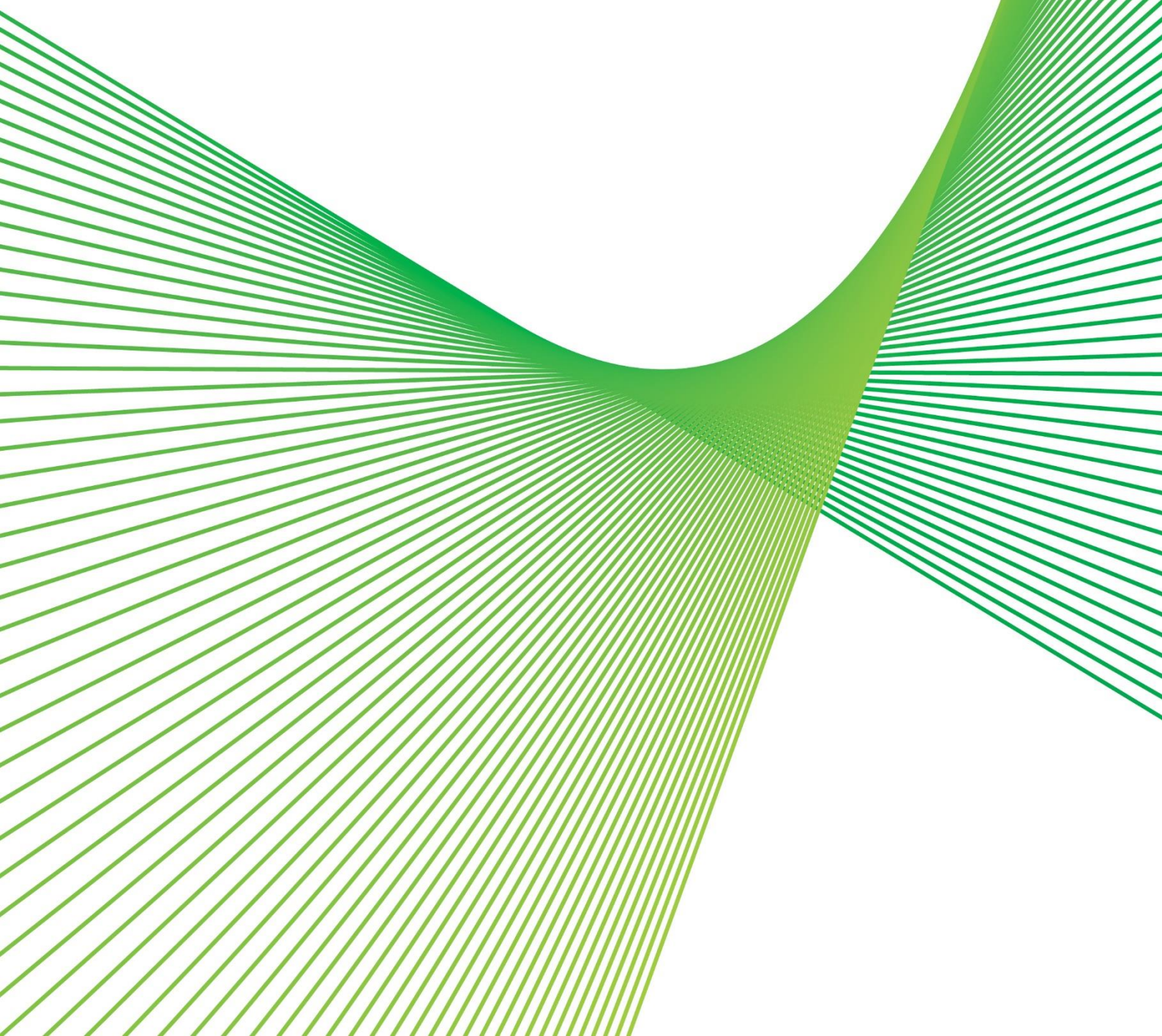


Summary: Maintaining compliance with performance standards applicable to Lower Tumut substation secondary systems

RIT-T Project Assessment Conclusions Report

Issue date: 17 May 2024



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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 Lower Tumut Substation. Publication of this Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process.

