Your Ref: ERC0300

23 June 2021

James Hyatt
Australian Energy Market Commission
Submitted online to: www.aemc.gov.au

Dear James

Submission: Draft Rule Determination on Efficient Management of System Strength on the Power System

CS Energy welcomes the opportunity to provide a submission to the Australian Energy Market Commission's (**AEMC's**) *Draft Determination – Efficient Management of System Strength on the Power System* (**Draft Determination**). CS Energy is strongly supportive of the creation of mechanisms that appropriately value and procure services that are critical to the effective and efficient delivery of secure and reliable energy into the future.

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 variable renewable energy (**VRE**) 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 for essential system services.

System strength is both localised in nature and difficult to commoditise to form a competitive and efficient procurement mechanism such as a spot market. As such, CS Energy supports the establishment of a planning standard for system strength as it allows for a proactive approach to managing system strength needs. As a member of the Technical Working

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Group (**TWG**) on this rule change request, CS Energy commends the AEMC on the consultative and collaborative process it undertook on this task.

CS Energy broadly agrees with the Draft Determination and considers:

- The need for further clarification of the system strength standard and how it relates to the minimum and efficient levels of system strength;
- The Reliability Panel should have oversight of the system strength standard;
- It is appropriate for the Australian Energy Market Operator (**AEMO**) to specify the system strength nodes and the network standards at these, however, the process for developing the methodology and forecasts requires the appropriate level of transparency and consultation. Best practise forecasting and oversight will minimise potential costs to consumers from changes in forecasts;
- It needs to be clearly articulated that System Strength Service (**SSS**) Providers are required to procure sufficient system strength to meet the entire network standard, thereby valuing the contribution being provided from existing synchronous plant; and
- Where system strength nodes may be impacted by investments in neighbouring regions, the obligation should be jointly shared between the relevant SSS Providers rather than relying on joint planning to ensure costs are appropriately attributed to the parties consuming system strength.

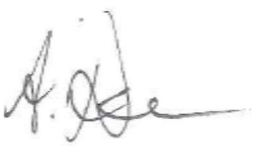
Furthermore, the Draft Determination stresses that the current arrangements for system strength are not appropriate yet in the broader AEMC and Energy Security Board processes, it has been argued that the equivalent frameworks for inertia are appropriate in the near-term, with further work on valuing inertia delayed as a longer-term action. Given the AEMC's desire to value missing markets, the same level of attention that has been given to system strength needs to be applied to inertia.

Responses to the specific questions

CS Energy's responses to the specific questions in the Draft Determination are set out in Attachment A.

If you would like to discuss this submission, please contact Henry Gorniak (Market and Power System Specialist) on 0418 380 432 or hgorniak@csenergy.com.au.

Yours sincerely



Alison Demaria
Market Policy Manager

ATTACHMENT A

Introduction

The key components of system strength, fault level and a resilient power system voltage waveform, are examples of many attributes that demonstrate the physics of the power system. Synchronous plant contributes to system strength while inverter-based resources (**IBR**) are typically limited but require a level of system strength for stable operation.

The changing generation mix is eroding the level of system strength across the NEM and the experience in South Australia has demonstrated the inefficiencies of a reactive approach to system strength. These interventions have also highlighted the value of system strength and the need to address this missing market.

The "do no harm" provisions that were established have provided key learnings that have been integrated into the Draft Determination. The underlying principle of allocating requirements and costs to the party deemed to be responsible for the reduction in system strength remains sound but the development of the system strength standard and associated frameworks facilitates the efficiencies and economies of scale that the current arrangements lack.

CS Energy is supportive of the proactive approach in meeting system strength needs via network standards and considers the SSS Providers best placed to meet the standard given the locational characteristic of system strength. This approach will need to be supported by a robust and transparent approach to forecasting the need, and clarity between the minimum standard versus the broader system stability requirements. It is also imperative that the final framework recognises and integrates both network and non-network system providers with appropriate incentives to the providers.

Defining the system strength standard

The draft rule outlines the two parts of the system strength standard:

- The *system standard* which represents the holistic requirement for system strength for system stability and to meet power system user expectations; and

- The *network standard* which imposes the specific obligations on SSS Providers for each declared system strength node.

System standard

Given the system standard itself is a high-level requirement that sets out the general expectation of conditions on the power system relating to system strength, its specification in the Rules drafting is similarly high-level.

