Transgrid

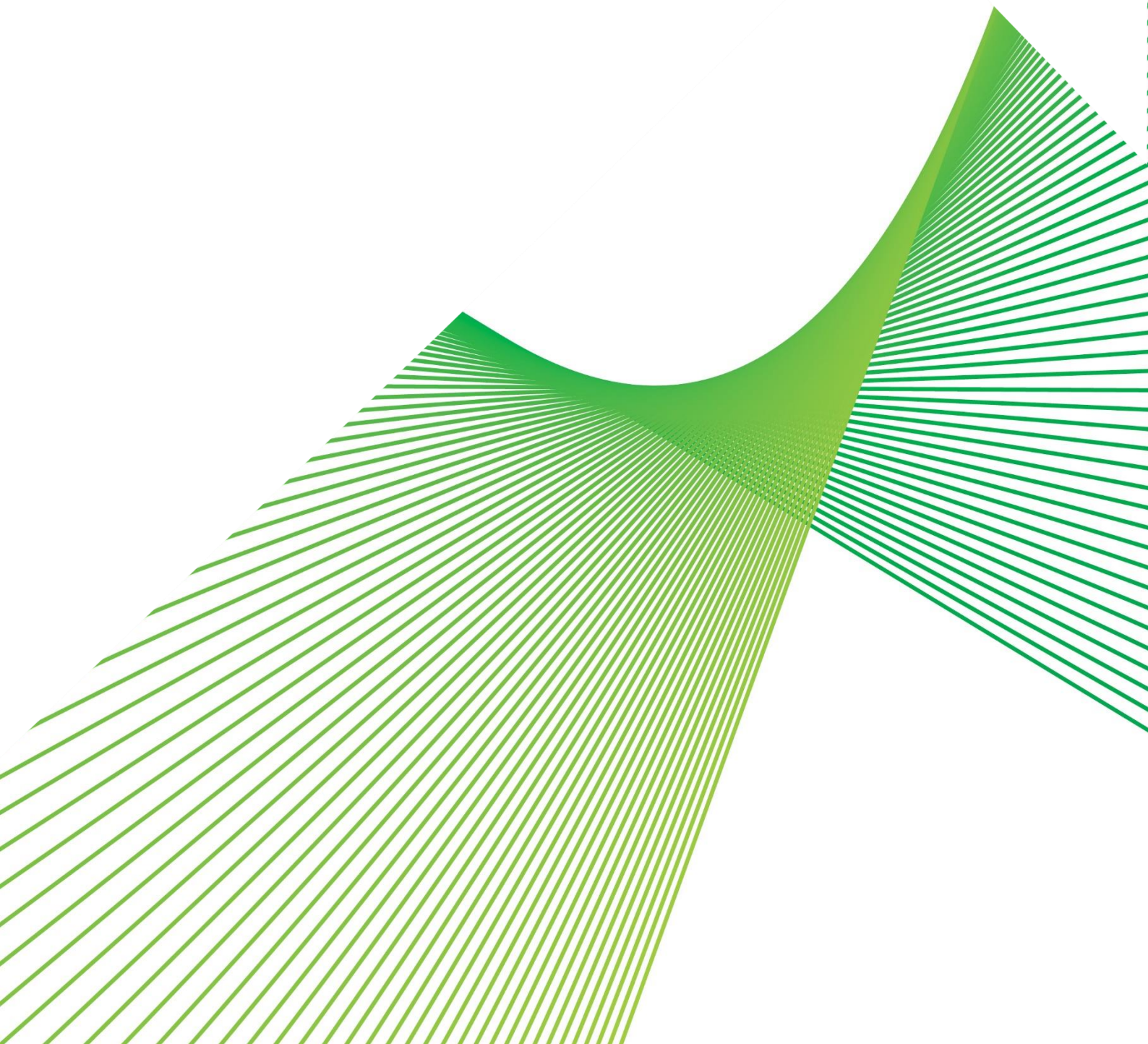
People. Power. Possibilities.

