



TERRAIN SOLAR

7<sup>th</sup> November 2017

**Mr John Pierce**  
Chairman  
Australian Energy Market Commission  
PO Box A2449  
SYDNEY SOUTH NSW 1235

Dear Mr Pierce,

**Terrain Solar Submission on the ERC0222 Generator Technical Performance Standards Proposed Rule Change**

Terrain Solar is an intending participant in the National Electricity Market (NEM) as a generator. Terrain Solar is an Australian solar and battery storage developer with a combined 45 years of industry experience. Terrain Solar are developing a portfolio of mid-scale solar PV and battery ready projects across various sites in NSW and QLD connected either within the distribution system as embedded generators or connected within the sub-transmission system.

Terrain Solar broadly supports the objectives of the Independent Review into the Future Security of the National Electricity Market recently commissioned by the Commonwealth Government and prepared by Dr Alan Finkel (the Finkel Review), namely to provide “**increased security, future reliability, rewarding consumers and lower emissions**”. Most critically we support that the outcomes of the Finkel Review were underpinned by the “three pillars of an **orderly transition, better system planning and stronger governance**”.

We understand that the majority of recommendations proposed by AEMO in their proposed Rule Change to the Generator Technical Performance Standards ERC0222 (Rule Change) are a direct response to the multiple faults and cascading failures that caused blackouts in South Australia in September 2016. Whilst system security and reliability is of paramount importance to all participants in the NEM, the events that occurred on September 2016 in South Australia were extreme and pushed the South Australian power system to its limits. Creating standards based on this one event alone is not an efficient approach to the design of the NEM. Furthermore, proposing retrospective changes to generator performance standards as a result of one event will significantly damage investor and financier confidence in the governance structures of the NEM which will see abandonment of investment in the Australian market and a more difficult and expensive market transition.

The AEMC has requested that submissions should make specific reference to the written detail in the Rule Change request and the specific draft rules proposed by AEMO. Terrain Solar broadly supports the position and recommendations made by the Clean Energy Council (CEC). In addition to the CEC's submission, Terrain Solar provide the following responses to the proposed Rule Change.



### Jurisdictional Consideration of AEMO's Advice

Issue	<p>Section 3.1 of AEMO's Rule Change cites that an <i>"urgency to review technical requirements is further indicated by other participating jurisdictions seeking their own requirements over and above those in the NER. AEMO understands that New South Wales, Victoria and Tasmania are contemplating their own performance requirements for new generation"</i>.</p> <p>AEMO suggests that this level of urgency therefore justifies the proposed retroactive transitional arrangements on generator applications.</p>
Response	<p>Terrain Solar have subsequently sought advice from the NSW Government, who have confirmed in writing that they have no intention of introducing their own performance requirement for new generation. We also understand that the NSW Government is not looking at implementing ESCOSA-like requirements for generator licensing, which can be costly and introduce further risk, uncertainty and complexity.</p> <p>We recommend AEMC to undertake their own independent assessment of these claims put forward by AEMO and the justification of implementing retroactive transitional arrangements as noted below.</p>

### Transitional Arrangements

Issue	<p>AEMO proposes retroactive arrangements to apply the generator performance standards changes as of 11 August 2017.</p>
Response	<p>AEMO's rhetoric implied that the rule change is urgent. However, no evidence of the urgent nature of the rule change was provided. If the urgency were genuine, evidence would be available to support such a claim.</p> <p>The AEMC notes that they cannot make retroactive changes to the generator performance standards. However, some transitional arrangements may be implemented. The wording around "transitional arrangements" are ambiguous and it is not clear how they will impact intending participants who are part way through the connection process.</p> <p>As previously stated retroactive changes can be extremely damaging to investor and financier confidence in the governance structures of the NEM. Deployment of long-term investment capital, which is critical to the orderly and cost effective transition of the electricity market, is dependent on complete visibility and transparency of transitional arrangements.</p> <p>Terrain Solar is aware that some NSPs and AEMO have already requested compliance with the new proposed generator performance standards in anticipation of its acceptance and retrospective application, despite AEMC clearly stating that it cannot apply rules retrospectively.</p>



