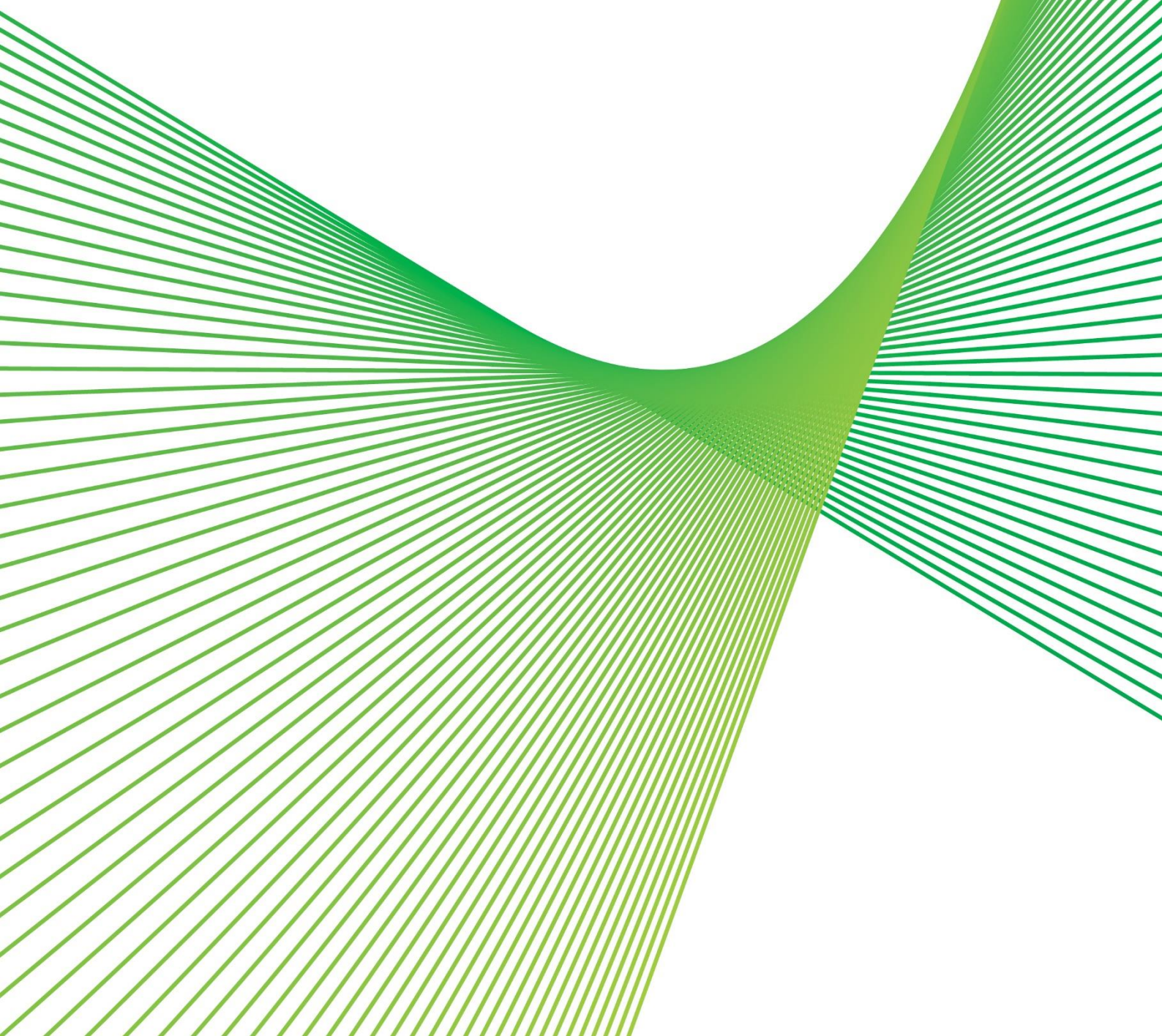


Summary: Maintaining voltage levels in Northern NSW

RIT-T Project Assessment Conclusions Report

Issue date: 1 February 2024



Disclaimer

This suite of documents comprises Transgrid's application of the Regulatory Investment Test for Transmission (RIT-T) which has been prepared and made available solely for information purposes. It is made available on the understanding that Transgrid and/or its employees, agents and consultants are not engaged in rendering professional advice. Nothing in these documents is a recommendation in respect of any possible investment.

