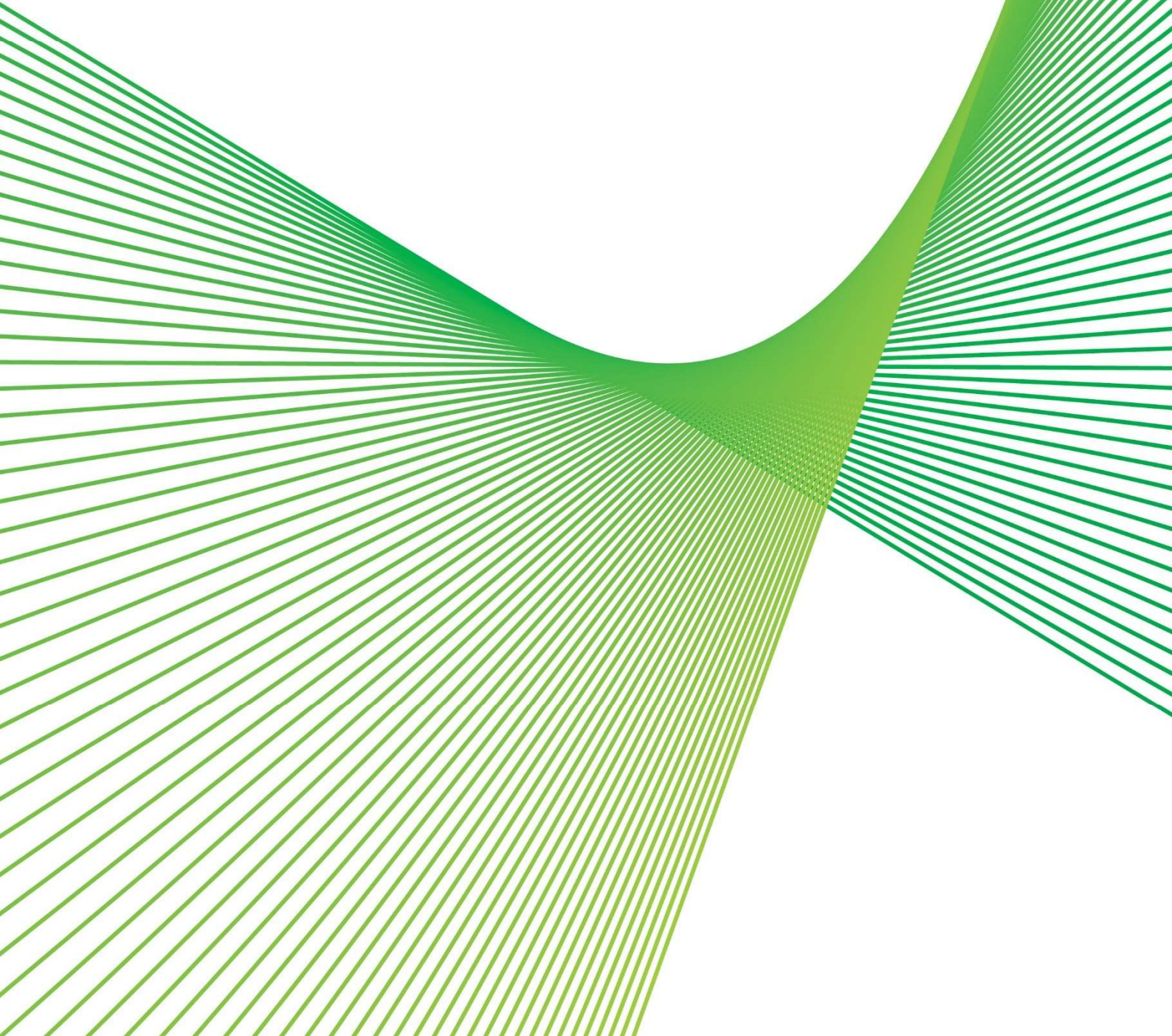


Summary: Increasing capacity for generation in the Molong and Parkes area

RIT-T Project Assessment Conclusions Report

Region: Central West NSW

Date of issue: 31 October 2023



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Summary

We are applying the Regulatory Investment Test for Transmission (RIT-T) to options for improving capacity for renewable generation in the Molong and Parkes area. Publication of this Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process following the Project Assessment Draft Report (PADR) we published on 16 June 2023.