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	<p>We therefore recommend that the AEMC:</p> <ul style="list-style-type: none"><li>a. Provide clear guidance on the transitional arrangements,</li><li>b. Implement any rule change no earlier than the date the rule change is approved, and</li><li>c. Monitor AEMO to ensure they are not delaying or obstructing generator applications ahead of transitional arrangements, which may give rise to increased investor uncertainty.</li></ul>
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### **Amendments to Negotiating Framework to be as close as Practicable to the Automatic Access Standards**

Issue	<p>AEMO propose to change the process of negotiating performance standards (clause 5.3.4A) so that connection applicants are required to aim for the automatic access standard and only fall below that standard if it is not practicable to meet it, providing evidence to the satisfaction of AEMO and the NSP.</p>
Response	<p>Under the NER the current negotiating framework is based on only permitting negotiated access standards where it can be demonstrated there are no adverse impacts on either power system security or the quality of supply to other Network Users.</p> <p>As such, the difference between a permitted negotiated access standard and the requirement to meet automatic access standards provides little or no material benefit to either power system security or the quality of supply to other Network Users, but the material costs can be significant. Applying a framework that mandates automatic access standards unless otherwise “not practicable” is highly subjective and may impose significant costs on generators which are not appropriate given the nature of the generator, its size, scale or location within the NEM.</p> <p>As per the National Electricity Objective and the AEMC’s 2009 Reliability Panel Technical Standards Review, the AEMC needs to balance system security with cost as one of the 12 principals that needs to be considered when assessing technical standards.</p> <p>We recommend that the current negotiating framework provides sufficient power for AEMO and NSPs to ensure generators provide power system security and ensure quality of supply to other Network Users, whilst balancing appropriate levels of control and costs commensurate with the nature, scale and location of the generator within the NEM. There is therefore no need to amend the current negotiating framework.</p>

### **Voltage Control and Reactive Power Requirements (Items 1 – 6)**

Issue	<p>AEMO propose a number of changes to <i>S5.2.5.1 Reactive Power Capability</i> and <i>S5.2.5.13 Voltage and Reactive Power Control</i> access standards which require</p>
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	generators to have sufficient equipment facilities and controls to regulate voltage at the connection location.
Response	<p>Managing and regulating power system voltages is the responsibility of NSPs who receive a regulated revenue base to ensure a reliable level of service to their customers. To the extent that a new proposed generator has the potential to impact voltages in the network, the onus is on the generator applicant to implement sufficient voltage and reactive equipment and controls to ensure there is no adverse impact to the quality of supply of other Network Users.</p> <p>The proposed changes to S5.2.5.1 and 5.2.5.13 transfer the risk of voltage performance from NSPs to generators who have traditionally not been responsible for regulating voltage and do not receive a regulated revenue base, through ancillary services or otherwise, to provide such services.</p> <p>This imposes a significant cost and risk onto generators, particularly those who are located on strong network locations where a large amount of reactive power would be required to control and regulate voltage. This creates new cost barriers, which will disproportionately affect smaller generators within the distribution or sub-transmission system, such as embedded generators.</p> <p>We recommend that the proposed changes to S5.2.5.1 and S5.2.5.13 be commensurate with the size of the proposed generator and its level of influence on system voltages given the location and strength of the proposed connection point. A further recommendation is to only apply the proposed minimum access standards in S5.2.5.1 and S5.2.5.13 to generators with a maximum capacity &gt; 30MW.</p>

