Transgrid

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Increasing capacity for generation in the Molong and Parkes area

Notification of MCC Assessment

Region: Central NSW

Date of issue: 19 November 2025

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2. Executive Summary

On 2 December 2023 we completed the Regulatory Investment Test for Transmission (RIT-T) for Increasing capacity for generation in the Molong and Parkes area. This RIT-T considered six credible options:

- Option 1 – Increase transmission line design temperature of Line 94T (Molong-Orange North)
- Option 2 – Restring Line 94T with higher rated 'Flicker/ACSS' conductor on existing structures
- Option 2A – Restring Line 94T with higher rated 'Partridge/ACSS/HS285' conductor on existing structures
- Option 2B – Implement Option 2 with Power Flow Controllers
- Option 3 – Double circuit transmission line
- Option 4 – Install a 50 MW/300 MWh Battery Energy Storage System (BESS)

The RIT-T identified Option 2 as the preferred option. Since completion of the RIT-T, the following changes have occurred:

- Option 2A is no longer considered a credible option. It is technically infeasible due to inability to procure the Partridge/ACSS/HS285 conductor (see section 3 of this MCC Assessment).
- The capital cost estimate for Option 2 has increased.
- During the detailed design process an alternative conductor for Option 2 was found to be fit for purpose, resulting in the preferred option being amended to use this alternative conductor (Invar).
- Delivery time has been delayed to December 2026.

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]. More specifically, 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.

Since completion of the RIT-T, the preferred option (Option 2) has been progressed with an alternative conductor (Invar). We noted in the PACR that this may happen and as a result we are considering Option 2 in this MCC Assessment in its current form, with the Invar conductor used as an alternative to the Flicker/ACSS conductor listed in the PACR.

Section 3.2 of this MCC Assessment outlines the underlying factors affecting the cost. For Option 2 we 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). Labour, plant, and other contractual costs were significantly higher than those forecast in the PACR. The primary contributors to these increases were internal Transgrid resource costs, procurement costs, and construction contract costs. The key drivers behind these increases are detailed in section 3.2.

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

We expect to reach the point of Financial Investment Decision (FID) within the next six 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 initial choice of conductor for Option 2 and then additional time required to procure the alternative conductor.

In the PACR we outlined that our next step upon conclusion of the RIT-T was to proceed to a detailed design stage for the preferred option (Option 2: restring Line 94T with higher rated 'Flicker/ACSS' conductor on existing structures) prior to its implementation. We noted that if, during the detailed design stage, another conductor with the same or higher rating and similar costs and benefits as Option 2, was found to be more fit for purpose, we may amend the preferred option to use the alternative conductor. We stated that we would only adopt an alternative conductor, if its use would not result in a material change to the net benefits of the option or a delay to when the option can be implemented and subject to updating stakeholders on the proposed changes.

Through this MCC Assessment we have demonstrated that there is no material change to the net benefits of Option 2. Option 2 remains our preferred option in this MCC Assessment. Considering the location and timing of the project and nature of the market modelling, assumptions such as the discount rate, renewable and storage policies, capacity factors, generator technical parameters, fuel cost, and emissions are less likely to impact the relative ranking of the options or the preferred option. This is because the main driver of the forecast gross market benefits of the options is the extent to which the constraint binding of Line 94T is alleviated by the option.

Section 4.2 outlines the market modelling assumptions. For the reasons noted above, we have not re-run the market modelling for this MCC Assessment.

To update stakeholders on the proposed changes (alternative conductor for Option 2) this MCC Assessment will be published on our website, alongside other information about the update.

The Net Present Value (NPV) results (which determine which option is preferred) are presented below. Option 2 remains the preferred option, despite its NPV falling from $24.47 million in the PACR to $21.88 million[2] in this MCC Assessment.

Table 2-1 Original and revised NPV of economic benefits relative to the base case ($m, 2021/22)

Assessment	Option 1	Option 2	Option 2B	Option 3	Option 4	Preferred Option
Original (as presented in the PACR)	20.08	24.47	5.01	-10.85	-60.67	Option 2
Revised (MCC Assessment)	20.08	21.88	5.01	-10.85	-60.67	Option 2

For comparison purposes, the benefit is presented in $2021/22 which is what was used in the PACR.

