Meeting demand growth in the Western Sydney Aerotropolis 'Priority Growth Area'

RIT-T Project Specification Consultation Report

Issue date: 7 May 2024

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Executive summary

This Regulatory Investment Test for Transmission (RIT-T) is a joint planning initiative between Transgrid and Endeavour Energy. The RIT-T will apply to options for ensuring reliable supply to the Western Sydney Aerotropolis 'Priority Growth Area' in light of demand growth from the development of the Western Sydney International (Nancy Bird Walton) Airport and surrounding metropolitan, commercial and industrial precincts (collectively referred to as the 'Aerotropolis precinct'). Publication of this Project Specification Consultation Report (PSCR) represents the first step in the RIT-T process.

This is a joint RIT-T between Transgrid and Endeavour Energy to establish a new Bulk Supply Point (BSP) at Kemps Creek to supply increasing load growth in the area. Endeavour Energy will not be conducting a separate RIT-D for connecting their side of the network to the new BSP because the scope of the Endeavour Energy work and the related cost estimate is included in the RIT-T and these works are necessary and intrinsic to the BSP augmentation work and the connection to the customers in the area.

Transgrid has worked with Endeavour Energy and determined that the expected increase in demand from developments in the Aerotropolis precinct will result in power flows exceeding the capacity of the Macarthur 132 kV transmission BSP from 2026/27 under system normal conditions. This will require load shedding under both system normal and contingency conditions at the Macarthur 132 kV BSP after Endeavour Energy completes the first phase of its current supply network upgrades in the area.[1]

This PSCR has been prepared in conjunction with Endeavour Energy (as the relevant distribution network service provider).[2]

Identified need: relieving network constraints to facilitate the connection of load and provide net market benefits

We have identified the opportunity to improve network supply capacity to the Aerotropolis precinct, which is expected to provide significant net market benefits by eliminating the need for load shedding. This will result in an overall increase in net benefits to participants in the National Electricity Market (NEM) and is considered a 'market benefits' driven RIT-T (i.e., as opposed to a 'reliability corrective action').

Credible options considered

We consider that there are two feasible options from a technical, commercial, and project delivery perspective that can be implemented in sufficient time to meet the identified need. These are summarised in Table E-1.

[1] Endeavour Energy completed a Regulatory Investment Test for Distribution (RIT-D) in January 2022 to address network limitations caused by increasing demand in the Aerotropolis area. This RIT-D identified the construction of a 26.5km 132kV underground feeder with 275MVA capacity that spans between South Erskine Park zone substation (ZS) to the Bringelly ZS as the preferred option. The project is expected to be in place by 2024/25 and will support the various new substations in the region designed to accommodate the increase in demand.

[2] Consistent with the joint-planning requirements in the National Electricity Rules.

Table E-1 Summary of the credible options

Option	Description	Capital cost ($m)		
		Transgrid	Endeavour Energy	Total
Option 1	New BSP next to the Kemps Creek substation	$109.4m	$24.4m	$132.8m
Option 2	New Airport South BSP supplied from cut-in to Line 39	$157.7m	$100.0m	$257.7m

Non-network options are not expected to be able to assist with this RIT-T

We do not consider that there will be a non-network solution, or group of solutions, that forms a potential credible option on a standalone basis, or that forms a significant part of a potential credible option for this RIT-T.

This is due to the network augmentation being required to facilitate substantial new loads, i.e., the investment is being built solely for greenfield load developments (and the magnitude of these developments is such that realistic non-network solutions cannot alter the timing or scope of the expected network investment).

Submissions and next steps

The purpose of this PSCR is to set out the reasons we propose that action be undertaken, present the options that address the identified need, outline why for this particular RIT-T we do not consider non-network options are able to assist, and allow interested parties to make submissions and provide input to the RIT-T assessment.

We welcome written submissions on materials contained in this PSCR. Submissions are due on 5 August 2024.

Submissions should be emailed to our Regulation team via regulatory.consultation@transgrid.com.au.[3] In the subject field, please reference 'Western Sydney Aerotropolis Priority Growth Area PSCR'.

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

We intend to produce a Project Assessment Draft Report (PADR) that addresses all submissions received and presents our draft conclusion on the preferred option for this RIT-T. Subject to what is proposed in submissions to this PSCR, we anticipate publication of a PADR in late 2024.

[3] We are bound by the *Privacy Act 1988 (Cth)*. In making submissions in response to this consultation process, we 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.

Contents

1. Introduction

This Regulatory Investment Test for Transmission (RIT-T) is a joint planning initiative between Transgrid and Endeavour Energy. The RIT-T will apply to options for ensuring reliable supply to the Western Sydney Aerotropolis 'Priority Growth Area' in light of demand growth from the development of the Western Sydney International (Nancy Bird Walton) Airport and surrounding metropolitan, commercial and industrial precincts (collectively referred to as the 'Aerotropolis precinct'). Publication of this Project Specification Consultation Report (PSCR) represents the first step in the RIT-T process.

Endeavour Energy completed a Regulatory Investment Test for Distribution (RIT-D) in January 2022 to address network limitations caused by increasing demand in the Aerotropolis area. This RIT-D identified the construction of a 26.5km 132kV underground feeder with 275MVA capacity that spans between South Erskine Park zone substation (ZS) to the Bringelly ZS as the preferred option. The project is expected to be in place by 2024/25 and will support the various new substations in the region designed to accommodate the increase in demand.

Endeavour Energy has and will continue to conduct separate RIT-D processes for zone substations in the Western Sydney Aerotropolis area and the major new 132kV underground feeder, however the capital investment required by Endeavour to enable the augmentation of Bulk Supply Points will not have a separate RIT-D process and will be covered by the joint planning with Transgrid and the RIT-T process. The Endeavour Energy capital investment required for enabling the connection of the BSP augmentations will provide a connection to customers and Western Sydney and are necessarily required and justified in our joint planning initiative. The scope of work and cost estimates of the Endeavour Energy capital investment are included and identified within the RIT-T. The regulatory investment testing in the RIT-T will include the Endeavour Energy scope of works to enable the augmentation of the BSPs.

Transgrid has worked with Endeavour Energy and determined that the expected increase in demand from developments in the Aerotropolis precinct will result in power flows exceeding the capacity of the Macarthur 132 kV transmission Bulk Supply Point (BSP) from 2026/27 under system normal conditions. This will require load shedding under both system normal and contingency conditions at the Macarthur 132 kV BSP after Endeavour Energy completes the first phase of its supply network upgrades in the area.

We have identified the opportunity to improve network supply capacity to the Aerotropolis precinct, which is expected to provide significant net market benefits by eliminating the need for load shedding. This will result in an overall increase in net benefits to participants in the National Electricity Market (NEM) and is considered a 'market benefits' driven RIT-T (i.e., as opposed to a 'reliability corrective action').

This PSCR has been prepared in conjunction with Endeavour Energy (as the relevant distribution network service provider).[4]

Transgrid's revenue determination for the 2023-2028 regulatory period includes a transmission augex project to serve rapid localised demand growth in the Western Sydney Aerotropolis Priority Growth Area.[5] The AER's draft determination for Endeavour Energy over 2024-2029 also includes approval for its

[4] Consistent with the joint-planning requirements in the National Electricity Rules.

[5] The AER's draft decision for Transgrid's 2023-2028 revenue determination approved our proposed augex project for meeting demand growth in the Western Sydney Priority Growth Area. See: Transgrid, *2023-28 Revised Revenue Proposal*, December 2022, p. 5

proposed total net forecast capex, including the proposed augex for augmentation projects associated with the Aerotropolis precinct.[6]

1.1. Purpose of this report

The purpose of this PSCR[7] is to:

- set out the reasons why we propose that action be undertaken (the 'identified need');
- present the options that we currently consider address the identified need;
- outline the technical characteristics that non-network options would need to provide (although we note that non-network options are not expected to be able to form part of a potential credible option for meeting the identified need for this RIT-T); and
- allow interested parties to make submissions and provide inputs to the RIT-T assessment.

Overall, this report provides transparency into the planning considerations for investment options to ensure continuing reliable supply to our customers. A key purpose of this PSCR, and the RIT-T more broadly, is to provide interested stakeholders the opportunity to review the analysis and assumptions, provide input to the process, and have certainty and confidence that the preferred option has been robustly identified as optimal.

1.2. Submissions and next steps

We welcome written submissions on materials contained in this PSCR. Submissions are due on 5 August 2024.

Submissions should be emailed to our Regulation team via regulatory.consultation@transgrid.com.au.[8] In the subject field, please reference 'Western Sydney Aerotropolis Priority Growth Area PSCR'.

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.

We intend to produce a Project Assessment Draft Report (PADR) that addresses all submissions received and presents our draft conclusion on the preferred option for this RIT-T. Subject to what is proposed in submissions to this PSCR, we anticipate publication of a PADR in late 2024.

