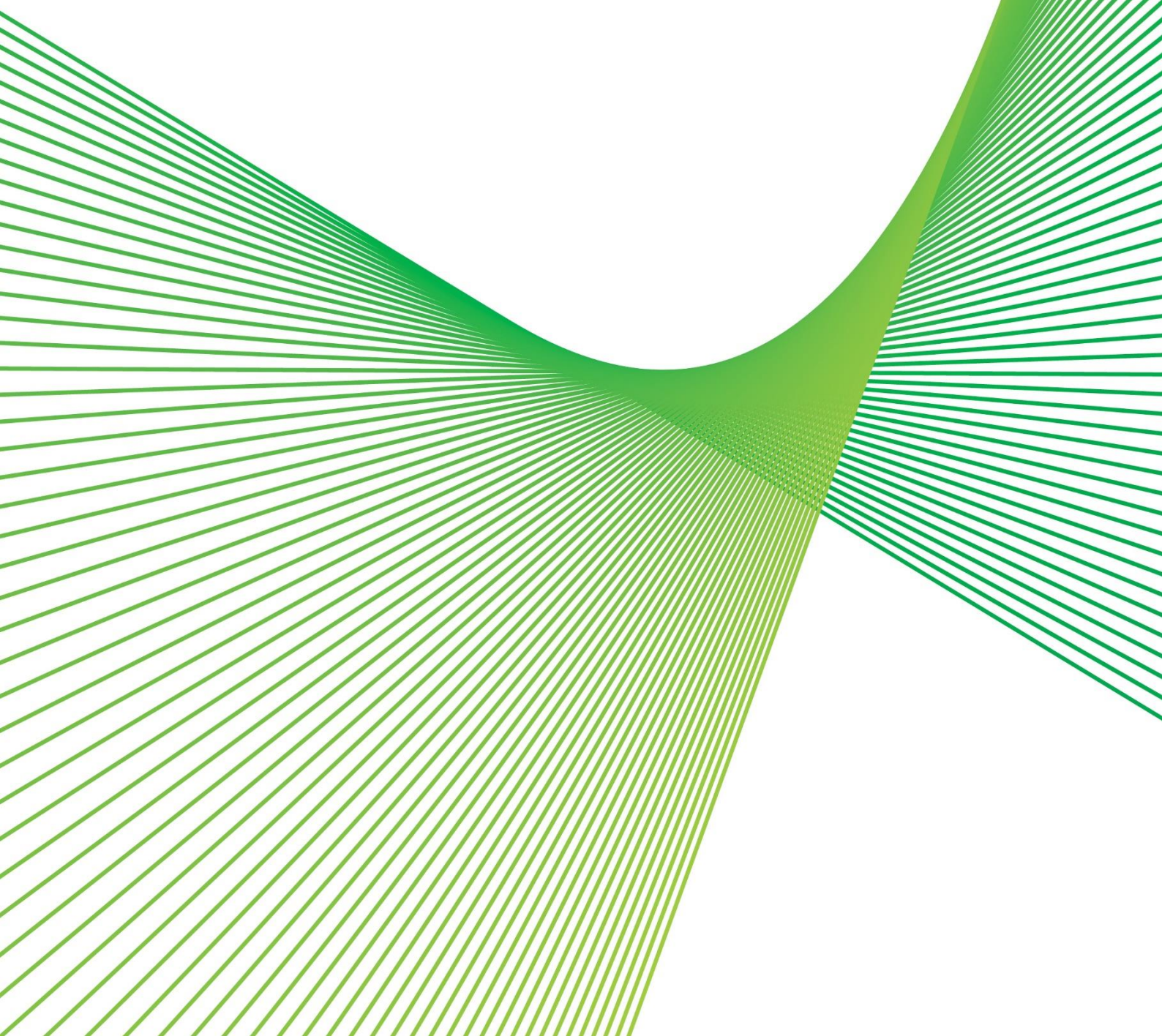


# Maintaining reliable supply to Western Sydney

RIT-T Project Specification Consultation Report

Region: Greater Sydney

Date of issue: 22 April 2024



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## Executive summary

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Demand forecasts from Endeavour Energy show rapid demand growth in the Western Sydney and Aerotropolis areas due to the connection of new data centres and ongoing development of commercial and residential lands and associated infrastructure in the area. There is an emerging risk of unserved energy at the Sydney West Bulk Supply Point (BSP) due to increasing summer demand exceeding the firm capacity at the site. This will result in load shedding under single or multiple outages of 330/132 kV transformers at Sydney West BSP to ensure loads are within the ratings of the remaining in-service transformers.