Maintaining voltage levels in Northern NSW

Notification of MCC Assessment (MCC Assessment #2)

Region: Northern NSW

Date of issue: 23 October 2025



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2. Executive Summary

On 5 March 2024 we completed the maintaining voltage levels in Northern NSW Regulatory Investment Test for Transmission (RIT-T). This RIT-T considered two credible options:

- Option 1 – Install a 66 kV 10 MVAr reactor at Moree and a 66 kV 15 MVAr reactor at Inverell
- Option 2 – Install a 132 kV 25 MVAr reactor at Inverell

Capital costs for both Option 1 and Option 2 have increased since completion of the RIT-T. This is the second increase in capital costs since completion of the RIT-T.

We performed an initial Material Change in Circumstance (MCC) Assessment (referred to throughout this document as 'MCC Assessment #1') to ascertain whether this increase constitutes a MCC as contemplated in the National Electricity Rules (NER). We notified the AER of the outcome of this on 20 December 2024. It was confirmed at that time that there was no change in the preferred option, and we accordingly proceeded with Option 2.

More specifically, MCC Assessment #1 examined whether the change in capital costs resulted in a material change in circumstances, relating to the preferred option identified in the final RIT-T document, our Project Assessment Conclusions Report (PACR). We refer to this as whether an 'MCC event' has occurred. This second assessment (referred to throughout this document as 'MCC Assessment #2'), has been performed for the same reasons, ie increase in capital costs. Section 3.2 of this MCC Assessment outlines the underlying factors affecting the cost. For Option 2 we have received contract pricing after going out to the market and the pricing received is within the +/- 10% of the central capital cost estimate (Class 2 estimate). We expect to reach the point of Financial Investment Decision (FID) within the next six months and therefore no further cost increases are expected.

The Net Present Value (NPV) results (which determine which option is preferred) are presented below. The table provides three sets of results: the original NPV results presented in the PACR; our first revision of the NPV in December 2024 and presented in MCC Assessment #1; and our latest set of results from this second revision of the NPV conducted in August 2025 for MCC Assessment #2.

Option 2 remains the preferred option, despite its NPV falling from -$3.56 million in the PACR to -$8.99 million in MCC Assessment #2.

Table E-1 Original and revised NPV of economic benefits relative to the base case ($m, 2023/24)

Assessment	Option 1	Option 2	Preferred Option
Original (as presented in the PACR)	-$5.24	-$3.56	Option 2
First Revision (MCC Assessment #1, December 2024)	-$8.26	-$6.44	Option 2
Second Revision (MCC Assessment #2, August 2025)	-$9.80	-$8.99	Option 2

For comparison purposes, the benefit is presented in $2023/24 which is what was used in the PACR. The current benefit converted to $2024/25[1] is -$10.01 million for Option 1 and -$9.18 million for Option 2.

MCC Assessment #2 confirms that Option 2 remains the preferred option for maintaining voltage levels in Northern NSW. We therefore have concluded that an MCC event has not occurred. MCC Assessment #2 includes a statement that the preferred option remains the preferred option and sets out supporting information necessary to demonstrate that the preferred option identified remains the preferred option in section 5 (MCC Assessment results).[2]

[1] Values de-escalated from 2024/25 to 2023/24 values in accordance with ABS actual All Group June CPI data.
[2] As per clause 5.16A.4(o2)(2) of the NER

3. Context and purpose of this report

On 5 March 2024 Transgrid completed the Regulatory Investment Test for Transmission (RIT-T). for maintaining voltage levels in Northern NSW. This RIT-T considered two credible options:

Option 1 – Install a 66 kV 10 MVAr reactor at Moree and a 66 kV 15 MVAr reactor at Inverell

This option involves extending the existing switchyard (within the existing property boundary) to accommodate installation of the reactors and their associated switchbays.

Option 2 – Install a 132 kV 25 MVAr reactor at Inverell

This option involves extending the existing switchyard (within the existing property boundary) to accommodate installation of the reactors and their associated switchbays.