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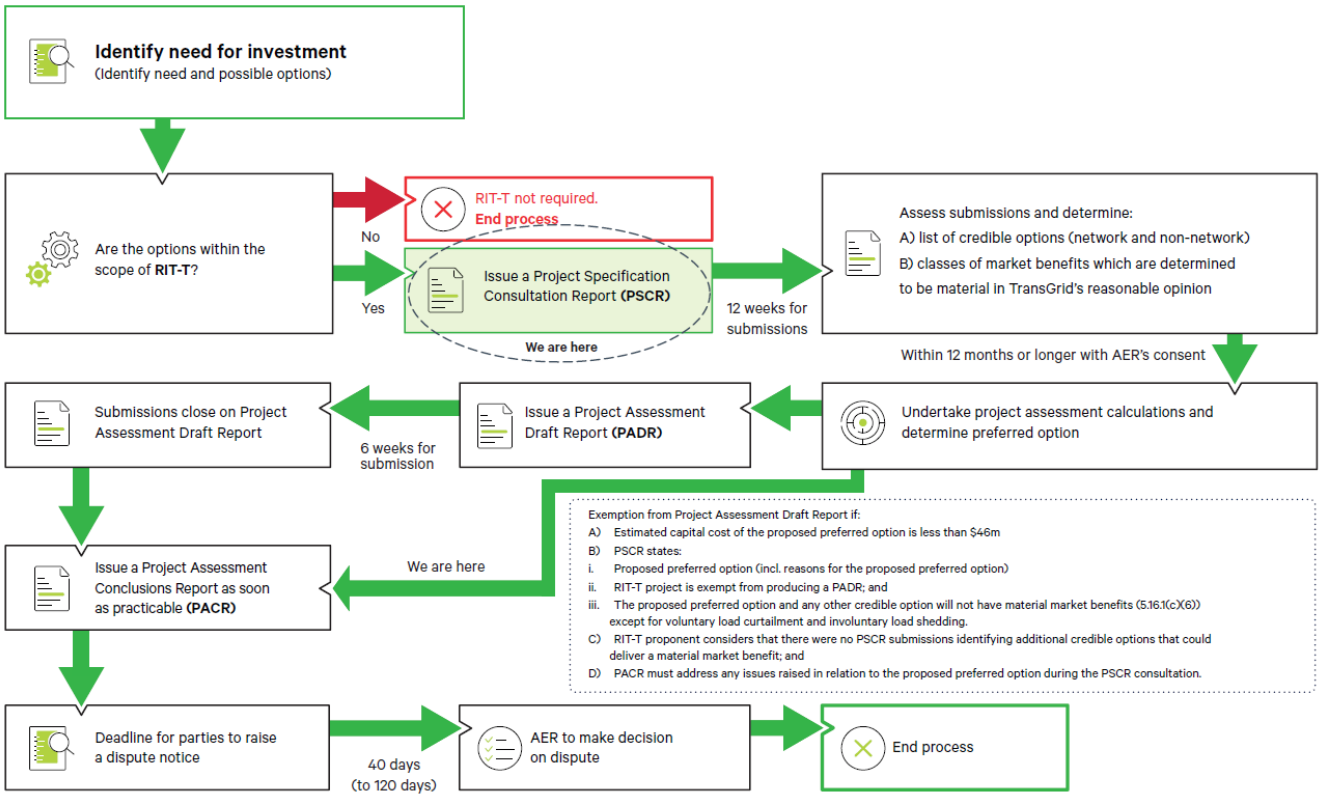
6 AER, *Endeavour Energy electricity distribution determination 2024 to 2029 – Attachment 5: Capital expenditure*, Draft decision.

7 See Appendix A for the National Electricity Rules requirements.

8 We are bound by the *Privacy Act 1988 (Cth)*. In making submissions in response to this consultation process, we 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.

Figure 1-1 This PSCR is the first stage of the RIT-T process[9]



[9] AEMC, *Replacement expenditure planning arrangements, Rule determination*, 18 July 2017.

2. The identified need

This section outlines the identified need for this RIT-T, as well as the assumptions and data underpinning it. It first sets out background information related to the Western Sydney Aerotropolis Priority Growth Area.

2.1. Background

The Greater Western Sydney area is expected to experience significant growth over the coming years due to development of:

- Western Sydney International (Nancy Bird Walton) Airport;
- the Sydney Metro-Western Sydney Airport line;
- the establishment of Sydney's third city, Bradfield;
- road infrastructure (including the M12 motorway);
- new industries including agribusiness, transport and logistics, defence, aerospace, education and advanced manufacturing; and
- a number of data centres planning to locate in the area.

A number of these new loads are backed by government commitments. For example:

- the Australian Commonwealth Government and the NSW Government have committed to the Western Sydney Airport, with commercial operations starting in 2026;[10] and
- the NSW Government granted planning approval for the Sydney Metro – Western Sydney Airport line, with testing occurring one year prior to its commissioning in 2026.[11] Sydney Metro have already started work on construction supplies, with significant load required for tunnel boring machines and other associated construction.

All of the above loads are captured within the NSW Government's Western Sydney Aerotropolis 'Priority Growth Area'.[12]

The region is currently supplied by Transgrid primarily via three Bulk Supply Points (BSPs) – the Macarthur BSP, the Sydney West BSP and the Liverpool BSP.

Under system normal conditions, the single Macarthur 330/132 kV transformer presently supplies:

- Nepean transmission substation
- Bringelly ZS
- Oran Park 132/11 kV ZS
- North Leppington 132/11 kV ZS,
- South Leppington 132/11 kV ZS; and
- a large customer installation at Smeaton Grange supplied at 132 kV.

[10] DPIE, Western Sydney Airport: Airport Plan, July 2020, p. viii. Details on the Western Sydney Airport are available from https://www.westernsydneyairport.gov.au/. Prime Minster press release on Sydney Metro and Western Sydney Airport available from https://www.pm.gov.au/media/new-agreement-keeps-sydney-metro-western-sydney-airport-jobmaker-project-track

[11] DPIE, Sydney Metro – Western Sydney Airport: State Significant Infrastructure Assessment, July 2021, p 6. Prime Minster press release on Sydney Metro and Western Sydney Airport available from https://www.pm.gov.au/media/new-agreement-keeps-sydneymetro-western-sydney-airport-jobmaker-project-track

[12] https://www.planning.nsw.gov.au/plans-for-your-area/priority-growth-areas-and-precincts/western-sydney-aerotropolis

In the future it will also supply additional proposed ZSs including initial supplies to the proposed Aerotropolis core 132/22 kV ZS.

Under system normal conditions, the two Macarthur 330/66 kV transformers presently supply:

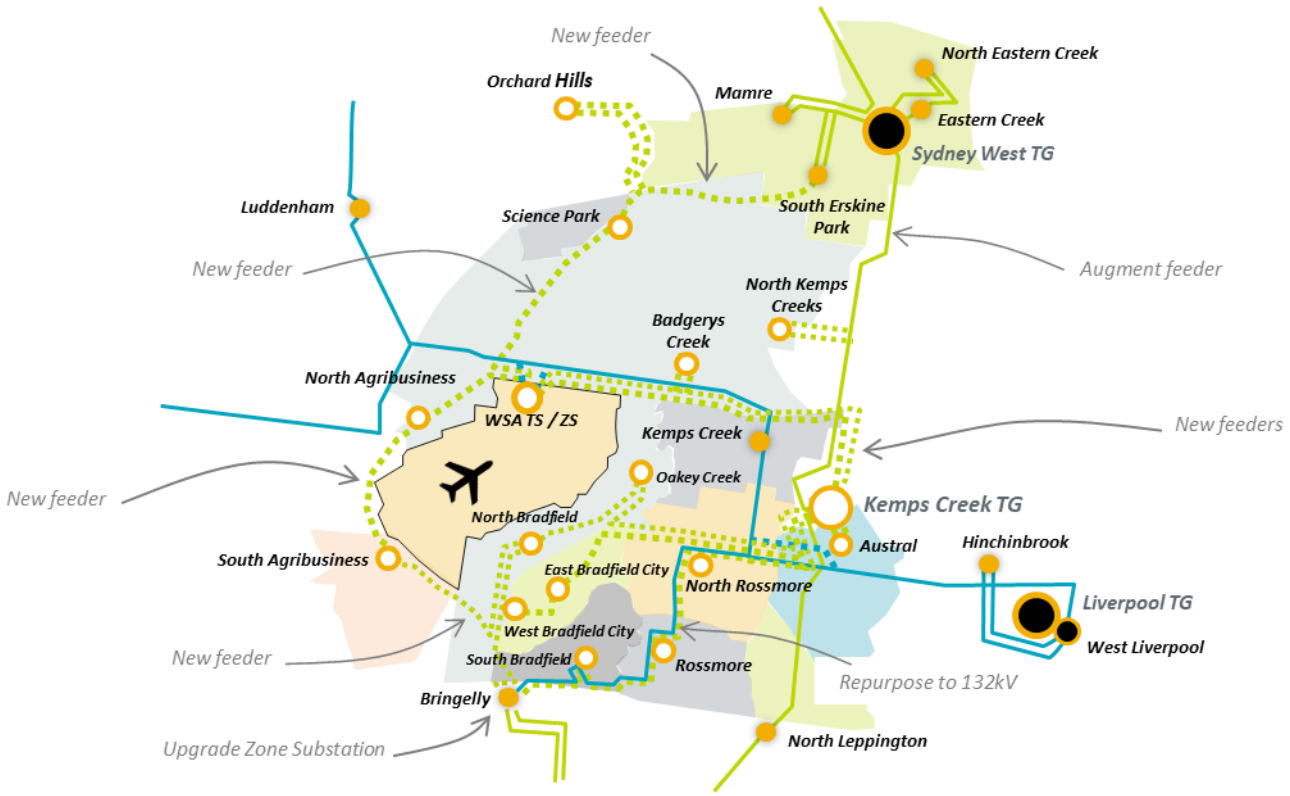
- Ambarvale ZS
- Appin ZS
- Campbelltown ZS
- Kentlyn ZS
- Menangle Park ZS; and
- a number of significant large customer installations.

In the future they will also supply proposed additional ZSs in the Greater Macarthur growth area (notably at Mt Gilead, Appin and Wilton New Town).

Endeavour Energy undertook a Regulatory Investment Test for Distribution (RIT-D) over 2021 and 2022 to address network limitations caused by increasing demand in the Aerotropolis area. This RIT-D identified the construction of a 26.5km 132 kV underground feeder with 275 MVA capacity that spans between South Erskine Park zone substation (ZS) to the Bringelly ZS as the preferred option. The project is expected to be in place by 2024/25 and will support the various new substations in the region designed to accommodate the increase in demand.

