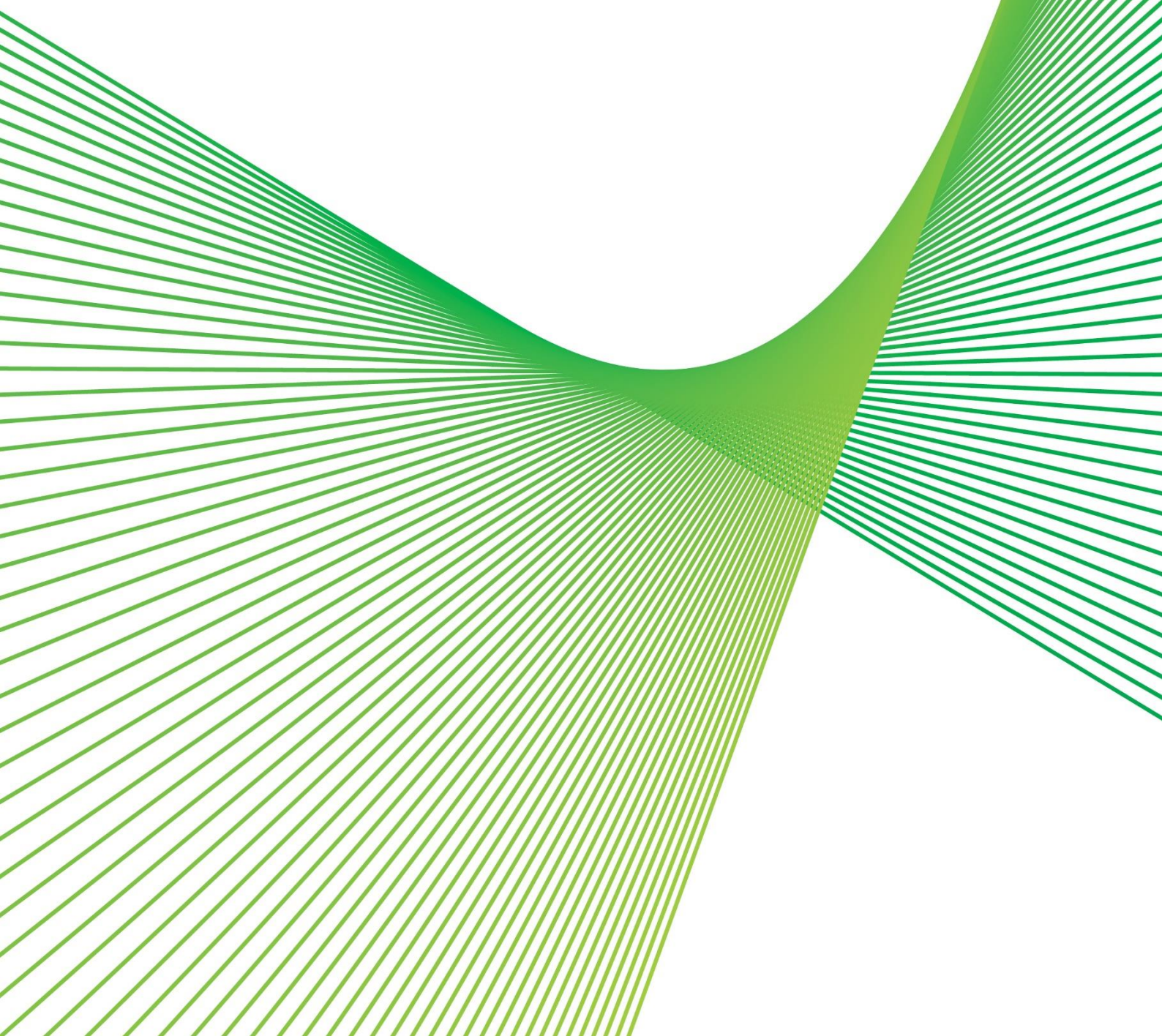


# **Increasing capacity for generation in the Molong and Parkes area**

RIT-T Project Assessment Draft Report

Region: Central West NSW

Date of issue: 16 June 2023



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## Summary

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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 Draft Report (PADR) represents the second step in the RIT-T process following the Project Specification Consultation Report (PSCR) we published on 29 July 2022.

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 in advanced stage.

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 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 2022 identified the Line 94T constraint as the second highest binding impact network constraint.<sup>1</sup>

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. 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.

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<sup>1</sup> AEMO, *NEM Constraint Report 2022 summary data*, 24 May 2023.



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 PADR.

### **The PADR analysis has benefited from stakeholder consultation**

We published a PSCR on 29 July 2022 and invited written submissions on the material presented within the document. In the PSCR, we noted that non-network options may be able to assist with meeting the identified need.

Five submissions were received in response to the PSCR which can be grouped into three categories:

- existing renewable generators in central west NSW
- a conductor manufacturer, and
- a power flow controller manufacturer.

The submissions raised a number of alternative options that we have assessed in addition the options presented in the PSCR. We have also presented additional sensitivity analysis in response to the issues raised by stakeholders. These submissions have been summarised and responded to in this PADR.

We held bilateral meetings with each of the submitters in order for them to further understand the RIT-T assessment and the option requirements in the Molong and Parkes area, as well as how proposed solutions are expected to be able to assist with meeting the identified need. These discussions have played a key role in developing the PADR and we thank all parties for their time and effort to-date.

