

23 August 2023

Australian Energy Market Operator (AEMO)  
[contact.connections@aemo.com.au](mailto:contact.connections@aemo.com.au)

Dear AEMO,

### **AEMO review of technical requirements for connection**

Connections & Power Systems Advisory Pty Limited (“CPSA”) welcomes the opportunity to provide a submission to the Update Report Part 1 including draft NER amendments relating to the technical requirement for connection (NER 5.2.6A)<sup>1</sup>.

CPSA is an engineering consultancy firm with a focus on grid connection with a team that has over 5 GW of experience connecting generators and loads to the National Electricity Market. We have experience working with network businesses, the market operator, generators, load customers and hence a range of experience. We do not represent any particular industry group and our submission is based on ensuring there is a pragmatic approach to managing the power system and enabling an orderly transition of the energy sector.

CPSA generally welcomes the changes proposed in AEMO’s report which indicate a shift in focus back to a more pragmatic approach to negotiating performance. There are however some areas for improvement as set out below.

We note that our feedback is generally in line with that of the Clean Energy Council (CEC) but would like to highlight the following in addition to what has been raised by the CEC.

**Table 1 Technical Requirements for Connection of Generators**

NER Clause	Item	CPSA Comments
S5.2.5.4	Response to voltage disturbances	<ul style="list-style-type: none"> <li>The problematic aspect of this clause in relation to over voltages has been the unbounded &gt;130 % requirement.</li> <li>Introduction of reference to peak voltage and non-power frequency voltages and IEC 60071-1 will only complicate things.</li> <li>The focus should be on providing an upper limit to over voltages.</li> </ul>
S5.2.5.5 Generating system	Form of multiple fault ride through clause	<ul style="list-style-type: none"> <li>We are concerned that these studies have almost become an academic exercise to run as many simulations &amp; combinations as possible.</li> </ul>

<sup>1</sup> <https://aemo.com.au/consultations/current-and-closed-consultations/aemo-review-of-technical-requirements-for-connection>

response to disturbances following contingency events		<ul style="list-style-type: none"> <li>Where studies are required, the focus should be to consider actual power system operating conditions / limitations when assessing this clause.</li> <li>The focus should be on having carveouts to CUO based on equipment limitations within the GPS and have the OEM declare these limitations (eg auxiliary supply limitations, dump resistor thermal limitations etc.</li> </ul>
S5.2.5.8 Protection of generating systems from power system disturbances	Establishment of a AAS and NAS	<ul style="list-style-type: none"> <li>We welcome AEMO's inclusion of a new AAS and NAS as per CPSAs recommendation in our previous submission to capture different levels of performance for different plant types.</li> <li>The use of / reference to Vector Shift protection is a pointless exercise given that setting this protection to &gt;20 degrees effectively desensitises it and renders it ineffective for detecting islanding conditions. If anything, the use of Vector shift protection should not be allowed as it difficult to reliably set it. Topology based schemes are the most dependable anti-islanding schemes.</li> </ul>
Definition	<i>Disconnection</i>	This term is used throughout and refers to (as defined in the NER) interrupting the flow of electricity at the connection point. This term should not be italicised in most clauses to provide flexibility to disconnect units/ reactive plant not at the connection point.
S5.2.5.10 Protection to trip plant for unstable operation	Tripping for oscillations that are contributed to by a generator	<ul style="list-style-type: none"> <li>There is a lack of understanding of the various failure modes and the type of instability they create. It is recommended that this be understood and quantified prior to trying to apply a suitable protection system to detect instability. Some of the failure modes or control instabilities include, FRT re-triggering, loss of PPC to unit comms, MPPT / active power control interactions etc.</li> <li>Automatic tripping of this protection function should be avoided until it has been proven. If the oscillations are not large, the issues is most likely a power quality issue and manual intervention in the short term would suffice.</li> </ul>

We appreciate that this a complex topic and hence welcome the opportunity to discuss any of the afore mentioned in further detail with the AEMO.

For any further information, please contact Winodh Jayewardene at [hello@cpsadvisory.com.au](mailto:hello@cpsadvisory.com.au)

Yours sincerely

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