The figure below shows the existing electricity network supplying this area.

Figure 2-1 Overview of the electricity network supplying the Western Sydney Aerotropolis Priority Growth Area



Our system studies show that Endeavour Energy's existing ZS at Luddenham, Bringelly and Kemps Creek are able to provide sufficient capacity for small developments initially, but there is insufficient sub-transmission and distribution system capacity to sustain development beyond the next two to four years.

The expected increase in demand due to these developments will result in power flows exceeding the capacity of the Macarthur 132 kV BSP from 2026/27 under system normal conditions. This will require extensive load shedding if action is not taken under both system normal and contingency conditions at the Macarthur BSP after Endeavour Energy completes the first phase of its supply network upgrades in the area.

2.2. Description of the identified need

The identified need for this RIT-T is to increase overall net market benefits in the NEM through avoiding load shedding that would otherwise be required if action is not taken due to the network being constrained due to demand growth. Our initial assessment indicates that the market benefits from relieving these constraints are expected to far exceed the cost of doing so.

2.3. Assumptions underpinning the identified need

This section sets out a number of key assumptions we consider underpin the identified need. These relate to the quantum of forecast EUE that is expected to occur if no action is taken.

2.3.1. Load forecasts

Endeavour Energy estimates demand according to a mixture of developable land areas or building floor space, if known, as well as known spot loads, Estimates are ultimately refined through discussions with

developers as they negotiate the planning system. The development rates provided by developers are assessed by Endeavour Energy and adjustments are made based on Endeavour Energy's experience connecting load, including applying load realisation factors to represent the probability of actual load appearing on the network.

As noted in section 2.1, the Greater Western Sydney area is expected to experience significant growth over the coming years due to development of:

- Western Sydney International (Nancy Bird Walton) Airport;
- the Sydney Metro-Western Sydney Airport line;
- the establishment of Sydney's third city, Bradfield;
- road infrastructure (including the M12 motorway); and
- new industries including agribusiness, transport and logistics, defence, aerospace, education and advanced manufacturing.

Each of these loads have been reflected in Endeavour Energy's three demand forecasts in the same manner (in terms of their timing) but differ slightly across the three forecasts in terms of the assumed load realisation factor (reflecting Endeavour Energy's professional experience with the connection of loads of these types).

In addition, Endeavour Energy is currently in receipt of a large number of data centre connection applications and enquiries in this part of their network. A connection 'application' is considered more certain than a connection 'enquiry' and ultimately, once a firm application is received, Endeavour Energy considers this to be consistent with the RIT-T definition of a 'committed' project.

Endeavour Energy's approach is to apply a load realisation factor to the connected load values for all data centre loads. The way in which each demand forecast reflects data centre loads is as follows:

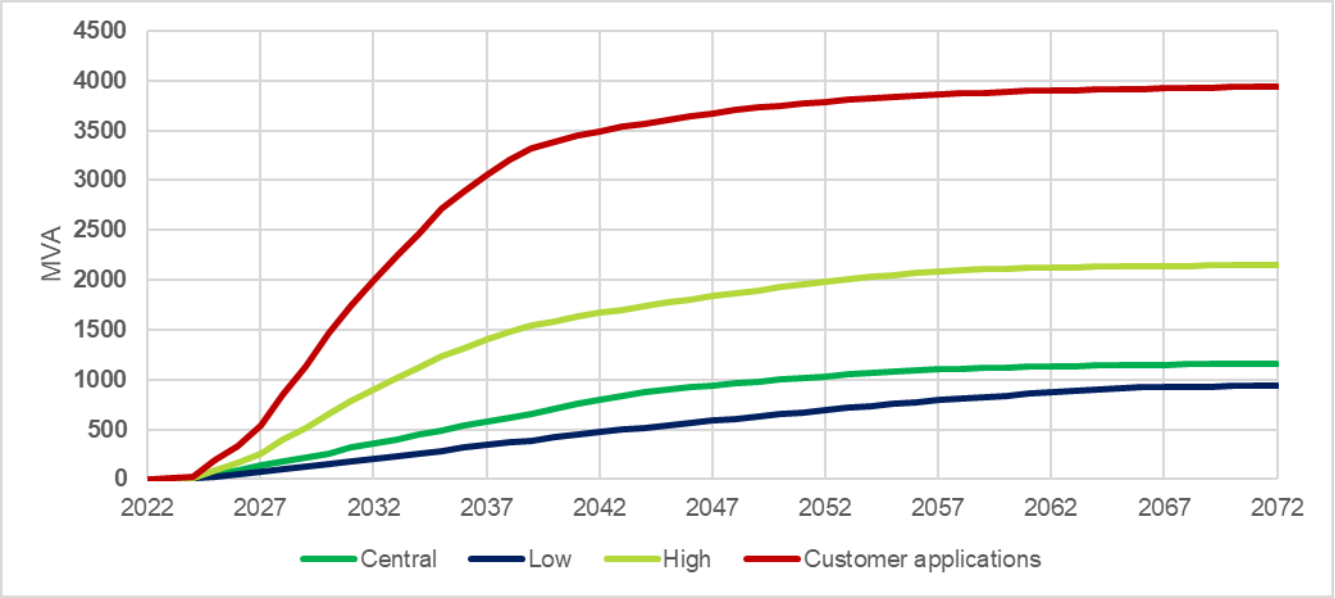
- the central demand forecast – only data centre applications are included (at an assumed load realisation factor of 40%);
- the low demand forecast – only data centre applications are included (at an assumed load realisation factor of 25%); and
- the high demand forecast – data centre applications are included (at an assumed load realisation factor of 40%), as well as data centre enquiries (at a load realisation factor of 20% to account for the fact that some enquiries may not turn into applications).

All three forecasts assume ramp rates of 15 years for data centre loads.

A diversity factor has also been reflected in all three forecasts (and in the same way) to reflect the expectation that not all loads will be peaking at the same time. This applies to both data centre load and non-data centre load.

Figure 2-2 below summarises the aggregate demand under each of the three demand forecasts developed by Endeavour Energy. Additional detail regarding individual load assumptions has not been provided due to confidentiality reasons. In the early years prior to commissioning of Kemps Creek BSP, the majority of this load (approx. 87%) will be supplied from Sydney West BSP and the remainder from Macarthur BSP.

Figure 2-2 Demand forecasts for the Western Sydney Aerotropolis Priority Growth Area



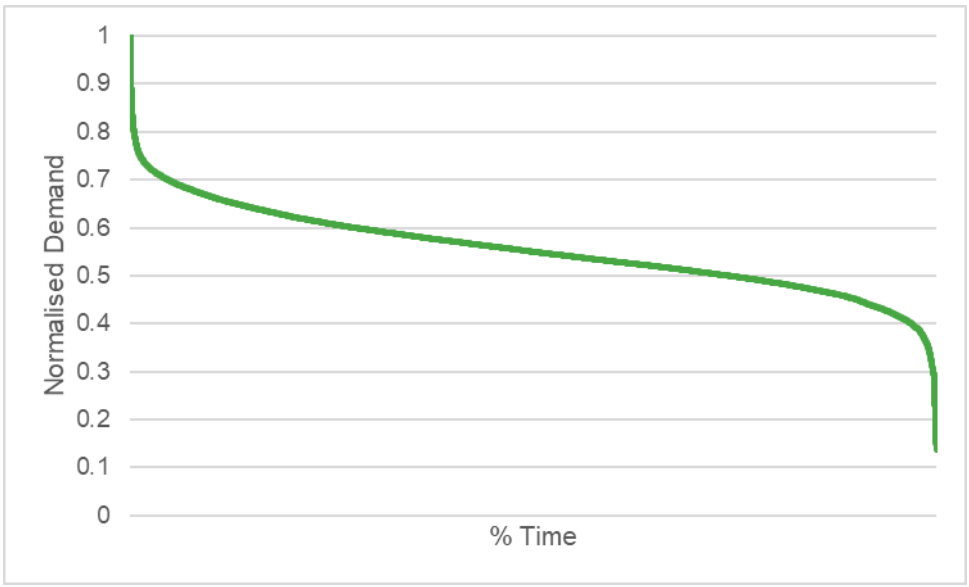
2.3.2. Expected pattern of use

Since the forecast loads are yet to connect, we have assessed the identified need using a composite demand profile, created by scaling an existing load profile that we expect will have similar demand characteristics as the forecast load (e.g. time and seasonal demand variations).

Specifically, the composite demand profile has been developed from the load profile for the existing Sydney West BSP and normalised to account for the expected load make-up at the future Kemps Creek BSP. The existing supply capacity to the area has been included in our assessment of the identified need.

Figure 2-3 below presents the normalised load duration curve (LDC) assumed for the Western Sydney Aerotropolis Priority Growth Area load based on the composite demand profile.

