Part of Energy Queensland

24 August 2022

Mr Daniel Westerman
Chief Executive Officer
Australian Energy Market Operator
GPO Box 2008
Melbourne VIC 3001

Email: contact.connections@aemo.com.au

Dear Mr Westerman

NER S5.2.5.10 Guideline Consultation

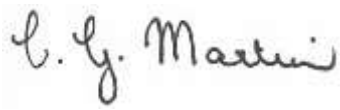
Ergon Energy Corporation Limited (Ergon Energy) and Energex Limited (Energex), operating as distribution network service providers in Queensland, welcome the opportunity to provide comments to the Australian Energy Market Operator (AEMO) on the *NER S5.2.5.10 Guideline Consultation* (consultation).

Ergon Energy and Energex are supportive of consistent guidelines for defining and assessing stable operation of networks. Ergon Energy and Energex consider that the definitions in the National Electricity Rules and the Power System Stability Guidelines could be clearer, particularly for asynchronous generators. Unclear definitions can lead to inconsistent implementation of protection schemes and has led to non-compliance of generators connected to the Ergon Energy and Energex distribution networks.

Ergon Energy and Energex have provided further comments to the consultation questions in the attached.

Should AEMO require additional information or wish to discuss any aspect of this submission, please contact either myself on 0438 021 254 or Laura Males on 0429 954 346.

Yours sincerely



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Encl: *Ergon Energy and Energex responses to consultation questions*

Ergon Energy Network and Energex response: NER S5.2.5.10 Guideline Consultation - Protection to trip for unstable operation

AEMO feedback topic	Response
1. Opportunities and/or challenges that exist for implementing a suitable protection system to meet the S5.2.5.10 access level requirements, for example available technology and areas requiring further development.	It is Ergon Energy's and Energex's understanding that the market for these protection systems is emerging and that there are limited options available to proponents, in part because requirements are not clearly understood. As such, it is important that this Guideline consider a transition plan, as well as the ability for existing generating systems to reasonably achieve the proposed functionality.
2. Clarity of the S5.2.5.10 access standard requirements, including how unstable operation is defined, conditions that are considered unstable and how they are assessed in accordance with the Power System Stability Guidelines.	Ergon Energy and Energex are of the view that the Guideline should consider: 1. A quantitative definition of what would be deemed to be an unstable operation, to a level that could be included in the National Electricity Rules, namely a definition that includes: a. A relevant frequency range for oscillations; b. An upper limit magnitude for oscillations range (or range of upper limits); and, c. A duration (or range of durations) after which protection must operate. 2. Clarification as to how causality (as opposed to contribution or damping) of oscillations should be practically determined for use within a protection system. 3. In the absence of an ability to practically determine causality of oscillations, clarification as to how a generator's protection systems should operate during an oscillation event. For example, once an oscillation is detected: a. If the generator cannot be determined to be causing the oscillation, should it still operate if it is contributing to the oscillation (as noted by AEMO's *S5.2.5.10 Consultation Technical Note*)? b. How does AEMO expect that the generator should respond? Alarm to controller for manual intervention? Automatic runback / curtailment scheme? Differing response based on the magnitude of the oscillation? c. In the event of curtailment, should there be diversification or coordination of

	generator response and how should this be handled. To the requirements of performance, Ergon Energy Network and Energex suggest: 1. The generator should not disconnect from the network if the magnitude of oscillations at the point of connection are halving every five seconds. This is consistent with the existing requirements of the Power System Stability Guideline to prevent premature disconnection. 2. Oscillations with a peak oscillation magnitude exceeding ±10% (20% swing) must isolate if oscillations are sustained for a demonstrable period of time, in the range 10-30 seconds pending further investigation, and are not damping in alignment with Requirement 1. This aligns closely with requirements of AS/NZS 61000.3.7:2001. 3. Oscillations with a peak oscillation magnitude exceeding ±1% (2% swing) voltage magnitude must isolate if oscillations are sustained for more than 20-30 seconds and are not damping in alignment with Requirement 1. This also aligns with AS/NZS 61000.3.7:2001. 4. Oscillations with a frequency of between 0.25Hz to 10Hz should be detectable and actioned by the protection system. This aligns with our experience in relation to steady-state oscillations that have occurred in the Ergon Energy and Energex networks.
3. The approach to develop, agree, implement and commission a suitable protection system with the NSP and AEMO, including consideration of nearby plant and their interaction/contribution (desired or undesired) to unstable operation.	Where possible, the scheme's response should be simulated using PSCAD, with consideration for differences in simulation and practical signals. Where practicable, artificial signals could be injected during commissioning to demonstrate compliance and appropriate triggering of alarms.