

NOTICE OF CHANGE TO SYSTEM STRENGTH REQUIREMENT AND SHORTFALL AT ROSS

National Electricity Rules – Rule 5.20C

Change to minimum fault level requirement and shortfall at Ross 275 kV fault level node in the Queensland region

Date of Notice: 28 June 2021

This notice informs stakeholders that AEMO has:

- Confirmed that the post-contingency minimum fault level requirement at the Ross fault level node in Queensland is 1,175 megavolt amperes (MVA).
- Finalised its assessment of the arrangements established by Powerlink in response to AEMO's April 2020 notice of a fault level shortfall at Ross¹.
- Applied the 2020 projections of available fault levels at Ross for the coming five-year period and considered these against the post-contingency minimum fault level requirement of 1,175 MVA.
- Based on those projections, assessed that the minimum fault level requirement at Ross is being met, with no shortfall.

Context for system strength analysis

System strength is a critical requirement for a stable and secure power system. A minimum level of system strength is required for the power system to remain stable under normal conditions and to return to a steady state condition following a system disturbance.

System strength relates to the ability to maintain and control the voltage waveform and, among other things, can impact the stability and dynamics of control systems used in inverter-based resources².

Under the National Electricity Rules (NER), system strength is represented by the three-phase fault level at designated fault level nodes.

The determination of system strength requirements and shortfalls in a rapidly transforming National Electricity Market is complex. The technologies and techniques required to identify and model interactions in power systems with growing penetrations of inverter-based resources (such as wind and solar generation and battery storage) continue to emerge and evolve.

¹ AEMO, 2020 Notice of Queensland system strength requirements and Ross node fault level shortfall, April 2020, at https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system-security-market-frameworks-review/2020/2020-notice-of-queensland-system-strength-requirements-and-ross-node-fault-level-shortfall.pdf?la=en.

² AEMO, System strength in the NEM explained, March 2020, at <https://aemo.com.au/-/media/files/electricity/nem/system-strength-explained.pdf?la=en>.

Meeting the fault level shortfall

The responsibility to make sufficient system strength services available to address the fault level shortfall rests with the System Strength Service Provider. Powerlink has this role in Queensland. AEMO's April 2020 notice of Queensland system strength requirements and Ross node fault level shortfall³ required that Powerlink have services in place to address the system strength shortfall at Ross fault level node by 31 August 2021.

Powerlink published an Expression of Interest (EOI) in April 2020⁴ for both short-term and long-term solutions to address the shortfall at Ross; submissions closed in May 2020. Powerlink then:

- Entered a short-term contract with CleanCo for system strength services in North Queensland until December 2020; and
- Commenced a long-term solution which included retuning four previously constrained solar farms' inverter settings (Daydream, Hayman, Whitsunday, and Hamilton solar farms) and the update of control settings at Mt Emerald wind farm.

AEMO has since reviewed the system strength requirement taking into account these changes.

Assessment of Ross fault level requirements and shortfall

In AEMO's 2020 System Strength and Inertia Report⁵, released in December 2020, AEMO indicated a draft revised assessment of the minimum fault level requirement (post-contingency) at Ross to 1,175 MVA (from 1,300 MVA in April 2020). This reduction accounted for the expected impact of the long-term solutions selected by Powerlink which have since been completed – the retuning of Daydream, Hayman, Whitsunday, and Hamilton solar farms was successfully completed in April 2021, and the update of Mt Emerald wind farm control settings was implemented at the end of October 2020. AEMO is now able to confirm the 1,175 MVA post-contingency minimum fault level requirement at Ross. AEMO is not amending the requirements for any other fault level nodes in the Queensland region as part of this notice.

Following the implementation of these solutions in North Queensland, AEMO no longer considers there to be a fault level shortfall at Ross. The assessment of this requirement does not remove the need for generators (where applicable) to mitigate their impact on system strength in accordance with the requirements of the NER and their connection agreements. AEMO's assessment assumes that applicable system strength remediation schemes for committed generation will be implemented and maintained, and any adverse system strength impact of new or altered generation and market network service connections will be fully remediated⁶.

AEMO will convert the requirement to operating procedures over coming months in accordance with underlying and variable operating conditions. This may mean that a lower fault level requirement can be applied under certain operating conditions.

³ AEMO, 2020 Notice of Queensland system strength requirements and Ross node fault level shortfall, April 2020, at https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/system-security-market-frameworks-review/2020/2020-notice-of-queensland-system-strength-requirements-and-ross-node-fault-level-shortfall.pdf?la=en.

⁴ Powerlink, Request for System Strength Services, 9 April 2020, at <https://www.powerlink.com.au/system-strength-consultations#:~:text=Powerlink%20commenced%20an%20Expression%20of,closed%20on%2013%20May%202020.&text=In%20June%202020%20AEMO%20approved,the%20end%20of%20December%202020>.

⁵ AEMO, 2020 System Strength and Inertia Report, at <https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/planning-for-operability>.

⁶ Refer to AEMO, System strength impact assessment guidelines, effective 1 July 2018, at <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/system-operations/system-security-market-frameworks-review>.