of its operation, and there is little argument on the need for frameworks that appropriately value, procure and schedule ESS as the NEM transitions.

The development of the OSM has represented a piecemeal and operationally biased approach to ESS and this may not deliver efficient outcomes for consumers. The mechanism as presented in the Draft Rule does not properly value ESS, deliver efficient operational signals nor establish clear and effective investment signals. If implemented, it is CS Energy's opinion that it will be detrimental to efficiently securing the future NEM, with consumers potentially facing the cost of its shortcomings. It is difficult to see how it will facilitate the transition to the desired service-led management of the power system or encourage technological innovation.

Other options to value ESS

In addition to the options presented by the two proponents, the process by which the OSM has been developed has failed to properly consider other mechanisms to value, procure and schedule ESS. CS Energy presents three approaches that merit further consideration. These are additional to the Australian Energy Council (**AEC**) Rule Change Request to establish an inertia market, the consideration of which will not be facilitated by the OSM. The AEMC could also consider the short-term option of contracting thermal generation while a more suitable longer-term mechanism is developed.

(a) Leveraging and enhancing existing frameworks

CS Energy agrees with AEMO's need for certainty in the provision of ESS and considers ESS could be delivered by existing processes. Some of these processes may require enhancements but will be more efficient than developing layered processes such as an OSM. The overarching source of certainty is the adherence by Market Participants to the required compliance obligations arising from the provisions that participant bids must not be 'false and misleading' and be provided in 'good faith' at all times. The development of clear standards will then complement and reinforce this certainty.

Clause 3.7.3 of the NER outlines the Short-term Projected Assessment of System Adequacy (**ST PASA**) requirement whereby AEMO must clearly identify and define the required inputs reasonably necessary for adequate power system operation and the maintenance of power system security and reliability of supply. Currently, the focus is on energy (Lack of Reserves (**LOR**) levels) and at times on frequency control although with no equivalent "lack of Frequency Control Ancillary Service (**FCAS**)" metrics. A clear definition for system adequacy and explicit metrics for ESS can be integrated into ST PASA, and AEMO could establish metrics such as Lack of Inertia levels to signal projected shortfalls.

Pre-dispatch and ST PASA have already demonstrated that the NEM Dispatch Engine (**NEMDE**) is capable of optimising and dispatching energy and frequency control based on participant bids and this provides a commitment schedule underpinned by the stringent compliance obligations. AEMO also already employs the Voltage Dispatch System (**VDS**) that utilises an objective function (reflecting optimisation) that captures the technical envelope and network and non-network options. The VDS from a MVAr scheduling perspective could be incorporated into pre-dispatch and ST PASA and should be explored.

Appropriate standards and information provision will establish clear market signals based on which participants will be incentivised to base offers/rebids and the resultant commitment outcomes. Thus, AEMO will have certainty and situational awareness of the state of power system security and reliability on a NEM and regional basis.

Furthermore, this approach provides a platform for a market response to an actual or forecast deficit in energy, frequency control services or other ESS. Failing a required market response, AEMO is informed to determine the latest time to intervene.

(b) Network planning obligations

TNSPs have a material role in the OSM with their limits advice setting out the technical need for ESS which may then manifest in a system configuration or specific ESS requirement. Furthermore, TNSPs are already subject to obligations related to system strength and minimum inertia levels.

System strength and reactive power are locational characteristics and requirements will vary across each NEM region. CS Energy acknowledges that while inertia is deemed as having a global effect, this may change in time with particular inertia distributions exposing the system to high levels of Rate of Change of Frequency (**RoCoF**). For example, if inertia is concentrated in one area and a contingency event occurs some distance away from the inertia source, a high RoCoF would ensue.

Thus, it is not unreasonable to explore whether technical requirements are best met in the long-term with network solutions via frameworks such that are in place for system strength. This framework as well as the minimum inertia obligation could be strengthened to place a network obligation for delivering both the minimum level of these services as well as the efficient level. The existing Network Support and Control Ancillary Services (**NSCAS**) arrangements for reactive power could similarly be leveraged.

AEMO would continue to be obligated to provide TNSPs with the forecasted need for these ESS. This information would be incorporated into the established network planning frameworks as well as the ESOO thereby providing the market with clear investment signals. TNSPs could then meet their obligations via a mix of network assets and long-term contracts with participants. The OSM could then be utilised to schedule both the network assets and contracts to ensure the real-time technical need is met.

This approach has many benefits. It is much simpler than the OSM as presented in the Draft Rule, the accountability distributions are clear, transparency is likely to be enhanced and given it is underpinned by the network planning processes, AER oversight is automatic and will provide a more resilient governance framework than that proposed for the OSM.