Built as part of the Snowy Mountains Scheme, Lower Tumut substation was commissioned in 1972 and forms part of our network that serves Southern New South Wales and the Australian Capital Territory. Lower Tumut substation is connected to Yass, Canberra, Wagga, Murray and Upper Tumut substations, via Transgrid's 330 kV network.

Secondary systems assets at Lower Tumut substation are facing technological obsolescence, increasing the time to rectify defects and increasing the risk that primary assets at the substation may not be able to reliably operate.

Identified need: meet the service level required under National Electricity Rules for protection schemes

Secondary systems are used to control, monitor, protect and provide secure communication to facilitate safe and reliable network operation.¹ They are necessary to ensure the secure operation of the transmission network and prevent damage to primary assets when adverse events occur.

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

Redundant protection schemes are required to ensure the transmission system is adequately protected as outlined in the Network Performance Requirement under Schedule 5.1 of the National Electricity Rules (NER), therefore the condition issues affecting the identified protection relays on the ACT and NSW transmission network must be addressed. The Network Performance Requirements, set out in Schedule 5.1 of the NER, place an obligation on Transmission Network Service Providers (TNSPs) to provide redundant protection schemes to ensure the transmission system is adequately protected. Clause 5.1.9(c) of the NER requires a TNSP to provide sufficient primary and back-up protection systems (including breaker fail protection systems), to ensure that a fault of any type anywhere on its transmission system is automatically disconnected.

Additionally, TNSPs are required to disconnect the unprotected primary systems where secondary systems fault lasts for more than eight hours (for planned maintenance) or 24 hours (for unplanned outages). TNSPs must also ensure that all protection systems for lines at a voltage above 66 kV are well-maintained so as to be available at all times other than for short periods (less than eight hours), while the maintenance of protection systems is being carried out.² In the event of an unplanned outage, AEMO's Power System Security Guidelines require that the primary network assets must be taken out of service within 24 hours³.

¹ As per Schedule 5.1 of the NER.

² As per S5.1.2.1(d) of the NER.

³ AEMO. "Power System Security Guidelines, 20 March 2024." Melbourne: AEMO, 2024. Accessed 15 April 2024.

Furthermore, as per clause 4.11.1 of the NER, remote monitoring and control systems are required to be maintained in accordance with the standards and protocols determined and advised by AEMO.

A failure of the secondary systems would involve replacement of the failed component or removing the affected primary assets, such as lines and transformers, out of service. Though replacement of failed secondary systems component is a possible interim measure, the approach is not sustainable as the stock of spare components will deplete due to the technology no longer being manufactured or supported. Once all spares are used, replacement will cease to be a viable option to meet performance standards stipulated in clause 4.6.1 of the NER.

If the failure to provide functional secondary systems due to technology obsolescence is not addressed by a technically and commercially feasible credible option in sufficient time (by 2027/28), the likelihood of not recovering from secondary systems faults and not maintaining compliance with NER performance requirements will increase.

The proposed investment will enable us to continue to meet the standards for secondary systems availability set out in the NER, and to avoid the impacts of taking primary assets out of service. Consequently, it is considered a reliability corrective action under the RIT-T.

A reliability corrective action differs from a 'market benefits'-driven RIT-T in that the preferred option is permitted to have negative net economic benefits on account of it being required to meet an externally imposed obligation on the network business.

No submissions received in response to the Project Specification Consultation Report

We published a Project Specification Consultation Report (PSCR) on 1 February 2024 and invited written submissions on the material presented within the document. No submissions were received in response to the PSCR.

No material developments since publication of the PSCR

No additional credible options were identified during the consultation period following publication of the PSCR.