What is unclear, is where the accountability lies in the quantification of this standard, including the appropriate trade-offs between operational and economic considerations. Given the investment decisions that are expected to be made in meeting the standard as well as the potential of the standard to facilitate generation investment, frameworks should be in place to appropriately assess the determination of the system standard.

In CS Energy's view, the system standard for system strength is akin to the System Restart Standard which is the remit of the Reliability Panel. The Reliability Panel sets the standard based on AEMO's advice and appropriate consultation while AEMO is responsible for defining the electrical sub-networks within that overarching standard. A similar framework could be applied for system strength whereby the broader power system security perspective of system strength is overseen by the Reliability Panel while the network standards are location specific.

Understanding what exactly this standard represents and how the network standards contribute to it will be a critical success factor. For example, the figures in Appendix B suggest additive components of the standard but these aren't appropriately explored. How this standard integrates into the operational timeframe also needs exploration as real-time operations will also have a focus on the efficient level of system strength not just the minimum level, as well as the need to procure system strength to meet any shortfalls in the actual need and the projected need that forms the network obligation. Frameworks to provide the right market signals need to be developed.

Network standard

The network standard sets out the specific obligation on SSS Providers to meet the minimum three phase fault level requirement and stable voltage waveforms criteria. These determinations will depend on:

(a) Locational consideration

As system strength is a localised characteristic, the declaration of system strength nodes is appropriate, and CS Energy assumes that these will reflect the contributions (positive or negative) to system strength within a sub-network. This would allow for contributions across regional boundaries to be identified. It is important that any unrecognised "cannibalisation" of system strength resources between regions does not occur where system strength electrical sub-regions are near regional boundaries.

AEMO is the right party to determine the system strength nodes and the minimum obligation on SSS Providers at each node.

(b) Obligated parties

CS Energy agrees that there should be a single SSS Provider in each region with these being as currently specified. However, where relevant, system strength nodes should have joint accountability to reflect the contributions from neighbouring regions. This would more likely facilitate the appropriate cost frameworks. For example, Queensland consumers should not pay for system strength needs arising from new IBR in northern New South Wales and vice versa.

Appropriate measures need to be in place to ensure that Transmission Network Service Providers (**TNSPs**) procure both non-market and market solutions competitively and efficiently, and joint planning decisions are transparent. In particular, the growth of the non-regulated business arms of some TNSPs places these entities at potential advantage for the provision of network system strength services, and ring-fencing arrangements need to be applied in this context.

(c) Specifying the obligation

Forecasting system strength requirements will be a critical success factor and CS Energy is supportive of the departure from assessments based on particular dispatch patterns. The optimal development pathway of the Integrated System Plan (**ISP**) represents an appropriate generation investment pathway on which to base the network standards. Based on this generation outlook, AEMO will project the minimum fault levels required at each node. It is important that the forecasting of the system strength node requirements is transparent and open to formal peer review, particularly given they will involve decisions on is what the most efficient level of system strength. This will ensure the outcomes meet the system strength standard without unjustified safety margins, and minimises, the occurrence of stranded assets due to overbuild or inappropriate location of the system strength providers. This will then lead to the best outcomes for consumers.

CS Energy agrees that a firm regulatory obligation on SSS Providers three years after the AEMO determination represents a good balance between forecast accuracy and planning needs.

The standard and associated frameworks need to clearly articulate that SSS Providers are obligated to meet the entire standard without reliance on any baseline contributions, and therefore should look to value the contribution from existing synchronous plant.

Access standards

CS Energy supports the principle of adjusted access standards to manage the demand for system strength, and the broadening of these standards to inverter-based load and Market Network Service Providers (**MNSPs**). CS Energy notes that the draft rule amends Clause 5.3.9 in the Rules to facilitate the renegotiation of connection standards related to short circuit ratio and voltage phase shift. This would enable liable parties to potentially reduce their system strength need and hence charge. While this pathway should not be discouraged, the SSS Provider needs to be cognisant that alterations to plant or remediation actions if undertaken by many generators connected to a node will reduce the overall system strength need, potentially resulting in an oversupply of system strength procured by the SSS Provider. This is particularly true for advancing technologies such as grid forming inverters.

It is also unclear whether remediation actions undertaken by IBR proponents such as the installation of synchronous condensers will still be considered as connection assets as per the current “do no harm” provisions. Given system strength requirements at a given node will be dynamic with time, it would seem prudent to consider these assets as a component of the suite of non-network assets utilised in the system strength framework where appropriate.

