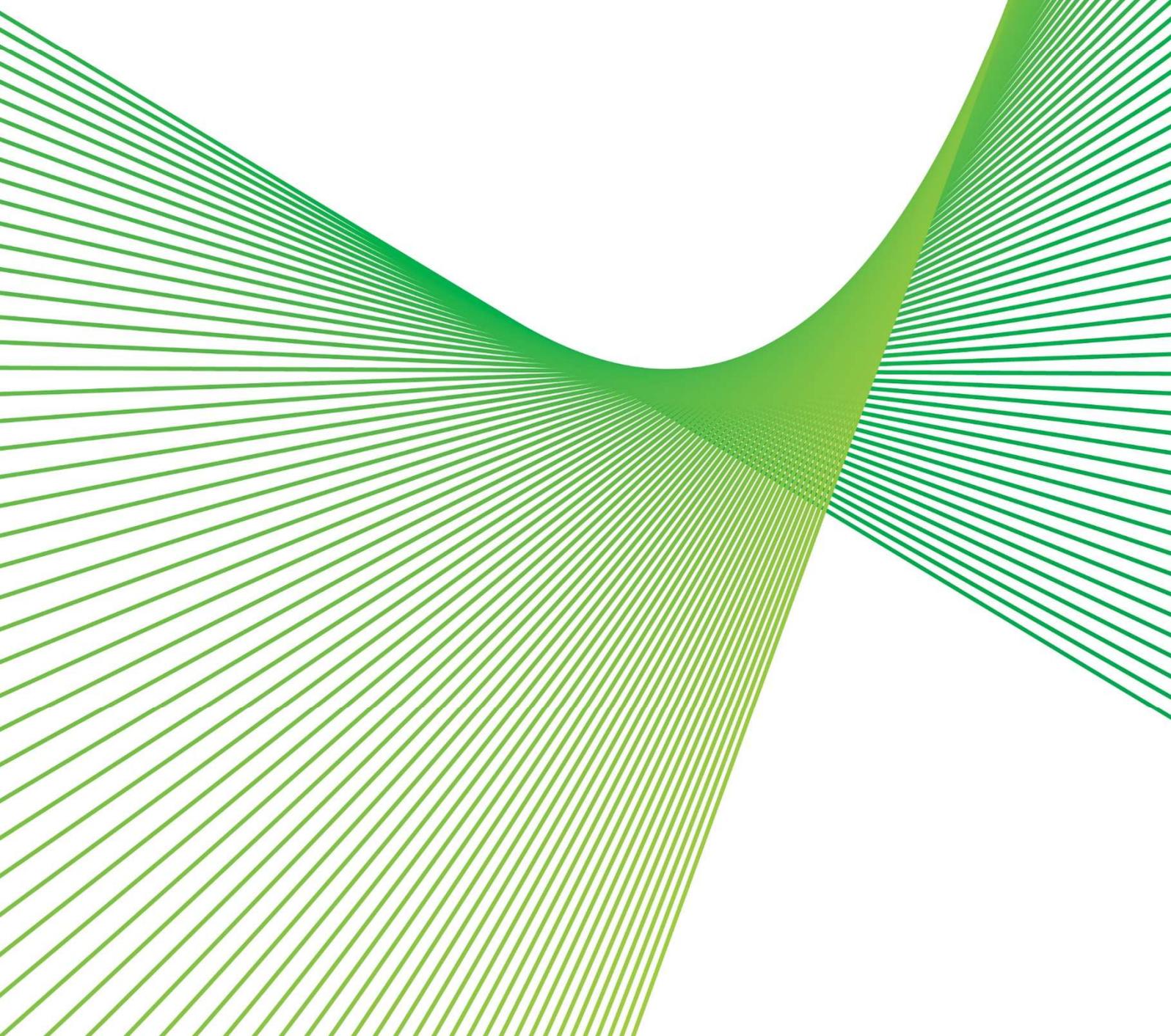


Summary: Maintaining safe and reliable operation of Beryl substation

RIT-T Project Assessment Conclusions Report

Issue date: 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 Beryl Substation. Publication of this Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process.

Beryl substation was commissioned in 1976 and forms part of our network that serves the central west NSW area and is supplied via two 132kV feeders (Line 94B and 94M), and feeds six customer 66kV lines operated by Essential Energy. 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. Although the central west NSW area is expected to experience strong growth over the next 10 years, with maximum demand forecast to grow by approximately 16% by 2032/33¹, Beryl Bulk Supply Point (BSP) is expected to have moderate load growth for next 10 years.

The condition of certain 132 kV and 66 kV high voltage and secondary system assets at Beryl 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 reactively rectify faults and increasing the risk that primary assets at the substation may not be able to reliably operate.

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

The identified need for this project is to maintain the safe and reliable operation of Beryl 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 rapidly deteriorate. 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 technological obsolescence. 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 RIT-T 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.

¹ Transgrid, NSW Transmission Annual Planning Report 2023, p.138.

No submissions received in response to the Project Specification Consultation Report

We published a Project Specification Consultation Report (PSCR) on 18 May 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 following changes have occurred since the PSCR which have not made an impact on the preferred option:

- Updated the capex estimate for Option 1
- Updated the discount rate used
- Updated the Value of Customer Reliability (VCR)

At the time the PSCR was published, the cost estimate for Option 1 was primarily based on a desktop assessment of the activity required to replace the high voltage and secondary systems assets. As we progressed to concept designs, we identified several changes that were not identified in the original assessment. The key changes are associated with existing conduits not being suitable for re-use and the capacitor footing needing to be re-built. Some minor compliance related items including lighting, and a new earth switch for clearances also contributed to an increase in the estimate.