Since publication of the PSCR the cost estimates from Labour, Materials and Expenses across all options have been adjusted to reflect the latest project plan to implement the preferred option. This adjustment did not impact upon the overall capital cost figures.

Option 2 remains the preferred option at this stage of the RIT-T process.

Credible options considered

We consider there are two credible options that would meet the identified need from a technical, commercial, and project delivery perspective.⁴ These are summarised in Table E-1.

Table E-1: Summary of the credible options

⁴ As per clause 5.15.2(a) of the NER.'

Option	Description	Capital costs (\$M, 2023-24)	Operating costs (\$/yr, 2023-24)
Option 1	Strategic asset replacement	15.27	21,078
Option 2	Complete replacement with Secondary Systems Buildings (SSBs)	27.18	10,770

Assets with deteriorating condition to be replaced include protection relays, control systems and metering systems. See Appendix B for a full list of assets to be replaced under Option 1.

No submissions received in relation to non-network options

In the PSCR we noted that 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 are not able to meet NER obligations to provide redundant protection schemes (secondary systems) and ensure that the transmission system is adequately protected. No submissions were received in response to the PSCR in relation to non-network options.

Conclusion: complete replacement with Secondary Systems Buildings (SSBs) optimal

This PACR finds that implementation of Option 2 is the preferred option to address the identified need. Option 2 involves the complete upgrade and renewal of the secondary systems by using modular Secondary Systems Buildings (SSBs) and installing new cable throughout the site. This option assumes that the new secondary systems will be designed to be accommodated within a similar panel arrangement as the existing installation. Redundant panels and tunnel boards in the ASB relay room will need to be progressively decommissioned and removed as the new secondary systems are cut-over and commissioned.

The condition of various categories of automation assets such as protection relays, control systems, AC distribution, DC supply systems, and market meters creates a need for modernisation. This will deliver benefits such as reduced preventative maintenance requirements, improved operational efficiencies, better utilisation of our high-speed communications network, improved visibility of assets using modern technologies and reduced reliance on routine maintenance and testing. There are also additional operational benefits available to improved remote monitoring, control and interrogation, efficiency gains in responding to faults, and phasing out of obsolete and legacy systems and protocols.

The capital cost of this option is approximately \$27.18 million (in \$2023-24). The work will be undertaken in stages over a five-year period with all works expected to be completed by 2027/28. Routine operating and maintenance costs are estimated to be approximately \$10,770 per annum (in \$2023-24).

Next steps

This PACR represents the final step of the consultation process in relation to the application of the Regulatory Investment Test for Transmission (RIT-T) process undertaken by Transgrid.

The second step of the RIT-T process, production of a Project Assessment Draft Report (PADR), was not required as Transgrid considers its investment in relation to the preferred option to be exempt from that part of the RIT-T process under NER clause 5.16.4(z1). Production of a PADR is not required due to:

- the estimated capital cost of the preferred option being less than \$46 million;

- the PSCR stating:
 - the proposed preferred option, together with the reasons for the proposed preferred option;
 - the RIT-T is exempt from producing a PADR; and
 - the proposed preferred option and any other credible options will not have a material market benefit for the classes of market benefit specified in clause 5.15A.2(b)(4), with the exception of market benefits arising from changes in voluntary and involuntary load shedding;
- no PSCR submissions identifying additional credible options that could deliver a material market benefit; and
- the PACR addressing any issues raised in relation to the proposed preferred option during the PSCR consultation (noting that no issues have been raised).

Parties wishing to raise a dispute notice with the AER may do so prior to 16 June 2024 (30 days after publication of this PACR). Any dispute notices raised during this period will be addressed by the AER within 40 to 120 days, after which the formal RIT-T process will conclude. Further details on the RIT-T can be obtained from Transgrid's Regulation team via regulatory.consultation@transgrid.com.au.⁵ In the subject field, please reference 'Lower Tumut Secondary Systems PACR'.