



Moree SAP – Contingent Project



**Demand Forecast Independent
Verification and Assessment**

Transgrid

16 October 2022

→ **The Power of Commitment**



Project name		Demand Forecast Validation					
Document title		Moree SAP – Contingent Project Demand Forecast Independent Verification and Assessment					
Project number		12592242					
File name		Demand Forecast Validation					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
Final	1	Tony Loveday	B. Clarke		B. Clarke		16/10/22

GHD Pty Ltd 39 008 488 373

180 Lonsdale Street

Melbourne, Vic 3000, Australia

T +61-3-8687-8000 | **F** +61-3-8687- 6522 | **E** maelmail@ghd.com | **ghd.com**

© GHD 2022

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Glossary

AER	Australian Energy Regulator
OER	Options Evaluation Report
PACR	Project Assessment Conclusions Report
PADR	Project Assessment Draft Report
RIT-T	Regulatory Investment Test for Transmission
SAP	Special Activation Precinct
NER	National Electricity Rules
TAPR	Transmission Annual Planning Report

Contents

Glossary	1
1. Introduction	3
1.1 Purpose of this report	3
1.2 Scope and limitations	3
1.3 Assumptions	3
2. Moree Special Activation Precinct	4
2.1 Regulatory Requirements	4
2.2 AER Draft Determination	4
2.3 Demand Forecast	4
2.3.1 Maintaining Reliable Supply to the North West Slopes area RIT-T	4
2.3.2 Moree SAP	5
2.3.3 AER reasons for rejection of contingent project	6
2.4 Conclusions	7

1. Introduction

Transgrid has included a contingent project “Moree Special Activation Precinct” within its 2023-28 Revenue Proposal. Given that load data from third parties is confidential, Transgrid has only detailed the consolidated / aggregate demand forecasts.

To further support the assessment of this project, Transgrid has engaged GHD to perform an independent verification and assessment of the projects demand forecasts.

1.1 Purpose of this report

The purpose of this report is to independently review and verify the basis of the load forecasts used by Transgrid in preparing the proposal for a contingent project for areas in their transmission network where future limitations requiring augmentation are may occur following a possible but not certain trigger event as a result of a demand increase which will initiate an application to amend a revenue determination to include a contingent project which will require augmentation to commence within the 2023-28 regulatory control period.

1.2 Scope and limitations

This report has been prepared by GHD for Transgrid and may only be used and relied on by Transgrid for the purpose agreed between GHD and Transgrid.

GHD otherwise disclaims responsibility to any person other than Transgrid arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

GHD has prepared this report on the basis of information provided by Transgrid, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.3 Assumptions

The following assumptions have been made when writing this report:

- There have been no major changes to the intentions of proponents in relation to spot loads since submissions were made during development of the demand forecast used during the proposal for a contingent project within the 2023-28 Revenue Proposal.

2. Moree Special Activation Precinct

2.1 Regulatory Requirements

The rules associated with Contingent Projects are set out in Chapter 6A.8 of the National Electricity Rules (NER).

Clause 6A.8.1 defines the rules used by the AER to determine if a proposed contingent project is actually a contingent project.

The regulatory requirements for applications for contingent projects are contained in clause 6A.8.2 of the NER and in the AER's Process Guideline for Contingent Project Application¹.

This report is only examining the rejection of the Moree Special Activation Precinct contingent project by the AER as part of the Transgrid 2023-28 revenue determination using reasons set out in clause 6A.8.1 of the NER.

2.2 AER Draft Determination

This report is being performed to review the demand forecast used by Transgrid to justify the possibility of a contingent project application being made during the 2023-28 regulatory control period should the relevant trigger event occur.

In their draft revenue determination for the 2023-28 regulatory control period² the AER rejected the proposed Moree Special Activation Precinct contingent project for the following reasons:

“Transgrid identified that initial joint planning discussions with Essential Energy have identified a future requirement to augment the transmission network in the Moree area. Transgrid considers the NSW Government is preparing a plan to develop the Moree area to provide a new business hub as the main driver of demand.

We consider the driver of this project appears to be organic load growth. Transgrid also noted that there is sufficient network capacity to manage the loads in the 2023–28 period. The trigger relates to total demand exceeding 50 MW. Our analysis of demand information provided by Transgrid suggests the probability of the trigger occurring in 2023–28 to be around 10%. Accordingly, we do not consider this to be an event or condition, the occurrence of which is probable during the 2023–28 period³. Although we recognise that demand forecasting is inherently uncertain, we do not consider this should serve as the sole basis for a contingent project.”

