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Submitted online to http://www.aemc.gov.au/Markets-Reviews-Advice/System-Security-Market-Frameworks-Review#

13th February 2017

System Security Market Frameworks Review Interim Report
Reference: EPR0053, ERC0208, ERC0211, ERC0214

The Australian Energy Council (the Energy Council) welcomes the opportunity to make a submission to the Australian Energy Market Commission's (AEMC) System Security Market Frameworks Review Interim Report (the Interim Report).

The Energy Council is the industry body representing 21 electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. These businesses collectively generate the overwhelming majority of electricity in Australia and sell gas and electricity to over 10 million homes and businesses.

The Australian Energy Market Operator (AEMO) has identified high priority areas for providing system security under the National Electricity Market's (NEM's) changing market structure. Four areas are of immediate concern to AEMO:

1. Management of extreme power system conditions.
2. Frequency control.
3. Visibility of the power system (information, data, and models).
4. System strength.

Protected events category

The AEMC has taken up the proposal for a protected events category to better mitigate the risk to the secure operation of the NEM of extreme events (such as weather events). The current NEM rules allow AEMO significant control and flexibility to classify credible and non-credible events and adjustments between these two categories. In the event of unusual weather, adding a third intermediate category may provide market benefits, provided sufficient controls exists within the National Electricity Rules with regard to its use. As more information about extreme events becomes available it is possible to better estimate the consequences and likelihood of their occurrence and take mitigating action. The aim of the additional category is to allow AEMO to take preemptive mitigation measures that would allow a more secure outcome for the system if the event remained classified as a contingency event, but be less restrictive on market operations than reclassification to a credible contingency. We support this development on the basis that the Reliability Panel is tasked with consulting with the Market with regard to the settings to apply to this new protected events category, this should provide AEMO with greater ability to take action before an emergency occurs. The Reliability Panel is the best body to set locations where the Protected Events category should be applied and the range of circumstances under which a reclassification to a protected event should occur.

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Emergency frequency response service

The Energy Council supports the development of an emergency frequency response service, to expand the scope of ancillary services to meet the needs of the changing network. The AEMC's Interim Report seems to have misinterpreted the operation of 6 second FCAS contingency response, in that the response is required to be fully provided within 6 seconds and sustained for a further 60 seconds and not initiate at 6 seconds as described in the Interim Report. We support the AEMC's draft rule to allow for the potential use of any technology solutions that can provide emergency frequency control. As the emergency frequency control scheme is developed, a transparent governance framework will assist to create a robust and effective mechanism.

The AEMC is correct in its Interim Report identifying that *contingency FCAS acts to arrest steep rates of change of frequency and then stabilises and recovers the system frequency over time to bring it back to within the normal operating frequency bands.* It is also worth noting that in South Australia, due to a South Australian Government directive, FCAS contingency raise services are not scheduled by AEMO for some credible contingencies which may significantly impact the South Australian region.

In South Australia, frequency stabilisation following a credible contingency, such as the trip of the Heywood interconnector flow path from Moorabool in Victoria to Tailem Bend in South Australia that leads to a large frequency fall is managed only by customer load shedding. It is also worth noting that while FCAS contingency services commence activating when frequency falls below 49.75 Hz, under frequency load shedding does not activate until approximately 48 Hz, by which time the system frequency in South Australia is somewhat in '*freefall*' and frequency stabilisation is difficult. It is possible that even with emergency frequency response enabled in South Australia this may be insufficient to prevent ongoing issues in South Australia if other FCAS contingency raise services remain unavailable for dispatch by AEMO. In addition, in order for emergency frequency response to be dispatched in South Australia, AEMO may require approval from the South Australian Government to schedule such a service if it is viewed as an additional FCAS contingency raise service.

It would be best to ensure AEMO has full access to existing tools for maintaining system security in South Australia, while investigating the options for additional services.

Valuing inertia and market design

Power system security can be efficiently supported by the development and introduction of a mechanism to increase inertia in the system. Increasing inertia in the network assists to manage the rate of change of frequency, and where inertia is provided by synchronous generators or other synchronous plant, system strength and recovery after extreme events will also improve. So a holistic view of solutions will assist to identify the least-cost option. Our submission to the Discussion Paper outlined the case for creating a reward structure that reflects the value inertia provides to the system, which is currently provided incidentally by synchronous generators connected to the network.

