

Request for system strength services in Queensland to address Fault Level Shortfall at Ross – Final Report

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REQUEST FOR SYSTEM STRENGTH SERVICES IN QUEENSLAND TO ADDRESS FAULT LEVEL SHORTFALL AT ROSS – FINAL REPORT

1. Introduction

On 9 April 2020, AEMO published a report '[Notice of Queensland System Strength Requirements and Ross Fault Level Shortfall](#)' (Notice) to the National Electricity Market (NEM) under Clause 5.20C.2(c) of the National Electricity Rules (NER)¹. The report declared a fault level shortfall at the Ross 275kV node, including other pertinent technical information and advised that system strength services should be in place to meet this shortfall by 31 August 2021. Under the Notice, the system strength shortfall is forecast by AEMO to continue beyond 2024-25.

As the Transmission Network Service Provider for Queensland and Jurisdictional Planning Body, Powerlink is responsible for providing System Strength Service and to address this declared shortfall. In April 2020, Powerlink commenced an Expression of Interest (EOI) process to seek solutions to address the Queensland Fault Level Shortfall at Ross.

In June 2020 AEMO approved the approach for a short-term solution under NER clause 5.20C.4(e), up until the end of December 2020. As a result, Powerlink entered into a short-term agreement with CleanCo Queensland to provide system strength services through utilising its assets in Far North Queensland.

This Final Report summarises the EOI consultation process as well as the activities undertaken by Powerlink in conjunction with renewable generators to resolve the fault level shortfall declared at the Ross 275kV node.

1.1 EOI process

Powerlink, in consultation with AEMO, undertook the following steps to evaluate technically feasible options (both non-network and network) to meet the system strength service requirements in Far North Queensland.

Step 1	EOI published	9 April 2020
Step 2	Additional information published to assist potential non-network proponents	30 April 2020
Step 3	Submissions closed	13 May 2020
Step 4	Discussions with non-network solution providers and AEMO including option analysis and testing	18 May – mid December 2020
Step 5	EOI update published	21 December 2020
Step 6	Due diligence and stress testing of potential technical solutions	October 2020 and April 2021

¹ Refer also to AEMO Electricity Market Notice [75226](#)

2. Description of the requirement for system strength services

System strength is a measure of the ability of a power system to remain stable under normal conditions and to return to a steady state condition following a system disturbance. System strength can be considered low in areas with low levels of local synchronous generation and deteriorates further with high penetration of inverter-based resources.

As noted in AEMO's 9 April 2020 Notice, Table 1 shows the projected fault level requirements and the shortfall at the Ross 275kV fault level node at the commencement of the EOI process.

Table 1 Projected fault level requirements and shortfall at Ross 275kV

Year	Minimum three phase Fault Level (MVA)	Shortfall (MVA)
2020-21	1300	90
2021-22	1300	90
2022-23	1300	90
2023-24	1300	90
2024-25	1300	90

3. Innovative technical solutions were identified as a result of the consultation process, negating the need for a long-term solution

In August 2020, and based on the submissions received, AEMO confirmed that the inverter tuning, as modelled, could reduce the overall system strength requirement at Ross. This confirmation was subject to final exchange of modelling and other details, and noted that a night time solution was also required. Consequently Powerlink entered into an agreement with Daydream, Hamilton, Hayman and Whitsunday Solar Farms in North Queensland to validate the expected positive benefits of inverter tuning during the daytime.

Powerlink also worked with Mt Emerald Wind Farm and AEMO on control setting changes. Modelling indicated that these changes could significantly reduce the overall system strength requirement at Ross.

In December 2020 stakeholders were advised that, while Powerlink was encouraged by the positive modelling results, the testing had been conducted under system normal conditions. However, more robust analysis was being undertaken to account for extreme system conditions and considerations of uncertainty and variability of generation and load profile. This analysis was required to confirm that the system strength shortfall could be positively met in full as a result of implementing these solutions.

AEMO also noted in their [2020 System Strength and Inertia Report](#) published in December 2020² on how early modelling indicated the shortfall is addressed through Powerlink's proposed approach and that studies to validate the benefits of the proposed changes over the longer term were ongoing.

² Refer to page 25

4. Evaluation and conclusion

The necessary due diligence and stress testing of the setting changes under various scenarios was completed in April 2021.

AEMO's latest analysis has found that the system strength requirements at the Ross node have changed since the 2020 Notice was issued. The assessment reflects adjustments to the detailed modelling information as a result of retuning at the Daydream, Hamilton, Hayman and Whitsunday Solar Farms and an update of the control settings at Mt Emerald Wind Farm. On 28 June 2021 AEMO announced the post-contingency minimum fault level requirement at the Ross node is now assessed as 1,175MVA.

Based on AEMO's most recent assessment, the minimum fault level requirement at Ross is being met with no shortfall identified. Powerlink's regional System Strength Service Provider obligations have now been fulfilled in relation to the Notice issued in April 2020 under the NER³.

5. EOI consultation delivers positive outcomes for customers

Through consultation and active collaboration with all parties, the outcome of this EOI has delivered positive outcomes to customers by implementing innovative cost-effective technical solutions which removed the need for long-term investment (network or non-network).

³ NER Clause 5.20C.2.