3.1. Background to the RIT-T

The Narrabri, Moree and Inverell areas are supplied by a series of 132 kV transmission lines which form a link between Glen Innes, Armidale and Tamworth.

The latest demand forecasts show that the minimum demand in NSW will be steadily declining over the next 10 years due to gradual and continued growth in distributed solar generation capacity.[3,4] In Northern NSW the expected growth in embedded generation is contributing to the falling minimum demand in the Moree and Inverell areas into the future.

This declining minimum demand is leading to excessive voltage levels, particularly when renewable generators in the region are not providing sufficient reactive support and demand is low.

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.[5] The NER also requires the power system to be operated in a satisfactory operating state, which requires voltages to be maintained within these levels, both in normal operation and following any credible contingency event.[6]

Our power system studies show that the declining minimum demand in Northern NSW, specifically in the Moree and Inverell areas, means that there is an immediate need to manage the risk of excessive voltage levels leading to non-compliance with the NER under system normal and a single credible contingency. Excessive voltages have already been encountered during a contingency event at Inverell. During this event, operational measures were implemented to manage the voltage levels in the short term. In the longer-term remedial solutions are required to maintain compliance with the NER and NSW Electricity Reliability and Performance Standard 2017.

[3] AEMO, *Electricity Statement of Opportunities (ESOO) 2024*, August 2024
[4] Transgrid, *Transmission Annual Planning Report (TAPR) 2025*, August 2025
[5] These levels are specified in clause S5.1a.4.
[6] These requirements are set out in clauses 4.2.6, 4.2.4 and 4.2.2(b) of the NER. The requirement for secure operation of the power system in clause 4.2.4 requires the power system to be in a satisfactory operating state following any credible contingency event, that is, to maintain voltage within 10 per cent of normal voltage following the first credible contingency event.

3.2. Capital cost changes since RIT-T completion

Table 1 shows that the capital costs for both Option 1 and Option 2 have changed twice since the PACR was published on 5 March 2024. We completed MCC Assessment #1 in December 2024 and MCC Assessment #2 in August 2025.

Table 1 Original and revised capital cost relative to the base case ($m, 2023/24)

Cost	Option 1	Option 2
Original[7] (as presented in the PACR)	8.41	5.95
MCC Assessment #1 (December 2024)	12.85	10.18
MCC Assessment #2 (August 2025)	13.66	12.42

For comparison purposes, the costs are presented in $2023/24, which is what was used in the PACR. The current costs converted to $2024/25[8] are $13.95m for Option 1 and $12.68m for Option 2.

- The underlying factors driving these cost changes include:
  - As design progressed the location of the reactor has changed (still within the substation) and to accommodate this, a larger bench extension is required. As such, several essential electrical, environment and security infrastructure components which were not considered at the initial stage are now required.
  - Due to the location change, additional security CCTV systems, lighting and lightning masts, and additional switchyard lighting have been included in the scope. These items are essential for operational safety and security compliance, and their inclusion has contributed to the cost increase.
  - We conducted a noise study as part of the environmental compliance which concluded that noise walls will be required and are now included in the revised scope.
  - Increased effort in bulk earthworks and civil works to install items listed in point above, especially on surface with hard basalt rock.
  - Additional demolition works such as removing part of the existing bench, boundary and internal fencing, concrete drains and drain pits, internal roadways, and existing lighting poles are required to complete this project. Hence, additional labour, equipment, and disposal efforts are necessary.
  - Construction timeline has increased which led to higher overheads, labour expenses and remote area allowances.
  - Principal Supplier Material cost (reactor, steelworks, HV equipment) has increased from the time of the MCC Assessment #1 estimate.

3.3. Material change in circumstance provisions in the NER

The NER covers the situation where there has been a material change in circumstance following the publication of a PACR. It is important to note that the increase in the capital cost estimate for the project, whilst substantial, does not in itself mean that an MCC event has occurred for the purposes of the NER. The NER refers to a material change in circumstance as including, but not being limited to, a change to:

[7] Values escalated from 2021/22 to 2023/24 values in accordance with ABS real CPI data.
[8] Values de-escalated from 2024/25 to 2023/24 values in accordance with ABS real CPI data.