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 are already in service, with a further 1,148 MW of generation committed or anticipated at the time the PADR was published. Since the publication of the PADR, an additional 1,250 MW of committed and anticipated wind and solar generation capacity has been added in the Molong and Parks area.

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

The current rating of the 132 kV Line 94T (Molong – Orange North), is constraining renewable generation in the Molong and Parkes area. AEMO's monthly constraint reports since September 2021 have consistently identified Line 94T as a top 10 constraint on the National Electricity Market (NEM). Network modelling shows thermal overloading of Line 94T is expected under normal system conditions with the current level of in-service and committed generation dispatched to their maximum capacities. Hence, we have identified the opportunity to strengthen the transmission network to relieve this constraint and realise net market benefits by avoiding curtailment of low-cost renewable generation in the Molong and Parkes area.

Benefits from improving capacity and relieving existing constraints in the Molong and Parkes area

The identified need for this RIT-T is to increase overall net market benefits in the NEM through improving capacity and relieving existing constraints on renewable generation in the Molong and Parkes area. This will enable greater output from renewable generation in this region of the NEM.

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

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

We consider this a 'market benefits' driven RIT-T as opposed to a 'reliability corrective action' driven RIT-T. The additional wholesale market benefits associated with each credible option have been estimated using market modelling as part of this PACR.

The PACR analysis has benefited from stakeholder consultation

We published a PADR on 16 June 2023 and invited written submissions on the material presented within the document.

Three submissions were received in response to the PADR. The main topics that emerged from the submissions were:

- Additional renewable generation in the Molong and Parkes area
- Implementation timing for the preferred option
- Options to address potential constraints in other parts of the central west NSW network
- Inconsistency between reported line ratings in the EY market modelling and Transgrid PADR.

The key matters raised in submissions relevant to the RIT-T assessment, as well as our responses and how the matters raised have been reflected in the PACR assessment, are summarised in Section 3 and Appendix B.

Key developments since the PADR have been reflected in the PACR

There have been three notable developments since the PADR was released, which impact the analysis in this RIT-T. In particular:

- AEMO released the 2023 Inputs, Assumptions and Scenarios Report (IASR) on 28 July 2023
- AEMO released an updated database of committed and anticipated generation projects in the NEM in July 2023.
- AEMO released the 2023 Electricity Statement of Opportunities (ESOO) in August 2023.

Details of these changes are provided in Section 2.2. We do not consider these developments will impact the relative ranking of the options as presented in the PADR.

The credible options remain unchanged from the PADR

Table E-1 below summarises each of the credible options assessed in the PACR.

Table E-1: Summary of the credible options

Option	Description	Estimated capex (June \$2022 million)
1	Increase transmission line design temperature of Line 94T	1.41
2	Restrung Line 94T with higher rated 'Flicker/ACSS' conductor on existing structures	7.50
2A	Restrung Line 94T with higher rated 'Partridge/ACSS/HS285' conductor on existing structures	8.16
2B	Implementing Option 2 together with power flow controllers	25.97
3	Replacing Line 94T with a double circuit transmission line	38.54
4	Installation of a 50MW/300MWh BESS at Molong substation	185.69

* All estimated capex (+/- 25%)

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 have been assessed under three scenarios as part of this PACR assessment, which reflect the scenarios from AEMO’s 2022 ISP.

Table E-2 summarises the specific key variables that influence the net benefits of the options under each of the scenarios considered.

Table E-2: 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)	All in-service, committed and anticipated generators (as outlined in Section 2.2)	All in-service, committed and anticipated generators (as outlined in Section 2.2).
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.

