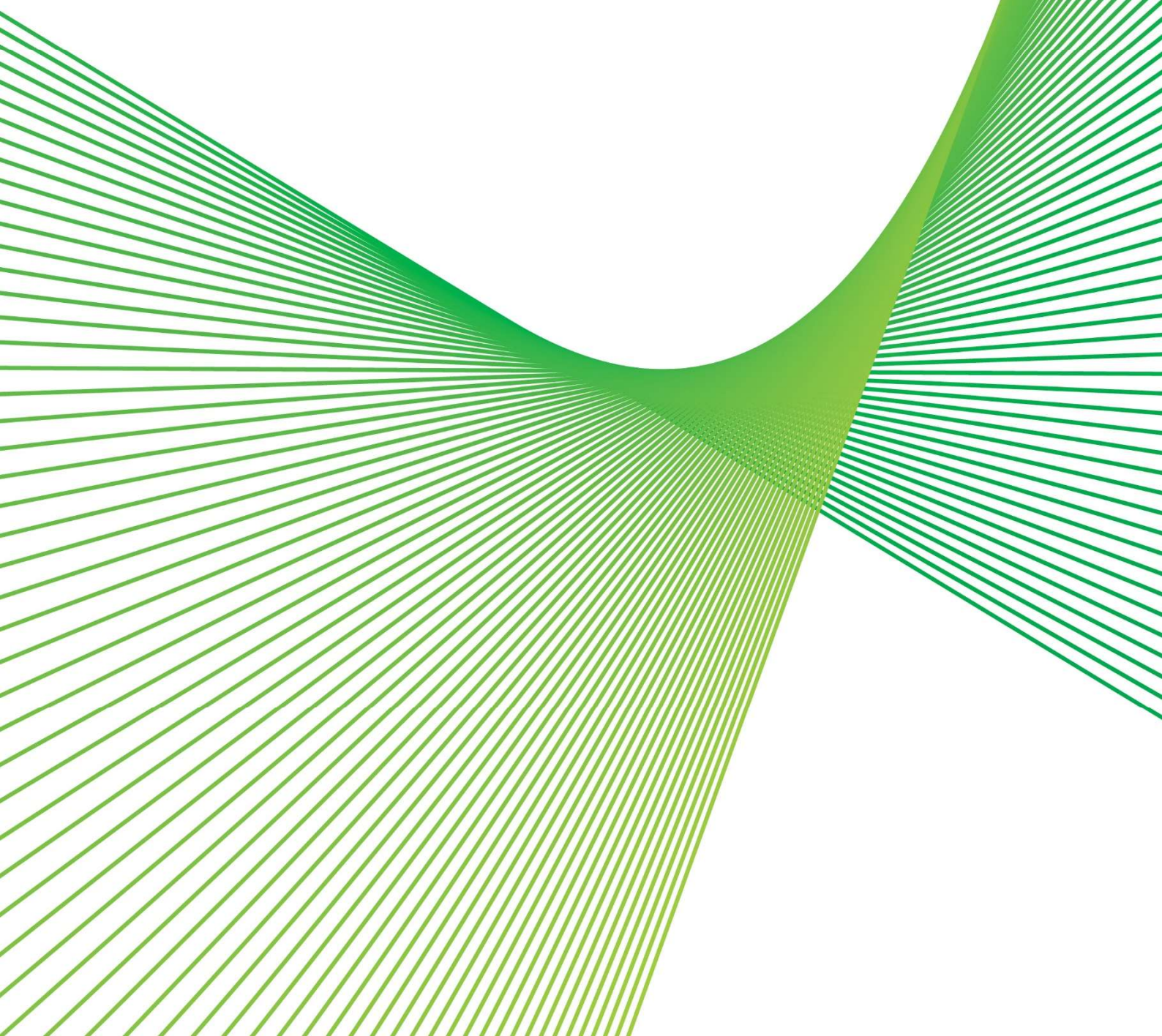


Summary: Maintaining Safe and Reliable Operation of Murray substation

RIT-T Project Specification Consultation Report

Region: Southern NSW

Date of issue: 19 December 2023



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Summary

We are applying the Regulatory Investment Test for Transmission (RIT-T) to options for maintaining the safe and reliable operation of Murray Substation. Publication of this Project Specification Consultation Report (PSCR) represents the first step in the RIT-T process.