- key inputs and assumptions;
- the identified need described in the PACR; or
- the credible options assessed in the PACR.

Pursuant to these NER provisions, Transgrid has undertaken MCC Assessment #2 to evaluate whether the change in the capital cost for both options represent an MCC event.

4. Approach to the MCC Assessment

This section outlines the inputs and assumptions used to complete the MCC assessment with updated capital costs for both Option 1 and Option 2:

4.1. Assessment against the base case

The costs and benefits of each option are compared against a 'do nothing' base case. Under this base case, where the excessive voltage levels due to declining minimum demand are unresolved, there is expected to be a reduction in supply reliability. This is expected to result in non-compliance with the NSW Electricity Reliability and Performance Standard 2017 at Moree. This is expected to result in unserved energy of 1.25 MWh per year, increasing to 1.4 MWh per year by 2043.

4.2. Assessment period and discount rate

MCC Assessment #2 makes use of a 20-year assessment period from 2024/25 to 2043/44. This period takes into account the size, complexity and expected asset life of the options.

Where the capital components of the credible options have asset lives extending beyond the end of the assessment period, the NPV modelling includes a terminal value to capture the remaining asset life. This ensures that the capital cost of long-lived options over the assessment period is appropriately captured, and that all options have their costs and benefits assessed over a consistent period, irrespective of option type, technology or asset life. The terminal values have been calculated based on the undepreciated value of capital costs at the end of the analysis period. As a conservative assumption, we have effectively assumed that there are no additional cost and benefits after the analysis and period.

A real, pre-tax discount rate of 7 per cent has been adopted as the central assumption for the NPV analysis. We have additionally tested the sensitivity of the NPV results to a lower bound discount rate of 3 per cent and an upper bound discount rate of 10.0 per cent[9].

4.3. Approach to estimating option costs

We have estimated the capital and operating costs of the options based on the scope of works necessary together with costing experience from previous projects of a similar nature.

For Option 1 the cost estimates are developed using our 'MTWO' cost estimating system. This system utilises historical average costs, updated by the costs of the most recently implemented project with similar scope. All estimates in MTWO are developed to deliver a 'P50' portfolio value for a total program of works (i.e., there is an equal likelihood of over- or under-spending the estimate total).[10] For Option 1, we estimate the actual costs would be within +/- 25 per cent of the central capital cost estimate.

For Option 2 we have received contract pricing after going out to the market and the pricing received is within the +/- 10% of the central capital cost estimate. An accuracy of +/- 10 per cent for cost estimates is consistent with industry best practice and aligns with the accuracy range of a 'Class 2 estimate, as defined

[9] AEMO *'2025 Inputs, Assumptions and Scenarios Report'*, August 2025, pp 159.
[10] For further detail on our cost estimating approach refer to section 7 of our Augmentation Expenditure Overview Paper submitted with our 2023-28 Revenue Proposal.

in the Association for the Cost Engineering classification system. All cost estimates are prepared in real, 2024/25 dollars. The cost estimates do not include or forecast any real cost escalation for materials.

Routine operating and maintenance costs are based on works of similar nature. Given that there is an incremental routine operating and maintenance costs saving in the options compared to the base case, this is a net benefit in the assessment.

4.4. Value of customer reliability

Consistent with the AER's RIT-T Guideline, we have developed VCR estimates that are based on the estimates developed and consulted on by the AER, weighted to reflect the mix of customers that are likely to be affected by the options.

We have applied a NSW-wide VCR value from AEMO latest IASR.[11] We have used this VCR as we consider this reasonably reflects the mix of customers supplied from the Molong substation, which includes residential, agricultural and industrial customers.