Figure 2-3 Normalised LDC assumed for the Western Sydney Aerotropolis Priority Growth Area



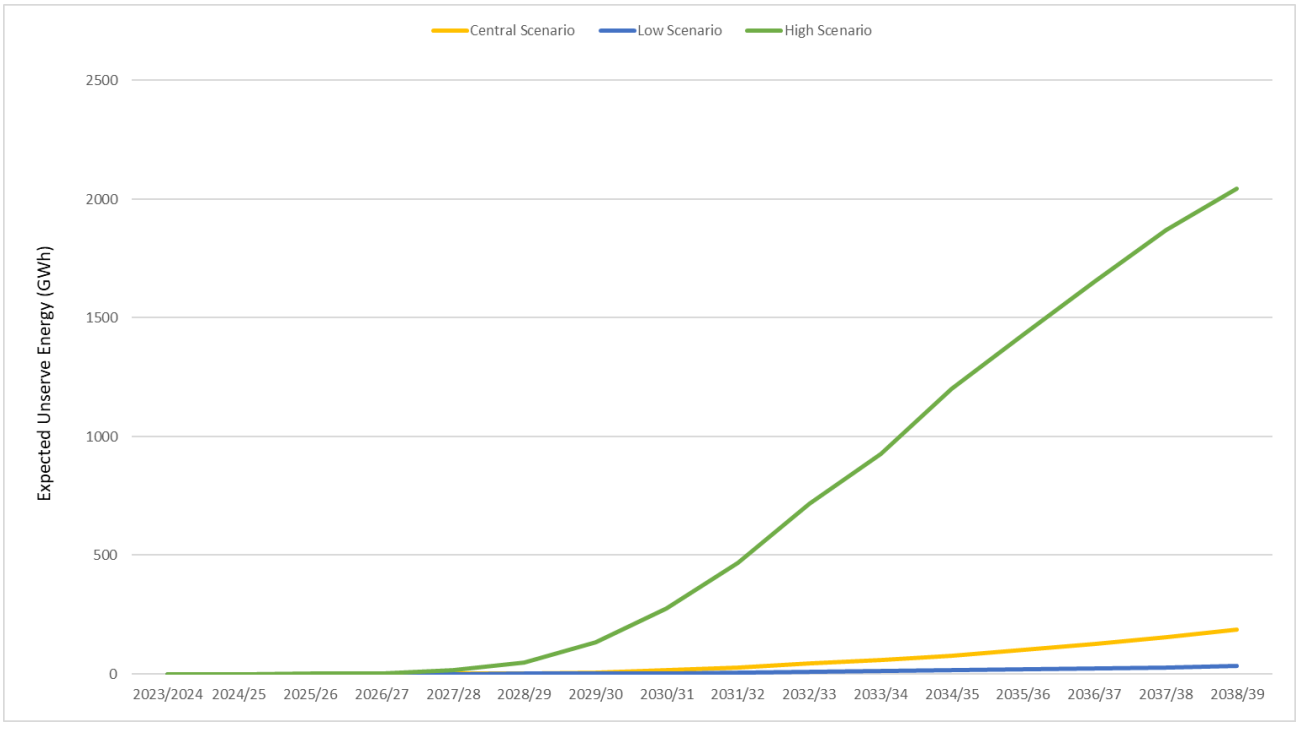
2.3.3. Forecast unserved energy if action is not taken

The forecast increase in demand will result in power flows exceeding the capacity of the Macarthur 132 kV BSP from 2026/27 under system normal conditions. Our studies also show that the forecast load growth will require load shedding under both system normal and contingency conditions at the Macarthur BSP after Endeavour Energy completes its supply network upgrades in the area (scheduled for 2024/25). We note that Endeavour Energy has no planned load transfer schemes either for this part of their network that could assist with minimising the extent of load shedding.

In the event of an outage of the Macarthur 132 kV transformer, all of the load for this catchment area would need to be initially supplied from the Macarthur 66 kV transformer until load can be transferred away. This means that for the duration of the switching time (assuming load can be switched away), the Macarthur 66 kV transformer will see an additional load equivalent to the load previously on the 132 kV transformer. This presents a significant load jump on this smaller transformer, and it is unlikely that this load will be sustained for the duration of the switching operations. In fact, it is likely to severely overload the transformer and cause significant loss of availability.

Transgrid and Endeavour Energy have assessed the peak load at risk based on Endeavour Energy's distribution load forecasts. It shows the expected unserved energy projections using the same three load forecasts outlined in section 2.3.1 above.

Figure 2-4 Expected EUE under the base case for each load forecast



2.3.4. Relevant IPART reliability standards

Without augmentation of Transgrid's transmission network supply capacity in the area, the forecast unserved energy is not expected to result in Transgrid failing to meet its transmission reliability standards obligations set by the Independent Pricing and Regulatory Tribunal (IPART) for the Macarthur BSPs by the

time the network augmentation is expected. However, we expect that these standards would be breached over the longer-term if action is not taken, given the exponential demand growth forecast in the area.

The reliability standards applicable for Macarthur are set out in Table 2-1 below and currently require Transgrid to reliably supply the load and maintain less than 3 minutes of EUE at average demand.[13]

Table 2-1 Relevant IPART reliability standards

Macarthur	Redundancy category [14]	Average demand (MW)	Unserved energy allowance (minutes)
Macarthur 132 kV	2	278	3 minutes (grouped)
Macarthur 66 kV	2	191	
Total	1	469	3 minutes

[13] IPART, *NSW Electricity Transmission Reliability and Performance Standard 2017*, available at: https://www.ipart.nsw.gov.au/sites/default/files/documents/electricity-transmission-reliability-standards-an-economic-assessment-august-2016.pdf

[14] Redundancy category level 2 means a non-zero amount of load must be supplied following the outage of a single system element.

3. Potential credible options

This section describes the options we have investigated to address the need, including the scope of each option and the associated costs.

We consider that there are two feasible options from a technical, commercial, and project delivery perspective that can be implemented in sufficient time to meet the identified need. Both options have been designed to meet the identified need, which is to avoid the forecast EUE by improving network supply capacity to the Western Sydney Aerotropolis Priority Growth Area.

Two other options were considered but not progressed for various reasons that are outlined in Table 3-5.

All costs presented in this PSCR are in 2023/24 dollars, unless otherwise stated.

3.1. Base case

Consistent with the RIT-T requirements, the assessment undertaken will compare the costs and benefits of each option to a base case. The base case is the (hypothetical) projected case if no action is taken, i.e.:[15]

> *"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'. 'BAU activities' are ongoing, economically prudent activities that occur in absence of a credible option being implemented."*

Under the base case, no proactive investment is made to meet the identified need to supply capacity in the Western Sydney Aerotropolis Priority Growth Area in accordance with expected demand growth. This is expected to increasingly require Transgrid to load shed during system normal conditions and contingency events due to the large increase in demand expected from the development in the area (as outlined in section 2.3.3 above).

While we note that the forecast unserved energy is not expected to breach the IPART reliability standards by the proposed date for investment, they would be breached over the longer-term under the base case if action is not taken due to the exponential demand growth forecast. While we would never plan for this situation to eventuate, the RIT-T requires the credible options to be assessed against a common base case representing a state of the world where action is not taken to address the long-term need. In reality, we are planning to have the most efficient long-term solution (which will be identified through this RIT-T process) to continue to provide reliable supply to the load in question.

3.2. Option 1 – New BSP next to the Kemps Creek substation

Option 1 involves the commissioning of a new BSP next to the existing Kemps Creek substation. Specifically, Option 1 involves Transgrid:

- constructing a new Kemps Creek BSP with two 375 MVA 330/132 kV transformers and connecting these back into our existing Kemps Creek 500/330 kV substation via new 330 kV switchbays; and
- adding a new 330/132 kV transformer at the existing Macarthur BSP.

Option 1 also involves Endeavour Energy:

[15] AER, *Regulatory investment test for transmission application guidelines – October 2023*, p 22.

- Establishing a new 132kV feeder from Kemps Creek BSP to Badgerys Creek ZS.[16]
- Repurposing existing feeder 512 (built at 132kV and currently energised at 33kV) from Bringelly including 1.8km of new underground cable to Kemps Creek BSP.
- Augmentation of Bringelly ZS by:
  - Removing existing 33/11 kV 19 MVA transformer No.1 and 33 kV Feeder 512 bay
  - Extending 132 kV bus-section
  - Installing a 132/11 kV 45 MVA power transformer and a 132 kV circuit breaker
  - Installing a 132 kV feeder bay
  - Installing a 132 kV bus-section breaker between the new bus-section and bus-section 2
- ring existing 132 kV Feeder 93X into Kemps Creek BSP, creating a new feeder to adjoining substations.[17]
- Macarthur BSP connection works comprising:
  - upgrading the existing 66 kV line 85L to a 132 kV line, including any associated 132kV and 66kV works to address resultant network constraint
  - upgrading line 9L1 and 9L2[18] to match the new Transgrid transformer rating of 375 MVA.
  - increasing the rating for cables/lines between the new Kemps Creek BSP and South Erskine Park.[19]

The estimated capital cost of this option is $132.9 million, which is comprised of $109.4 million (including property) in Transgrid costs and $24.5 million in Endeavour Energy costs.

The new BSP under Option 1 will be located on vacant property Transgrid is in the process of acquiring as a strategic land acquisition in expectation of the investment considered in this RIT-T. The cost of this land has been included in the cost estimate for this option in accordance with the AER RIT-T Guidelines.[20] Table 3-1 shows the breakdown of the estimated capital costs for this option.

Table 3-1 Breakdown of Option 1's expected capital cost, $m

Component	Labour	Materials	Expenses	Land	Total
Transgrid					
New Kemps Creek Substation (including 2 x 375 MVA 330/132kV transformers)	$9.4m	$20.0m	$55.2m*		$84.6m
Existing Kemps Creek Substation Modifications	$1.8m	$3.0m	$4.7m	-	$9.5m
Transmission Line Works	$0.8m	$1.4m	$2.3m	-	$4.5m
New 330/132 kV transformer at the existing Macarthur BSP	$1.9m	$3.5m	$5.4m	-	$10.8m
Total capital cost – Transgrid	**$13.9m**	**$27.9m**	**$67.6m***		**$109.4m**

[16] The scope of work included here reflects an *incremental* scope and cost to connect to Kemps Creek BSP only. The remaining scope and cost of this feeder was included in Endeavour Energy's Badgerys Creek FPAR.
[17] Final destinations to be advised pending network configuration at time of commissioning of the BSP – likely destination of North Kemps Creek ZS or a High Voltage Customer in a northward direction, and a new feeder to Austral ZS or North Leppington ZS in a southward direction.
[18] New proposed line number when 85L is upgraded to 132 kV.
[19] This component is currently being reviewed by Endeavour Energy and may be updated to installing a series reactor to manage the 132 kV line/cable loading as part of the PADR. However, this will not be material given the two components are expected to have broadly similar costs (and feature in both Option 1 and Option 2).
[20] AER, *Regulatory investment test for transmission application guidelines – October 2023,* p 29.