### Multiple Low Voltage Disturbance Ride Through (Items 14 - 15)

Issue	<p>AEMO propose new requirements in <i>S5.2.5.5 Generating System Response to Disturbances Following Contingency Events</i> for generators to withstand multiple low voltage disturbances.</p> <p>The new rule also requires that negotiated access standards can only be proposed where AEMO and the TNSP agree that the total reduction in generation in the entire power system will be less than 100MW.</p>
Response	<p>The multiple failures and cascading of faults that lead to the South Australian blackout event in September 2016 were extreme and highly unpredictable. AEMO's proposed new requirement in S5.2.5.5 requires the assessment of multiple Low Voltage Ride Through (LVRT) events which is difficult to predict and could lead to a deterministic network configuration of N-3 rather than the N-1 which is commonly accepted by all network jurisdictions. To require generators to continue to operate during these highly unpredictable events could expose generators to significant risk of damage and prolonged performance outages which creates greater investment uncertainty and arguably poorer long-term system security.</p>



	<p>An appropriate balance should be struck to ensure generators only continue to operate during multiple LVRT events to the extent that they have the ability to trip off in order to prevent damage or asset life reduction. A probabilistic approach should also be used to determine the thresholds of the multiple LVRT events to be considered in consultation with AEMO and the TNSP on a case-by-case basis, rather than have a deterministic threshold as prescribed in the proposed rule change.</p> <p>Also, given the high likelihood that a multiple LVRT event would trigger active or passive anti-islanding protection for generators connected within the distribution system, we recommend that the new requirement in S5.2.5.5 should not apply to embedded generators.</p>
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### High Voltage Disturbance Ride Through (Items 16 – 18)

Issue	<p>AEMO propose a number of changes to <i>S5.2.5.4 Generating System Response to Voltage Disturbances</i> and <i>S5.2.5.5 Generating System Responses to Disturbances following Contingency Events</i> that require increased capability for High Voltage Ride Through (HVRT) events and response to voltage disturbances.</p>
Response	<p>As per comments on Item 1 – 6 NSPs are responsible for managing and regulating power system voltages who in turn receive a regulated revenue base to do so.</p> <p>The proposed changes to S5.2.5.4 and 5.2.5.5 transfer the risk of voltage performance from NSPs to generators who have traditionally not been responsible for regulating voltage and do not receive a regulated revenue base, through ancillary services or otherwise, to provide such services.</p> <p>This imposes a significant cost and risk onto generators, particularly those who are located on strong network locations where large amounts of reactive power would be required to control and regulate voltage. This creates new cost barriers, which will disproportionately affect smaller generators within the distribution or sub-transmission system, such as embedded generators.</p> <p>We recommend that the proposed changes to S5.2.5.4 and S5.2.5.5 be commensurate with the size of the proposed generator and its level of influence on system voltages given the location and strength of the proposed connection point. A further recommendation is to only apply the proposed minimum access standards in S5.2.5.4 and S5.2.5.5 to generators with a maximum capacity &gt; 30MW.</p>

### Frequency Response Mode Capability (Items 26 – 30)

Issue	<p>AEMO proposes a number of changes to <i>S5.2.5.11 Frequency Control</i> to require generators to have facilities that allow participation in market ancillary services.</p>
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Response	<p>Participation in market ancillary services is a commercial driver. AEMO's proposed changes to require participants to have the capability to participate in market ancillary services provides no guarantee that additional generators will participate in market ancillary services as they may have other commercial drivers (for example maximising generation as part of their Power Purchase Agreement). Forcing generators to procure the necessary facilities, however, imposes costs which are unnecessary and could otherwise be addressed directly within the ancillary services markets rather than in the generator performance standards.</p> <p>Furthermore the proposed changes to S5.2.5.11 creates disproportionate costs for smaller generators who have less influence on frequency control and would receive less benefits from market ancillary services. We therefore recommend that the minimum access standards proposed in S5.2.5.11 should only apply to generators with a maximum capacity &gt; 30MW rather than a nameplate rating &gt; 30MW. This recommendation also reflects the changing requirements within S5.2.5.1 and S5.2.5.4 which are generally increasing the difference between nameplate rating and maximum capacity even though maximum capacity is the overarching driver for system security and power quality.</p>
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### Capability for Active Power Control via Automatic Generator Control and to Limit Active Power and Ramp Rate (Items 31 – 32)

