6 May 2020

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Mr Charles Popple
Ms Michelle Shepherd
Ms Allison Warburton
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Dear Commissioners,

INVESTIGATION INTO SYSTEM STRENGTH FRAMEWORKS IN THE NEM DISCUSSION PAPER

EnergyAustralia (EA) welcomes the opportunity to comment on the Australian Energy Market Commission's (AEMC's) Discussion Paper on System Strength Frameworks in the National Electricity Market (NEM).

EA is one of Australia's largest energy companies with around 2.5 million electricity and gas accounts in NSW, Victoria, Queensland, South Australia, and the Australian Capital Territory. EA owns, contracts and operates an energy generation portfolio that includes coal, gas, battery storage, demand response, solar and wind assets. Combined, these assets comprise 4,500MW of generation capacity.

EA is committed to transitioning Australia's energy sector to a lower emissions future, without compromising the delivery of secure, reliable and affordable energy to customers. EA is therefore appreciative of the AEMC's efforts to examine the regulatory, conceptual and physical foundations of system strength in the NEM. Ensuring these foundations are fit for purpose will be a vital enabler of a rapid and robust energy market transition.

The critical points in this submission are:

- EA considers the current minimum system strength and do no harm frameworks are ill-suited for maintaining system security while facilitating a rapid and robust energy market transition. EA, therefore, supports the Commission's proposal to investigate alternative frameworks for system strength provision in the NEM.

- EA notes the critical and bi-directional implications of this review for, and with, the ESB's post-2025 NEM design review. EA considers it imperative that each investigation progresses in an open, transparent and integrated manner so that rigorous and holistic system security frameworks result.

- A concise, National Electricity Rules (NER, Rules) appropriate articulation of system strength may be challenging to come by given the complexity of the concept and its application in the NEM. Although EA supports further investigation

to improve the accuracy and simplicity of the current definition, EA cautions against an overly prescriptive approach that risks unduly complicating the Rules framework.

- EA considers the Commission's approach to developing a new system strength framework could be improved with the adoption of the principles of parsimony, practicality and persistence.

- EA considers that the centrally coordinated model is likely to be the best model for maintaining minimum levels of system strength to ensure power system security. However, key challenges include accurately and successfully forecasting supply and demand dynamics along with mitigating potential free-rider impacts if there is no related do no harm obligation or incentive.

- In this respect, EA acknowledges the forecasting improvements AEMO has sought in recent times but considers there is more to be done. It is only through robust and transparent information provision and forecasting arrangements, developed in consultation with industry participants, that economic risks to customers can be minimised under any new system strength framework.

- EA agrees that the locational and lumpy nature of system strength makes a market-based decentralised model unsuitable for ensuring the provision of minimum levels of system strength. Despite this, EA considers there may be a role for such a market-based approach above minimum thresholds to alleviate constraints, increase network hosting capacity and increase NEM resilience.

- EA considers that both the mandatory service and access standard models have several deficiencies that make them inappropriate for use in any new system strength framework. EA suggests they not be pursued as part of the ongoing review.

- EA considers that transmission level issues be the primary focus at this stage of the review given their disproportionate scale compared with distribution network considerations.

Responses to specific questions are provided below, and EA would welcome the opportunity to discuss this submission further with you. Should you have any questions, please contact me via email (Bradley.Woods@energyaustralia.com.au) or by phone on 03 8628 1293.

Yours sincerely,

Bradley Woods
Industry Regulation Lead

Investigation into system strength frameworks in the NEM
STAKEHOLDER SUBMISSION TEMPLATE

The template below has been developed to enable stakeholders to provide their feedback on specific questions that the Commission is interested in due to the discussion paper. It is designed to assist stakeholders provide valuable input on those questions the Commission is interested in. However, it is not meant to restrict any other issues that stakeholders would like to provide feedback on.