*Endeavour Energy***[21]					
New 132kV feeder from Kemps Creek BSP to Badgerys Creek ZS	$0.5m	$1.3m	$0.4m	$0.1m	$2.3m
Re-energising existing 132kV built	$1.9m	$4.2m	$1.1m	$0.4m	$7.6m
Augment Bringelly ZS	$1.9m	$4.1m	$1.1m	$0.4m	$7.5m
Ring 93X into Kemps Creek BSP	$0.3m	$0.8m	$0.2m	$0.1m	$1.4m
Macarthur BSP Connection works	$1.5m	$3.1m	$0.8m	$0.3m	$5.7m
Total capital cost – Endeavour Energy	**$6.1m**	**$13.5m**	**$3.6m**	**$1.3m**	**$24.5m**

Table 3-2 shows the expected expenditure profile of this option (which is not expected to change by demand forecast assumed).

* Some of the Transgrid cost breakdowns for Expenses and Land have been combined due to ongoing commercial process.

**Endeavour's Land cost breakdowns are high-level estimates, based on possible easement requirements and not based any particular land acquisition. Endeavour intends to further refine these estimates and refine the scope for the PADR.

Table 3-2 Annual breakdown of Option 1's expected capital cost, $m

Year	Capital expenditure
Transgrid	
FY24-25	$28.9m
FY26	$15.3m
FY27	$64.0m
FY28	$1.2m
Total capital cost – Transgrid	**$109.4m**
Endeavour Energy	
FY25	$0.8m
FY26	$0.7m
FY27	$3.4m
FY28	$10.4m
FY29	$9.2m
Total capital cost – Endeavour Energy	**$24.5m**

Additional operating expenditure for Transgrid and Endeavour Energy has been estimated at $1.09 million/year (approximately 1 per cent of total capital expenditure) and $97,800/year (approximately 0.4 per cent of total capital expenditure), respectively, for this option.

All works are estimated to take 49 months to complete and the new BSP has an expected optimal commissioning date of 2027/28.

Figure 3-1 below presents the layout of the new Kemps Creek BSP under Option 1.

[21] The Endeavour Energy breakdown is to be interpreted as indicative only and is based on standard breakdowns for similar projects across their network (i.e., it is not specific to this project).

Figure 3-1 Layout of the new Kemps Creek BSP under Option 1

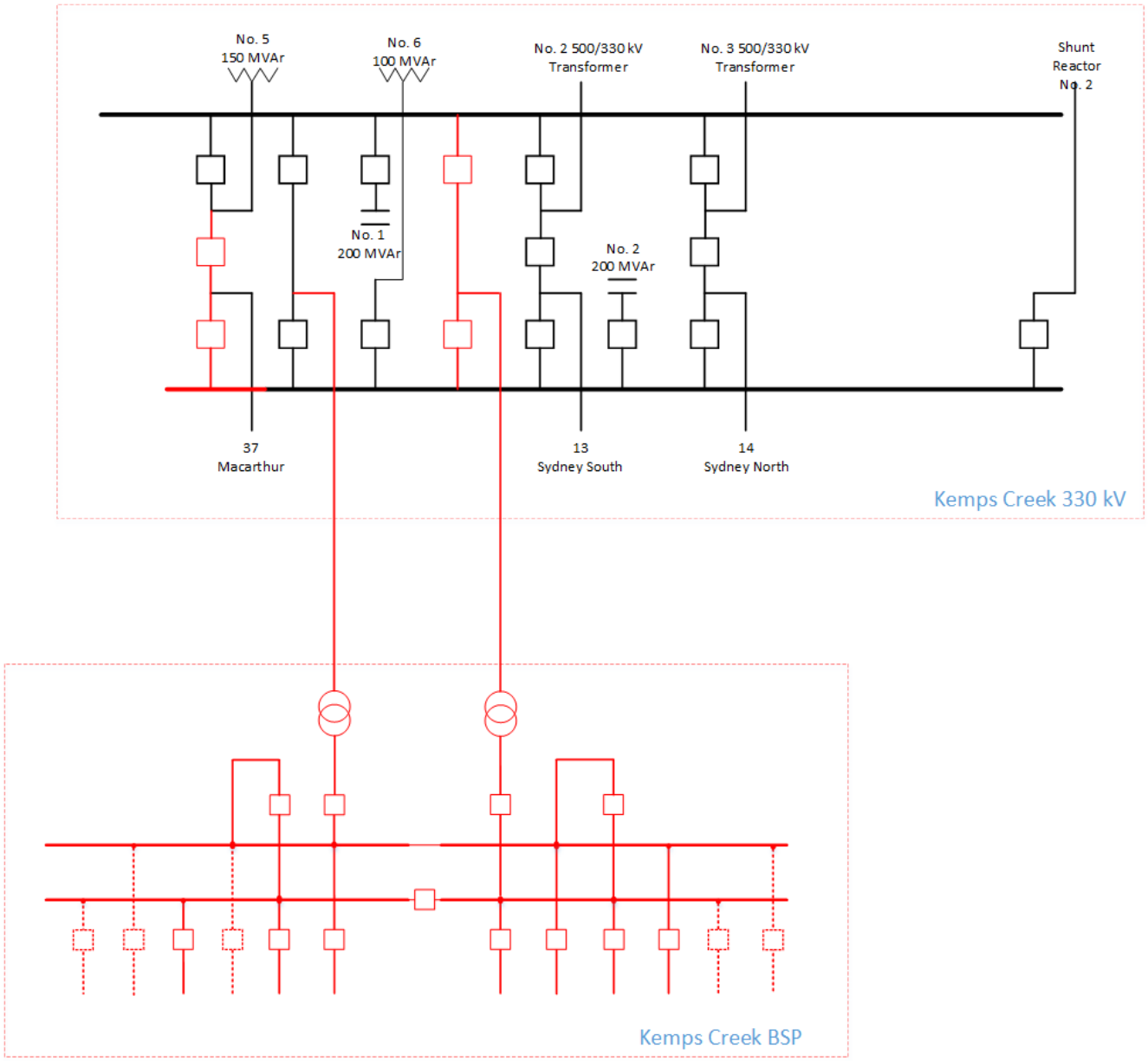


Figure 3-2 below shows the Macarthur BSP layout for connecting one new 330/132 kV transformer (which applies equally to Option 2 below).

Figure 3-2 Macarthur BSP layout for connecting one new 330/132 kV transformer (for both options 1 and 2)