Issue	AEMO proposes a number of changes to S5.2.5.14 <i>Active Power Control</i> to include Automatic Generator Controls (AGC) and ramp rate controls and remove the 30MW threshold.
Response	<p>It is unclear from the proposed rule change whether the requirements for ramp rate controls are subject to resource availability and does not automatically require deployment of energy storage. This would impose significant and unnecessary costs on intermittent and semi-scheduled generators and does not recognise the existing Market Management System (MMS) that AEMO can utilise to provide dispatch instructions.</p> <p>Furthermore we do not support the removal of the 30MW threshold under S5.2.5.14 as this creates disproportionate costs on smaller generators who have less influence on system security.</p>

### Remote Monitoring and Control (Items 33 – 35)

Issue	AEMO proposes a number of changes to S5.2.6.1 <i>Monitoring and Control Requirements</i> which remove the current thresholds of remote monitoring and control capabilities to be only required for generators with a capacity > 30MW.
Response	The imposition of remote monitoring and control requirements on generators less than 30MW applies a disproportionate cost on smaller generators with little impact or influence on active power dispatch, AGC, ramp rate controls or runback schemes.



	<p>As per our response to Items 26 – 32 we do not support the removal of the 30MW threshold under S5.2.5.11 and S5.2.5.14. Therefore, we also do not support the need for remote monitoring and control requirements for generators less than 30MW under S5.2.6.1.</p>
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### Revised Definition of Continuous Uninterrupted Operation (Item 37)

Issue	<p>AEMO have proposed a revised definition of <i>Continuous Uninterrupted Operation</i> (CUO).</p>
Response	<p>AEMO's revised definition remains ambiguous as there is no clear guidance on the expected performance prior, during and after the clearance of a fault. Furthermore AEMO's rule change request provides little basis or justification for changing the definition of CUO to the extent proposed.</p> <p>As an example AEMO has removed the flexibility to negotiate reasonable technical outcomes for achieving and demonstrating adequate CUO to ensure there are no adverse impacts on system security or the power quality of other Network Users. This can lead to AEMO imposing significant costs onto the generator without demonstrating any material benefits to system security or power quality.</p> <p>We therefore recommend the following definition which provide a clearer representation of AEMO's requested changes, which is also commensurate with AEMO's intent under S5.2.5.5:</p> <p style="padding-left: 40px;">In respect of a <i>generating system</i> or operating <i>generating unit</i> operating immediately prior to a <i>power system</i> disturbance, not <i>disconnecting</i> from the <i>power system</i> except under its <i>performance standards</i> established under clauses S5.2.5.8 and S5.2.5.9 and, <u>during and/or after</u> clearance of any electrical fault that caused the disturbance, only substantially varying its <i>active power and/or reactive power</i> <del>under required by</del> its <i>performance standards</i> established under clauses <u>S5.2.5.5, S5.2.5.11, S5.2.5.13</u> and S5.2.5.14, with all essential auxiliary and <i>reactive plant</i> remaining in service, and responding so as to not exacerbate or prolong the disturbance or cause a subsequent disturbance for other <i>connected plant</i>.</p> <p>The proposed definition above is consistent with the intent of the definition of CUO stated in the AEMC's Final Determination of the Rule Change on Technical Standards for Wind and Other Generator Connections (2013):</p> <p><i>"The Commission also notes that the definition of continuous uninterrupted operation ... means that a generating system or unit is in-service prior to a disturbance, and</i></p>



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	<i>continues to operate (within its performance standards) during that disturbance and after the disturbance has subsided.” (p. 41)</i>
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We thank you for the opportunity to provide a submission to the proposed Rule Change ERC0222 Generator Technical Performance Standards. If you have any questions in relation to this submission please don't hesitate to contact Chris Wilson on the contact details provided below.

Yours sincerely

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