2.3 Demand Forecast

2.3.1 Maintaining Reliable Supply to the North West Slopes area RIT-T

Maintaining Reliable Supply to the North West Slopes area project has completed its Regulatory Investment Test for Transmission (RIT-T). The preferred option identified in the PACR involves a non-network solution provided through a BESS at the Gunnedah 132 kV substation and the installation of a third 60 MVA 132/66 kV transformer at Narrabri 132/66 kV substation in the near-term. It also involves the rebuilding of the existing 969 line between the Tamworth 330 kV and Gunnedah substations as a double circuit line and upgrading the 9UH line between Narrabri and Boggabri North to a rating of 100 MVA over the longer-term, depending on outturn demand forecasts.

The solution identified for the North West Slopes RIT-T was developed considering load growth (mining and gas developments) across the area from Tamworth to Narrabri. Potential loads in the transmission network further to the north from Narrabri to Moree to Inverell (132kV lines 96M and 9U2) were not considered as sufficiently committed for inclusion in the RIT-T at that time.

¹ <https://www.aer.gov.au/system/files/ac06907-Final%20guideline.pdf>

² [AER - Transgrid 2023-28 - Draft Decision - Attachment 5 - Capital expenditure - September 2022.pdf](#)

³ NER, cl. 6A.8.1 (c)(5)

2.3.2 Moree SAP

GHD has reviewed the process that Transgrid has used to develop the load forecast for the Moree Special Activation Precinct contingent project included in their 2023-28 revenue proposal and the reasons that the AER rejected its inclusion as proposed contingent project in the draft 2023-28 Transgrid revenue determination.

The Regional Growth NSW Development Corporation (RGDC) approached Transgrid in August 2021 advising of a possible Special Activation Precinct (SAP) in the Moree area. The Moree SAP development is being delivered by the Department of Regional NSW (DRNSW), the NSW Government’s central reGENCY for regional issues, through the RGDC. Known for its high-value agricultural produce, innovative farming and concentration of agribusinesses, the Moree precinct will cover an area of 4,716 hectares. The precinct will take advantage of its location, leveraging the Inland Rail route and Newell Highway to create a new business hub within the region.

RGDC is looking at developing the Moree SAP starting within the 2023-28 period based on their latest advice, as per the demand forecast they provided, given in Figure 1 below. The preliminary loads are made up of multiple connections and will connect into the network in stages. RDGC sought Transgrid’s establishment of a new 132/22 kV substation to supply the SAP, connecting into the existing 96M Moree to Narrabri 132 kV line.

The load forecast provided to Transgrid in a submission to the PADR Maintaining Reliable Supply to the North West Slopes area (NWS) is shown in the below table. Moree SAP was not included in the demand forecast for NWS PADR as the Moree SAP project was not sufficiently committed at that time for the purposes of the RIT-T.

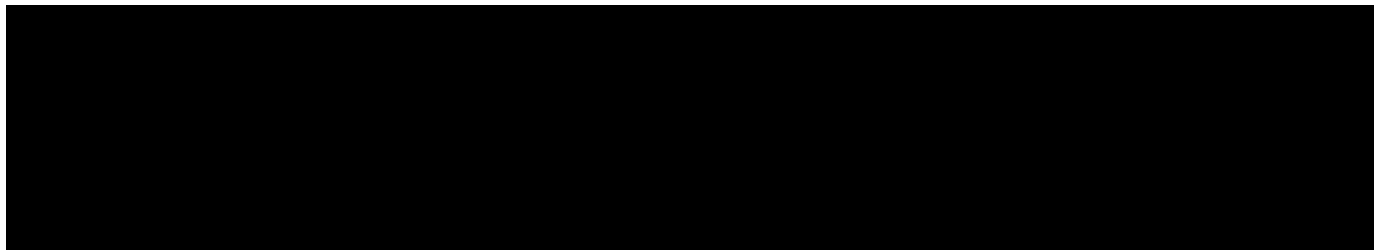


Figure 1 - Moree SAP forecast provided by NSW Government

Transgrid used this forecast and performed an assessment of the possible network limitations which could occur with an increase in load at Moree. For the additional loading forecast in all three scenarios during the 2023-28 period the loss of the 9U2 line between Moree and Inverell, when the Moree Solar Farm is not generating, the voltage at Moree can drop to below 0.9 per unit, breaching the system standard voltage requirement of the NER Schedule S5.1a.4 Power Frequency Voltage. It also has the possibility of causing voltage collapse at times of high demand which will result in all the load in the Moree area being disconnected.

The demand in the shaded light to dark brown cells at times of peak demand would require up to 12 MVAR of reactive support from 2024 or 2025, up to 18 MVAR of reactive support from 2026 to 2031, up to 24 MVAR of reactive support from 2028 to 2031 and more beyond 2031, depending on the loading scenario which will eventuate. From this it can be concluded that voltage support will be required at Moree for any increase in load of over 5 MVA at Moree. A forecast load increase of over 23 MVA will require significant reactive support.