(c) OSM with clear, obligated targets

Discussion on the required ESS tends to be tied to the level of inverter-based generation online. This is reminiscent of the experience in Ireland where the system operator Eirgrid put in place a System Non-synchronous Penetration (**SNSP**) limit. The SNSP reflected its engineering knowledge at the time, and they established a clear pathway to increase this value. This approach had the dual benefit of providing clear forward signals to the market. The SNSP also provided EirGrid with headroom so that they could accommodate trials of the provision of ESS from non-traditional technologies[5], improving their knowledge and creating opportunities for new capability to enter the market.

[5] See for example, Eirgrid, *Plan to procure Low Carbon Inertia Services*, 2021

The OSM could be structured in a similar way. For example, it could comprise of two embedded markets. The first would capture the provision of ESS from traditional technologies and would allow for longer recall times. The second could be in real-time or close to real-time and focus on the procurement of ESS from non-traditional technologies. This could be viewed as similar to a contract and spot market.

Initially, the first market could be used to procure *X%* of the forecast technical need while the real-time market procured and scheduled the remaining *100-X%. X* could for example initially represent the system configurations which would provide AEMO with a buffer to utilise the real-time market to trial new technologies and strengthen its knowledge in unbundling the services.

Obligations would be placed on AEMO for *X* to decrease over time, with clear targets published to provide visibility to the market. The Reliability Panel would oversee this projected pathway ensuring an efficient transition to a real-time mechanism which unbundled ESS.

During this transition, it is envisaged that AEMO would be subject to the reporting obligations detailed in Appendix B, allowing it and the market to work together to a common understanding of the future ESS needs and the capability of technologies in providing these.

This approach would also address the complexities in designing a mechanism that could accommodate both slow and fast start technologies and then transition to catering for fast start technologies as the power system transitioned.

Recommendations to be addressed if OSM progresses

The AEMC is charged with ensuring the integrity of regulatory reform and the protection of consumers from potential consequences of ill-informed processes. This remit is at risk of being violated if the OSM proceeds in its current form. The OSM does not properly value ESS and will not future proof the NEM as it transitions to a different energy mix.

If alternative options to value ESS are not considered, CS Energy considers that the AEMC has the following obligations in progressing the development of the OSM:

1. *Treat Essential System Services as essential* – incentives for the provision of ESS will only be established if ESS are valued as a service in their own right rather than secondary to energy. This must be respected across all aspects of the mechanism design. Importantly, the entire volume of ESS must be valued as opposed to that that is marginal to the energy market;

2. *Develop standards and operational metrics* – standards and metrics are foundational to the development of any mechanism. Without them, ESS cannot be appropriately valued, compliance and governance frameworks will be obsolete, procurement volumes can't be reconciled, and the market will not receive clear investment signals. This will increase the costs borne by consumers.

   The development of standards includes an assessment of the consumer value of system security on which the pricing framework can be based. This should be undertaken by the Reliability Panel;

3. *Apply a sunset clause on system configurations* – should the OSM or other mechanism proceed with the procurement of system configurations, a sunset clause should be

established in the NER. This is necessary to both provide AEMO with the incentive to unbundle ESS and to provide the market with confidence of the opportunities for new capability.

The sunset clause could be phased and would align with a clear roadmap to unbundling the services. However, it is essential that a repeat of the experience with the mandatory PFR sunset clause does not occur. This sunset clause was removed without due consideration, establishing PFR as mandatory to the detriment of participants. If the OSM Rule were to include a sunset clause, any amendment to its timing including potential removal should be under the oversight and assessment of the Reliability Panel and include proper consultation with stakeholders;

4. *Establish an explicit operability parameter and clarify the objective* – the AEMC must be honest about whether an ESS mechanism is designed to procure a level of operability. This needs to be treated like any other market parameter, with the economic trade-offs of the level of operational certainty considered and independently scrutinised;

5. *Engage independent technical advice* – AEMO as the system and market operator is charged with providing unbiased technical advice to inform the regulatory process. This forms an important voice in the process however, it is apparent from the Draft Rule and various technical working group discussions that the OSM is a solution that has been driven by the operator with little consideration given to other potential options.