[2] The pre-2023/24 actual costs are sunk costs and excluded from the assessment.

This MCC Assessment confirms that Option 2 remains the preferred option for Increasing capacity for generation in the Molong and Parkes area. 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).[3]

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

3. Context and purpose of this report

On 2 December 2023 Transgrid completed the Regulatory Investment Test for Transmission (RIT-T) for Increasing capacity for generation in the Molong and Parkes area. This RIT-T considered six credible options which are outlined in the table below.

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

Option		Description
1	**Increase transmission line design temperature of Line 94T (Molong-Orange North)**	This option involves increasing Line 94T's summer daytime thermal rating from 112 MVA to 125 MVA by increasing the maximum design temperature of the existing Wolf conductor from 85C to 100C and Neon conductor from 85C to 92C.
2	**Restring Line 94T with higher rated 'Flicker/ACSS' conductor on existing structures**	This option involves increasing Line 94T's summer daytime thermal rating from 112 MVA to at least 150 MVA by restringing Line 94T with a higher capacity conductor (i.e., Flicker conductor).
2A	**Restring Line 94T with higher rated 'Partridge/ACSS/HS285' conductor on existing structures**	This option involves increasing Line 94T's summer daytime thermal rating from 112 MVA to at least 152 MVA by restringing Line 94T with a higher capacity conductor than Option 2 (i.e., a Partridge conductor).
2B	**Implement Option 2 with Power Flow Controllers**	This option involves implementing Option 2 (i.e., increasing Line 94T summer daytime thermal rating from 112 MVA to at least 150 MVA by restringing Line 94T with a higher capacity conductor) as well as installing power flow controllers.
3	**Double circuit transmission line**	This option involves removing the existing structures and conductors of Line 94T and replacing them with new dual circuit towers and dual conductors with higher ratings.

4	**Install a 50 MW/300 MWh BESS**	This option involves installing a 50 MW/300 MWh BESS at Molong substation. Based on our load flow studies, we have determined that a 50 MW battery with 6 hour duration (i.e. BESS to charge at the time when solar generation is highest) is required to address the constraint on Line 94T.

With the information we now have regarding availability of conductors, we no longer consider Option 2A to be a credible option on the grounds of it being technically infeasible. Had we progressed with Option 2A through to detailed design, we would have used the same conductor as Option 2 (Invar). Due to Option 2A not being our preferred option at PACR stage, we consider Option 2A in this MCC Assessment in its original form (ie exactly as it was described in the PACR).

3.1. Background to the RIT-T

The Molong and Parkes area has seen significant growth in renewable generation connections to the transmission network, as part of the wider energy market transition. New renewable generators have connected or are planning to connect to the network west of our Molong 132/66 kV substation. Nineteen solar and wind generation farms in the area with a combined output of 1,273 MW were already in service at the commencement of the RIT-T, with a further 1,148 MW of generation committed or anticipated at the time the Project Assessment Draft Report (PADR) was published in June 2023. By the time the Project Assessment Conclusions Report (PACR) was published in October 2023, an additional 1,250 MW of committed and anticipated wind and solar generation capacity had been added in the Molong and Parkes area. Since completion of the RIT-T a renewable generator with capacity of 140 MW (near Orange North) is now in service.

Line 94T plays a central role in transmitting electricity from renewable generators in the Molong and Parkes area to the load in and around Orange. It is a 132 kV line that connects Molong substation to Orange North switching station, which in turn supplies Orange city, Cadia Mine and surrounding areas.

The current rating of Line 94T is constraining renewable generation in the Molong and Parkes area. The Australian Energy Market Operator's (AEMO's) Monthly Constraint Reports since September 2021 have consistently identified Line 94T as a top 10 constraint on the National Electricity Market (NEM). AEMO's latest Annual NEM Constraint Report for 2024 identified the Line 94T constraint, as the highest binding thermal constraint on NSW network[4]. Network modelling shows thermal overloading of Line 94T is expected under normal system conditions with current levels of in-service and committed generation dispatched to their maximum capacities.