The information in these documents reflect the forecasts, proposals and opinions adopted by Transgrid at the time of publication, other than where otherwise specifically stated. Those forecasts, proposals and opinions may change at any time without warning. Anyone considering information provided in these documents, at any date, should independently seek the latest forecasts, proposals and opinions.

These documents include information obtained from the Australian Energy Market Operator (AEMO) and other sources. That information has been adopted in good faith without further enquiry or verification. The information in these documents should be read in the context of the Electricity Statement of Opportunities, the Integrated System Plan published by AEMO and other relevant regulatory consultation documents. It does not purport to contain all of the information that AEMO, a prospective investor, Registered Participant or potential participant in the National Electricity Market (NEM), or any other person may require for making decisions. In preparing these documents it is not possible, nor is it intended, for Transgrid to have regard to the investment objectives, financial situation and particular needs of each person or organisation which reads or uses this document. In all cases, anyone proposing to rely on or use the information in this document should:

1. Independently verify and check the currency, accuracy, completeness, reliability and suitability of that information
2. Independently verify and check the currency, accuracy, completeness, reliability and suitability of reports relied on by Transgrid in preparing these documents
3. Obtain independent and specific advice from appropriate experts or other sources.

Accordingly, Transgrid makes no representations or warranty as to the currency, accuracy, reliability, completeness or suitability for particular purposes of the information in this suite of documents.

Persons reading or utilising this suite of RIT-T-related documents acknowledge and accept that Transgrid and/or its employees, agents and consultants have no liability for any direct, indirect, special, incidental or consequential damage (including liability to any person by reason of negligence or negligent misstatement) for any damage resulting from, arising out of or in connection with, reliance upon statements, opinions, information or matter (expressed or implied) arising out of, contained in or derived from, or for any omissions from the information in this document, except insofar as liability under any New South Wales and Commonwealth statute cannot be excluded.

Privacy notice

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.

Under the National Electricity Law, there are circumstances where Transgrid may be compelled to provide information to the Australian Energy Regulator (AER). Transgrid will advise you should this occur.

Transgrid's Privacy Policy sets out the approach to managing your personal information. In particular, it explains how you may seek to access or correct the personal information held about you, how to make a complaint about a breach of our obligations under the Privacy Act, and how Transgrid will deal with complaints. You can access the Privacy Policy here (<https://www.transgrid.com.au/Pages/Privacy.aspx>).

Summary

We are applying the Regulatory Investment Test for Transmission (RIT-T) to options for maintaining voltage levels in the Moree and Inverell area in Northern New South Wales (NSW). Publication of this Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process.

Transgrid and the Australian Energy Market Operator (AEMO) forecasts that minimum demand in NSW will rapidly decline over the next 10 years due to ongoing growth in distributed solar (PV) generation.¹ In Northern NSW, growth in small to large scale embedded generation connecting to the Essential Energy network is forecast to continue, driving declining minimum demand in this region.

The Northern NSW region is supplied by a series of 132 kV transmission lines which form a link between Glen Innes, Armidale and Tamworth. Our power system studies show that the declining minimum demand in these areas mean that the electricity transmission system in these areas is at risk of exceeding allowable voltage levels during times of low demand and in particular when nearby generators are unable to provide reactive power support.

We are required to manage the risk of system voltages exceeding their allowable limits as set out in the National Electricity Rules (NER)² and the NSW Electricity Reliability and Performance Standards 2017. This RIT-T therefore examines various network and non-network options to address the excess voltage levels to ensure compliance with the requirements of the NER and provide the greatest net benefit to the market.