The PSCR included the replacement of 6 disconnectors as part of Option 1, however utilisation of local site staff knowledge has enabled us to consider alternative methods to address the identified asset issues. Therefore, the replacement of the identified disconnectors has been removed from the current scope and no longer being addressed by this RIT-T. While the removal of the disconnectors resulted in a slight decrease in the overall capital expenditure estimate, the additional changes at concept design stage that are described above have resulted in an increase in the total capital expenditure for Option 1. Specifically, the capital expenditure estimate from Option 1 has increased from \$7.06m (\$2021-22) in the PSCR to \$8.60m (\$2021-22) in this PACR.

We note that, since the PSCR was released, there has been a law change to introduce an emissions reduction objective into the national energy objectives² 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.³ 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 because there is no change in options by implementing the emission change into the NPV. Therefore, this new category of market benefit is not expected to be material for this RIT-T and so has not been estimated.

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

² 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.

³ 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.

Credible options considered

We identified one credible network option that meets the identified need from a technical, commercial, and project delivery perspective⁴. This option is summarised in Table E-1.

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

Option	Description	Capital costs, (\$m, 2021-22)	Operating costs (per year), \$
Option 1	Targeted replacement of high voltage and secondary system assets	8.60	14,748

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
Protection relays	Line 94B 132kV – No2 Protection 66kV Capacitor No.2 - No1 Protection 66kV Capacitor No.2 - No2 Protection 66kV Capacitor No.3 - No1 Protection 66kV Capacitor No.3 - No2 Protection 66kV Capacitor No.4 - No1 Protection 66kV Capacitor No.4 - No2 Protection Line 86J 66kV – No1 Protection Line 86J 66kV – No1 Protection Line 80R 66kV – No1 Protection Line 80R 66kV – No1 Protection Line 381 66kV – No1 Protection Line 381 66kV – No1 Protection Line 851 66kV – No1 Protection Line 851 66kV – No1 Protection Line 80U 66kV – No1 Protection Line 80U 66kV – No1 Protection Line 852 66kV – No1 Protection Line 852 66kV – No1 Protection
Control systems	110V DC Supply – No1. Battery 110V DC Supply – No1. Charger 110V DC Supply – No2. Battery 110V DC Supply – No2. Charger

⁴ As per clause 5.15.2(a) of the NER.

Metering systems	Transformer No.2 - Revenue metering Transformer No.2 - Check metering Transformer No.3 - Revenue metering Transformer No.3 - Check metering
Capacitor banks	66kV 10MVA No.2 Capacitor Bank
Current transformers	66kV No.3 Transformer

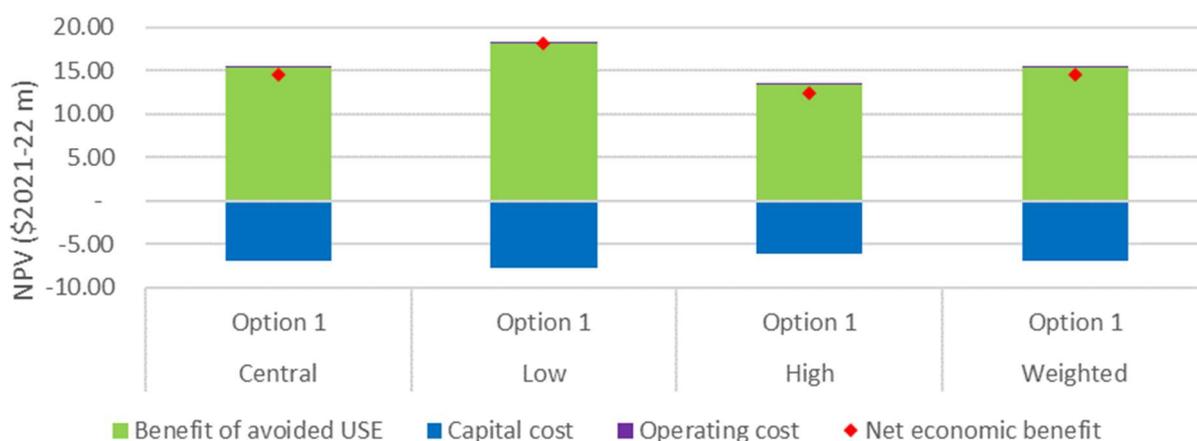
Non-network options are not expected to assist in this RIT-T

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. In addition, we did not receive any submissions from proponents of these solutions in response to the PSCR.

Conclusion: targeted replacement of high voltage and secondary system assets at Beryl substation is optimal

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 benefits of approximately \$14.55m. 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.

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



The capital cost of this option is approximately \$8.60 million (in \$2021-22). 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 \$14,748 per annum (in \$2021-22).

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. It follows a PSCR released in May 2023. 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 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.

Parties wishing to raise a dispute notice with the AER may do so prior to 23 January 2024⁵ (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 'Beryl substation renewal PACR'.

⁵ Additional days have been added to cover public holidays