The existing Network Support and Control Ancillary Service (NSCAS) mechanism provides a framework for procuring these types of services. These mechanisms are not currently being exploited, are predominately backward looking and do not cater for future system security issues or current operations that enhance the performance of the network. Prior to establishing new regulatory requirements or markets, a detailed examination should be undertaken of the appropriateness of existing NSCAS measures (like calculating the NSCAS gap) to meet system security issues.

Many of the solutions to improve system security can provide improvements to more than one of the four areas of immediate concern identified by AEMO. The AEMC's evaluation of the best (most efficient and effective) solution to increase system security needs to take account of the characteristics of electricity services. The design of a mechanism to value inertia depends on the inherent characteristics of the service. Inertia is an instantaneous and uncontrolled response to a need within the power system at that given point in time. This inertia response is an inherent feature of large synchronous generation and other synchronous rotating equipment. The benefits of inertia are diffused across the whole system, where investors who provide inertia cannot exclude those who do not pay for the service from receiving benefits. Currently, there is also an information asymmetry when examining the need for inertia services; transmission networks and AEMO are

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the only parties with visibility of the level of inertia in the network. So inertia does not lend itself to a competitive market structure with many buyers and sellers, all with equal access to information. Identifying the least cost, most effective means to procure a service like inertia requires consideration of the limitations in the NEM and inherent in the service itself.

In order to elicit a supply response the revenue available to inertia providers must cover the cost of supply. In the long run, this may mean that revenue needs to cover the cost of a new investment (noting that most investments will also be able to participate and the energy and/or other ancillary services markets). In the short run, the revenue required may be lower as existing plant and equipment could be modified to provide new services. While it is important to remunerate investors for the services that they provide, the primary reason for these existing market participants to operate is to sell energy. To the extent that distortions in the wholesale market suppress wholesale prices to below the long run cost of production, the incentive to remain in the market will be reduced. Addressing these long term structural distortions will also assist in the efficient delivery of security enhancing services.

Our submission to the Discussion Paper outlined the view that AEMO could purchase more system inertia on behalf of the Market (as proposed in the AGL rule change[i]), and a new fast FCAS service. But if these support services were not developed or were infeasible then a RoCoF limit may be appropriate. At this early stage, it is essential to consider and balance the relative costs and benefits of all options. If it is possible for a competitive procurement process to deliver the necessary services to maintain system security, that competitive process is likely to yield greater efficiency than a regulatory requirement which seeks to impose an obligation on generators to provide a minimum level of service.

While there is a need to have a consistent set of mechanisms across the NEM, provided system frequency is being managed within the frequency operating standards (FOS), there may not be a requirement for additional services within a region at specific points in time. For example, there is currently no driver to create a requirement for specific inertia procurement (with the associated costs entailed in doing so) in Victoria as there is plentiful inertia within the region. However the mechanism should be flexible so that if and when it did become an issue in the future, the market operator could quickly create a price signal reflecting demand for the service.

In the event that the AEMC determines that a Market mechanism is unlikely to deliver the amounts of inertia response required and a regulatory response for generators to provide a minimum level of service is required, it is important to consider the cost recovery mechanism as it impacts to new and existing participants. One option is to determine contributions on the basis of a causer pays principle. To prevent the occurrence of conflicting dispatch outcomes this obligation could vary in proportion to generation capacity online and should not apply to generators who are offline. Alternatively, a synchronous condenser (not generating) would not affect dispatch and could be a generator operating under a Network Support Agreement (or similar) where the generator is not subject to marginal wholesale pricing outcomes and therefore, could be structured in a way that would not affect dispatch outcomes. Further consideration of these issues will be required as option for rule changes are investigated.

Visibility of the power system

While the AEMC's process has not reached consideration of visibility of the power system yet, it is a key element to integrating intermittent and distributed resources to the network. Reliable wind power forecasts help Denmark manage wind power production that can at times exceed the total load of the country[ii]. Maintaining good visibility of intermittent generators and maintaining robust forecasting models assists in the overall system operation and the integration of renewables. Generation which is non-scheduled is not required to participate in AEMO's central dispatch process which diminishes the visibility and accountability of forecast generation.

In our 2016 submission to the Non-Scheduled Generation & Load in Central Dispatch rule changes (ERC0203) we outlined benefits arising from increased information and transparency in generation output. A reduction in the threshold for generator registration from 30MW to 5MW is in the interest of maximising price discovery and information transparency within the NEM as well as allowing AEMO to better control generation output from a system security perspective. The changes are likely to result in market participants changing their behaviour by virtue of having additional data to inform their operational decisions and bidding practices.