The identified need for this RIT-T is to increase consumer and producer surplus in the NEM through relieving network constraints on the supply of renewable generation from the Molong and Parkes area. This will enable a greater amount of renewable generation produced in the Molong and Parkes area to be supplied to customers in the NEM.

[4] AEMO, NEM Constraint Report 2024 summary data

Within the context of the RIT-T assessment, greater supply of renewable generation is expected to deliver market benefits primarily through reductions in total dispatch costs from:

- lower fuel costs, by enabling lower cost renewable generation to displace higher cost conventional generation elsewhere in the NEM; and
- lower capital costs, by reducing (or deferring) the need for new investment in generation plants to meet growing electricity demand in the future.

The proposed investment will enable us to realise net market benefits in the NEM by relieving this constraint and avoiding curtailment of low-cost renewable generation in the Molong and Parkes area. 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 2 has changed since completion of the RIT-T.

Table 3-2 Original and revised capital cost relative to the base case ($m, 2021/22)

Cost	Option 1	Option 2	Option 2B	Option 3	Option 4
Original (as presented in the PACR)	1.41	7.50	25.97	38.54	185.69
MCC Assessment (November 2025)	1.41	11.74[5]	25.97	38.54	185.69

For comparison purposes, the costs are presented in $2021/22, which is what was used in the PACR. The cost for Option 2 in this MCC Assessment was converted from nominal to real $2021/22 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 internal Transgrid resource costs, procurement costs, and construction contract costs. The key drivers behind these increases are outlined below:

- Under traditional contractor delivery models, the head contractor is typically responsible for procuring materials. However, due to the specialised nature of the conductor and associated hardware, Transgrid procured these materials directly for free issue to the contractor. This decision was made to de-risk the project. This approach required additional management effort beyond what was anticipated in the PACR. The development of detailed conductor specifications introduced further complexity and cost, including adequate risk assessments and associated training requirements.

  Furthermore, since the selected conductor type had not previously been used or tested within Transgrid's network, it carried higher technical and delivery risks, necessitating additional construction management oversight and increasing overall management costs.

[5] The pre 2023/24 actuals were sunk costs and excluded from the assessment. Total of pre 2023/24 actuals is about $0.59 million in nominal.

- The PACR estimated conductor and hardware costs at $1.56 million. However, actual costs rose to $2.8 million due to the adoption of new conductor technology. Several conductor types were assessed during the development phase and through a competitive procurement process. Ultimately, the Invar conductor was selected as the most suitable option, contributing to the cost increase of materials are increasing supply chain constraints, rising material costs, and challenges in sourcing suitable conductor types in the global market.
- Labour, plant, and other contractual expenses exceeded the forecasts outlined in the PACR. A competitive tender process was conducted, inviting submissions from four members of the Construction Services Panel. The preferred proposal represented the best value for money while demonstrating strong competitiveness.

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 June 2026[6] and has extended by 6 months to December 2026 as per our 2025 TAPR[7]. The work is scheduled to be undertaken in 2025/26 with commissioning possible by 2026/27.

- The underlying factors driving the delay include:
  - Supply chain constraints requiring an alternate conductor type and hardware fittings being required
  - Design changes and further enabling scope
  - Further investigative works and site visits
  - Type testing of conductor and hardware fittings.

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 refers to 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.

[6] Transgrid, 2024 Transmission Annual Planning Report, August 2024, pp.52
[7] Transgrid, 2025 Transmission Annual Planning Report, August 2025, pp.59

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 2.

Overall, we believe re-simulation of the model to include additional generation capacity and updated CWO REZ build limits will not change the relative ranking of the options.

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, thermal limitations on Line 94T will continue to constrain the amount of renewable generation that can be supplied from the Molong and Parkes area to load in the Orange area. Expected increases in renewable generation capacity in the Molong and Parkes area, and expected growth in demand in the Orange area, will result in the network constraint binding more often and to a greater extent, which in turn will increase the volume of renewable generation curtailed. This would increase reliance on existing conventional generation connected to other parts of our network, which would impose higher fuel costs on customers, and increase the need for additional generation capacity to be installed to meet demand growth in the Orange area.

