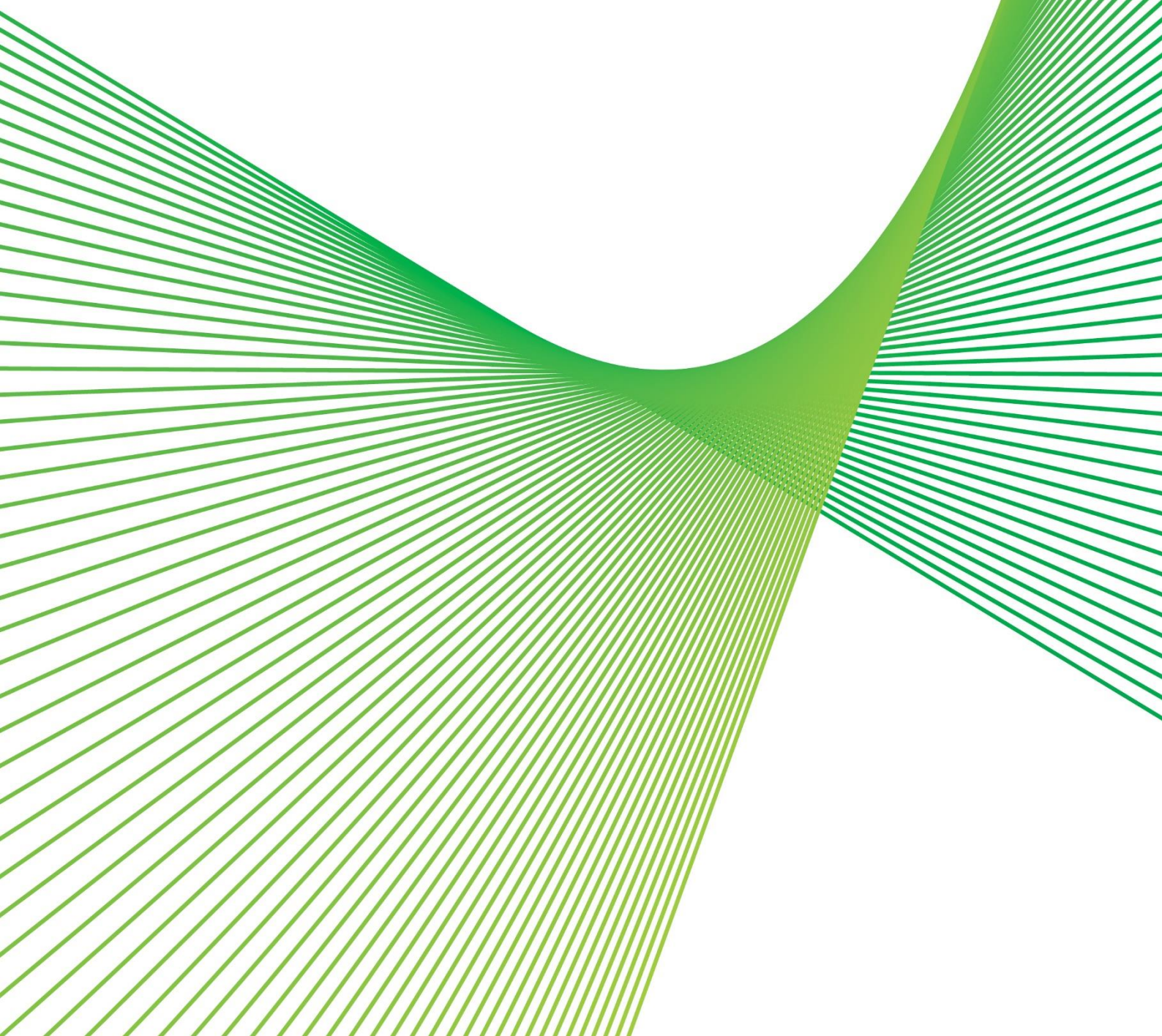


Summary: Maintaining safe and reliable operation of Inverell substation

RIT-T Project Assessment Conclusions Report

Region: Northern NSW

Date of issue: 2 July 2025



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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 Inverell substation. Publication of this Project Assessment Conclusions Report (PACR) is the final step in the RIT-T process.

Inverell 132/66 kV substation is located on Transgrid's Northern NSW network. It connects to Transgrid's 132 kV Moree, White Rock and Armidale substations. It also connects to Essential Energy's 66 kV distribution network which supplies industrial and residential loads in the Inverell region.

There are two 132/66 kV transformers at Inverell substation which were both commissioned in 1983, and both transformers are considered under this need. The health index considers natural age, dissolved gas analysis (DGA), oil quality (OQ), Bushing Dielectric Dissipation Factor (DDF), defects, load and corrosive oil.

Deterioration of the Inverell No.1 and No.2 transformers at Inverell substation increases the likelihood of prolonged and involuntary load shedding in the Northern NSW region and increases the risk of safety and environmental hazards associated with a catastrophic failure.

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

The identified need for this project is to maintain the safe and reliable operation of Inverell substation and the broader transmission network in NSW by addressing the risk of failure of Inverell substation's No.1 and No.2 power transformers.

The No.1 and No.2 transformers are approaching the end of their serviceable life and showing signs of deterioration due to the following key factors:

Natural Age: The transformers were manufactured and commissioned in 1983. The transformers will be 42 years in 2024/25 and will be approaching their 45-year expected useful life by the end of 2023-2028 regulatory period.

Aged Oil Impregnated Paper (OIP) Bushings: The 132 kV and 66 kV OIP bushings were originally installed in 1983 and are over the 30-year useful life of high voltage bushings.

