

Tuesday, 8 August 2017

John Pierce  
Chairman  
Australian Energy Market Commission  
Lodged Electronically

Dear Mr Pierce,

**RE: ERC0211 Managing power system fault levels draft rule**

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, energy efficiency, hydro, bioenergy, energy storage, geothermal and marine along with more than 4,000 solar installers. We are committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner.

As previously noted the CEC agrees that the National Electricity Market (NEM) is changing, and supports the need to adapt the market in a way that moves away from a reliance on ageing generators, many of which are slated for closure in the coming decade. The implications of this transformation include moving towards planned sourcing of services, such as fault current, that may not be provided inherently by generating plant.

Despite this risk the CEC has concerns with the Commission's view as expressed in the draft rule. In particular the view expressed around the prospect of major implications for system security stemming from the connection of new inverter-based generating plant. The Commission acknowledges that as new inverter-based plant connects low fault current contributions tend to reduce the short-circuit ratio (SCR) as seen by other generators. However, the Commission also suggests that this situation may become so severe that it may cause cascading failures and even black system events. These statements are inconsistent. If inverter-based generators shut down or trip off for a fault this would naturally lead to a reversing of the impact on SCR seen by other generators, which in turn would overcome the risk of cascading failure caused by a reduction in SCR. On this basis the CEC considers that the Commission has significantly overstated the risks of this issue.

Obligations to do no harm to existing connection agreements are already dealt with in the National Electricity Rules. TNSPs have negotiating power to ensure that new connections do

not prevent the TNSP from meeting its service commitments to existing connection agreements as stipulated by clause 5.3.5(d). It is entirely unclear why the Commission believes this current obligation is ineffective, and why the additional 'system strength connection works' stipulated in the draft rule is not simply another form of augmentation already contemplated by this clause. Similar augmentations are already used for voltage management to facilitate connections and new entrants are already required to fund such works.

Given the above, and the existing National Electricity Rules provisions, the major issue to be addressed by this rule change is managing and planning for a reduction of fault current anticipated by the closure of large thermal plant in the future. This issue is clearly one which requires a coordinated and planned regulated investment solution and TNSPs should be responsible for managing this.

In addition to these general concerns more specific feedback on the draft rule is provided below. However, we note that there is a great deal of work being undertaken in this space. Most notably the Australian Energy Market Operator's Ancillary Services Technical Advisory Group is meeting for the second time on August 10, one day after submissions are due to this draft rule. As such, the information and views provided here are based on currently available information and may change with new information.

We thank the Commission for the opportunity to provide our views on these matters. Please contact the undersigned or Emma White (03 9929 4107) for any queries regarding this submission.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Tom Butler', with a long horizontal flourish extending to the right.

Tom Butler, Director – Energy Transformation

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### ***Determination of sub-networks requires more consideration and a transparent framework***

In addition to providing sufficient inertial response, sub-networks would also be required to maintain continuous operation in an islanded state. This would require providing AEMO with sufficient certainty that the sub-network also held sufficient:

- regulation and contingency FCAS, which can be met within the sub-network to control frequency following separation
- fault current, which will be sufficient to maintain stable operation of plant
- generation to meet demand
- reserve margins
- any other parameters required to ensure stable continuous operation.

Recent experience in South Australia has seen AEMO implement a constraint to ensure FCAS services are available from local sources, with limited notice given to the market when first initiated. The implications have been dramatic increases in FCAS costs for the region, and no change in competition for the service. In the absence of a proper and transparent assessment and decision on sub-network selection and planning, the risk includes increased continued use of inefficient constraints, such as the South Australian local regulation constraint, in more locations in the NEM.

The identification and determination of 'inertia sub-networks' will have to account for the provision of all the other services needed to maintain continuous operation in the determination of sub-networks. Investors looking to provide these services require some certainty and AEMO's constraint equations would not provide this. Sub-networks must be assessed and planned for transparently and through the NTNDP and ESOO as appropriate.

### ***Significant generator closure timeframes are not aligned to investment timeframes to replace inertial or fault level contributions***

The Commission has established that TNSPs would be accountable for replacing any lost inertial capability or fault current as a result of generator closures. Investments of this nature are likely to exceed the threshold to apply the regulatory investment test meaning that a lengthy RIT-T process would delay the investment decision. The equipment required to meet the needs of local market participants would take 12-24 months to be deployed, while the generator closure notice and closure may be completed in less than half this time. This misalignment could lead to protracted periods where a region or sub-network is operated

inefficiently and under significant constraints before the TNSP deploys and commissions inertia assets (assuming the RIT-T delivers a positive outcome).

The Commission must extend the draft rule to ensure that planned generator closure timeframes from notice to closure are restricted to at least the minimum timeframe possible for a RIT-T to be undertaken<sup>1</sup>. Failing to address this misalignment alongside this rule change will lead to major risks to the efficiency of the NEM as large thermal generators close.