SUBMITTER DETAILS

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CHAPTER 2 – KEY ISSUES WITH THE CURRENT SYSTEM STRENGTH FRAMEWORKS

Section 2.3 – Key issues of the minimum system strength framework	
1. Do stakeholders agree with the AEMC's assessment of the issues of the minimum system strength framework?	Broadly, EA agrees with the Commission's assessment of the issues with the minimum system strength framework. Although successful in dealing with legacy issues upon inception and in identifying the deterioration that has occurred in the NEM since 2017, as the Commission notes, the framework is often reactive and does not allow for remediation sufficiently far in advance. EA considers this could be remedied by an improved forecasting focus. For example, by increased periodic reporting and forecasting of system strength against the minimum three-phase fault levels at relevant nodes. Done accurately, this may also prevent the need for the inclusion of a margin for power system resilience when defining minimum system strength. Similarly, although agreeing that responsibilities are somewhat ambiguous in the current framework, EA considers that both AEMO and TNSPs should continue to be accountable for unplanned outages and contingencies in any revised structure. This is due to asset management practices helping to alleviate material impacts from asset degradation on system strength over time. Finally, EA agrees that other definitional parameters beyond the provision of fault current should be explored if ambiguity and complexity are not added to the framework as a result. Please see the answer to question eight below for more detail.

2. Have stakeholders identified any other significant issues as a result of the minimum system strength framework?	EA notes that there is some ambiguity as to when a positive pass-through event for a system strength declaration can be said to have occurred. Both ElectraNet and TasNetworks have sought clarification from the Australian Energy Regulator (AER) on this issue without success. As a result, they have both been granted extensions to their cost pass-through applications. EA considers that clarification of this issue would lead to improved framework transparency and efficiency. That is, by providing certainty to customers about when the network costs of meeting system strength obligations will be reflected in their bills.
Section 2.4 – Key issues of the "do no harm" framework	
3. Do stakeholders agree with this assessment of the issues of "do no harm" framework?	EA agrees with the Commission's assessment. Namely, that it presents challenges to new entrants from increased operational and modelling complexity which is increasing costs and compromising timely investment.
4. Have stakeholders identified any other significant issues as a result of the "do no harm" framework?	EA has not identified any other significant issues with the do no harm framework. EA does note, however, that, with the system strength evaluation undertaken solely by AEMO, independent verification and replication of system strength analysis can be challenging to achieve.
Section 2.7 – Conclusion	
5. What are stakeholders views on the Commission's proposal to consider evolving the framework to a more integrated approach for system strength in the NEM?	The Australian Energy Market Operator (AEMO) has declared system strength gaps in South Australia, Tasmania, Western Victoria and more recently in Queensland. Moreover, EA can foresee situations where low system strength will become increasingly frequent in other parts of Victoria. For example, on days of high wind and solar photovoltaic (PV) output coupled with low operational demand, which could lead to the decommitment of large synchronous generation units. As above, although EA considers the current frameworks have worked well in identifying issues to date, they are ill-suited for maintaining system security while also facilitating a rapid, robust energy market transition going forward. EA, therefore, supports the Commission's proposal to investigate alternative frameworks for system strength in the NEM. Despite this support, EA notes the critical and bi-directional implications of this review for, and with, the ESB's post-2025 NEM design review. Each review must be progressed in an open, transparent and integrated manner, so that holistic and rigorous system security frameworks result.

CHAPTER 3 – CONSIDERATIONS FOR PROVISION OF SYSTEM STRENGTH

Section 3.1 - What is system strength?	
6. Do stakeholders agree with the Commission's characterisation of system strength?	EA agrees with the Commission's characterisation.