Identified need: maintaining voltage levels in Northern NSW in compliance with NER requirements

The identified need for this RIT-T is to maintain voltage levels in Northern NSW by managing the risk of excess voltage levels due to declining minimum demand. There is an increasing likelihood of non-compliance with the NER and NSW reliability standards without investment to address the need.

We are required to maintain compliance with Schedule 5.1.4 of the NER and the NSW Electricity Reliability and Performance Standards 2017. Consequently, we consider this 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 26 July 2023 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. The discount rate and Value of Customer Reliability (VCR) used has been updated to align with the Australian Energy Market Operator's (AEMO's) 2023 Inputs, Assumptions and Scenarios Report. No

¹ AEMO, [2023 Electricity Statement of Opportunities](#), August 2023.

² [Schedule 5.1.4 of the NER](#) requires us to plan and design equipment for voltage control to maintain voltage levels within 10 per cent of normal voltage. We expect non-compliance with this requirement will occur without remedial action.

material developments have occurred since publication of the PSCR and Option 2 remains the preferred option at this stage of the RIT-T process.

We note that, since the PSCR was released, there has been a law change to introduce an emissions reduction objective into the national energy objectives³ and that the National Electricity Rules are currently being updated to add a new category of market benefit to the RIT-T reflecting changes in Australia’s greenhouse gas emissions.⁴ While we acknowledge this important change to the RIT-T, we note that there is not expected to be a difference in greenhouse gas emission levels between the two options assessed in this PACR since the options are not expected to affect the dispatch of generation in the wholesale market. This new category of market benefit is therefore not expected to be material for this RIT-T and so has not been estimated.

Credible options considered

We consider there are two credible options that would meet the identified need from a technical, commercial, and project delivery perspective.⁵ These are summarised in Table E-1.

Table E-1 Summary of credible options, \$2021/22

Option	Description	Capital costs, \$m	Operating costs (per year), \$	Remarks
Option 1	Install a 66 kV 10 MVAR reactor at Moree and a 66 kV 15 MVAR reactor at Inverell	7.64	76,400	Provides the same benefits as Option 2, but at a higher cost
Option 2	Install a 132 kV 25 MVAR reactor at Inverell	5.41	54,100	Most economical and preferred option

No submissions received in relation to non-network options

In the PSCR we noted that we considered non-network options may be able to assist with meeting the identified need, specifically non-network technologies that are able to provide reactive support. 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.

³ On 12 August 2022, Energy Ministers agreed to fast track the introduction of an emissions reduction objective into the national energy objectives, consisting of the National Electricity Objective (NEO), National Gas Objective and National Energy Retail Objective. On 21 September 2023, the *Statutes Amendment (National Energy Laws) (Emissions Reductions Objectives) Act 2023* (the Act) received Royal Assent.

⁴ AEMC, *Harmonising the electricity network planning and investment rules and AER guidelines with the updated energy objectives (electricity)*, draft determination, 26 October 2023, p. i.

⁵ As per clause 5.15.2(a) of the NER.