4.5. One scenario has been modelled

The RIT-T must include any of the ISP scenarios from the most recent IASR that are relevant unless[12]

- the RIT-T proponent demonstrates why it is necessary to vary, omit or add a reasonable scenario to what was in the most recent IASR, and
- the new or varied reasonable scenarios are consistent with the requirements for reasonable scenarios set out in the RIT-T instrument.

The AER's RIT-T Guidelines clarify that the number and choice of reasonable scenarios must be appropriate to the credible options under consideration, and that the choice of reasonable scenarios must reflect any variables or parameters that are likely to affect the ranking or sign of the net benefit of any credible option[13] .

For the purposes of this RIT-T, we have only modelled outcomes under the Step Change IASR scenario. This scenario was selected because it is the most likely scenario under AEMO's latest IASR.[14] Adoption of this scenario is also consistent with the minimum demand forecasts provided by Essential Energy, which are POE50 forecasts and therefore also represent the most likely forecast. We do not consider it necessary to model the other ISP scenarios (i.e., Slower Growth, and Accelerated Transition scenarios). The Slower Growth and Accelerated Transition scenarios differ from the Step Change scenario on the basis of a range of parameters, including forecast demand and the approach to decarbonisation. As discussed in section 4.1, the credible options considered in this RIT-T avoid the same amount of unserved energy. This means that the underlying demand forecasts are not considered material to the outcome of this RIT-T. We do not consider that other assumptions or parameters underpinning the alternative scenarios will affect the ranking of the credible options.

[11] This VCR is equal to the $31,428/MWh within AEMO *2025 Inputs, Assumptions and Scenarios Report*, August 2025, pp.158
[12] AER, *Application Guidelines Regulatory Investment Test for Transmission*, November 2024, pp.33
[13] AER, *Application Guidelines Regulatory Investment Test for Transmission*, November 2024, pp.43.
[14] AEMO *2025 Inputs, Assumptions and Scenarios Report*, August 2025, pp. 18.

A summary of the key variables in the Step Change scenario is provided in the table below.

Table 2 Summary of step change scenario

Parameter	Step Change
Discount rate	7%
Network capital costs	Base estimate
Operating and maintenance costs	Base estimate
Value of Customer Reliability (VCR) ($2024/25)[15]	$31.428/kWh
Minimum demand forecast	Capital demand forecast (POE50)

4.6. Sensitivity analysis

We have not conducted sensitivity analysis in this MCC Assessment #2 as we expect to reach the point of Financial Investment Decision (FID) within the next six months. Should that period extend beyond six months, we will re-assess if required.

[15] This VCR is aligned with AEMO's 2025 Inputs, Assumptions and Scenarios Report

5. MCC assessment results

5.1. Original NPV results from the PACR

Original results presented within the PACR are shown in Table 3 below.

Table 3 Initial NPV of economic benefits relative to the base case ($m, 2023/24), as presented in the PACR

Option	Step Change
Option 1	-$5.24
Option 2	-$3.56

5.2. NPV results from MCC Assessment #1 in December 2024

NPV results from MCC Assessment #1 are shown in Table 4 below.

Table 4 NPV of economic benefits relative to the base case ($m, 2023/24), as presented in MCC Assessment #1

Option	Step Change
Option 1	-$8.26
Option 2	-$6.44

5.3. NPV results from the MCC Assessment #2 in August 2025

NPV results from MCC Assessment #2 are shown in Table 4 below.

Table 6 NPV of economic benefits relative to the base case ($m, 2024/25), as presented in MCC Assessment #2

Option	Step Change
Option 1	-$10.01
Option 2	-$9.18

6. Conclusion and recommendation

MCC Assessment #2 has found that Option 2 (install a 132 kV 25 MVAr reactor at Inverell) remains the preferred option, despite its NPV falling from -$3.56 million in MCC Assessment #1 in December 2024 to -$8.99 (real FY2024) million in MCC Assessment #2. As a result, an MCC event has not occurred.

Therefore, it is recommended that Transgrid continue to deliver the project using Option 2 installation of the 132 kV 25 MVAr reactor at Inverell.