



20 July 2022

Clare Stark  
Australian Energy Market Commission  
Submitted online at: [www.aemc.gov.au](http://www.aemc.gov.au)

Dear Ms Stark

### **Submission: Essential system services and inertia in the NEM**

CS Energy welcomes the opportunity to provide a submission to the Australian Energy Market Commission's (**AEMC's**) and the Australian Energy Market Operator's (**AEMO's**) joint paper on *Essential system services and inertia in the National Electricity Market (Joint Paper)*.

#### **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**

The NEM is changing and will continue to do so as it transitions to a market with more intermittent energy and an overall lower carbon footprint. The ability to effectively and efficiently manage power system security and reliability against this evolving landscape is paramount, and CS Energy supports the need to develop flexible and adaptive market and regulatory frameworks that appropriately value all Essential System Services (**ESS**).

CS Energy is concerned that the Joint Paper does little to progress the specification, valuing and procurement of ESS nor does it fulfil its stated intent around provision of information about progress to date and the potential next priority of inertia. Rather it:

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- Provides little new insight;
- Diminishes the value of ESS by continuing to endorse a process that overlooks the need to establish foundational frameworks prior to advancing solutions of *any* form;
- Presents a confusing position that appears to conflate the role of AEMO in the regulatory process; and
- Does not give adequate consideration of, or due process to, the Australian Energy Council's (**AEC's**) rule change request and instead focuses on a predetermined outcome.

#### 1. Lack of information

The Joint Paper seeks to set out the progress on ESS initiatives to date yet does not present any substantial progress and instead, sets out a summary of statements and processes. CS Energy is increasingly concerned by the lack of technical work that has been undertaken to date in relation to ESS and is confused about the AEMC's willingness to progress reform measures without this technical understanding.

AEMO's Engineering Framework program of work is frequently cited as considering the technical requirements for ESS yet has not produced any substantive output or provided any clear indication when such studies will be conducted. The priority actions released in June 2022 are welcomed, but they echo the high-level statements on the need to undertake power system studies that AEMO has been making since 2015.<sup>1</sup>

Without an appropriate level of visibility and transparency, industry cannot have understanding or confidence in any mechanism that seeks to value and procure ESS. It is particularly difficult to understand how the Operational Security Mechanism (**OSM**) represents an efficient solution and why the Joint Paper advocates this approach without presenting genuine analysis and options for approaches that would usually occur as part of the AEMC's processes.

CS Energy appreciates the complexity of power system security assessments, but these static, transient and dynamic analyses 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, one would expect the Joint Paper to present tangible evidence that the technical work is being progressed sufficiently to feed into the regulatory processes. Delivery of outcomes under the Engineering Framework needs to provide for appropriate collaboration with industry, visibility, transparency and scrutiny on the technical requirements for ESS. Only then can the AEMC develop efficient and effective approaches to incentivising the provision of ESS over both the operational and investment timeframes.

#### 2. Role clarification

A paper that posits a joint position from the market commission and the market operator yet appears to seek input on how (or whether) to progress a rule change request presents a confusing and alarming precedent.

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 as

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<sup>1</sup> AEMO's Future Power System Security Program established in 2015 identified the need and intent to understand the technical requirements of ESS.

does other stakeholder input, but neither should solely influence the regulatory process and the fair consideration of all rule change requests. The Joint Paper encroaches the boundaries of this process by conflating AEMO's role and effectively presenting the OSM, a solution driven by the operator, as a predetermined outcome while seeking endorsement to defer due consideration of the AEC proposal.

AEMO should not be driving any regulatory outcome but should focus on undertaking the technical work that constitutes its core role and on which regulatory outcomes can then be based, work that is currently lacking for ESS. CS Energy implores the AEMC to clearly delineate the roles in the regulatory process and re-evaluate the AEC rule change request with its unbiased lens.

### 3. Treating Essential System Services as essential

By definition ESS are critical components of the power system, responsible for the safety, stability and security of its operation. The ESS reform processes currently underway as outlined in the Joint Paper do not adequately reflect this criticality. In CS Energy's opinion, the work described in the paper represents a piecemeal and operationally biased approach to ESS and this will not deliver efficient outcomes for consumers.

CS Energy has previously expressed its concerns with the lack of a holistic approach to ESS and the necessary foundational work to ensure they are appropriately identified and valued,<sup>2</sup> an approach also advocated by FTI in the Energy Security Board's (**ESB's**) program.

The pathways set out in the Joint Paper will not provide an ESS framework that:

- Properly values ESS;
- Appropriately informs the market;
- Delivers efficient operational signals;
- Establishes clear and effective investment signals; or
- Provides the most efficient outcome for consumers.

#### *Recognising the value of ESS in regulatory frameworks*

To date, ESS have been a natural by-product of energy generation from synchronous sources and were abundant. Subsequently, the NEM's regulatory and operational frameworks have been developed from this perspective. As a result, frameworks such as the National Electricity Rules (**NER**) may inadvertently mask the value of ESS. Clause 3.15.7(a2)(4) is an example of this occurrence with Directions issued by AEMO for ESS such as inertia, system strength and voltage control categorised as Directions for energy. Not only does this discount the value of ESS, it also robs the market of valuable information about the operational needs of the power system. These instances could also provide a starting point for identifying the value of individual ESS.

