Australian Energy Market Commission

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Parliament House
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By email: **leslie.guy@parliament.sa.gov.au**

Dear Committee Secretary

Select Committee on the State-wide Electricity Blackout and Subsequent Power Outages

The Australian Energy Market Commission (AEMC or Commission) welcomes the opportunity to make a submission to the Legislative Council Select Committee's inquiry into the state-wide electricity blackout and subsequent outages (Inquiry).

The AEMC has also been tasked by the COAG Energy Council, with conducting a review into these matters. The terms of reference for the AEMCs *Review of the black system event in South Australia on 28 September 2016* are attached to this submission[1]. It should be noted that some of the matters included in the Inquiry terms of reference are the same as those included in the AEMC's review of the 28 September events. Given our review is in progress, this submission only includes information that appears in publically available AEMC reports and falls within the scope of our roles and functions.

The AEMC has recently published two reports on matters relevant to the Select Committee's Inquiry. An outline of each is provided below.

1. System Security Market Frameworks review – Directions paper

The widespread deployment of new, non-synchronous generating technologies, such as wind farms and solar panels, is having major impacts on the operation of the power system. The AEMC's System Security Market Frameworks review (Review) and the three associated rule change requests seek to address the two key systems security issues identified in an interim report[2] published in December 2016: the management of frequency and of system strength in a

[1] On 7 October 2016 the COAG Energy Council agreed to direct the AEMC to review the factors which contributed to the 'black system' event experienced in South Australia (SA) on 28 September2016. Terms of reference were issued in December 2016 and can be found on the AEMC website:
http://www.aemc.gov.au/getattachment/c689a94d-57e7-4821-bf11-56318c481165/Terms-of-reference.aspx

[2] In December 2016, the AEMC published an interim report on the System Security Market Frameworks Review. The report sets out some of the key aspects of system security being considered and some of the preliminary

power system with reduced levels of synchronous generation. The Review will consider and develop changes to the market rules to allow the continued uptake of these new forms of generation while maintaining the security of the system.

A directions paper[3] for the System Security Market Frameworks Review was published on 23 March 2017. The directions paper proposes an approach to addressing frequency control and consists of two packages of complementary measures that would be implemented in a staged manner: an immediate package and a subsequent package.

The immediate package contains a number of complementary measures to maintain control of power system frequency following a contingency event.

- Required inertia operating level - A requirement on Transmission Network Service Providers (TNSPs) to provide and maintain a defined operating level of inertia at all times.
- TNSP procurement of fast frequency response - An interim measure, TNSPs would be allowed to contract with third party providers of Fast Frequency Response (FFR) services where the TNSP considers, and AEMO agrees, that an FFR service can be used to meet the required operating inertia level.
- Generator obligations for FFR capability - An obligation on new non-synchronous generators to have the capability to provide FFR services. Generators would not be mandated to provide the service but would be required to install the capability for providing the service at the time of construction.

The subsequent package consists of two additional mechanisms that could be implemented over time to enhance the immediate package and improve the overall effectiveness and efficiency with which inertia and FFR services are procured in the long term.

The obligation on TNSPs to provide a required operating level of inertia and the obligation on new non-synchronous generators to have FFR capability would both carry over from the immediate package. However:

- For additional inertia provided by the TNSP above the minimum operating level, an incentive framework would be developed to guide the inertia provided towards the most efficient level. Under the incentive framework, TNSPs would be rewarded for the delivery of market benefits from a project to provide additional inertia that allowed for greater power transfer capability in the network.
- The interim framework for TNSPs to contract with third party providers of FFR services would be replaced by a market for FFR services to optimise the FFR quantity consistent with system security requirements and levels of system inertia and other FCAS.

The directions paper also provides a more detailed discussion of the issues associated with system strength than was contained in the interim report. The proposed approach for system strength is to amend the rules to clarify that Network Service Providers (NSPs) should be responsible for maintaining an agreed minimum short circuit ratio to connected generators. Generators would continue to be required to meet their registered performance standards above this agreed level.