7. Has the Commission set out all the necessary considerations for defining a system strength service? If not, what additional considerations could be included?	Please see the answer to question eight below.
8. Do stakeholders consider the regulatory definition of system strength should be updated/changed? If not, why not? If so, how could this be done?	EA notes that technically speaking, there is no definition of system strength in the National Electricity Rules (NER, the Rules). Instead, aspects of it are defined in relation to the contribution to three-phase fault level at a given fault level node (services), or other NER clauses (agreement, provider, requirements, payment etc.). This lack of a definition creates a certain amount of vagueness in the Rules. However, EA understands that this was an intentional design element of the 2017 minimum system strength framework. That is, framework flexibility and robustness were favoured over definitional prescription, particularly as it relates to system strength services. EA agrees with the Commission that system strength has become a catch-all term for a range of interrelated factors concerning power system stability. Although supportive of further investigation to better define system strength, EA considers that a more concise, Rules-appropriate articulation may be challenging to come by given the complexity of the concept and its application in the NEM. As noted in the consultation paper, there are at least four threshold levels of system strength, including: • essential/minimum standards, • those required to alleviate constraints, • those affecting hosting capacity, and • those improving system resilience to rare, non-credible events. In this respect, EA cautions against an overly prescriptive approach that risks unduly complicating the Rules framework. For example, from many different definitions of system strength services. EA suggests this might be better handled by the broad definition currently used in the NER with more specific characterisation contained in supporting guidelines.
9. Do stakeholders consider that the system strength definition should recognise active and passive system strength procurement? If not, why not? If so, how could this be done?	Consistent with the above, EA considers that there is a risk of Rules over-prescription by including these elements. These would then require Rules changes for any desired amendments. The more detailed specification in a related guideline may be a more administratively efficient option.
10. Do stakeholders agree that clarifying the NER system strength service definition is likely to contribute to more/broader options for the system strength provision?	Please see the answer to question eight above.

11. Are there any additional sources of fault current in the NEM that can contribute to meeting system strength needs?	EA highlights that operational solutions can impact fault levels by changing network configurations. For example, from closing bus ties in strategic locations such as the Latrobe Valley. These factors should also be considered as part of any needs analysis.
12. Are there any other technologies in the NEM that can contribute to meeting system strength needs that should be considered?	EA considers that grid forming inverters is one other technology worthy of further investigation.
Section 3.2 - Why is system strength needed?	
13. Do stakeholders agree with why system strength is needed?	EA agrees with the Commission's assessment of why system strength is needed. That is, to maintain a secure power system and support the broader energy market transition.
14. Are there any additional reasons for why system strength is needed in a power system?	EA has no comment on this question.
15. Do stakeholders agree with the characterisation of the impact of inverter-based generation on system strength?	Yes. Per the answer to question 5 above, EA can foresee situations where this may be a problem in Victoria in future.
16. Are there any additional impacts on system strength that should be taken into account?	EA has no comment on this question.
Section 3.3 - The provision of system strength in the NEM	
17. Do stakeholders agree that with the characterisation of system strength thresholds?	EA considers the Commission's characterisation of system strength thresholds appropriately captures both the positive and negative consequences of varying levels of system strength in the NEM.
18. Are there any additional thresholds or alternative characterisations that might be included in the investigation?	EA does not consider that any additional or alternative characterisations are required.
Section 3.4 - The provision of system strength in the NEM	
19. Do stakeholders agree with the system strength attributes?	EA agrees with the Commission's assessment of system strength attributes.
20. Are there any additional attributes of system strength that the Commission should be aware of?	EA does not consider that there are extra system strength attributes that the Commission needs to bear in mind.

CHAPTER 4 – EVOLVING SYSTEM STRENGTH FRAMEWORKS

Section 4.1 - Approach to developing a new framework	
21. Do stakeholders agree with approach (Plan, Procure, Price, Pay) to developing a new framework for system strength? Are there additional steps/concepts that should be explored?	EA supports the Commission's approach to developing a new system strength framework. However, EA considers this approach could be improved with the addition of the following principles: • Parsimony – operational, financial and regulatory complexity should be avoided. • Practicality – the framework should adequately reflect the physical and operational nature of system strength and be implementable in a reasonable timeframe. • Persistence – the framework should be considered holistically with other elements of the regulatory reform program and be robust to future NEM changes. • Post Implementation – benefits and learnings from an implementation review should be assessed and shared to prioritise future framework development.
Section 4.2 - Models for delivering system strength	
22. Do stakeholders agree with the summary of the potential capabilities of each system strength model in Table 4.1?	EA agrees with the Commission's capability assessment, but please see below for further detail on EA's evaluation of each model.
Section 4.3 - Model 1: Centrally Coordinated	
23. Do stakeholders agree with the characterisation and assessment of a centrally coordinated model? Are there any other advantages and/or challenges?	EA considers that the centrally coordinated model is likely to be the best model for maintaining minimum levels of system strength to ensure power system security. As both the Energy Security Board (ESB) and the Commission have noted, the locational, lumpy nature of system strength and its provision means marginal pricing will be difficult to effect in all situations. This makes a more decentralised, market-based approach less practicable for ensuring secure operating levels. Similarly, an access standard, by itself, would be unlikely to provide the required minimum levels of system strength. Although mandatory service provision would remedy this deficiency, EA considers this would come at too high a cost in terms of economic efficiency (see further below). A centrally coordinated approach would have the advantage of building on the current frameworks and system strength procurement mechanisms. These include leveraging the current forecasting and planning processes, operational protocols, coordination with other markets services and regulatory oversight. Done well, this could improve economic efficiency via the delivery of system strength services in a timely, transparent and co-optimised manner. As noted by the Commission, such an approach could bolster investment outcomes, simplify connection arrangements and, ultimately, lower costs to customers. System strength levels change with energy demand and supply dynamics and occur over both operational (dispatch) and longer-term (investment) timeframes. The critical risk with a centrally coordinated approach, therefore, lies in the accuracy of the forecasting and planning processes undertaken by the central body. Any error will have the potential to result in over or under-provision of system strength, thereby leading to inefficient costs being born by customers. Inadequate service provision or underutilised assets are but two examples there.

