Transgrid

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Maintaining safe and reliable operation of Tamworth 330 kV substation

Notification of MCC Assessment

Region: Northern NSW

Date of issue: 8 January 2026

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2. Executive Summary

The 'Maintaining safe and reliable operation of Tamworth substation' Regulatory Investment Test for Transmission (RIT-T) was completed on 17 January 2025. The identified need for this project is to maintain the safe and reliable operation of Tamworth substation, and it considered two credible options:

- Option 1 – Replacement of the No.1 and No.2 Tamworth transformers
- Option 2 – Refurbishment of the No.1 and No.2 Tamworth transformers

The RIT-T identified Option 1 as the preferred option. Since completion of the RIT-T, the following changes have occurred:

- The capital cost estimate for Option 1 has increased from $20.32 million to $38.46 million.
- Delivery time has been delayed to November 2027.

We have performed a Material Change in Circumstance (MCC) Assessment to ascertain whether this increase constitutes a MCC as contemplated in the National Electricity Rules (NER)[1]. This assessment examined whether the change in capital costs and timing 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). In this MCC Assessment we refer to this as whether an 'MCC event' has occurred.

Section 3.2 of this MCC Assessment outlines the underlying factors affecting the cost. For Option 1, a Class 2 estimate with an accuracy of +/- 10 per cent was developed using our MTWO cost estimating system, based on detailed design with a higher level of accuracy that the estimate available at the time the PACR was published. Option 2 remains within +/- 25% of the central capital cost estimate. Labour, plant, and other contractual costs were significantly higher than those forecast in the PACR. The primary contributors to these increases were procurement costs, construction contract costs, and internal resource costs. The key drivers behind these increases are detailed in section 3.2.

We expect to reach the point of Financial Investment Decision (FID) within the next three months and therefore no further cost increases are expected.

Section 3.3 outlines the reason for delay in the estimated delivery time, related to time required to procure the transformers for Option 1.

Through this MCC Assessment we have demonstrated that there is no material change to the net benefits of Option 1. Option 1 remains our preferred option in this MCC Assessment.

The Net Present Value (NPV) results (which determine which option is preferred) are presented below. Option 1 remains the preferred option, despite its NPV falling from $639.85 million in the PACR to $365.98 million in this MCC Assessment. The reduction in NPV is driven by the increase in capital expenditure for Option 1 and a reduction to the Value of Customer Reliability (VCR) from $51.196/kWh in the PACR to $31.428/kWh in this MCC Assessment. The VCR update is aligned with the Australian Energy Market Operator's (AEMO's) 2025 Inputs Assumptions Scenarios Report (IASR).

[1] As per clause 5.16A.4(o2)(2) of the NER

Table 2-1 Original and revised NPV of net economic benefits – weighted scenario ($m, 2024/25)

Assessment	Option 1	Option 2	Preferred Option
Original (as presented in the PACR)	639.85	157.41	Option 1
Revised (MCC Assessment)	365.98	95.44	Option 1

For comparison purposes, the net economic benefit is presented in $2024/25 which is what was used in the PACR.

This MCC Assessment confirms that Option 1 remains the preferred option for Maintaining safe and reliable operation of Tamworth 330 kV substation. We therefore have concluded that an MCC event has not occurred. This MCC Assessment 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]

[2] As per clause 5.16A.4(o2)(2) of the NER

3. Context and purpose of this report

On 17 January 2025 Transgrid completed the Regulatory Investment Test for Transmission (RIT-T) for Maintaining safe and reliable operation of Tamworth 330 kV substation. This RIT-T considered two credible options which are outlined in the table below.

Table 3-2 Summary of credible options as presented in the PACR

Option	
1	Replacement of the Tamworth No.1 and No. 2 transformers
2	Refurbishment of the No.1 and No.2 Tamworth transformers

3.1. Background to the RIT-T

Tamworth 330 kV substation has three transformers. No. 1 and No. 2 were commissioned in 1967, and No. 3 was commissioned in 1998. These form a part of Transgrid's network that serves the northern region of NSW. Tamworth 330 kV substation connects to Transgrid's 330 kV Armidale, Liddell and Muswellbrook substations as well as Transgrid's 132 kV Narrabri, Tamworth and Gunnedah substation.

The identified need for this RIT-T is to maintain the safe and reliable operation of Tamworth substation and the broader transmission network in Northern NSW by addressing the risk of failure of the Tamworth No.1 and No. 2 330 kV transformer at Tamworth substation.

The No.1 and No.2 transformer (330/132 kV, 150 MVA) were commissioned in 1967 during the initial construction of Tamworth 330 kV substation and have now reached the end of their serviceable lives. The No.3 transformer which was commissioned in 1998 is in satisfactory condition and not part of this need. The three transformers at the substation play a central role in supplying electricity to the distribution network in the northern region.