4.2. Market modelling

Considering the location and timing of the project and nature of the market modelling, assumptions such as the discount rate, renewable and storage policies, capacity factors, generator technical parameters, fuel cost, and emissions are less likely to impact the relative ranking of the options or the preferred option. This is because the main driver of the forecast gross market benefits of the options is the extent to which the constraint binding of Line 94T is alleviated by the option. Therefore, the key assumptions which may impact the gross market benefits of the Line 94T options are the demand forecast, generation capacity assumptions, and the REZ build limit in the Molong, Parkes, and Wellington area.

The assumed wind and solar capacity build limit in the CWO REZ did not change significantly in the 2023 IASR relative to the 2022 ISP assumption applied in the Line 94T RIT-T modelling.[8] The 2022 AEMO ISP assumes 3.9 GW for CWO REZ capacity, while TAPR 2023 information states approximately 4.5 GW which remains consistent up to TAPR 2025.[9]

This means the total amount of wind and solar capacity forecast to be built in this REZ would not be anticipated to change with re-simulation. Overall, we believe re-simulation of the model to include additional generation capacity and updated CWO REZ build limits will not change the relative ranking of the options.

We consider additional modelling to account for the new assumptions is not required given that Option 2 is the preferred solution under all scenarios and for almost all sensitivities, and additional modelling would impose additional time and costs on a relatively small project.

[8] AEMO, July 2022, Inputs assumptions and scenarios workbook v3.3
[9] Transgrid, 2025 Transmission Annual Planning Report, August 2025, pp.33

4.3. Assessment period and discount rate

The RIT-T analysis spans a 25-year assessment period from 2022/23 to 2047/48.

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 5.50 per cent has been adopted as the central assumption for the NPV analysis, to align with the market modelling presented in the PACR.[10]

4.4. 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).[11]

For this MCC Assessment, we have received contract pricing for Option 2 (preferred option) 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 in the Association for the Cost Engineering classification system. All cost estimates are prepared in nominal dollars.

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.

4.5. 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

[10] 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.

[11] 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.

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 2022 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	Step Change	Progressive Change	Hydrogen Superpower
Capital costs	Base estimate	Base estimate	Base estimate
Demand	Central demand forecast (ISP POE10 and Orange North POE50)	Central demand forecast (ISP POE10 and Orange North POE50)	High demand forecast (ISP POE10 and Orange North POE10)
New renewable generation in the area	All in-service, committed and anticipated generators (as outlined in section 2.2 of the PACR)	All in-service, committed and anticipated generators (as outlined in section 2.2 of the PACR)	All in-service, committed and anticipated generators (as outlined in section 2.2 of the PACR)
Wholesale market benefits estimated	EY estimate based on the 'step change' 2022 ISP scenario	EY estimate based on the 'progressive change' 2022 ISP scenario	EY estimate based on the 'hydrogen superpower' 2022 ISP scenario

The three scenarios have been weighted based on the ISP weightings:

- 52 per cent to the Step Change scenario
- 30 per cent to the Progressive Change scenario; and
- 18 per cent to the Hydrogen Superpower scenario.

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

4.6. 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 six 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. Option 2A has been removed as it is no longer considered credible.

Table 5-1 Initial NPV of economic benefits relative to the base case ($m, 2021/22), as presented in the PACR

Option	Weighted Scenario
Option 1	20.08
Option 2	24.47
Option 2B	5.01
Option 3	-10.85
Option 4	-60.67

5.2. NPV results from this MCC Assessment in November 2025

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

Table 5-2 NPV of economic benefits relative to the base case ($m, 2021/22), as presented in this MCC Assessment

Option	Weighted Scenario
Option 1	20.08
Option 2	21.88
Option 2B	5.01
Option 3	-10.85
Option 4	-60.67

6. Conclusion and recommendation

This MCC Assessment has found that Option 2 (restring Line 94T with higher rated Invar conductor on existing structures) remains the preferred option, despite its NPV falling from $24.47 million in the PACR to $21.88 (real FY2021/22) 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 2: restring Line 94T with higher rated Invar conductor on existing structures.