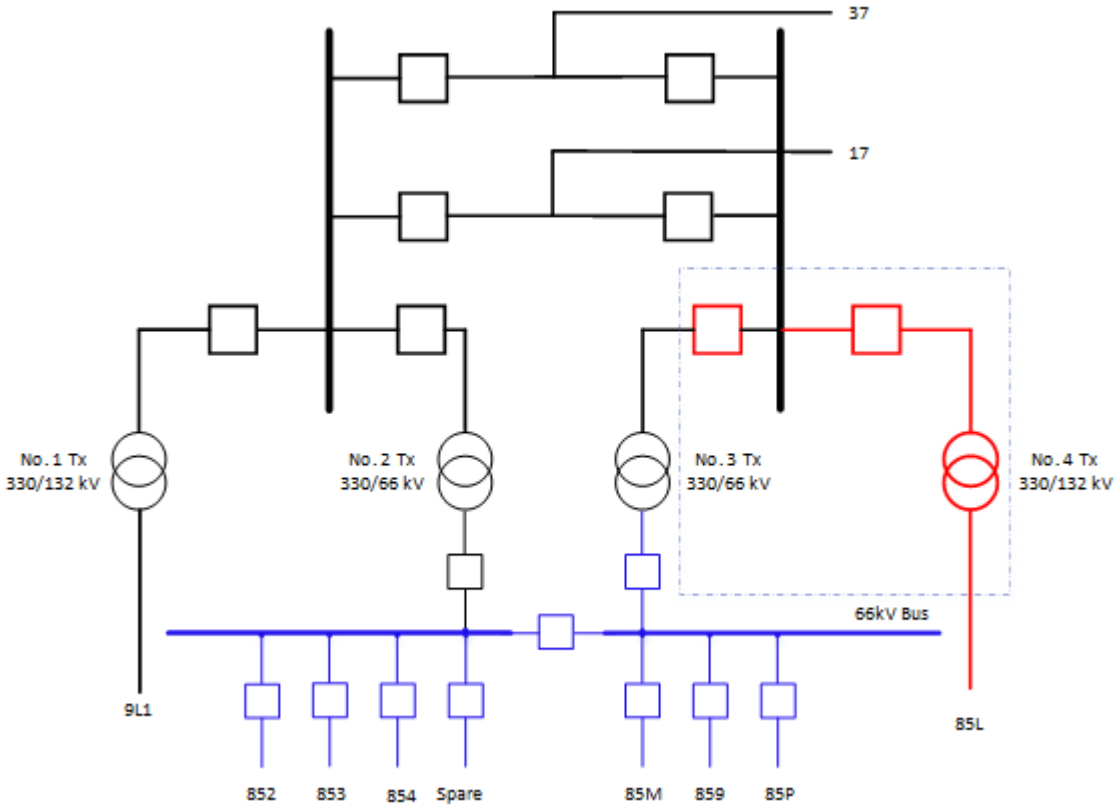
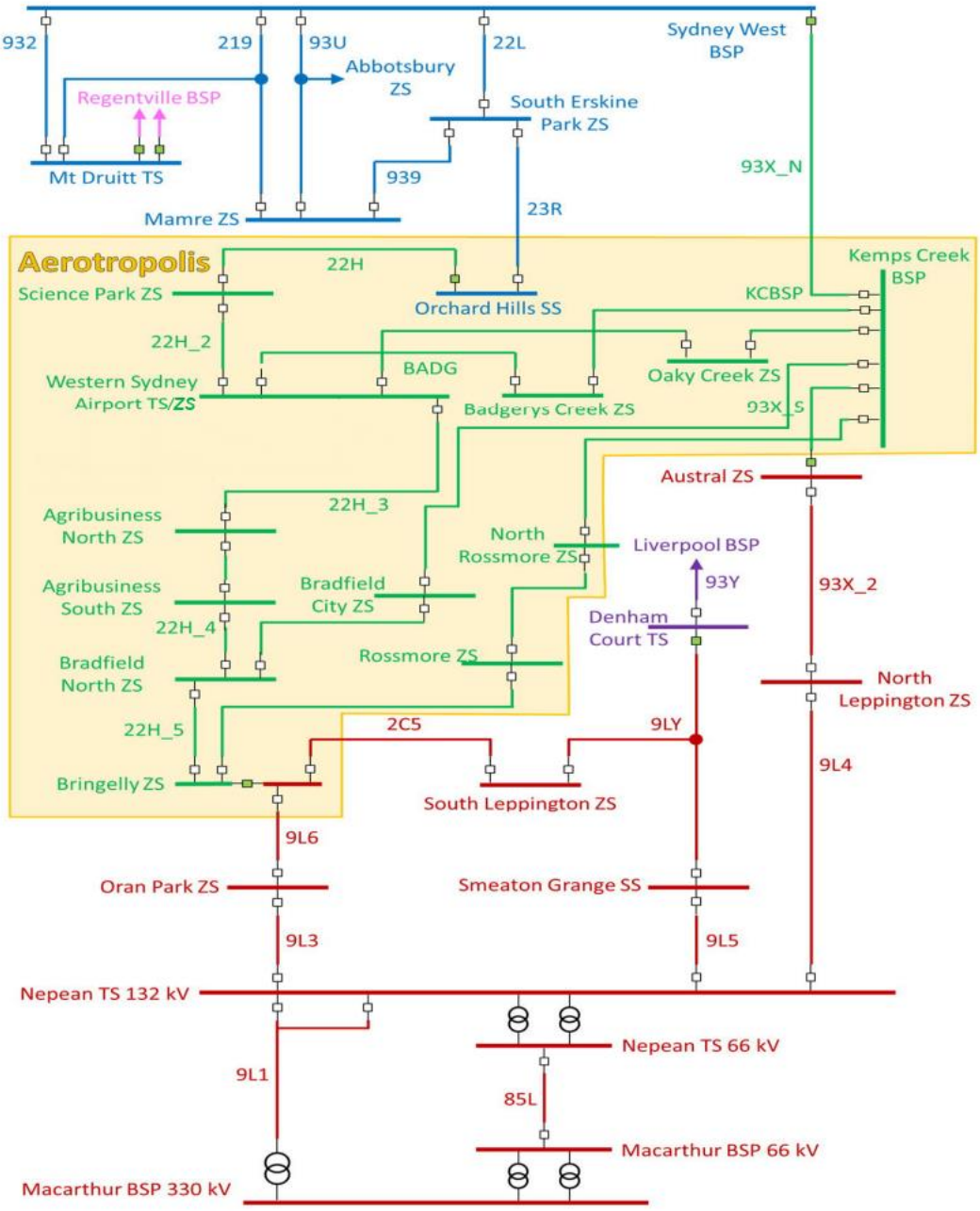


Figure 3-3 shows the Endeavour Energy Aerotropolis Area Plan for its 132 kV network configuration expected by 2035-2040, including the new Kemps Creek BSP under Option 1.

Figure 3-3 Endeavour Energy Aerotropolis Area Plan for 132 kV supply showing network configuration expected by 2035-2040



3.3. Option 2 – New Airport South BSP supplied from cut-in to Line 39

Option 2 involves the commissioning of a new BSP near the southern transition station of the Western Sydney Airport underground cable, which is cut-in to Line 39. Specifically, Option 2 involves Transgrid:

- establishing a new Transgrid Airport South BSP with two x 375 MVA 330/132 kV transformers, and looping-in the 330 kV Line 39; and
- installing an additional 375 MVA 330/132 kV transformer at Macarthur BSP.

Option 2 also involves Endeavour Energy:

- establishing a new 132kV feeder from Airport South BSP to Bringelly ZS
- establishing a new 132kV feeder from Airport South BSP to Badgerys Creek ZS via Northern Road
- establish two new 132kV cables from Airport South BSP to feed 93X north and south
- Macarthur BSP connection works comprising:
  - upgrading the existing 66 kV line 85L to a 132 kV line, including any associated 132kV and 66kV works to address resultant network constraint
  - upgrading line 9L1 and 9L2[22] to match the new Transgrid transformer rating of 375 MVA.
  - increasing the rating for cables/lines between the new Kemps Creek BSP and South Erskine Park.[23]

The estimated capital cost of this option is $257.8 million, which is comprised of $157.8 million in Transgrid costs and $100.1 million in Endeavour Energy costs.

Option 2 will add extra loading to the already heavily loaded Line 39, which may lead to network constraints causing a reduction in renewable generation available from the southern Sydney area compared to Option 1. While this is noted, it is not intended to be estimated as part of the PADR assessment (as outlined in section 5.2 below).

The new BSP under Option 2 will be located on new property Transgrid will need to purchase. The cost of this land has been included in the cost estimate for this option in accordance with the AER RIT-T Guidelines.[24] Table 3-3 shows the breakdown of the estimated capital costs for this option.

Table 3-3 Breakdown of Option 2's expected capital cost, $m

Component	Labour	Materials	Expenses	Land	Total
Transgrid					
New Transgrid Airport South BSP (including two x 375 MVA 330132kV transformers)	$5.1m	$34m	$94.7m*		$133.8m
Transmission Line Works	$1.2m	$6.5m	$5.6m*		$13.3m
New 375 MVA 330/132 kV transformer at Macarthur BSP	$0.9m	$5.9m	$3.8m	-	$10.6m
Total capital cost – Transgrid	**$7.2m**	**$46.4m**	**104.1***		**$157.7m**
*Endeavour Energy***					
New 132kV feeder Airport South BSP to Bringelly ZS	$4.4m	$9.3m	$2.5m	$0.8m	$17.0m
New 132kV feeder from Airport South BSP to Badgerys Creek ZS	$5.4m	$12.0m	$3.3m	$1.1m	$21.8m

[22] New proposed line number when 85L is upgraded to 132 kV.
[23] This component is currently being reviewed by Endeavour Energy and may be updated to installing a series reactor to manage the 132 kV line/cable loading as part of the PADR. However, this will not be material given the two components are expected to have broadly similar costs (and feature in both Option 1 and Option 2).
[24] AER, *Regulatory investment test for transmission application guidelines – October 2023,* p 29.

Two new 132kV cables from Airport South BSP to 93X	$13.9m	$30.6m	$8.3m	$2.8m	$55.6m
Macarthur BSP connection works	$1.5m	$3.1m	$0.8m	$0.3m	$5.7m
Total capital cost – Endeavour Energy	**$25.2m**	**$55.0m**	**$14.9m**	**$5.0m**	**$100.1m**

* Some of the Transgrid cost breakdowns for Expenses and Land have been combined due to ongoing commercial process.

**Endeavour's Land cost breakdowns are high-level estimates, based on possible easement requirements and not based any particular land acquisition. Endeavour intends to further refine these estimates and refine the scope for the PADR.

Table 3-4 shows the expected expenditure profile of this option (which is not expected to change by demand forecast assumed).

Table 3-4 Annual breakdown of Option 2's expected capital cost, $m

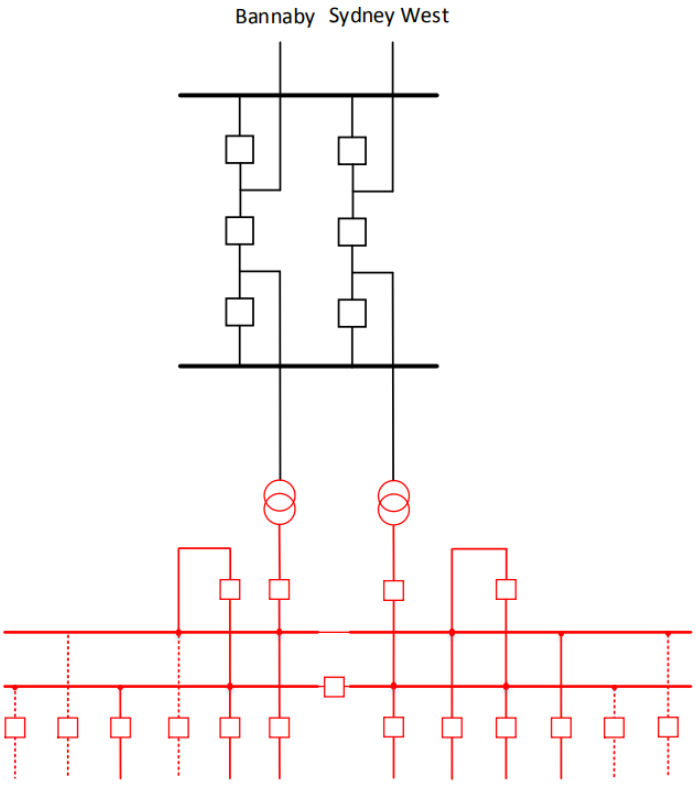
Year	Capital expenditure
Transgrid	
FY24-27	$82.4m
FY28	$35.3m
FY29	$40.1m
Total capital cost – Transgrid	**$157.8m**
Endeavour Energy	
FY27	$15.0m
FY28	$40.0m
FY29	$35.1m
FY30	$10.0m
Total capital cost – Endeavour Energy	**$100.1m**

Additional operating expenditure for Transgrid and Endeavour Energy has been estimated at $1.58 million/year (approximately 1 per cent of total capital expenditure) and $0.417 million/year (approximately 0.4 per cent of total capital expenditure), respectively, for this option.