Thus, the first step to capturing the value of ESS is to ensure that current frameworks recognise the relevant service in its own right and not solely as a by-product of energy. In

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<sup>2</sup> See for example any of CS Energy's submissions to AEMC consultations related to system security.

some instances, as the system transitions, it may be more appropriate to consider energy as the by-product of ESS provision. As part of its system security program of work, the AEMC should undertake a stocktake of the NER to identify where amendments for ESS are required. Given the lack of definitions related to system security, this audit will segue into the next step of developing appropriate *power system security standards* frameworks.

### *Framework for system security Standards*

Understanding the technical requirements and developing appropriate operational metrics and standards for each ESS is vital. System adequacy and system security are terms that are implied yet nowhere in the NER, AEMO operational guidelines or procedures and system standards are they explicitly defined.

Much of the discussion in CS Energy's submission to the AEMC's Directions Paper on capacity commitment mechanism and synchronous services markets related to the need to establish clear operational standards for ESS remains relevant.<sup>3</sup> 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 Panel's webpage for system security is not found.

Power system security is defined qualitatively in terms of satisfactory operating states and the ability of the power system to return to such a state following a credible contingency event. This is encompassed in the technical envelope which reflects the fact that power system security is a product of the dynamic interactions of its components. The AEMC's description states that '*the power system is secure when technical parameters such as voltage and frequency are maintained within defined limits*', that is, no physical constraints are violated.

While these definitions are valid, CS Energy maintains that procurement mechanisms for ESS cannot be developed until these defined limits have been quantified into explicit operational metrics. For example:

- What are these technical limits?
- How do these limits interact and how do they change with different operating conditions?
- What is an *efficient* level of headroom for each ESS?

Explicit operational metrics will also assist in understanding and managing 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.

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<sup>4</sup>. Some services were explicitly

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<sup>3</sup> [CS Energy submission to AEMC Directions Paper on Capacity Commitment Mechanism and Synchronous Services Markets](#), October 2021

<sup>4</sup> 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.

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'.<sup>5</sup>

The UK government and Ofgem jointly commissioned an independent panel of experts to conduct a review of electrical engineering standards.<sup>6</sup> 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.<sup>7</sup> The review highlighted both the short and long-term benefit of having clear operational metrics.

In the NEM information on system security needs are 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 Projected Assessment of System Adequacy (**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 Electricity Statement of Opportunities (**ESOO**) and Integrated System Plan (**ISP**). The Power System Risk Review (**PSRR**) does provide some assessment of future requirements but it is not holistic or complete<sup>8</sup>. Understanding these trends manifests in a long-term investment signal.

The suite of ESS are documented in the Generator Performance Standards and could be extracted to develop a suite of capability for each of the services.

### *Role of current frameworks*

The process of developing operational metrics and enhancing information provision on ESS within existing processes will also serve as an assessment of the efficacy of existing mechanisms and identify further opportunities relevant to power system security.

CS Energy agrees with AEMO's need for certainty in the provision of ESS and considers this can 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 (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 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.

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<sup>5</sup> [EirGrid response to SEM Committee Consultation on DS3 System Services Procurement Design](#), p.6

<sup>6</sup> [Electrical engineering standards: independent review - GOV.UK \(www.gov.uk\)](#)

<sup>7</sup> Frazer-Nash Consultancy, [Electricity Engineering Standards Review Technical Analysis of Topic Areas](#), December 2020

<sup>8</sup> CS Energy expects this will evolve to be more aligned with Transpower's System Security Forecast.

Pre-dispatch (**PRD**) 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 utilises a 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 PRD 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 make 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.

#### 4. AEC rule change request

The Joint Paper highlights the gaps in the ESS reform initiatives work to date and does not give fair consideration of the AEC proposal and the need for market signals. The arguments presented for its deferral relate to the need to first understand the technical requirements and perform robust analysis. This argument applies to all work on ESS including the potential development of an OSM. Any procurement mechanism needs clear and governable metrics on which procurement is based, so the Joint Paper itself negates further work on the OSM at this stage.

CS Energy considers the AEMC should leverage the AEC rule change request to re-evaluate the overall approach to ESS reform to ensure it captures market as well as operational needs. This includes:

- Consideration of an audit of the NER to ensure that the definitions, processes and procedures appropriately reflect the evolving role of ESS, including a clear definition of *power system security standards*;
- Development of operational metrics and standards for ESS. The AEMC could consider a similar process to the UK independent Electrical Engineering Standards Review; and
- A review of existing operational processes and how they can be enhanced to incorporate ESS into a holistic environment and provide appropriate transparency to the market.

If you would like to discuss this submission, please contact me on 0407 548 627 or [ademaria@csenergy.com.au](mailto:ademaria@csenergy.com.au).

Yours sincerely



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