Option 2 is found to be the preferred option

This PACR finds that Option 2 is the preferred option for meeting the identified need on a weighted basis and in all but one of the sensitivities assessed. This option involves increasing Line 94T’s summer daytime thermal rating by restringing Line 94T with a higher capacity conductor. The thermal rating of the new conductor would increase from 112 MVA to at least 150 MVA.

In the Project Assessment Draft Report (PADR) we identified Options 2 and 2A as the preferred options. We have decided to progress with Option 2 over Option 2A as Option 2 is expected to deliver approximately \$24.5 million in net benefits over the assessment period (on a weighted-basis), which is marginally higher than the \$23.9 million in net benefits expected to be delivered by Option 2a.

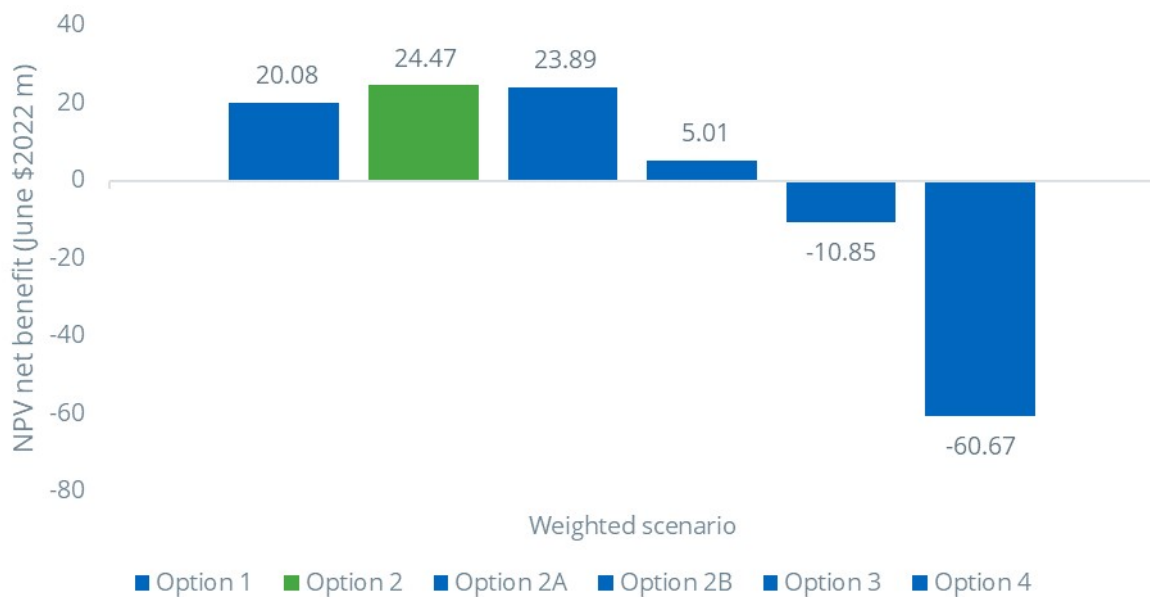
While other options, such as Option 4, are able to generate additional gross market benefits compared to Option 2, the build costs of these options are significantly higher and result in lower net benefits under all scenarios.

Option 2 will now be subject to detailed design. If, during the detailed design stage, another conductor with the same or higher rating and similar costs and benefits as Option 2 is found to be more fit for purpose, we may amend the preferred option to use the alternative conductor. We will only adopt an alternative conductor if its use will 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.

Table E-3: NPV of net economic benefits relative to the base case – Weighted scenario (June \$2022 million)

Option	Weighted scenario
Option 1	20.08
Option 2	24.47
Option 2A	23.89
Option 2B	5.01
Option 3	-10.85
Option 4	-60.67

Figure E-1 NPV of net economic benefits relative to the base case (Weighted scenario, June \$2022 million)



Next steps

This PACR represents the final step of the consultation process in relation to the application of the RIT-T process.

Parties wishing to raise a dispute notice with the AER may do so prior 2 December 2023 (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 our Regulation team via regulatory.consultation@transgrid.com.au.¹ In the subject field, please reference 'Increasing capacity for generation in the Molong and Parkes area PACR'.

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