



Powerlink Queensland

Request for power system security services in central, southern and broader Queensland regions – Final Report_Part 1: Network Support and Control Ancillary Services

December 2022

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Executive Summary

Powerlink is required to make available system strength services and Network Support and Control Ancillary Services (NSCAS)

As specified in the Australian Energy Market Operator's (AEMO) *2021 System Security Reports: System Strength, Inertia and NSCAS* and *May 2022 Update to 2021 System Security Reports*, AEMO declared:

- an immediate system strength shortfall of up to 90MVA at the Gin Gin fault level node to be addressed by March 2023; and
- an immediate Reliability and Security Ancillary Service (RSAS) gap of approximately 120 megavolt-amperes reactive (MVAR) power absorption, increasing to 250MVAR reactive power absorption by 2026 in southern Queensland.

This Final Report_Part 1 focuses on the outcome of the assessment to fill the immediate Reliability and Security Ancillary Service (RSAS) gap of 120 megavolt-amperes reactive (MVAR) power absorption in southern Queensland.

Description of the requirement for NSCAS

The declared RSAS gap occurs at times of minimum system demand. The gap is caused by an imbalance between the reactive power generated by various system components and the capability of online generators and other dynamic reactive power compensation equipment to absorb the excess generated reactive power and consequently maintain system voltages within an acceptable range.

Powerlink is required to satisfy its regional System Strength Service Provider and NSCAS obligations under the National Electricity Rules as set out in clauses 5.20C.3 and 3.11.3.

Powerlink's approach to addressing the identified need for NSCAS

In July 2021, prior to the declaration of the RSAS gap, Powerlink commenced a Regulatory Investment Test for Transmission (RIT-T), Managing voltages in South East Queensland. The proposed preferred option identified in the Project Assessment Draft Report published in October 2022, is the installation of a 120MVAR bus reactor at Belmont Substation in 2023/24. Subsequent to 2023/24, Powerlink will initiate network support agreements with non-network option proponents in the South East Queensland (SEQ) area to meet AEMO's projected shortfalls in reactive power absorption capability.

As the RIT-T can only deliver a network and/or non-network solution from 2023/24, the immediate RSAS gap declared by AEMO remains unaddressed. To meet the requirement to address the declared gap, Powerlink issued an EOI in May 2022 seeking system security services to provide an opportunity for proponents of non-network solutions to provide solutions in the short-term and prior to the implementation of any recommendations from the RIT-T process.

Submissions received

Four submissions were received as part of the EOI:

- Three confidential Battery Energy Storage Systems were proposed at various locations, with operational timings ranging from late 2024 to mid 2026; and
- CleanCo Queensland (CleanCo) proposed two options relating to the use of one their assets located in SEQ.

NSCAS evaluation and conclusion

The timing of the BESS proposals and the potential network solution to install a reactor could not meet the immediate need. As such, the BESS proposals and a new reactor have not been assessed within this report. Considering alignment with RIT-T timeframes, the BESS proponents were invited to

make a submission in response to the Managing Voltages in SEQ PADR which closes on 9 December 2022.

While transitioning to the *preferred option* identified under the RIT-T, the lowest cost solution identified for implementation for the short-term and until circa mid-2024, is reactive support of up to 130MVAR provided from CleanCo's asset. In the rare event that the reactive support from CleanCo's asset is insufficient to address voltage issues, Powerlink will implement line switching to reduce the RSAS gap by an additional 70MVAR.

As a result, the negotiation of a Network Support Agreement with CleanCo to address the immediate gap is being advanced at the time of publication of this report.

Next steps

Powerlink expects to publish the Final Report_Part 2 focusing on the outcome of the assessment to fill the immediate system strength shortfall of up to 90 MVA at the Gin Gin fault level node by March 2023.

1. Introduction

As the Transmission Network Service Provider for Queensland and Jurisdictional Planning Body, Powerlink is responsible for providing Network Support and Control Ancillary Services (NSCAS), inertia and system strength services.

On 17 December 2021, the Australian Energy Market Operator (AEMO) identified in the [2021 System Security Reports: System Strength, Inertia and NSCAS](#) power system security needs in Queensland for the next five years based. This was based on its Progressive Change scenario, prepared for the [Draft 2022 Integrated System Plan](#) (ISP), driven by declining minimum demand and forecast reductions of synchronous generator dispatch.

On 11 May 2022, AEMO provided an [Update to 2021 System Security Reports](#) which identified system strength and inertia needs based on the accelerated Step Change scenario, considered most likely in the draft 2022 ISP (which was available at that time) and prior to the [2022 ISP](#) published on 30 June 2022.

Subsequently, on 19 May 2022, Powerlink commenced an [Expression of Interest](#) (EOI) process to seek solutions to address the NSCAS gap in southern Queensland required immediately, and to address the system strength shortfall declared at the Gin Gin fault level node by March 2023.