Coordinating system strength supply and demand

The System Strength Mitigation Requirement (**SSMR**) draws upon the lessons learnt from the current “do no harm” arrangements to provide an appropriate balance between choice for the connecting party and efficiencies gained from economies of scale and transparency of costs.

(a) System strength charge

The system strength charge, and its components, represents a transparent signal to potential new connections and in CS Energy's view, is preferential to the current arrangements:

- As the System Strength Unit Price (**SSUP**) will be set for the SSS Provider's five-year regulatory period, it provides connecting parties with certainty over the costs related to system strength. As the SSUP can be different for each node, it serves as a locational signal to intending connecting parties.

  CS Energy supports the central role of the Australian Energy Regulator (**AER**) in setting the SUPP, and the pricing methodology employed by SSS Providers;

- As the System Strength Locational Factor (**SSLF**) reflects the spatial characteristics of system strength, it provides clear signals to connecting parties. CS Energy agrees that the SSLF should be fixed for each connection point for which the charge is payable over all subsequent periods; and

- The quantity of system strength that is expected to be consumed by the connecting party is provided to assist in the connecting party understanding the costs of connection and potential remediation options.

Connecting parties should be equipped with sufficient information to understand the system strength costs of their connection and make informed decisions. While CS Energy supports this provision of choice it may result in challenges in determining the net system strength requirement at a node during the projected period that needs to be met by the SSS Provider.

(b) Parties liable under the SSMR

The Draft Determination applies to generating systems 5 MW or greater, inverter-based loads connected under Chapter 5 and MNSPs as outlined in Table D.2. While CS Energy appreciates the simplicity of considering liability based on type of connection, given the anticipated market transition to new forms of aggregated participation in the market, participants such as virtual power plants and demand response service providers which are greater than 5 MW in aggregate should also be liable for their system strength consumption. While these projects may be individually small, in time they may account for a larger proportion of the market.

(c) Providers of system strength

The Draft Determination stipulates that "*a SSS Provider must coordinate the procurement of a portfolio of solutions to satisfy the standard, and it cannot rely on any system strength services that may be coincidentally provided by generators as a result of them being dispatched in the energy markets in the operational timeframe.*"[1] In this way, the system strength framework addresses the missing market in current arrangements as existing plant can compete to provide system strength at a given node.

That is, in determining any shortfalls in the system strength requirement at each node, AEMO and SSS Providers cannot consider the contribution of existing synchronous plant as the baseline system strength at the node unless it has already contracted to either the SSS Provider or a connecting party. Existing plant already contribute to system strength

[1] AEMC, Draft determination on efficient management of system strength on the power system, p.74

needs and have not been valued to date. The obligation on SSS Providers to consider valuing the contribution of existing plant should be more clearly articulated in the standard.

(d) Cost-recovery

The Draft Determination repeatedly references the fact that most IBR requires the presence of system strength to operate stably and at the same time not compromise power system security. IBR are the causes and beneficiaries of the system strength requirement and thus the cost of the provision of the required system strength must be allocated to those parties.

Existing generation under the system strength framework

The Draft Determination reiterates that this system strength framework will only apply to new connections not existing IBR. It is important for the system strength framework to provide consistency in the services procured and the appropriate payment. CS Energy is aware that Powerlink has been exploring inverter tuning to reduce the overall system strength requirement at Ross.[2] Powerlink has entered into agreements with Daydream, Hamilton, Hayman and Whitsunday Solar Farms in North Queensland to validate the expected benefit of inverter retuning. Powerlink has advised that it will apply to the AER for a network support pass to recover the costs from network consumers.

It needs to be ensured that the parties that are contributing to the system strength shortfall are not receiving payment to rectify their consumption of available system strength unless the payment is for a proof of concept. Retuning of inverters requires changes to the generator performance standard and approved by AEMO. In the case of synchronous plant, any such exercise is the responsibility of the plant owner that includes the associated costs as attested by the recent changes under mandatory primary frequency response. This reinforces the need for transparency in the procurement of solutions to meet the system strength standard.

[2] https://www.powerlink.com.au/sites/default/files/2020-12/Powerlink%20Queensland%20-%20Request%20for%20System%20Strength%20Services%20in%20Queensland%20at%20Ross%20-%20December%202020%20Update.pdf