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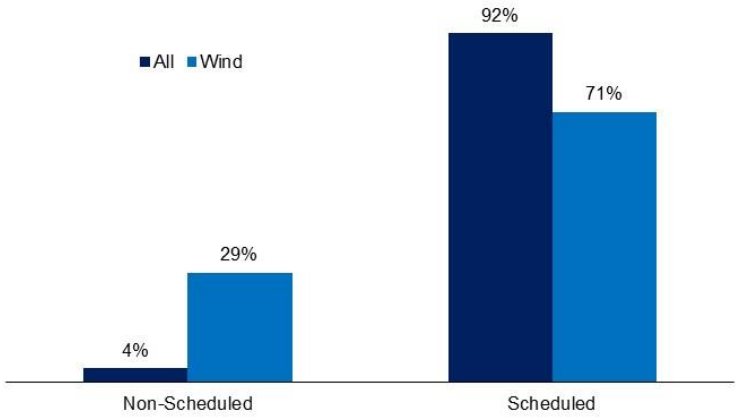
Non-scheduled generation is not required to conduct its own forecasting that contributes to AEMO's planning and management of system security. In the future, as intermittent generation makes up a larger share of generation it may be necessary for all generators to contribute to the forecasting efforts of the market operator. In 2016, around 30 per cent of wind generators in the NEM were non-scheduled (Figure 1).

Figure 1: generation capacity by fuel and market status, 2016



Source: Australian Energy Council data, 2017

At the distributed generation level, in the future it may become necessary to improve the visibility of distributed generation to the network or the market operator. AEMO's ability to robustly forecast the impact of solar PV on network performance will inform the tools it uses to control frequency or the mitigating measures taken in anticipation of an extreme weather event. The roll out of smart meters around the NEM is underway, and smart meters have the capability to report customer level data remotely. However, to take advantage of this capability to increase the visibility of distributed generation, the household system needs to be configured correctly.

Constraining generators should be a last resort

Constraining down generation to prevent the loss of system security should be a last resort, because it decreases the utilization of assets and may be inefficient for consumers in the long term. However, constraining generators is a reliable and immediate tool for managing system security (and was used to control RoCoF following the 2016 system black event in South Australia), where other solutions do not currently exist. Over time, other solutions may be developed and implemented which may be more sustainable and efficient in the long run. The NEM's strong governance framework and market structure should be leveraged to assist us to find innovative and smart solutions to system security under high shares of intermittent, asynchronous generation.

We recognise that the NEM network planning requirements are not set on the basis of a constraint-free network under all credible conditions, and so constraining down of generation under some system conditions may be the most cost efficient solution. Ensuring that we make the most of our generation resources means that we find the most effective and efficient means of providing a secure system in the long run interest of consumers. This will enable Australia to minimise possible inefficient outcomes seen in countries such as Ireland where constraining intermittent wind resources has become the norm to maintain system security[iii] (which in some circumstances may have been poorly located in areas of congestion). In the long run, inertia and energy should be co-optimised combined with market arrangements in place, where investors have the choice of providing inertia services or providing energy and not contributing to inertia.

The measures outlined in the Interim Report provide additional tools for the market operator to manage system security. We support the continued close collaboration between market participants, AEMO and the AEMC to respond to the market challenges as technology and energy use transforms the market.

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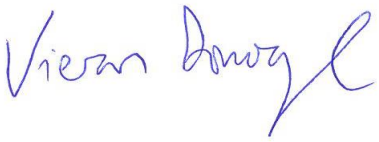
Any questions about our submission should be addressed to Emma Richardson, Policy Adviser by email to emma.richardson@energycouncil.com.au or by telephone on (03) 9205 3103.

Yours sincerely,



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[i] AGL, 2016, *Proposed rule change: NEM Wide Inertia Ancillary Service*, letter to the AEMC, http://www.aemc.gov.au/getattachment/bacba344-8989-4107-ae2a-480427c9c9f9/Rule-change-request.aspx

[ii] Danish Energy Agency, 2015, *Integration of Wind Power: Energy Policy Toolkit*, https://ens.dk/sites/ens.dk/files/Globalcooperation/system_integration_of_wp.pdf

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