   Given the conflation of roles in the development of the Draft Rule, it is CS Energy's opinion that the AEMC should engage independent technical advice in any future consideration of the OSM;

6. *Develop a pricing structure that appropriately values ESS* – the pricing framework needs to properly reflect the supply/demand balance for system services. Pay-as-bid, claims of double-dipping, make-whole payments, and arbitrary caps on bids positions ESS as secondary. The pricing structure needs to value ESS rather than seeking to compensate providers (in limited circumstances). Without this, investment signals will not materialise;

7. *Develop a scheduling process that doesn't discriminate* – the scheduling process needs to balance the needs of different technologies and overall efficiency. Establishing gate closure well beyond recall times for many plants generates a market risk that cannot be managed. This is particularly true in the absence of clear frameworks and governance of the decision-making process.

   The AEMC should consider reconciling gate closure with a unit's recall time as required to be submitted in the enhanced Medium-term (**MT**) PASA;

8. *Establish appropriate governance frameworks* – strong and appropriate governance frameworks need to be established for each step of the process. The roles of the Reliability Panel and the AER need to be clearly articulated in the NER, including appropriate oversight of AEMO's procurement and scheduling decisions. The AEMC needs to achieve a better balance between flexibility and accountability in the Rules. Good governance should not be bypassed by allowing AEMO full discretion in governance and transparency frameworks;

9. *Strengthen reporting requirements* – the NER should set out high-level obligations on the reporting requirements for ESS. In addition to daily and annual reporting, quarterly market performance reports should also be produced. This reporting must not be confined to a summary of outcomes and corresponding statistical data. It must seek to

identify key learnings and observations that will enable the unbundling of the essential system services sooner than later or provide legitimate reasoning as to why this not feasible.

Reporting requirements must also recognise the role documents like the Annual Planning report (**APR**) and ESOO have in providing the market with clear investment signals;

10. *Reporting obligations should commence upon the final Rule determination* – AEMO's reporting obligation should commence immediately following the final Rule determination. This would allow AEMO and the market to utilise the time prior to implementation as a critical learning period and will aid in transforming the system configurations to unbundled ESS and provide strong feedback loops. This insight may even assist the design process;

11. *Understand the of interaction and integration with other markets and processes* – dynamic modelling to understand the interaction of ESS pricing mechanisms with the energy market is essential. The Draft Rule leaves too many questions unanswered.

    The design would also benefit from scenario planning; and

12. *Properly consider other options* – the AEMC must consider alternative options with an appropriate level of due diligence. This should not be limited to the Delta and Hydro Tasmania proposals but consider approaches such as expanding the ESS obligation on TNSPs and utilising the OSM to schedule long-term contracts in dispatch as outlined above.

APPENDIX B

CS Energy provides the following commentary on its concerns on the design of the OSM.

Clarifying the objective

Given the conflict between the stated objective and the operationalisation of the OSM, it is imperative that the AEMC provides clarification and surety that the Rule will ensure this strategic intent is reflected in the mechanism's operationalisation. If not, the procurement and valuing of ESS that is realised in the operational timeframe will not deliver on the long-term strategic intent to incentivise investment.

CS Energy seeks further information on what precisely the OSM is procuring through the bundled provision of security services represented by the system configurations and how these volumes will be procured given the absence of standards. In its *Power System Requirements Report*[6], AEMO expresses the required ESS in two categories: frequency management and voltage management. Within the former, mechanisms for primary, secondary and tertiary frequency control are in place leaving only inertia to presumably be procured under the OSM. Within voltage management, frameworks are in place for system strength (voltage rigidity) while slow and fast response voltage control is not explicitly valued although currently may be scheduled via the VDS.

Maintaining frequency and voltage within limits reflects the *N-1* system security standard while the provision of services for transient, oscillatory and voltage stability as captured within the NSCAS are related to market benefit as they maximise power transfer across the network.

CS Energy would like to understand what the proposed system configurations will deliver that is not inertia, system strength or voltage control. What are the interactions that are of value and why? For example, if AEMO will be utilising the OSM to procure a level of operability then this would ideally be explicit. CS Energy appreciates that as the power system transitions its operation will become more complex and understands the desire for more certainty. Operability, however, must be treated like any other market element with set parameters representing efficient levels and be supported by appropriate transparency frameworks.

The OSM design as outlined in the Draft Rule treats the valuing of ESS as secondary. This is obviated in the pricing structure which is more akin to a compensation framework and also in the intransigence to unbundle certain services. Further confirmation arises from the integration of the OSM with the energy market, with AEMO describing its overall objective as maximising the value of trade in the energy market off a secure basis.