Condition assessment of the No.1 and No.2 transformer at Tamworth 330 kV substation using Transgrid's Network Asset Risk Assessment Methodology has noted signs of deterioration, primarily due to condition issues associated to corrosion.

Power transformers are essential to the task of transmitting electricity as they change the voltage level between different sections of an electricity network. This enables electricity transportation infrastructure to be significantly more cost-effective, by reducing the power losses experienced between generators and consumers, while providing power at the appropriate voltage for end-users.

If the deteriorating asset condition is not addressed by a technically and commercially feasible option, the likelihood of prolonged and involuntary load shedding in the northern region will increase. In addition, the increased risk of failure presents a safety risk which Transgrid is obligated to manage.[3] Rectifying the

[3] We manage and mitigate safety and bushfire risk to ensure they are below risk tolerance levels or 'As Low As Reasonably Practicable' ('ALARP'), in accordance with our obligations under the *New South Wales Electricity Supply (Safety and Network Management) Regulation 2014* and our Electricity Network Safety Management System (ENSMS).

worsening condition of the transformer will reduce safety risks, as well as lower planned and unplanned corrective maintenance costs.

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

- Reduction of risk as valued as a 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 corrective maintenance

If left unreplaced or not refurbished, continued degradation in the condition of the asset will significantly increase the risk of asset failure and the risk of unplanned network outages. There will be an increased cost to replace the assets upon failure in a reactive fashion. A failure can also pose serious safety and environmental hazards. A failure of the power transformers can result in the risk of injuring people, cause collateral damage and outages of nearby services, and other environmental issues such as fires. Replacing the power transformers at Tamworth 330 kV substation will reduce the risk of involuntary load shedding for customers in Northern NSW and reduce the risk of safety and environmental hazards associated with any catastrophic failures occurring.

We consider this a 'market benefits' driven RIT-T and the preferred option will deliver positive net market benefits.

3.2. Capital cost changes since RIT-T completion

The table below shows that the capital costs for Option 1 has changed since completion of the RIT-T.

Table 3-2 Original and revised capital cost ($m, 2024/25)

Cost	Option 1	Option 2
Original (as presented in the PACR)	20.32	2.51
MCC Assessment (December 2025)	38.46	2.51

For comparison purposes, the costs are presented in $2024/25, which is what was used in the PACR. The cost for Option 1 in this MCC Assessment was converted from nominal to real $2025/26 with CPI data.

Labour, plant, and other contractual costs were significantly higher than those forecast in the PACR. The primary contributors to these increases were, procurement costs, construction contract costs, and internal Transgrid resource costs. The key drivers behind these increases are outlined below:

- Power transformer costs have increased significantly. This is driven by market forces due to international supply chain demands.
- Existing transformer compounds to be demolished and reconstructed due to the existing compound having reached its end of life.
- Additional enabling scope such as new surge arrestors, secondary scope, transformer marshalling kiosks and lightning mast.

- Asbestos was found on site hence additional cost is required to dispose of the asbestos in an appropriate manner.
- Part of the cost increase is due to the need to retain the existing No.1 transformer as a contingency during the extended works to maintain supply reliability. It will be relocated to the spare bund and decommissioned once the new transformers are commissioned.
- The construction timeline has been extended which led to higher overheads, labour expenses and remote area allowances.

3.3. Delay to timing since RIT-T completion

The planned timing to deliver the project noted in the PACR was commissioning possible in 2025/2026. This was updated in our 2024 Transmission Annual Planning Report (TAPR), with the proposed in-service date listed as December 2026[4] and has extended by 10 months to October 2027 as per our 2025 TAPR[5]. The work is scheduled to be undertaken in 2025/26 with commissioning possible by 2026/27 for No.1 Transformer and 2027/28 for No.2 Transformer.

The underlying factors driving the delay include:

- Additional construction works as outlined in Section 3.2.
- Outage constraints in the northern region where summer outage is not possible. This means that contractor has to demobilise during the summer period and mobilise again after the summer period.
- Asbestos removal.
- Design changes and further enabling scope.
- Further investigative works and site visits.

3.4. 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 defines a *material change in circumstance* as including, but not being limited to, a change to:

- 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 this MCC Assessment to evaluate whether the changes to the capital cost and delivery timing all options represent an MCC event.

[4] Transgrid, 2024 Transmission Annual Planning Report, August 2024, pp.62
[5] Transgrid, 2025 Transmission Annual Planning Report, August 2025, pp.67

4. Approach to the MCC Assessment

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

4.1. Assessment against the base case

The costs and benefits of each option are compared against a 'do nothing' base case. Under the base case, no proactive capital investment is made to remediate the deterioration of the high voltage and secondary systems assets at Tamworth substation. We incur regular and reactive maintenance costs, and environmental, safety, and financial related risks costs, that are caused by the failure of assets at the Tamworth substation. In addition, there would be a small, avoided cost of routine operating and maintenance costs in Option 1 compared to the base case.