Murray 330 kV Substation is an ex-Snowy Mountains Hydro-electric Authority site which was commissioned in 1964. Murray Substation connects approximately 1500 MW of renewable hydro-electric energy generation, supports four 330kV transmission lines in the southern New South Wales network, and provides electricity flow paths between the Snowy Mountains and Victoria. The 132kV network connects Guthega Hydro (60MW), Jindabyne Pumping Station, Mungyang and Cooma Substation.

The substation is expected to continue to play a central role in the safe and reliable operation of the power system throughout and after the transition to a low-carbon electricity future. As a major generation and state interconnector connection point, Murray Substation supports transmission through the entire NEM.

The condition of certain 330 kV and 132 kV high voltage and secondary system assets at Murray substation has deteriorated over time, leading to an increasing risk of failure which could result in reliability, safety, environment and financial consequences. The secondary systems assets are also impacted by obsolescence of the equipment, increasing the time to rectify defects and increasing the risk that primary assets at the substation may not be able to reliably operate.

The purpose of this PSCR is to examine and consult on options to address the deterioration of the high voltage and secondary systems asset condition and the risk from technology obsolescence of the secondary systems at Murray substation.

Identified need: ensure the safe and reliable operation of Murray substation

The identified need for this project is to maintain the safe and reliable operation of Murray substation and the broader transmission network in NSW by addressing the risk of failure of certain high voltage and secondary systems at the substation.

Condition assessments performed through our routine maintenance program has shown degradation in the condition of these high voltage and secondary systems assets which will increase their risk of failure. Without intervention, other than ongoing business-as-usual maintenance, the assets are expected to deteriorate further and more rapidly. This will increase the risk of supply interruptions to our customers as well as safety, environmental and financial consequences.

The secondary system assets are also subject to obsolescence of the equipment. This means that the technology is no longer being manufactured or supported and reactive replacement of failed secondary systems component is not sustainable and impacts our ability to meet the requirements of the National Electricity Rules (NER).

We have classified this RIT-T as a 'market benefits' driven RIT-T as the economic assessment is not being progressed specifically to meet a mandated reliability standard but by the net benefits that are expected to be generated for end-customers. However, the options considered in this PSCR will also ensure compliance with a range of obligations under the NER and jurisdictional instruments (which is not expected to be the case under the base case), including obligations set out in Schedule 5.1 of the NER to provide redundant secondary systems and ensure that the transmission system is adequately protected.

One credible network option has been identified

We have identified one credible network option that meets the identified need from a technical, commercial, and project delivery perspective.¹ This option is summarised in the below.

Table E-1: Summary of the credible options

Option	Description	Capital costs (\$M, 2022-23)	Operating costs (\$M/yr, 2022-23)
Option 1	Targeted replacement of high voltage and secondary system assets	20.88	0.009

Table E-2 below presents a list of the specific assets with deteriorating condition to be replaced under Option 1.

Table E-2: List of assets to be replaced under Option 1

Item	Asset
Transformers	No1 Transformer No2 Transformer No1 Auxiliary Transformer No2 Auxiliary Transformer No3 Auxiliary Transformer
Protection relays	No1 & No2 Transformer No1 Protection Relay No1 & No2 Transformer No2 Protection Relay 330kV No1 Section A Bus No1 Protection Relay 330kV No2 Section A Bus No1 Protection Relay 330kV No1 Section B Bus No1 Protection Relay 330kV No2 Section B Bus No1 Protection Relay 97G/1 Geehi Tee No1 Protection Relay 97G/1 Geehi Tee No2 Protection Relay
Switchboard	415V AC Switchboard and Distribution System 11kV Switchboard including Protection and Metering 11kV Switchgear Building with auxiliary services

Non-network options are not expected to be able to assist with this RIT-T

We do not consider non-network options to be commercially and technically feasible to assist with meeting the identified need for this RIT-T. Non-network options will not mitigate the safety and environmental risk and are not able to meet NER obligations to provide redundant secondary systems and ensure that the transmission system is adequately protected.