CS Energy also seeks clarification on whether the OSM will be utilised to relieve constraints that would then allow the dispatch of greater volumes of renewable energy, lowering energy costs. This was CS Energy's understanding based on AEMO and AEMC's presentations however this seems to be contradicted in the Draft Rule which states that the OSM *would not schedule security services for the sole purpose of reducing energy costs. Instead it would only incur the costs of providing security services to the extent that it contributes to power system security*[7]. Section 9.1 creates further confusion in stating that the OSM

[6] AEMO, *Power System Requirements*, July 2020
[7] AEMC, *Draft Rule Determination – Operational Security Mechanism*, p.31

provides no guarantee of adequate system strength, reinforcing the question of the objective of the OSM.

If operability is the key driver for the system configurations and thus the OSM, this needs to be explicit in the design process and measures enforced to ensure it does not undermine the overarching strategic objective to appropriately value ESS and the evolution of a services-based market.

Shortcomings of the OSM

CS Energy has many concerns about the OSM and the process that has been undertaken in its design.

(a) Standards and operational metrics

As CS Energy has espoused in previous submissions, understanding the technical requirements, and developing appropriate operational metrics and standards for each ESS is vital and a necessary precursor to the development of an efficient procurement mechanism. While the NER provide reference to *power system security standards* and their oversight by the Reliability Panel, there is no clarity on what these entail and the Draft Rule does not define a role for the Reliability Panel in the OSM.

Internationally, market operators and governing bodies have acknowledged the need to define clear operational and planning metrics related to ESS and provide transparency to the market:

- EirGrid established a dedicated workstream to develop Operational Security Standards (**OSS**) on which to base procurement mechanisms[8]. Some services were explicitly quantified while, after extensive analysis, EirGrid determined that a system non-synchronous penetration limit represented the most efficient and effective transitional approach to system security. Importantly, these OSS provide the necessary transparency which is '*key to evolve and segue to competitive procurement mechanisms as ESS markets mature*'[9]; and

- The UK government and Ofgem jointly commissioned an independent panel of experts to conduct a review of electrical engineering standards.[10] The review had a broad remit focused on ensuring the standards were delivering economic efficiency to the system and consumers as well as effectively facilitating a smart and flexible electricity system. ESS and resilience were central to the *Electricity Engineering Standards Review* and supported by independent technical analysis.[11] The review highlighted both the short and long-term benefit of having clear operational metrics.

The Draft Rule reiterates that the current engineering knowledge is not sufficient to unbundle the required system services and specifies the intent to establish the identified system configurations as the operational standard. What it fails to explain however, is why

[8] EirGrid has established Operating Security Standards and Transmission System Security and Planning Standards which set the explicit requirements from a year ahead to real time for assessing adequacy and operational security. Explicit limits are defined for voltage control, inertia and target damping ratios for example.
[9] *EirGrid response to SEM Committee Consultation on DS3 System Services Procurement Design*, p.6
[10] Electrical engineering standards: independent review - GOV.UK (www.gov.uk)
[11] Frazer-Nash Consultancy, *Electricity Engineering Standards Review Technical Analysis of Topic Areas*, December 2020

the ability to identify and declare an inertia, reactive power or system strength shortfall precludes the development of individual standards for these services.

CS Energy appreciates the complexity and uniqueness of the NEM and seeks to understand and work with AEMO to understand the gaps. Transparency will be key to this process. Static, transient and dynamic power system security assessments represent AEMO's core role as the system operator. Given the need to undertake these technical studies has been regularly identified by AEMO since 2015, it is disappointing that the Draft Rule presents no detail of technical work being progressed. Information, when provided to the market, has been restricted to qualitative statements.

Any business case for the OSM should include the:

- Technical learnings and insight from the experience in Tasmania regarding the activation of ESS in that region in recent years, outcomes which formed the basis of Hydro Tasmania's rule change request;

- Operational experience of the VDS since its implementation on 14 December 2015. The VDS utilises an objective function (reflecting optimisation) that captures the technical envelope and network and non-network options in the control and provision of reactive power;

- Assessment of the efficacy of the existing obligations on TNSPs related to inertia and system strength and how these frameworks could be leveraged;[12] and

- How the OSM delivers additionality to the Enhanced ST PASA currently being developed by AEMO and also scheduled for implementation in 2025.

It is unclear how the OSM can deliver efficient outcomes for consumers in both the short and long-term if the defined limits of the technical envelope are not quantified into explicit operational metrics. For example, what are the technical limits on which system configurations are based? How do these limits interact and change with different operating conditions? What is an efficient level of headroom for each ESS? What metrics are employed to forecast the technical need for system configurations?