	In this respect, the critical longer-term forecasting variables include the exit of coal-fired power stations and the connection of replacement renewable generation. EA acknowledges the work AEMO has completed to date in this area, e.g. refinement of Short and Medium-Term Projected Assessment of System Adequacy (ST & MTPASA) methodologies along with reporting improvements stemming from the transparency of new projects rule change. However, as acknowledged in the recent release of AEMO's Renewable Integration Study (RIS), there is more required. For example, redeveloping existing pre-dispatch scheduling systems and improving modelling and forecasting of new technologies to better account for system security needs. EA supports these initiatives and considers that more information around the grid conditions under which voltage control and system strength will become problematic would also be useful. For example, consistent forecasting and review of fault level nodes to report on minimum synchronous dispatch scenarios. It is only through robust and transparent information provision and forecasting, developed in consultation with industry participants, that economic risks to customers can be minimised. A further issue to be considered under this approach concerns how the impact of new entrants on system strength will be handled if there is no do no harm obligation or incentive. For example, whether existing connection standards, proposed connection fee incentives (see the paragraph immediately below) and increased coordination from the centralised approach will be enough to negate potential free-rider impacts. In terms of cost recovery, EA agrees that this option could retain the flexibility afforded by the current minimum system strength and do no harm frameworks. That is, with costs being paid for by both generators and customers, with AER oversight ensuring costs are efficiently passed through. To the extent that a revised connection fee might provide improved locational signals and incentives to generators, EA considers it appropriate for generators to retain the right to undertake system strength remediation. This is so that an element of competitive discipline in the provision of system strength services is maintained.
Section 4.4 - Model 2: Market based decentralised	
24. Do stakeholders agree with the characterisation and assessment of a market based decentralised model? Are there any other advantages and/or challenges?	EA agrees with the Commission's assessment that a market based decentralised model would be unsuitable for the provision of system strength at minimum or essential threshold levels. As noted above, the locational and lumpy nature of system strength makes marginal price discovery difficult in some situations. For example, there may be no relevant provider or only a monopolistic one in some areas. Lacking competitive pressures, a transparent marginal price signal is unlikely to emerge with efficient service investment and delivery thereby compromised. As a result, this may mean market interventions or directions are required to maintain minimum system strength levels. Despite this criticism, EA considers there may be a role for a market based decentralised approach to system strength provision beyond minimum levels. That is, by valuing constraints alleviation, increased hosting capacity and supporting NEM resilience. The shadow value of constraints is already captured by the NEM Dispatch Engine (NEMDE) and provides a useful starting point for valuing these additional services. As the Commission notes, however, this may require significant reformation of constraints management in NEMDE, particularly if dynamic, near real-time constraints information, is desired. This cost, along with the additional administrative and IT costs