In developing a staged approach, the Commission sought to strike a balance between addressing immediate issues related to the management of power system security and developing an efficient and effective framework to address such issues in the medium to longer term. The immediate package represents a practical approach that can be adopted relatively quickly and which will

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findings of the Commission. http://www.aemc.gov.au/getattachment/7d65d3c8-28f9-43b0-a9ca-5d7d27ee663d/Interim-report.aspx

[3] The AEMC initiated this review on 14 July 2017 and has published a directions paper to present its proposed approach to resolving these issues on 23 March 2017: http://www.aemc.gov.au/Markets-Reviews-Advice/System-Security-Market-Frameworks-Review#

provide a high degree of confidence that the system can continue to be operated in a secure manner. The subsequent package of measures is intended to improve the effectiveness and efficiency with which services are procured in the long term.

The Commission is seeking stakeholder feedback on the contents of the directions paper, particularly in regards to the proposed approaches to addressing frequency control and system strength issues. Submissions closed on 20 April 2017 and can be viewed on the AEMC website[4].

1. Emergency frequency control schemes – Final Determination

The widespread deployment of new technologies in the electricity market is having major impacts on the maintenance of power system security – the power system's capacity to continue operating within defined technical limits, even in the event of the disconnection of a major power system element such as an interconnector or large generator.

The risks associated with some events have increased in light of the transitioning electricity market. In the past, the effects of these events have been mitigated through the use of schemes installed by Network Service Providers (NSPs) designed to quickly respond to changes in frequency where a sudden disturbance has caused an imbalance between load and generation. However, the shifting generation mix means that the frequency of the power system can now change much more quickly, reducing the effectiveness of these schemes.

In addition to this, event classifications did not allow the Australian Energy Market Operator (AEMO) to manage the system to limit the frequency consequences of events classified as non-credible contingencies, through the use of pre-emptive (or "ex-ante") measures. For example AEMO was not previously able to procure frequency control services or constrain generation to limit the consequences before a non-credible event occurred.

A final rule determination[5] to implement new emergency frequency control schemes to address these issues was published on 30 March 2017. The final rule establishes an integrated, transparent framework for the consideration and management of power system frequency risks arising from non-credible contingency events in the National Electricity Market.

The final rule includes:

- a clear framework to regularly review current and emerging power system frequency risks, and then identify and implement the most efficient means of managing emergency frequency events;
- an enhanced process to develop emergency frequency control schemes to allow for the efficient use of all available technological solutions to limit the consequences of emergency frequency events, including a formalised arrangement for the management of over-frequency events; and
- a new classification – the protected event – that will capture certain high consequence non-credible contingency events. Once the Reliability Panel has declared an event to be protected, this will allow the Australian Energy Market Operator (AEMO) to manage the system at all times (ie on a 24/7 basis) by using some ex-ante operational solutions, as well as some limited generation or load shedding, to limit the consequences of those protected events.

This integrated framework for emergency frequency control schemes and new classification of protected events will support security of supply for consumers as the generation mix changes and technology evolves. However, it is important these measures are delivered efficiently, so that costs

[4] http://www.aemc.gov.au/Markets-Reviews-Advice/System-Security-Market-Frameworks-Review

[5] On 30 March 2017, the AEMC published a final rule and final rule determination on the Emergency Frequency Control Scheme rule change request: http://www.aemc.gov.au/Rule-Changes/Emergency-frequency-control-schemes-for-excess-gen

for consumers are as low as possible. The final rule therefore sets out clear governance arrangements, including the requirement for robust cost benefit processes.

Additional AEMC work relevant to the Inquiry

The Select Committee has referred to "the role of various parties in national electricity markets" in item (g) of its terms of reference. The Commission has noted on a number of occasions the importance of sound governance arrangements in supporting reform of energy markets. Governments play a crucial role in for providing policy leadership, but the unique nature of the energy regulatory framework that allows significant participation from a broad range of stakeholders in reforming energy markets, specifically through the Rule making process. More detail can be found in the Commissions previous submissions, specifically its submissions to the Dr. Finkel's independent review into the future security of the NEM (2017) [6] and the Review of Governance Arrangements for Australian Energy Markets (2015)[7].