### **Key developments since the PSCR have been reflected in the PADR**

There have been a number of key developments since the PSCR was released, which impact the analysis in this RIT-T. In particular we have included:

- an additional four options based on stakeholder submissions to the PSCR;
- Stage 1 of the preferred option from the Maintaining Reliable Supply to Bathurst, Orange and Parkes RIT-T in the assessment base case, to ensure benefits quantified in that RIT-T aren’t double counted; and
- additional in-service, committed and advanced renewable generation in the Wellington, Molong and Parkes area based on AEMO’s latest generation information.

### **The credible options have been refined since the PSCR**

The credible options assessed involve relieving the existing constraint through different means. Three broad types of credible options have been assessed which involve:

- increasing the capacity of the existing Line 94T (Molong – Orange North) (Option 1, 2, 2A and 3)
- installing power flow controllers in combination with increasing the capacity of the existing Line 94T (Option 2B), and
- installing a Battery Energy Storage System (BESS) (Option 4).

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

Table E-1: Summary of the credible options

Option	Description	Estimated capex (\$M, Real 2021-22)
1	Increase transmission line design temperature of Line 94T	1.4
2	Restrung Line 94T with higher rated 'Flicker/ACSS' conductor on existing structures	7.5
2A	Restrung Line 94T with higher rated 'Partridge/ACSS/HS285' conductor on existing structures	8.2
2B	Implementing Option 2 together with power flow controllers	26.0
3	Replacing Line 94T with a double circuit transmission line	38.5
4	Installation of a 50MW/300MWh BESS at Molong substation	185.7

Note: All estimated capex is an accuracy level of +/- 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 PADR 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, as outlined in section 2.2.2)	Central demand forecast (ISP POE10 and Orange North POE50, as outlined in section 2.2.2)	High demand forecast (ISP POE10 and Orange North POE10, as outlined in section 2.2.2)
Renewable generation in the area	All in-service, committed and advanced generators (as outlined in section 2.2.1)	All in-service, committed and advanced generators (as outlined in section 2.2.1)	All in-service, committed and advanced generators (as outlined in section 2.2.1)
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
Discount rate	5.50%	5.50%	5.50%

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 and 2A are the preferred options

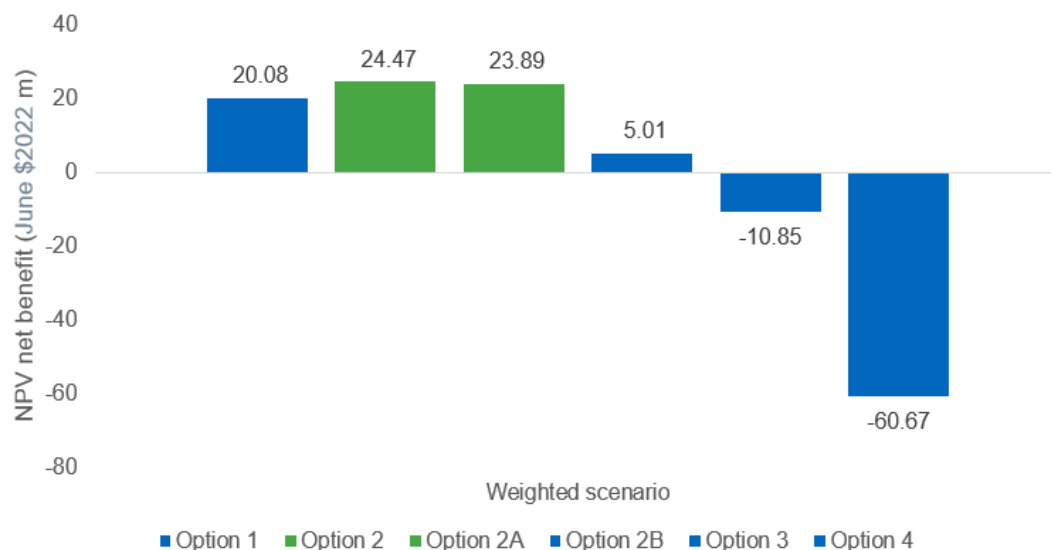
Options 2 and 2A produce the highest net benefits under each of the three ISP scenarios. While Option 2 produces the largest net benefit under each scenario, the net benefits produced by Option 2A are only marginally lower. Given the similarities between the builds of the two options (both require restringing Line 94T with higher rated conductors), as well as the similar gross market benefits produced by both options, we consider both options to be the preferred options.

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

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

Option	Weighted scenario
Option 1	20.1
Option 2	24.5
Option 2A	23.9
Option 2B	5.0
Option 3	-10.9
Option 4	-60.7

Figure E-1 NPV of net economic benefits relative to the base case (Weighted scenario)



For the next stage of the RIT-T process, we intend to undertake more detailed analysis on which of Option 2 or 2A are likely to deliver greater cost efficiencies and, therefore, which will be the preferred option.

## Next steps

We welcome written submissions on this PADR. Submissions are due on 2 August 2023. Submissions should be emailed to our Regulation team via [regulatory.consultation@transgrid.com.au](mailto:regulatory.consultation@transgrid.com.au).<sup>2</sup> In the subject field, please reference 'Increasing capacity for generation in the Molong and Parkes area PADR'.

At the conclusion of the consultation process, all submissions received will be published on our website. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement.

The next formal stage of this RIT-T is the publication of a PACR. The PACR is expected to be published in December 2023.

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<sup>2</sup> Transgrid is bound by the Privacy Act 1988 (Cth). In making submissions in response to this consultation process, Transgrid will collect and hold your personal information such as your name, email address, employer and phone number for the purpose of receiving and following up on your submissions. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement. See Privacy Notice within the Disclaimer for more details.