Explicit metrics will provide both operational and market benefits including:

- Facilitating the required assessment of the technical and economic trade-offs represented by the standards;

- Transparency in the minimum volumes of ESS required as well as the levels that represent an efficient market outcome;

- Providing clarity to participants on whether their assets have the ability to form a system configuration, constituting vital investment information;[13]

- Revealing the system service requirement that is marginal, acknowledging the reality that the system needs will be dynamic and not equal across each ESS. This information will be obscured by the bundled approach;

[12] AER, *Compliance update – Provision of essential system services*, November 2022
[13] AEMC, *Op Cit.*, p.35

- Establishing clear market signals through appropriate standards and information provision upon which participants will be incentivised to base offers/rebids and the resultant commitment outcomes. Clear standards facilitate performance and compliance obligations including that participant bids are not 'false and misleading' and are provided in 'good faith' at all times. Thus, AEMO will have certainty and situational awareness of the state of power system security and reliability on a NEM and regional basis;

- Aiding in the understanding and management of power system resilience. Identifying the level of ESS required during events could help identify "how near the edge" the power system was for a given power system event. This could include an assessment on the sufficiency of the individual ESS and appropriateness of the levels of ESS to meet power system security; and

- Aiding AEMO in meeting its obligations under clause 3.7.3 of the NER which outlines the ST PASA requirement whereby AEMO must clearly identify and define the required inputs reasonably necessary for adequate power system operation and the maintenance of power system security and reliability of supply.

CS Energy strongly disagrees with the operational standard for the OSM being limited to system service configurations and believes this approach will compromise the integrity of future system security in the NEM. The bundling and opacity of system services will stymie investment in the required capability exposing the power system to a reliance on existing assets as they near retirement.

Investment opportunities will be further clouded by the proposed flexibility in the system service list and associated definitions[14] and the lack of oversight from the Reliability Panel. It is unclear how this list will be implemented and managed but a clear governance framework is required to ensure the market is provided with consistency and confidence on which to base operational and investment decisions.

The system configurations cannot serve as a proxy for a standard on the level of operability that is procured via the OSM. Like all market metrics, the level of operability represents a trade-off between the operational certainty and the economic cost. Given consumers will ultimately bear this cost, it is critical that the level of operability is quantified, and frameworks are in place to ensure it is not under or over procured. The Reliability Panel is best placed to undertake this role, and this is consistent with its broad remit.

(b) Value and pricing of ESS

As outlined previously, the Draft Rule diminishes the role of ESS through its endorsement of a lack of foundational frameworks and an operational design that demotes valuing ESS.

While recognising the *imperative to incentivise participants to provide security services irrespective of energy*[15], system service payments are presented as compensatory to energy market trade. This is reinforced by the approach to settlement and the discussion on apparent double-dipping if a participant was to be paid for the provision of both energy and system services. It is also unclear whether the full volume of system services that are required for a secure operating state will be valued given that the "demand" estimated in the OSM schedule appears to be the discrepancy between the actual need and what may

[14] AEMC, *Op Cit.*, p.20 and p.28
[15] AEMC, *Op Cit.*, p.64

be delivered by energy market participants. Incentives for ESS can only be established if the total quantum of demand is priced and reflects scarcity pricing.

The Draft Rule does make some effort to consider the value of ESS, but this is confused with the focus on the OSM objective function rather than the foundational aspects of valuing a service. Reliability, for example, has a clear metric that is based on the customer Value of Lost Load (**VoLL**) and is determined through rigorous analysis by the Reliability Panel. The demand curve of Figure 4.1 illustrates what consumers are willing to pay for security[16] yet, without any metrics CS Energy does not understand the basis on which ESS are being valued. This will have flow on effects on the proposed approach to market power which relies on *achieving a price for ESS that reflects its value to the system*[17].

This becomes more pronounced when considering the homogenisation of ESS through the system combinations and the proposed bid structure. The bundled approach means all services will be paid the same price regardless of what service is marginal, obscuring critical real-time market signals. Furthermore, the inability to offer bids in bands fails to acknowledge the provision of multiple services by some assets.

The AEMC claims that given the binary nature of some of the services, marginal pricing is not meaningful. CS Energy disagrees and considers the pay-as-bid framework to undermine the true value of system services. Enablement payments would be expected to be different, but all enabled participants should be paid the marginal price. It is also likely that pay-as-bid pricing will increase market power concerns as it will encourage undesirable arbitrage.

Pay as bid appears to reflect a desire to prioritise “efficiency” over incentivisation yet it fails to recognise the inefficiencies that it drives. For example, the Draft Rule posits that requiring OSM bids in a consistent format would deliver efficient outcomes. This pricing structure may be what is easier for the envisaged OSM optimiser but is it the best metric to incentivise system services? The desire for efficiency is also likely to be applied via the AER through the enforcement of caps on participant OSM bids. It is unclear how the AER intends to determine the level of caps without an understanding of the true value of ESS.