In relation to item (h) of the terms of reference "reforms that would improve electricity reliability and affordability in South Australia whilst reducing carbon emissions"; the Commission recently published advice[8] at the request of the COAG Energy Council that explored the characteristics of alternative mechanisms for achieving the electricity sector's share of Australia's Paris Agreement emissions reduction targets. The AEMC analysed the characteristics and impacts on the energy market of three emissions reduction policy mechanism, each designed so that they are expected to meet the electricity sector's share of emissions reductions by 2030. The three policy mechanisms considered were as follows:

- A market-based mechanism which would involve the establishment of a declining Emissions Intensity Target (EIT) for the electricity sector.
- A technology subsidy which would involve extending the existing LRET subsidy mechanism for new renewable generation capacity.
- Government regulation involving a staged approach to fossil-fuelled generator exit.

The Commission's analysis has shown that the EIT is the most cost effective, scalable, and robust emissions reduction mechanism, of the three broad pathways available to policy makers even when it was tested against various sensitivities such as high demand, low demand and high gas price sensitivity.

Importantly, when contemplating the effective integration of energy and emissions reduction policy, we consider that it is important that any mechanism to achieve an emissions reduction objective is designed having regard to principles such as:

- Adaptability – able to meet its objectives in the face of a changing and uncertain future.
- Flexibility – able to respond to changes in demand, fuel prices, technology costs and other factors that influence electricity market outcomes.
- Technological and geographic neutrality – abatement brought about through the greatest variety and location of technology options will help minimise the long term costs
- Allocation of risk – to those parties best-placed to identify and respond to risks in an efficient manner

Considering these principles will also lead to more efficient energy market outcomes and lower costs to consumers over the long term.

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[6] http://www.aemc.gov.au/getattachment/6ecd9317-10f8-40b6-b053-bfad507099b6/AEMC-submission-to-the-independent-review-on-the-f.aspx

[7] http://www.aemc.gov.au/getattachment/2f3f9d4d-71a7-41e7-a8c5-341f18205d81/AEMC-submission-to-Review-of-Governance-Arrangemen.aspx

[8] http://www.aemc.gov.au/Markets-Reviews-Advice/Integration-of-energy-and-emissions-reduction-poli

Background:

The AEMC plays two main roles in Australia's energy markets.

1. It makes and amends rules in relation to the National Electricity Market (NEM), transmission and distribution networks, wholesale gas markets, natural gas pipelines and the retail sale of energy to consumers through the National Energy Consumer Framework. It makes and amends these rules in response to a request from any person or organisation other than the AEMC itself. Rule change requests are typically submitted by individuals, industry or governments.
2. It undertakes reviews and provides advice on improvements to regulatory and energy market arrangements to the COAG Energy Council. To do this work we consult widely on matters which bear on the progress of the COAG Energy Council's energy reform agenda. The AEMC regularly monitors and reports on a range of matters including the level of competition in energy retail markets, future price trends, and energy market performance. The Reliability Panel, which forms part of the AEMC's institutional arrangements, reviews and reports on the safety, security and reliability of the national electricity system.

In performing its functions, the AEMC is obliged to have regard to national energy objectives for electricity, gas and energy retail, that is, to promote efficient investment in, and efficient operation and use of, electricity [or natural gas or energy services] for the long term interests of consumers with respect to price, quality, safety, reliability and security of supply.

The regulatory frameworks for energy were designed to, and do continuously adapt to support changes in energy markets. This is evidenced by around 220 changes to rules and more than 100 reviews completed since the AEMC was established.

I trust this information will be helpful in informing the Select Committee's Inquiry. The AEMC would be happy to provide any additional information to the Select Committee to assist its Inquiry. If you have any questions or require further information please contact me at anne.pearson@aemc.gov.au or (02) 8296 7800.

Yours sincerely

Anne Pearson
Chief Executive

Encl. Terms of Reference to AEMCs *Review of the black system event in South Australia on 28 September 2016*