Internal Arcing: Dissolved Gas Analysis (DGA) shows high levels of acetylene in the main tank of the transformers. This typically indicates arcing in the paper or oil at high temperatures.

Oil leaks: There are leaks from the bushings, valves, pipework flanges, and main tank lid gasket, allowing moisture ingress and oxygen into the main insulation.

These condition issues have been evaluated through the transformer health index methodology to give an effective age for the No.1 transformer of 51 years (2024/25) and 55 years for the No.2 transformer (2024/25), which is significantly above their chronological ages. These condition issues, if not remediated, increase the probability of transformer failure.

Replacement of the Inverell transformers will significantly reduce the likelihood of prolonged and involuntary load shedding in the northern region and help Transgrid manage its safety obligations.

The key economic benefits associated with addressing this need are summarised as:

Reduction of risk as valued as direct impact to Transgrid and consumers including:

- Changes in involuntary load shedding
- Safety and environmental hazards associated with a catastrophic failure.

Avoided operating expenditure related to an escalation of corrective maintenance.

The proposed investment to address the asset condition has significant 'market benefits' as the proposed investment will help to avoid involuntary load shedding. Options considered under this RIT-T have been assessed relative to a base case. Under the base case, no proactive capital investment is made and the condition of No.1 and No.2 Inverell transformers will continue to deteriorate. The investment will also assist Transgrid to manage and mitigate safety risks that would otherwise arise from a failure in transformers.¹

No submissions received in response to the Project Specification Consultation Report

We published a Project Specification Consultation Report (PSCR) on 20 March 2025 and invited written submissions on the material presented within the document. No submissions were received in response to the PSCR.

Developments since publication of the PSCR

No additional credible options were identified during the consultation period following publication of the PSCR. In addition, no material changes have occurred since the PSCR that have made an impact on the preferred option.

At the time the PSCR was published, Option 1 listed the installation of one new auxiliary transformer. This has since been updated to two new auxiliary transformers to accurately reflect the current scope.

At this stage of the RIT-T we expect the capital expenditure to remain within +/- 25% of the estimate presented in the PSCR (approximately \$15.50 million in real \$2024-25). No additional credible options have been identified and as there is currently only one credible option, therefore any cost variance due to the addition of two structures will not result in a material change in circumstances.

Option 1 remains the preferred option at this stage of the RIT-T.

Two credible network options have been identified

We have identified two credible network options that meet the identified need from a technical, commercial, and project delivery perspective.² These options are summarised in the table below.

¹ Transgrid manages and mitigates safety risk to ensure they are below risk tolerance levels or 'As Low As Reasonably Practicable' ('ALARP'), in accordance with Transgrid's obligations under the New South Wales Electricity Supply (Safety and Network Management) Regulation 2014 and Transgrid's Electricity Network Safety Management System (ENSMS). In particular, risks for Transgrid and its consumers are mitigated unless it is possible to demonstrate that the cost involved in further reducing the risk would be grossly disproportionate to the benefit gained.

² As per clause 5.15.2(a) of the NER.

Table E-1 Summary of the credible options

| Option | Description | Capital costs (\$M, 2024/25) |
|----------|--|------------------------------|
| Option 1 | Replacement of the No.1 and No.2 Inverell transformers | 15.50 |
| Option 2 | Refurbishment of the No.1 and No.2 Inverell transformers | 2.48 |

The preferred option is Option 1, as it has the highest positive weighted NPV result of the technically and commercially feasible options which have been considered.

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 expected lost load, safety risks and environmental risks from failure of the No.1 and No.2 transformers.

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. This is because any non-network solution for this need is expected to only add to the costs of this option without providing any net benefits. We invited parties to make written submissions regarding the potential of non-network options to satisfy, or contribute to satisfying, the identified need for this RIT-T. No submissions were received in response to the PSCR in relation to non-network options.

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

We have assessed that Option 1 is the best performing option under all three reasonable scenarios considered in this PACR. On a weighted basis, where each scenario is weighted equally, Option 1 is expected to deliver net benefits of approximately \$11.21 million. We note that the net benefit is lower than what we published in the PSCR (though still positive). This is because we have updated our value of customer reliability (VCR) to reflect the new estimates published by the AER as part of its 2024 VCR review.³ On a statewide basis, the VCR values are lower than what we had used in the PSCR.

Conclusion

This PACR finds that Option 1 is the preferred option to address the identified need. Option 1 involves replacement of the No.1 and No.2 transformers at Inverell substation.

The capital cost of this option is approximately \$15.50 million (in \$2024/25). Planning, design, development and procurement (including completion of the RIT-T) will occur between 2025/26, while project delivery and construction will occur in 2026/27 and 2029/30. All works are expected to be completed by 2029/30. The

³ See: <https://www.aer.gov.au/industry/registers/resources/reviews/values-customer-reliability-2024>.

expected project timeframe is 60 months with an expected asset life of 45 years. Routine operating and maintenance savings are estimated at approximately \$1,141 per annum (in \$2024/25).

Next steps

This PACR represents the final step of the consultation process in relation to the application of the RIT-T process undertaken by Transgrid. It follows a PSCR released on 20 March 2025. No submissions were received in response to the PSCR.

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

- the estimated capital cost of the proposed preferred option being less than \$54 million;
- the PSCR states:
 - 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 option 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;
- the RIT-T proponent considers that there were no PSCR submissions identifying additional credible options that could deliver a material market benefit; and
- the PACR must address any issues raised in relation to the proposed preferred option during the PSCR consultation.

Parties wishing to raise a dispute notice with the AER may do so prior to 7 August 2025 (30 days after publication of this PACR). Any dispute notices raised during this period will be addressed by the AER within 40 to 100 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. In the subject field, please reference 'Inverell substation renewal PACR'.