The experience of the implementation of the FCAS market highlighted the need to tolerate some short-term inefficiency to deliver long-term benefits. Valuing system services is no different. The pricing must be based on the true value of the service otherwise existing and future capability will have no incentive to participate, ultimately increasing the costs borne by consumers.

CS Energy also does not see how this pricing structure will help the development of the inertia market proposed by the AEC.

To achieve its objective, the AEMC needs to ensure that the pricing and settlement frameworks properly value ESS and that the OSM pricing is consistent with other service-based mechanisms such as FCAS. This includes defining a role for the Reliability Panel to determine the value of ESS to the system from which cost settings can flow.

[16] AEMC, *Op Cit.*, p.32
[17] AEMC, *Op Cit.*, p.47

(c) Interaction with the energy market

CS Energy is concerned with the lack of detailed consideration of the interaction of the OSM with the energy market and potential adverse impacts. The Draft Rule cannot progress until this fundamental due diligence is performed.

Basic questions including whether the OSM would be subject to the Market Price Cap (**MPC**) or whether OSM prices would be capped if the energy market reached the Cumulative Price Threshold (**CPT**) have not been considered. This creates additional concern for the more complex interactions, for example:

- The bid structure is removing minimum load capacity from the hedge contract market which may have significant impact given thermal units are expected to dominate the system configurations in the near term;

- The negative make whole payment introduces a risk that participants will need to price into their bids. This will likely increase the overall cost of the mechanism to consumers for little benefit;

- Whether the requirement for OSM enabled generators to bid their minimum loads at the floor price distorts the NEMDE) optimisation; and

- The interaction of the OSM and NEMDE has not yet been explored or understood. This can have ramifications on the overall outcomes under the proposed design. For example, a thermal unit may be operating in the energy market and has bids in pre-dispatch. The ESS it provides as a by-product of this generation may be required to meet system security but under the OSM this is not valued. The OSM then enables another thermal unit whose minimum load then makes it uneconomical for the first unit to continue to operate in the energy market and hence its rebids reflect the intent to decommit. The lack of valuing of ESS would then force AEMO to direct this or another unit and would likely represent a more costly outcome than if ESS were properly valued.

(d) Scheduling and uncertainty

The proposed OSM scheduling process creates more uncertainty for participants than it solves transferring operational risk from AEMO to synchronous generators. Although the Draft Rule claims that the OSM provides revenue certainty in advance[18], this certainty is diluted by both the undervaluing of ESS and the approach to scheduling which disadvantages slow start units. From CS Energy's perspective, it would be more advantageous for it to explore NSCAS options for ESS than participate in the OSM for its thermal units.

It is expected that participants will have sufficient foresight of the expected security schedule over the day, and the potential cash flow in that period will entice thermal units to bid in the OSM. However, the structure of the mechanism means that enablement, and thus payment, will only be guaranteed approximately two hours ahead of dispatch. Given fuel supply requirements, and the recall times and costs associated with commitment, the proposed scheduling process raises concerns that have not been assuaged by the lack of detail in the Draft Rule.

Participants will be required to make commitment decisions in good faith while the governance of scheduling decisions remains unclear. During the consultation process it was

[18] AEMC, *Op Cit.*, p.61

revealed to participants that while units may be part of the provisional OSM schedule, at gate closure (anticipated to be two hours), most units would not be able to physically decommit in this time and therefore would be part of the energy market and deemed ineligible for the OSM.

This provides an unacceptable level of risk to both participants and the future system. Market confidence would be quickly eroded, and capability would not bid into the OSM while the masking of ESS within the energy market destroys investment signals.

CS Energy disagrees with the AEMC's claim that this risk is similar to that already faced by participants in the energy market. The energy market has a level of certainty and visibility that is generated through its processes, governance frameworks and overall transparency, all of which are lacking for the OSM.

More broadly, given the OSM scheduler determines the commitment period and timeframe, it will be difficult for participants to manage risk. The Draft Rule allocates the timings at AEMO's discretion and thus predictability from OSM schedules depends on AEMO's decision-making processes. Clear frameworks and accountability for this process have not been developed creating uncertainty stemming from the asymmetry in good faith obligations.

Given the intention is for the OSM to initially procure and schedule system configurations of thermal generators, it is surprising that no allowance for recall time has been incorporated. If a unit requires a certain amount of notice to come online (or stay online) this should be a bid parameter that is considered in the OSM dispatch. If the unit is not subsequently enabled for OSM, its enablement cost should still be recovered.