Option 1 delivers the highest net economic benefit and will meet NER requirements

We have assessed that Option 1 is net beneficial under all three reasonable scenarios considered in this PSCR. On a weighted basis, where each scenario is weighted equally, Option 1 is expected to deliver net

¹ As per clause 5.15.2(a) of the NER.

benefits of approximately \$1,222.02 million². Option 1 will also enable us to meet a range of obligations under the NER and jurisdictional instruments (which is not expected to be the case under the base case), including obligations set out in Schedule 5.1 of the NER to provide redundant secondary systems and ensure that the transmission system is adequately protected.

Draft Conclusion

This PSCR finds that Option 1 is the preferred option to address the identified need. Option 1 involves targeted replacement of high voltage and secondary system assets at Murray substation that have deteriorating condition and have reached (or will soon reach) the end of their technical lives and for which only limited manufacturer support and spares are available.

The capital cost of this option is approximately \$20.88 million (in \$2022-23). The work will be undertaken over a five-year period with all works expected to be completed by 2027/28. Routine operating and maintenance costs are estimated at approximately \$0.01 million per annum (in \$2022-23).

Exemption from preparing a Project Assessment Draft Report

Subject to the identification of additional credible options during the consultation period, publication of a Project Assessment Draft Report (PADR) is not required for this RIT-T as we consider that the conditions in clause 5.16.4(z1) of the NER exempting RIT-T proponents from providing a PADR have been met.

Specifically, production of a PADR is not required because:

- the estimated capital cost of the preferred option is less than \$46 million;³
- we have identified in this PSCR our preferred option and the reasons for that option, and noted that we will be exempt from publishing the PADR for our preferred option; and
- we consider that the preferred option and any other credible options do not have a material market benefit (other than benefits associated with changes in voluntary load curtailment and involuntary load shedding).

If an additional credible option that could deliver a material market benefit is identified during the consultation period, then we will produce a PADR that includes an assessment of the net economic benefit of each additional credible option.

If no additional credible options with material market benefits are identified during the consultation period, then the next step in this RIT-T will be the publication of a Project Assessment Conclusions Report (PACR) that addresses all submissions received, including any issues in relation to the proposed preferred option raised during the consultation period.⁴

² Approximately 99% of the overall net benefit is made up of reliability risk. This is due to both high voltage transformers at the Murray substation having effective ages beyond their technical life. As the assets continue to age the probability of one or both of the transformers failing increases. This increased probability of failure combined with a long load restoration time and large industrial loads, means that there is likely to be significant amounts of unserved energy over the assessment period without replacement of the assets.

³ Varied from \$43m to \$46m based on the [AER Final Determination: Cost threshold review](#), November 2021.

⁴ In accordance with NER clause 5.16.4(z2).

Submissions and next steps

We welcome written submissions on materials contained in this PSCR.

Submissions are due on 18 March 2024⁵ and should be emailed to our Regulation team via regulatory.consultation@transgrid.com.au.⁶ In the subject field, please reference 'Murray substation renewal PSCR.' At the conclusion of the consultation process, all submissions received will be published on our website. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement.

Should we consider that no additional credible options were identified during the consultation period, we intend to produce a PACR that addresses all submissions received including any issues in relation to the proposed preferred option raised during the consultation period. Subject to additional credible options being identified, we anticipate publication of a PACR in early 2024.

⁵ Additional days have been added to cover public holidays

⁶ Transgrid is bound by the Privacy Act 1988 (Cth). In making submissions in response to this consultation process, Transgrid will collect and hold your personal information such as your name, email address, employer and phone number for the purpose of receiving and following up on your submissions. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement. See Privacy Notice within the Disclaimer for more details.