### ***The NEO would be met where existing facilities can be re-purposed***

A long-term view of the NEM would logically conclude that significant volumes of existing thermal generation will retire in the coming decade. With this in mind, there is likely to be significant advantage in converting existing assets into synchronous condensing capability where available (and RoCoF withstand capability can be demonstrated). Despite this clear advantage to consumers, the draft rule contemplates incremental additional investment in new synchronous condensers to be in place prior to the retirement of thermal plant.

The long-term interests of consumers would be best met where AEMO identifies that re-purposing of existing assets is preferred. However, the draft rule appears to promote incremental investments in inertia services that would be insufficient to achieve this long-term outcome. The obvious investment choice would likely be unrealisable and the draft rule does not make sufficient provisions to meet the long-term interests of consumers.

The rules should make express provisions that enable TNSP procurement of existing synchronous condensing assets, even where these assets provide inertia services above the minimum level calculated by AEMO. This measure would take a long-term view of the increasing deployment of non-synchronous generation technologies alongside a growing demand base and economy.

### ***Transparency is essential to support generator investment decisions***

The Commission is proposing that a register of generator SCRs is created and that this information will inform investment decisions for new entrants. The application of this information for new entrants is not as clear as it is for NSP planning studies. A new entrant would be able to make more informed investment decisions from the publication of information on the minimum fault level at specific locations in the transmission network.

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<sup>1</sup> Noting that the Finkel Review recommended that three year notice period for generator closures is enforced.

A logical conclusion for any transmission planner is that fault level will reduce over time in the absence of other investments, as large thermal plant is retired and replaced with more non-synchronous generation and distributed energy resources continue to increase in number.

NSPs already publish maximum fault levels in their Annual Planning Reports and the rules should be updated to ensure publication obligations are extended to include expected minimum fault levels at the same nodes. The reporting of these fault levels should also be accompanied by a clear outline of the assumptions and modelling conditions applied to determine the minimum fault levels.

### ***Existing generators have incentives to maximise registered SCRs***

Under the draft rule new entrant generators would face costs commensurate to the registered SCR levels of other local generators. On the other hand generators that do not have clear sight of their minimum SCR levels would likely face costs to identify and measure their registered SCR. Existing generators would thus have an incentive to maximise their registered SCR to create barriers to entry for competition and to mitigate risk and the expense of demonstrating their minimum allowable SCR to find the market's efficient operating point.

In addition TNSPs will also have an incentive to register high SCR's as they would benefit from future investments to prevent the expected fault current pushing SCR levels below that needed to support connection agreements.

In order to manage the risk of registered SCRs being set above efficient levels, and ensure efficient by new entrants AEMO should be given powers to ensure reasonable SCRs are registered by existing generators. A clear calculation methodology must be put in place in the SCR guideline with AEMO positioned in a strong oversight and advisory role.

### ***TNSP veto powers for system strength remediation works are not necessary***

Alongside this rule change's duplication of 'do no harm' requirements for new entrants the explicit powers for TNSPs to veto proposed system strength remediation works are problematic.

The assets anticipated for network solutions are not aligned to those required for generator solutions, in particular with regards to life span. Adding this requirement would give a TNSP scope to oblige new entrants to invest in solutions that have life expectancies beyond the connection agreement which may only be provided by TNSP-owned assets. The CEC's view is that this explicit requirement is not workable and applies unnecessary 'special treatment'

conditions for system strength that are already managed with the existing do no harm provisions and negotiating frameworks.

### ***Connection inquiry responses need to state assumptions***

The Commission proposes that NSPs includes the minimum 'expected fault current' at the proposed connection point in a connection inquiry response. Given the diverse influences on fault current (augmentation, generator retirements and new entrants for example) it is reasonable to expect that this information is supported by the assumptions which have led to the minimum fault current. Clarifying these assumptions will enable the generator to better understand the risks associated with the proposed connection point.

### ***System strength remediation schemes need to consider commercial arrangements***

The Commission has proposed that a generator can either limit its operation, or invest in ancillary equipment as part of a system strength remediation scheme. This unreasonably limits the scope of the scheme to on-site activities when there may be opportunities from contractual arrangements with other parties to deliver the same technical solution at lower cost.

The draft rules around 'system strength remediation schemes' need to be updated to permit a contract with a third party to facilitate minimum SCR levels being met where the connection applicant identifies this as the lowest cost preference. Explicitly omitting this is inconsistent with the National Electricity Objective as only higher cost solutions would be permitted.

### ***Transitional arrangements need to align to the connection process***

The Commission is proposing that a drop-dead date for connection agreement signing be applied as a transitional arrangement, and this date aligns to the date that AEMO has to publish the minimum SCR information. As a result those generators in the connection process would see the information they have used to assess their connection change overnight which may make the proposed project unviable.

A more progressive solution would require that the TNSPs and AEMO inform connection applicants with SCR information and minimum expected fault levels ahead of the rule applying to advanced proposed connections. Noting that there are no new 'do no harm' obligations created by this rule the Commission should consider a six month window from the rule commencing to it applying to connection applicants that had lodged a connection agreement by the commencing date.