(e) Governance and compliance frameworks

As previously alluded, the OSM is lacking a governance and compliance regime across its lifecycle. The absence of standards and transparent operational metrics precludes establishing the consumer value of system security and the independent economic trade-off of system operability. There also doesn't appear to be any process to assess the validity of system configurations particularly if configurations are dominated by the same plants.

The Draft Rule proposes that all the necessary checks and balances would be set out in the Security Services Guideline (**Guideline**) and other operational procedures. That is, AEMO would have responsibility for the development of the governance and compliance frameworks. Yes, participants will be consulted on these but AEMO ultimately retains ownership. This is completely inappropriate. Governance and compliance frameworks need to be fleshed out in parallel with the design process, have components that apply to participants and AEMO alike, and have independent oversight.

Participants need to understand the notification process and their obligations under the OSM. The Draft Rule is scant on the performance of enabled units indicating the ability for AEMO to recover payments for non-delivery but no broader compliance implications.

Similarly, there does not appear to be any oversight of AEMO's determination of OSM eligibility. The OSM must balance the "ahead" procurement with the appropriate checks and balances including good faith obligations for all participants in the mechanism, including

AEMO. For example, if the OSM schedule doesn't change materially yet prices or eligibility do, AEMO should be required to provide clear justification.

CS Energy would also like to understand what penalties, if any, may be imposed for forced non-delivery. For example, recall times can be prolonged by the technical synchronisation of a returning unit. Bids would be provided in good faith but the recall time may be unavoidably extended.

(f) Transparency

In the NEM information on system security needs is ad hoc. Directions for system security are commonplace but there is no clear information on operational ESS trends. The operational planning horizon remains focused on energy and frequency, with the PASA not providing any outlook on broader ESS requirements. The longer-term planning horizon isn't much better, with limited information provided to the market in the **ESOO** and Integrated System Plan (**ISP**). The General Power System Risk Review (**GPSRR**) does provide some assessment of future requirements but it is not holistic or complete. Understanding these trends manifests in a long-term investment signal.

The development of the OSM represents an opportunity to address the current information gaps and the AEMC would ideally ensure that there are clear Rules obligations for AEMO to ensure the required transparency. Granting AEMO the flexibility and adaptability to determine what information will be provided in its Guideline risks the market not having sufficient visibility in both the operational and investment timeframes. CS Energy notes that current AEMO custom and practice is to advise the NEM that it has issued a direction(s) for power system security without detailing the actual issue and the system service required. It is essential that this practice is changed to enable transparency, and subsequent insight and learning be incorporated into the OSM. At a minimum, AEMO should develop reporting requirements arising from the AER *Compliance update – Provision of power system services*[19] to provide an integrated insight on power system services.

CS Energy is keen to understand exactly what "volume" of security services are enabled and the granularity of the information that will be published in the daily reports. Participants will need to optimise their portfolios across the energy, FCAS and OSM markets which requires an understanding of its expected exposures across each of these markets. It must be clear what information the market will receive.

CS Energy agrees with the proposed daily and annual report outlined in the Draft Rule but argues the need for a quarterly market performance report akin to that provided for the energy market. This will provide valuable information to the market. It is also important for the Draft Rule to articulate the role of the AER in the OSM governance.

To facilitate investment, greater transparency is required. The three-week OSM schedule is not sufficient to provide forward signals on market need and opportunity. CS Energy recommends the Rules obligations of the ESOO and ISP are extended to include ESS. Alongside network planning reports, the ESOO provides the dominant long-term investment signals to the market so it is critical that it encompasses system services.

In the event the OSM proceeds with the utilisation of the system configurations as proposed, CS Energy proposes the following approach be considered to ensure that the system configuration does not become an enduring approach that inhibits transparency, the unbundling of the ESS and proper valuation of the services:

[19] AER, *Op. Cit*.

- AEMO's reporting obligation would ideally commence following the final Rule determination to utilise the time prior to the commencement of the OSM on 1 October 2025 to address the issue of transforming the system configurations to unbundled ESS. It is proposed that the AEMO reporting occur on a quarterly basis and incorporate the Technical Working Group forum at key milestone developments in the unbundling;

- TNSP limit advice on ESS should be made available to NEM participants and include an explanation as to why the ESS remain bundled (where that is the case). AEMO must also provide an explanation in each case as to why the system configuration must be utilised and what is inhibiting the unbundling of the ESS. It is not sufficient to refer to the TNSP providing the limit advice in a certain format. It is incumbent on both the TNSP and AEMO to provide an explanation, and forecast when they may be in a position to change the format so that the ESS ultimately become unbundled;