We note that this course of action is not expected in practice. However, this approach has been adopted since it is consistent with AER guidance on the base case for RIT-T applications.[6]

4.2. Assessment period and discount rate

The RIT-T analysis spans a 20-year assessment period from 2024/25 to 2043/44.

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 are calculated as the undepreciated value of capital costs at the end of the analysis period and can be interpreted as a conservative estimate for benefits (net of operating costs) arising after the analysis period.

A real, pre-tax discount rate of 7.0 per cent has been adopted as the central assumption for the NPV analysis, in alignment with PACR.[7]

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.

The RIT-T cost estimates were 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).[8]

[6] Transgrid notes that the AER RIT-T Guidelines state that the base case is where the RIT-T proponent does not implement a credible option to meet the identified need, but rather continues its 'BAU activities. The AER define 'BAU activities' as ongoing, economically prudent activities that occur in the absence of a credible option being implemented.

[7] The 2021 IASR was used for the market modelling in the RIT-T, therefore we have used the same assumptions in this MCC Assessment for consistency.

[8] 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.

For this MCC Assessment, the cost estimate for Option 1 has been developed with an Association for the Advancement of Cost Engineering (AACE) Class 2 estimate, based on a detailed design with a high level of accuracy. This approach has been taken due to Option 1 being identified as the preferred option in the RIT-T. 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 in the Association for the Cost Engineering classification system. All cost estimates are prepared in nominal dollars.

The cost estimate for Option 2 was 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).[9] The estimate for Option 2 is based on desktop analysis and remains within +/- 25% of the central capital cost estimate. The estimate has not been further assessed as we do not plan to progress with this option because it was not identified as our preferred option in the RIT-T.

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. Uncertainty has been captured by way of three scenarios

The RIT-T is focused on identifying the top ranked credible option in terms of expected net benefits. However, uncertainty exists in terms of estimating future inputs and variables (termed future 'states of the world').

To deal with this uncertainty, the NER requires that costs and market benefits for each credible option are estimated under reasonable scenarios and then weighted based on the likelihood of each scenario to determine a weighted ('expected') net benefit. It is this 'expected' net benefit that is used to rank credible options and identify the preferred option. The credible options were assessed under three scenarios as part of the PACR assessment, which reflect the scenarios from AEMO's 2024 ISP.

The table below summarises the specific key variables that influence the net benefits of the options under each of the scenarios considered, as stated in the PACR.

Table 4-1 Summary of scenarios

Variable/Scenario	Central scenario	Low risk costs scenario	High risk costs scenario
Scenario weighting	1/3	1/3	1/3
Discount rate	7.0%	7.0%	7.0%
VCR (2024/25)[10]	31,428/MWh	31,428/MWh	31,428/MWh
Network capital costs	Base estimate	Base estimate	Base estimate
Avoided unserved energy	Base estimate	Base estimate – 25%	Base estimate +25%

[9] Ibid
[10] AEMO *2025 Inputs, Assumptions and Scenarios Report*, August 2025,pp.158

Safety, environmental, and financial risk benefit	Base estimate	Base estimate – 25%	Base estimate + 25%
Avoided routine operating and maintenance costs	Base estimate	Base estimate	Base estimate

No further updates were applied to these scenarios for this MCC Assessment.

4.5. Sensitivity analysis

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

5. MCC assessment results

5.1. Original NPV results from the PACR

Original results presented within the PACR are shown in the table below.

Table 5-1 NPV of net economic benefits relative to the base case ($m, 2024/25), as presented in the PACR

Option	Weighted Scenario
Option 1	639.85
Option 2	157.41

5.2. NPV results from this MCC Assessment in December 2025

NPV results from this MCC Assessment are shown in the table below.

Table 5-2 NPV of net economic benefits relative to the base case ($m, 2024/25), as presented in this MCC Assessment

Option	Weighted Scenario
Option 1	365.98
Option 2	95.44

The reduction in NPV is driven by the increase in capital expenditure for Option 1 and a reduction to the Value of Customer Reliability (VCR) from $51.196/kWh in the PACR to $31.428/kWh in this MCC Assessment. The VCR update is aligned with the Australian Energy Market Operator's (AEMO's) 2025 Inputs Assumptions Scenarios Report (IASR).

6. Conclusion and recommendation

This MCC Assessment has found that Option 1 (replacement of the No.1 and No.2 transformers at Tamworth 330 kV substation) remains the preferred option, despite its NPV falling from $639.85 million in the PACR to $365.98 (real FY2024/25) million in this MCC Assessment. As a result, an MCC event has not occurred.

Therefore, it is recommended that Transgrid continue to deliver the project using Option 1: Replacement of the No.1 and No.2 transformer at Tamworth 330 kV substation.