This *Final Report_Part 1: NSCAS*

- summarises the EOI consultation process as well as the activities undertaken by Powerlink in conjunction with proponents of non-network solutions to resolve the declared gap;
- provides the outcome of the assessment to fill the immediate Reliability and Security Ancillary Service (RSAS) gap of 120 megavolt-amperes reactive (MVA_r) power absorption in southern Queensland;
- confirms that the longer term requirements for RSAS will be addressed under the Managing voltages in South East Queensland Regulatory Investment Test for Transmission (RIT-T); and
- advises that a Final Report_Part 2: system strength services to address the declared gap at the Gin Gin fault level node will be published in early 2023.

1.1 EOI process undertaken for the NSCAS component

Powerlink, in consultation with AEMO, undertook the following steps to evaluate technically feasible options (both non-network and network) to meet the NSCAS requirements in southern Queensland.

Step 1	EOI published	19 May 2022
Step 2	Submissions closed	24 June 2022
Step 3	Discussions with non-network solution providers and AEMO on proposed solutions and identification of the recommended solution	July – November 2022
Step 4	Final Report_Part 1: NSCAS publication	December 2022

2. Description of the requirement for NSCAS and interactions with the current RIT-T

On 17 December 2021, AEMO declared an immediate Reliability and Security Ancillary Service (RSAS) gap of approximately 120 megavolt-amperes reactive (MVA_r) power absorption, increasing to 250MVA_r reactive power absorption by 2026 in southern Queensland.

The RSAS gap occurs at times of minimum system demand and is caused by an imbalance between the reactive power generated by various system components and the capability of online generators and other dynamic reactive power compensation equipment to absorb the excess generated reactive power and consequently maintain system voltages within an acceptable range.

In July 2021, prior to the declaration of the RSAS gap, Powerlink commenced a Regulatory Investment Test for Transmission (RIT-T), [Managing voltages in South East Queensland](#) (SEQ). The proposed preferred option identified in the Project Assessment Draft Report published in October 2022, is the installation of a 120MVAR bus reactor at Belmont Substation in 2023/24. Subsequent to 2023/24, Powerlink will initiate network support agreements with non-network option proponents in the SEQ area to meet AEMO’s projected shortfalls in reactive power absorption capability.

As the RIT-T can only deliver a network or non-network solution from 2023/24, the immediate RSAS gap declared by AEMO remains unaddressed. To meet the requirement to address the declared gap Powerlink issued an EOI in May 2022 seeking additional system security services to provide an opportunity for parties capable of addressing this gap to provide solutions in the short-term prior to the implementation of any recommendations from the RIT-T process.

Powerlink has agreed with AEMO that a linear assumption between the published immediate and future gap should be applied to determine requirements for the time until a solution may be delivered through the RIT-T process. The expected shortfall for each year is shown in Table 1.

Table 1 Short-term NSCAS requirements as at December 2021

Financial Year	Reactive Power absorption gap
2021/22	120 MVAR
2022/23	152.5 MVAR
2023/24	185 MVAR
2024/25	217.5 MVAR
2026/27	250 MVAR

3. Option pre-requisite criteria

In order to be assessed, the potential non-network options submitted or identified through the EOI process were required to:

- address the requirements set out in AEMO’s 2021 System Security Reports and 2022 Update in part or in full;
- be commercially and technically feasible; and
- be implementable in sufficient time to enable Powerlink to meet its regional NSCAS obligations in accordance with the NER.

4. Submissions received

Four confidential submissions were received in relation to NSCAS. Broadly, these submissions fell into two categories.

4.1 Battery Energy Storage Systems (BESS)

The timing of these offers was not aligned to the immediate need. However, based on the indicative proposed commissioning dates and assuming the projects’ developmental status continues as

foreshadowed in the EOI submissions, the future BESS projects fall within the RIT-T timing. As such, these proponents have been encouraged to make submissions to the Managing voltages in SEQ PADR which closes on 9 December 2022.

4.2 Operation of existing synchronous generation

While the details of the submission are confidential, the offer from CleanCo is aligned to the immediate need and meets the option pre-requisites noted in Section 3. A redacted version of CleanCo's submission is available on Powerlink's website.

5. NSCAS evaluation and conclusion

Taking into consideration the submissions received, the necessary due diligence to identify the optimal solution to meet the immediate NSCAS requirement has been assessed by both Powerlink and AEMO.

Powerlink recommends implementation of a combination of measures to address the immediate NSCAS gap including:

- a Network Support Agreement with CleanCo to operate during times of reactive power shortfall; and
- in the rare event that the reactive support from CleanCo's asset is insufficient to address voltage issues, Powerlink will implement line switching to reduce the RSAS gap by an additional 70MVar. If this is insufficient to fully address the RSAS gap the AEMO control room may take additional actions as required to ensure the system remains within acceptable operational limits.

As a result, Powerlink has progressed commercial negotiations with CleanCo to provide the necessary NSCAS through utilising its assets in southern Queensland. The development of a Network Support Agreement is being advanced at the time of publication of this report.

Powerlink and AEMO are continuing to negotiate operating arrangements subject to the operating protocol in the Network Support Agreement.

Subject to successfully negotiating and entering into a Network Support Agreement with CleanCo, Powerlink's responsibility has now been fulfilled in relation to the immediate NSCAS requirement issued by AEMO in December 2021 under the NER.