- AEMO provide a summary of the due diligence of the TNSP limit advice including an assessment if the limit advice is conservative. AEMO's current due diligence process on the TNSP limits advice it receives focuses on ensuring power system security is satisfied. AEMO does not assess if the limits advice is conservative, that is, it seeks to confirm that power system security is met but arguably market efficiency may not be delivered for such outcomes;

- AEMO provide an insight to the assessment being utilised in determining the system configuration – that is, does it represent a (*N-1*) standard and quantification of the associated safety margin being utilised should also be provided;

- It is reasonable to expect AEMO and the TNSP, as reflected in the limits advice and corresponding constraint equation, be able to explain what ESS and the corresponding amount of that ESS has being utilised to manage the identified system security requirement. Currently AEMO produces constraints that represent individual system services including system strength and inertia. It is noted that AEMO utilises system configurations for system strength in South Australia, Victoria and Queensland.[20] It is an imperative that AEMO advises how it implements these limit equations as constraint equations in the NEM market systems;

- AEMO should be calculating and reporting the actual amount of each ESS in the NEM and on a regional basis that recognises the local utility delivered by the ESS such as system strength and reactive power. The actual amounts should be reconciled with AEMO declared shortfalls of ESS and the provision of any ESS by the TNSP to determine an actual or forecast abundance/shortfall of ESS. This outcome has a two-fold effect in that it enables proactive system security management and provides both operational and investment signals;

- Post implementation of the OSM, AEMO reporting requirements should include how AEMO is giving effect to the power system requirements including how the requirement was determined and reconciled with the amount actually activated/enabled. This should cover the dispatch and forecast timeframes. In the absence of standards for the ESS this will prove to be challenging in making an assessment on market efficiency, minimisation of costs and ultimately if the OSM is maximising market value.

  In the event AEMO defers to directions for ESS, the quarterly reports should include details that provide learning and input to the OSM process and in particular the quantity,

[20] AEMO general limits advice available here.

duration and circumstances for the ESS requirement. It may provide valuable input to the development of the Guideline. It should be noted that CS Energy believes that the underlying objective of the proposed Guideline should be to give effect to the ESS standard(s);

- AEMO should report the distribution and amount of ESS in the NEM. Utilisation of 'heat maps' to quantify abundance/shortfalls and minimum levels required, with these preferably reconciled against an ESS standard. This would provide market signals for potential investment and also dilute or eliminate any semblance of market power.

While CS Energy supports the day-to-day, quarterly and annual reporting on ESS volumes, prices and trends, this will only become meaningful following the unbundling of the services. Reporting must not be confined to a summary of outcomes and corresponding statistical data. Transparency and clear signals on what system services are needed and their value including the development of the Guideline can be facilitated by utilising the current commitment outcomes in dispatch and pre-dispatch to calculate where possible the provision of system services. This approach could also be applied to the suite of system configurations to calculate the system services being provided by summating the capability of each generator in the system configuration.

The Generator Performance Standards (**GPS**) provide quantitative values for the following attributes:

- Reactive power capability (which enables a calculation of reactive power headroom and footroom that is capable of being extracted from the VDS). The calculations could then be grouped appropriately to reflect the localised nature of voltage on the power system;

- Voltage and reactive power control (providing insight into the system strength capability/contribution);

- Contribution to the fault current on the connected network (providing insight into the system strength capability/contribution); and

- Inertia (currently AEMO is performing the inertia calculation on global and regional basis utilising constraints).

Thus, it would be feasible to calculate the levels of inertia, reactive power headroom and footroom and a value for the fault contribution based on the commitment outcomes in dispatch and pre-dispatch. The quantities of the ESS calculated from the commitment run could then be reconciled with the system configurations where the values of the system services can be calculated individually and aggregated to enable comparisons to be made as per the Table below.

Attribute	**Dispatch**		**Pre-dispatch**	
	Commitment	**System Configuration**	**Commitment**	**System Configuration**
Inertia (MWsec)				
Reactive power (± MVars)				
Fault current (kA)				
System strength				

The system strength contribution combining voltage and fault current may require further work on how best to express this as a system service.

This exercise would enable a deep dive into the system configuration and the system services being provided. It would assist the market in understanding how to identify the

dominant or marginal service being provided and, in the event of disconnection of one or more system service providers, how to determine the specific service and quantity required as replacement.

Placing an obligation on AEMO to commence this reporting framework prior to the implementation of the OSM would provide valuable insights and learning that would feed into the development of the Guideline. This approach or one similar would provide the levels of transparency that is being sought by participants regarding system services and should form part of the day-to-day reporting