	incurred in setting up a new market(s), must be weighed against the potential market benefits and other alternative arrangements. For example, given the locational nature of system strength, there may not be a critical mass of market participants to warrant market development with alternative bilateral contracting arrangements proving more efficient.
Section 4.5 - Model 3: Mandatory service provision	
25. Do stakeholders agree with the characterisation and assessment of a mandatory service provision model? Are there any other advantages and/or challenges?	EA does not consider that a mandatory service provision model would be appropriate for providing minimum levels of system strength, or at levels above this threshold. Being similar to the existing do no harm framework, it is hostage to the same deficiencies. That is, it is unlikely to facilitate the coordination and efficiency of service provision. In those areas where system strength is not, and is unlikely to be, an issue, the costs of mandating service provision will be nothing more than a direct, deadweight loss of economic efficiency to the NEM. A mandatory service model would place all costs of providing system strength on generators. As noted above, however, system strength issues result from the complex interaction of many demand-side and supply-side variables. Many of these are not under the control of generators. Apportioning all costs solely to generators would, therefore, violate several principles considered necessary to maximise economic efficiency which EA supports. For example, both the causer pays and the beneficiary pays principles. A mandatory service model would also raise issues of economic equity between incumbent and future generators. For example, to introduce a mandatory service model on all generators would disadvantage existing generators who had made investment decisions in an era without having to provide system strength services. However, to place the mandatory service provision only on new generators would offer a competitive advantage to existing generators, potentially stymying new generation investment. EA notes that the same equity arguments would apply for system strength impacts that arise from the decommissioning of synchronous plant. As was exemplified during the Optional Firm Access review, issues of economic equity are challenging to resolve. For this reason, and the reasons listed above, EA could not support a mandatory service model and suggests it is not considered further as part of the review.
Section 4.6 - Model 4: Access standard	
26. Do stakeholders agree with the characterisation and assessment of an access standard model? Are there any other advantages and/or challenges?	The access standard model has many of the same deficiencies as the mandatory service model. That is, generators would wear all costs of system strength provision despite not being a causer nor beneficiary in all cases. It would raise economic equity issues between new and incumbent generators. In applying costs to all generators, even in areas where system strength is not an issue, economic efficiency would also be retarded. Moreover, an access standard would be unlikely to result in any meaningful long-term contribution to the provision of the three-phase fault level. Given these deficiencies, EA suggests this model is not pursued any further whether singularly or in combination with another model in a hybrid framework.
Chapter 4 – General	

27. Are there other model(s) stakeholders think should be explored?	EA notes that both Hydro Tasmania and TransGrid have, or are about to, initiate rule change requests that bear relevance to this consultation. EA supports both these proposals being included and explored as part of this work.
28. What combinations of models (i.e. hybrids) should be explored further?	EA considers elements of the first two models might be combined in a hybrid framework. However, as noted above, it is not clear to what extent a market-based decentralised model would be economically efficient. EA suggests that further investigation, including quantification of potential implementation costs, be undertaken to help with this assessment. For the reasons stated above, EA does not consider that the last two models should be combined with other models in any hybrid arrangement.
29. Do stakeholders have any suggestions as to how any/all the models set out could be implemented or modified? Please comment on any and all models possible.	EA understands that TasNetworks, Hydro Tasmania and AEMO are working together on operational forecasting and procurement mechanisms using SCADA interfaces to meet obligations under the Tasmanian System Strength and Inertia Shortfall Declarations. EA suggests that to the extent these mechanisms have been tested and are considered robust, these might help inform the centrally coordinated model.

CHAPTER 5 – SYSTEM STRENGTH IN DISTRIBUTION NETWORKS

30. What factors make system strength provision in distribution networks unique from transmission networks?	EA mostly agrees with the Commission's assessment of the factors unique to system strength in distribution networks. In terms of meshing, however, this is very different in central business districts versus rural areas. Accounting for both these bookend cases will be required to facilitate a fit for purpose distribution system strength framework. Given the disproportionate scale of system strength issues at a distribution level, and how well this issue is already managed, EA considers that transmission level issues should be the primary focus of the review at this stage.
31. What are the key issues for system strength in distribution networks, including the magnitude and urgency of system strength issues in distribution networks?	Please see the answer to question 30 above.
32. How should any system strength issues in distribution networks be addressed? Are any model(s) from Chapter 4 appropriate to address system strength provision in distribution networks?	Please see the answer to question 30 above.