In addition to the voltage support, should the Moree SAP be supplied via the Moree 66 kV rather than from a new substation on the 96M line, the pink shaded cells show what loading would overload an existing Moree transformer upon outage of the remaining transformer, and highlighted red cells show where the reliability standard would be breached.

Table A2.5: Essential Energy (North) bulk supply point summer maximum demand

	2022/23		2023/24		2024/25		2025/26		2026/27		2027/28		2028/29		2029/30		2030/31		2031/32								
	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA							
Moree 66 kV	27	0	27	27	-1	27	27	-1	27	28	-1	28	28	-1	28	28	-2	28	28	-2	28	28	-2	28	28	-3	28

Table A2.6: Essential Energy (North) bulk supply point winter maximum demand

	2022		2023		2024		2025		2026		2027		2028		2029		2030		2031											
	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA	MW	MVAR	MVA	MVA										
Moree 66 kV	37	-7	37	36	-7	37	36	-7	37	36	-7	37	36	-8	37	36	-8	37	37	-8	37	37	-8	37	37	-9	38	37	-9	38

Figure 2 - Moree substation connection point forecast

The Moree substation forecast provided in Figure 2, taken from Transgrid's 2022 TAPR, shows present loading of up to 28 MW during summer or 37 MW during winter. With the smaller load increase of 5 MW identified above causing issues in the Moree area, the initial 50 MW trigger assessment was an optimistic assessment prior to the above analysis. Following this more detailed analysis the trigger point for when augmentation will be required to ensure voltages can be maintained in the Moree area will be when the total load in the Moree area exceeds 42 MW.

Adding additional capacitor banks at Moree can alleviate voltage constraints, however beyond that point further reactive support would continue to be required with every few MW of load increase, with diminishing effectiveness. A larger dynamic voltage support solution would provide a more prudent approach to solve the issue.

As such, the identified need is highly likely to occur in the 2023-28 period, with a lower 42 MW total supply limit to the load at Moree taken as a trigger point, along with the commitment of the Moree SAP, to begin the contingent project RIT-T process.

2.3.3 AER reasons for rejection of contingent project

GHD notes that in section B.1.4.5 of the AER draft determination the following statement is made:

"We consider the driver of this project appears to be organic load growth. Transgrid also noted that there is sufficient network capacity to manage the loads in the 2023–28 period. The trigger relates to total demand exceeding 50 MW. Our analysis of demand information provided by Transgrid suggests the probability of the trigger occurring in 2023–28 to be around 10%. Accordingly, we do not consider this to be an event or condition, the occurrence of which is probable during the 2023–28 period⁴. Although we recognise that demand forecasting is inherently uncertain, we do not consider this should serve as the sole basis for a contingent project."

Since the time that Transgrid submitted its 2023-28 revenue proposal to the AER, more detailed modelling of the transmission network in the Moree area has been performed. This modelling has shown that the additional load that needs to be applied at Moree to cause the network voltage to fall below required limits has been reduced from 13 MW (50 MW of total load) to 5 MW (42 MW of total load). In all forecasts of the loading at the Moree SAP provided by the Regional Growth NSW Development Corporation (low, medium or high scenarios) the load in the Special Activation Precinct will exceed 5 MW by 2025. This level of demand will require additional voltage support to be provided in the Moree area in order to ensure network voltages remain within the system standard voltage requirement of the NER Schedule S5.1a.4 Power Frequency Voltage. A demand increase resulting from any development within the Moree SAP will very likely result the demand increasing by at least 5 MW. Hence the probability of the Moree SAP contingent project will be required has significantly increased from when the original revenue proposal was submitted.

When the trigger point of 42 MW total load at Moree, along with the commitment of the Moree SAP, is reached the contingent project RIT-T process will need to be initiated. Network or non-network augmentation projects to ensure that network voltages remain within required limits will need to be initiated during the 2023-28 regulatory control period.

⁴ NER, cl. 6A.8.1 (c)(5)

2.4 Conclusions

GHD is satisfied that Transgrid has correctly used load forecasts provided by customers to justify the inclusion of Moree Special Activation Precinct as a contingent project in the AER revenue determination for the 2023-28 regulatory control period.

Since the original Transgrid revenue proposal for the 2023-28 regulatory control period was made to the AER more detailed modelling of the transmission network in the Moree area has shown that the increase in load that will result in voltage issues is now only 5 MW. There is now a much higher probability that demand resulting from development of the Moree SAP will require a contingent project RIT-T to be initiated. The contingent project will need to deliver solutions during the 2023-28 period if any the low, medium or high scenarios of demand from the SAP are realised.

GHD has reviewed the basis of rejection of the Moree SAP contingent project in the draft revenue determination and provided justification why these reasons should be reviewed and revised.