All works are estimated to take 59 months to complete and the new BSP has an expected optimal commissioning date of 2028/29.

Figure 3-4 below presents the layout of the new Airport South BSP under Option 2.

Figure 3-4 Layout of the new Airport South BSP under Option 2



The layout of the Macarthur BSP for connecting one new 330/132 kV transformer is the same as for Option 1 (i.e., that shown in Figure 3-4 above).

Endeavour Energy has not developed a single-line diagram for the Aerotropolis Area Plan 132 kV network configuration by 2035-2040 for Option 2 (as they have for Option 1 above) given it is not expected to be the preferred option (and there is considerable work involved in developing these diagrams). If this changes in the PADR, a diagram will be developed for Option 2.

3.4. Options considered but not progressed

We considered several additional options to meet the identified need in this RIT-T. Table 3-5 summarises the reasons the following options were not progressed further.

We have not included non-network options in Table 3-5 We explain in section 4 below that non-network options are not expected to constitute potential credible options for this RIT-T, either on a standalone basis or as part of a potential credible option.

Table 3-5 Options considered but not progressed

Description	Reason(s) for not progressing
Upgrade the existing Sydney West and Macarthur BSP	While this option is considered technically feasible, it is not considered commercially feasible under the RIT-T. Specifically, it is expected to cost significantly more than Option 1 and Option 2 (approximately $257 million for

	Transgrid and approximately $127 million for Endeavour Energy[25]) and not provide any additional expected market benefits.
Upgrade existing Sydney West and Macarthur BSP with open point within Endeavour Energy distribution network	While this option would reduce the loading on Macarthur BSP transformers, which would reduce the scope of works at the Macarthur BSP, it also reduces the reliability level of Metro and Western Sydney Airport load to N since there will be short supply disruptions when switching from one BSP to another. These periodic disruptions to supply are not acceptable to the Western Sydney airport and will breach the IPART transmission reliability standards for redundancy. This option is therefore not considered technically feasible under the RIT-T.

3.5. No material inter-network impact is expected

We have considered whether the credible options listed above is expected to have material inter-regional impact.[26] A 'material inter-network impact' is defined in the NER as:

> *"A material impact on another Transmission Network Service Provider's network, which impact may include (without limitation): (a) the imposition of power transfer constraints within another Transmission Network Service Provider's network; or (b) an adverse impact on the quality of supply in another Transmission Network Service Provider's network."*

AEMO's suggested screening test to indicate that a transmission augmentation has no material inter-network impact is that it satisfies the following:[27]

- a decrease in power transfer capability between transmission networks or in another TNSP's network of no more than the minimum of 3% of the maximum transfer capability and 50 MW;
- an increase in power transfer capability between transmission networks or in another TNSP's network of no more than the minimum of 3% of the maximum transfer capability and 50 MW;
- an increase in fault level by less than 10 MVA at any substation in another TNSP's network; and
- the investment does not involve either a series capacitor or modification in the vicinity of an existing series capacitor.

We note that each credible option satisfies these conditions. By reference to AEMO's screening criteria, there is no material inter-network impacts associated with any of the credible options considered.

[25] The Endeavour Energy estimate excludes additional expected costs associated with fault level upgrades.
[26] As per clause 5.16.4(b)(6)(ii) of the NER.
[27] Inter Regional Planning Committee, *Final determination: Criteria for assessing material inter-network impact of transmission augmentations*, 2004, pp 16-18.

4. Non-network options

We do not consider that there will be a non-network solution, or group of solutions, that forms a potential credible option on a standalone basis, or that forms a significant part of a potential credible option for this RIT-T.

This is due to the network augmentation being required to facilitate substantial new loads, i.e., the investment is being built solely for greenfield load developments (and the magnitude of these developments is such that realistic non-network solutions cannot alter the timing or scope of the expected network investment).

5. Materiality of market benefits

This section outlines the categories of market benefits prescribed in the National Electricity Rules (NER) and whether they are considered to be material for this RIT-T.[28]

5.1. Changes in involuntary load curtailment are expected to be material

We consider that the only category of market benefit that is likely to be material is changes in involuntary load shedding. Other categories of market benefits prescribed in the NER are not considered material for this RIT-T at this stage (as outlined in the sections below).

As part of the PADR assessment, we propose to estimate the value of avoided expected unserved energy at the Aerotropolis precinct under each of the credible options, compared to the base case. This will include both planned and unplanned outages and will be valued using the AER's estimate of the Value of Customer Reliability (VCR).

5.2. Wholesale electricity market benefits are not considered material

Option 2 is expected to add extra loading to the already heavily loaded Line 39, which may lead to network constraints causing a reduction in renewable generation available from the southern Sydney area compared to Option 1. However, we do not consider that the consequent impact on the wholesale market will be material to the outcome of this RIT-T and are therefore not planning to quantify this benefit.

Specifically, due to the significantly lower cost of Option 1 and the fact it can be commissioned a year earlier, Option 1 is expected to be strongly preferred to Option 2 in the PADR assessment. Estimating the (negative) impact of Option 2 on the wholesale market is therefore not expected to change this conclusion and we do not consider the resources required to do so to be proportionate for this RIT-T.

We therefore consider that the following classes of market benefits are not material for this RIT-T assessment:

- changes in fuel consumption arising through different patterns of generation dispatch;
- changes in voluntary load curtailment (since there is no impact on pool price);
- changes in costs for parties other than the RIT-T proponent;
- changes in ancillary services costs;
- changes in network losses; and
- competition benefits.

5.3. No other classes of market benefits are considered material

In addition to the classes of market benefits discussed above, NER clause 5.15A.2(b)(4) requires that we consider the following classes of market benefits arising from each credible option. We consider that none of the classes of market benefits listed will be material for this RIT-T assessment for the reasons in Table 5-1.

[28] The NER requires that all classes of market benefits identified in relation to the RIT-T are included in the RIT-T assessment, unless the TNSP can demonstrate that a specific class (or classes) is unlikely to be material in relation to the RIT-T assessment for a specific option – NER clause 5.15A.2(b)(6). See Appendix A for requirements applicable to this document.

Table 5-1 Reasons why other non-wholesale electricity market benefits are considered immaterial

Market benefits	Reason
Difference in the timing of unrelated expenditure	While we note that potential future works are expected to be lower if Option 1 is pursued, compared to Option 2, we do not consider this to be material under the RIT-T. Specifically, if load growth from the Aerotropolis precinct were to continue for a sustained period, then this would be met by: • installing additional transformers in the new BSP if Option 1 is pursued; or • upgrading an existing line or constructing an additional line if Option 2 is pursued. We expect that the cost of installing additional transformers in the new BSP will be lower than the cost of upgrading an existing line or constructing an additional line. Since Option 1 is expected to be strongly preferred over Option 2, as outlined above, quantifying this additional market benefit for Option 1 will only further increase its net benefits over Option 2, which will not change the ranking of the two options. We therefore do not consider this category of market benefit to be material for this RIT-T and do not intend to estimate it in the PADR.
Option value	We note the AER's view is that option value is likely to arise where there is uncertainty regarding future outcomes, the information that is available is likely to change in the future, and the credible options considered by the TNSP are sufficiently flexible to respond to that change.[29] We note that no credible option is sufficiently flexible to respond to change or uncertainty for this RIT-T. Specifically, each option is focused on proactively providing network capacity ahead of demand growth in order to avoid unserved energy.

We note also that there has been a law change to introduce an emissions reduction objective into the national energy objectives[30] and that the NER have been updated to add a new category of market benefit to the RIT-T reflecting changes in Australia's greenhouse gas emissions.[31]

Transgrid supports greater consideration of emissions impacts within network planning and investment frameworks. These changes enable network planning and investment frameworks support achievement of the Commonwealth Government's net zero targets. Transgrid has set our own science-based targets to cut emissions and decarbonise our business. These include:

- Reducing Scope 1 and 2 emissions by 60 per cent by 2030, compared with a base year of 2021 and net zero by 2040.
- Reducing Scope 3 emissions from Purchased Goods and Services, and Capital Goods by 48 per cent for every million dollars that we spend on these two categories by 2030, compared with a base year of 2021, and net zero by 2050.[32]

While we acknowledge this important change to the RIT-T, we do not propose to estimate this new category of market benefit as it is not considered material for this RIT-T. Specifically, and as outlined in the section above, Option 2 is expected to lead to network constraints causing a reduction in renewable generation available from the southern Sydney area compared to Option 1, and thus will have greater

[29] AER, *Regulatory Investment Test for Transmission – Application Guidelines*, October 2023, p. 57.
[30] On 12 August 2022, Energy Ministers agreed to fast track the introduction of an emissions reduction objective into the national energy objectives, consisting of the National Electricity Objective (NEO), National Gas Objective and National Energy Retail Objective. On 21 September 2023, the *Statutes Amendment (National Energy Laws) (Emissions Reductions Objectives) Act 2023* (the Act) received Royal Assent.
[31] See NER clause 5.15A.2(b)(4)(viii).
[32] For more information on Transgrid's planned journey to net zero please see our website here: https://www.transgrid.com.au/about-us/our-approach/our-journey-to-net-zero

levels of greenhouse gas emissions than Option 1. Given Option 1 is expected to be strongly preferred to Option 2, due to its significantly lower costs and earlier commissioning date. The greater levels of greenhouse gas emissions for Option 2 are therefore not expected to be material to the outcome of the RIT-T and thus are not proposed to be estimated (i.e., if they were estimated, it is expected that they would only further add to the conclusion that Option 1 is preferred).