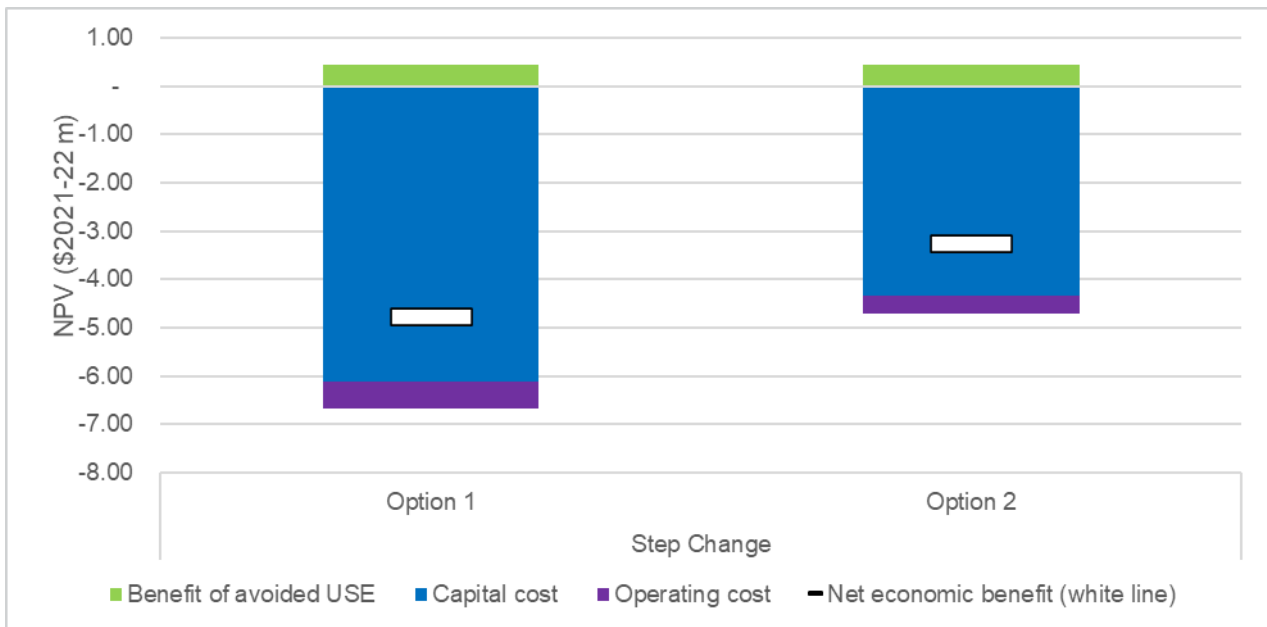
Conclusion: installation of a 132 kV 25 MVA reactor at Inverell is optimal

Implementing Option 2 by 2025/26 will meet the relevant regulatory obligations set out in the NER and NSW reliability standards, maintaining voltage levels in Northern NSW in the long term.

Option 2 delivers the highest net economic benefits in all scenarios, meeting the identified need and avoiding expected unserved energy in the long term at a lower cost than Option 1. This makes Option 2 the preferred option.

Under all scenarios, the costs of mitigating the risks under both options are found to be significantly outweighed by the expected benefit of avoiding the risks. Option 2 provides the greatest estimated net benefit of the two options considered – with net benefits that are approximately 47 per cent greater than Option 1.

Figure E-1 Net economic benefits (\$m, PV)



The optimal commercially and technically feasible option presented in this PSCR – Option 2 (Install a 132 kV 25 MVA reactor at Inverell) – is the preferred option to meet the identified need and maintain voltage levels in Northern NSW.

Moving forward with this option is the most prudent and economically efficient solution to ensure the NER requirements and NSW reliability standards are met in the long term, while avoiding expected unserved energy.

The estimated capital expenditure associated with this option is \$5.41 million. +/- 25 per cent. Routine operating and maintenance costs relating to planned activities are approximately \$54,100 per year.

This preferred option, Option 2, is not found to have positive net benefits under the Step Change scenario, however, since this RIT-T is a reliability corrective action, the top-ranked option is permitted to have a negative market benefit.

We also conducted sensitivity analysis on the net economic benefit to investigate the robustness of the conclusion to key assumptions. Our analysis concluded that Option 2 remains the preferred option under all sensitives studied.

The works will be undertaken between 2023/24 and 2025/26, with final commissioning of the solution expected in 2026/27.

All works will be completed in accordance with the relevant standards by 2025/26 with minimal modification to the wider transmission assets. Necessary outages of in-service equipment will be planned appropriately in order to complete the works with minimal impact on the network.

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 5 March 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. In the subject field, please reference 'Maintaining voltage levels in Northern NSW PACR'.