Nonetheless, Transgrid is working to understand how to assess the value of expected changes in greenhouse gas emissions. Insights will be considered and presented within the PADR. Where possible and practical, we will refine this approach and any results following updated guidance being provided by the AER on RIT-T related emissions reduction assessments.

6. Overview of the assessment approach

This section outlines the approach that we propose to apply in assessing the net benefits associated with each of the credible options against the base case as part of the PADR.

6.1. Description of the base case

As described in section 3.1 above, the base case assumes that no proactive capital investment will be made to accommodate the forecast demand growth, which results in very high levels of unserved energy.

While we note that the forecast unserved energy is not expected to breach the IPART reliability standards by the proposed date for investment, they would be breached over the longer-term under the base case if action is not taken due to the exponential demand growth forecast. While we would never plan for this situation to eventuate, the RIT-T requires the credible options to be assessed against a common base case representing a state of the world where action is not taken to address the long-term need. In reality, we are planning to have the most efficient long-term solution (which will be identified through this RIT-T process) to continue to provide reliable supply to the load in question.

We propose to cap the expected future unserved energy, in MWh, as part of the forthcoming PADR NPV assessment, as the uncapped value of unserved energy will otherwise become unrealistically high (since, in reality, we would undertake investment to avoid widespread customer outages). The very large, uncapped values can distort the comparison of net market benefits between credible options. The approach of capping USE in the base case is in-line with other RIT-Ts and will not affect the ranking of the overall options.[33]

6.2. Assessment period and discount rate

A 20-year assessment period from 2023/24 to 2042/43 is proposed to be adopted for this RIT-T analysis. This period takes into account the size, complexity and expected asset life of the options.

Where the capital components of the credible options have asset lives extending beyond the end of the assessment period, the NPV modelling will include a terminal value to capture the remaining functional 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 serviceable asset life. The terminal values will be calculated as the undepreciated value of capital costs at the end of the analysis period.

A real, pre-tax discount rate of 7 per cent will be adopted as the central assumption for the NPV analysis presented in the PADR, consistent with AEMO's latest Input Assumptions and Scenarios Report (IASR).[34] The RIT-T requires that sensitivity testing be conducted on the discount rate and that the regulated weighted average cost of capital (WACC) be used as the lower bound. We propose to therefore test the

[33] We note that this is also consistent with the approach proposed by Dr Biggar in his review of the Powering Sydney's Future RIT-T (see: Biggar, D., An Assessment of the Modelling Conducted by Transgrid and Ausgrid for the "Powering Sydney's Future" Program, May 2017, p. 27). While Dr Biggar suggests capping the 'congestion cost' (calculated as the unserved energy valued at the VCR) in such assessments, we consider it more intuitive to cap the underlying unserved energy, in MWh, and continue to value it at the appropriate VCR. This is the approach that has been adopted by other NSPs and is effectively equivalent to the approach proposed by Dr Biggar.

[34] AEMO, *2023 Inputs, Assumptions and Scenarios Report*, Final report, July 2023, p 123.

sensitivity of the results to a lower bound discount rate of 3.21 per cent,[35] as well as an upper bound discount rate of 10.5 per cent (i.e., the upper bound in the latest IASR).[36]

6.3. Approach to estimating option costs

The two subsections below outline how the Transgrid and Endeavour Energy costs have been estimated.

6.3.1. Transgrid costs

We have estimated the capital costs of the options based on the scope of works necessary together with costing experience from previous projects of a similar nature.

All costs estimated by Transgrid's project development team use the estimating tool 'MTWO'. The MTWO cost estimating database reflects actual outturn costs built up over more than 10 years from:

- period order agreement rates and market pricing for plant and materials;
- labour quantities from recently completed project; and
- construction tender and contract rates from recent projects.

The MTWO estimating database is reviewed annually to reflect the latest outturn costs and confirm that estimates are within their stated accuracy range and represent the most likely expected cost of delivery (P50 costs[37]). As part of the annual review, Transgrid benchmarks the outcomes against independent estimates provided by various engineering consultancies.[38]

Transgrid does not generally apply the Association for the Advancement of Cost Engineering (AACE) international cost estimate classification system to classify cost estimates. Doing so for this RIT-T would involve significant additional costs, which would not provide a corresponding increase in benefits compared with the use of MWTO estimates and so this has not been undertaken.

We estimate that actual costs will be within +/- 25 per cent of the central capital cost estimate. While we have not explicitly applied the AACE cost estimate classification system, we note that an accuracy of +/- 25 per cent for cost estimates is consistent with industry best practice and aligns with the accuracy range of a 'Class 4' estimate, as defined in the AACE classification system.

No specific contingency allowance has been included in the cost estimates.

All cost estimates are prepared in real, 2023/24 dollars based on the information and pricing history available at the time that they were estimated. The cost estimates do not include or forecast any real cost escalation for materials.

Routine operating and maintenance costs are based on works of similar nature.

[35] This is equal to WACC (pre-tax, real) in the latest final decision for a transmission business in the NEM (Transgrid) as of the date of this analysis, see: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/transgrid-determination-2023%E2%80%9328/final-decision

[36] AEMO, *2023 Inputs, Assumptions and Scenarios Report*, July 2023, Final Report, p. 123.

[37] I.e., there is an equal likelihood of over- or under-spending the estimate total.

[38] 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.

6.3.2. Endeavour Energy costs

The Endeavour Energy costs presented in this document were prepared by Endeavour Energy's Network Planning team based on estimates provided for recent scopes of work, primarily establishing new 132kV underground feeders. Unit rates were then applied by proposed feeder length and by construction methodology.

Costs have been split across cost elements based on high level percentage splits as observed on recent projects. The costs have been phased across financial years based on the expected delivery date of the projects.

Endeavour Energy does not generally apply the AACE international cost estimate classification system to classify cost estimates. Endeavour Energy estimates that actual costs will be within +/-50 per cent of the central capital cost estimate. No specific contingency allowance has been included in the cost estimates. All cost estimates are prepared in real, 2023/24 dollars based on the information and pricing history available at the time that they were estimated. The cost estimates do not include or forecast any real cost escalation for materials. Routine operating and maintenance costs are based on a fleet level assessment of assets and works of similar nature.

6.4. Three different scenarios will be modelled to address uncertainty

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.

We currently expect that the credible options will be assessed under three scenarios as part of the PADR assessment. Within this assessment, the only market benefit likely to be material is changes in involuntary load shedding. As a result, the three PADR scenarios will differ through their assumed local demand forecasts, as this is the key parameter influencing the ranking of the credible options.

Given that wholesale market benefits are not relevant for this RIT-T, the three scenarios implicitly assume the expected most likely scenario for the 2024 ISP (i.e., the 'Step Change' scenario).

Table 6-1 Summary of scenarios

Variable / Scenario	Central	Low demand scenario	High demand cost scenario
Scenario weighting	*1/3*	*1/3*	*1/3*
Discount rate	7.0%	7.0%	7.0%
Network capital costs	Base estimate	Base estimate	Base estimate
Operating and maintenance costs	Base estimate	Base estimate	Base estimate
Demand growth	Central forecast (from section 2.3.1)	Low forecast (from section 2.3.1)	High forecast (from section 2.3.1)

We propose to weight the three scenarios equally given there is nothing to suggest an alternate weighting would be more appropriate.

The effect of changes to other variables (including the discount rate and capital costs) on the NPV results will be investigated in sensitivity analysis as part of the PADR. We consider this to be consistent with the AER guidance for RIT-Ts of this type (i.e., where wholesale market benefits are not expected to be material).[39,40]

We note that there has been a recent rule change that requires us to propose one or more relevant reopening triggers for considering whether there has been a material change in circumstances as part of the PADR if the estimated capital cost of the proposed preferred option is greater than $100 million.[41] We will address this new requirement in the PADR and expect that the triggers will be informed by the sensitivity and boundary analysis at that stage.

[39] AER, *Regulatory Investment Test for Transmission – Application Guidelines*, October 2023, pp. 42-44.
[40] See: AER, *Decision: North West Slopes and Bathurst, Orange and Parkes Determination on dispute - Application of the regulatory investment test for transmission*, November 2022, pp. 18-20 & 31-32, as well as with the AER's RIT-T Guidelines.
[41] NER clause 5.16.4(k)(10).

Appendix A Compliance checklist

This appendix sets out a checklist which demonstrates the compliance of this PSCR with the requirements of the National Electricity Rules version 209.

Rules clause	Summary of requirements	Relevant section
5.16.4 (b)	A RIT-T proponent must prepare a report (the project specification consultation report), which must include:	–
	(1) a description of the identified need;	2.2
	(2) the assumptions used in identifying the identified need (including, in the case of proposed reliability corrective action, why the RIT-T proponent considers reliability corrective action is necessary);	2.3
	(3) the technical characteristics of the identified need that a non-network option would be required to deliver, such as: (i) the size of load reduction of additional supply; (ii) location; and (iii) operating profile;	4
	(4) if applicable, reference to any discussion on the description of the identified need or the credible options in respect of that identified need in the most recent National Transmission Network Development Plan;	NA
	(5) a description of all credible options of which the RIT-T proponent is aware that address the identified need, which may include, without limitation, alterative transmission options, interconnectors, generation, demand side management, market network services or other network options;	3
	(6) for each credible option identified in accordance with subparagraph (5), information about: (i) the technical characteristics of the credible option; (ii) whether the credible option is reasonably likely to have a material inter-network impact; (iii) the classes of market benefits that the RIT-T proponent considers are likely not to be material in accordance with clause 5.15A.2(b)(6), together with reasons of why the RIT-T proponent considers that these classes of market benefit are not likely to be material; (iv) the estimated construction timetable and commissioning date; and (v) to the extent practicable, the total indicative capital and operating and maintenance costs.	3.2, 3.3