We are applying the Regulatory Investment Test for Transmission (RIT-T) to options that allow Transgrid to meet expected demand and connection point reliability requirements in the Sydney West supply area. Publication of this Project Specification Consultation Report (PSCR) is the first step in the RIT-T process. As investment is needed to meet externally imposed regulatory obligations and service standards, we consider this a reliability correction action RIT-T.

### **Identified need: meeting demand and reliability requirements in the Sydney West area**

The identified need for this RIT-T analysis is to meet demand for electricity and connection point reliability requirements in the Sydney West area.

The latest Endeavour Energy demand forecast for Sydney West BSP shows significant demand growth which is mainly driven by spot load including data centres, metro train lines and large commercial and residential development around the new airport in Western Sydney.

In the absence of network investment, our central maximum demand forecast for the Western Sydney area (Latest POE50 demand forecast) is expected to exceed the firm transformer capacity at Sydney West BSP from 2025/26. The difference between forecast maximum demand and firm transformer capacity at this BSP will increase from 48 MVA in 2025/26 to 791 MVA in 2032/33.

If there is a single or multiple outage of 330/132 kV transformers at the Sydney West BSP, and this contingency event occurs at or near times of high demand, load shedding will be required to maintain load below the firm capacity of the remaining in-service transformers. Based on probabilistic planning studies of transformer failure rates and repair times, we estimate expected unserved energy of 5 MWh in 2025/26, increasing to approximately 2,036 MWh in 2031/32, and 11,307 MWh in 2047.

We have commenced this RIT-T to assess options which will enable us to meet our reliability requirements in the Sydney West area in view of the significant increase in forecast demand. We consider this a 'reliability corrective action' under the RIT-T as the proposed investment is for the purpose of meeting externally imposed regulatory obligations and service standards, i.e., Schedule 5.1.4 of the National Electricity Rules (NER).

### **Two credible network options have been identified**

We have identified two credible network options that meet the identified need from a technical, commercial, and project delivery perspective.<sup>1</sup> These options are summarised in Table E-1 below.

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<sup>1</sup> As per clause 5.15.2(a) of the NER.

Table E-1 Summary of the credible options

Option	Description	Capital costs (\$M, 2022-23)	Operating costs (\$M/yr, 2022-23)	Remarks
Option 1	Install a new 330/132 kV 375 MVA transformer at Sydney West BSP	24.78	0.25	This is our preferred option as it results in the highest net economic benefit
Option 2	Establish a new 330/132 kV BSP at Mt Druitt and convert existing 132 kV line 932 and 219 to 330 kV	80.05	0.80	This option has a higher cost, longer implementation time and will result in a lower net economic benefit.

### Unclear whether non-network solutions will be commercially and technically viable

We consider that non-network options may be able to assist with this RIT-T. Specifically, this will involve potential demand management to reduce the load below the limit of 1500 MVA at Sydney West BSP. This could take the form of a grid-connected battery to provide load reductions.

At this stage, it is not clear whether non-network solutions will be commercially and technically viable. In this PSCR, we have set out the technical characteristics that a non-network option would need to deliver to address the identified need consistent with the NER. We are interested in hearing from proponents on their individual solutions and costs. However, we note that the cost of the network options may act to effectively bound the cost available for any non-network options to be considered commercially feasible.

We encourage parties to make written submissions regarding the potential of non-network options to satisfy, or contribute to satisfying, the identified need for this RIT-T.

### Option 1 delivers the highest net economic benefits

In all scenarios considered, Option 1 results in the highest net economic benefits. Option 1 will address the identified need sooner compared to the alternative option, and at a lower cost. Sensitivity testing finds that Option 1 delivers the highest net economic benefits even under changes in key modelling assumptions. This makes Option 1 our preferred option.

### Draft Conclusion

At this stage of the RIT-T process, we consider that implementing Option 1 will meet the identified need, is technically and commercially feasible, and will result in the highest net economic benefit.

Option 1 involves installing a new 375 MVA 330/132 kV transformer at the existing Sydney West BSP. This option will increase the firm transformer capacity at Sydney West BSP by 375 MVA. The capital cost of this option is approximately \$24.78 million  $\pm$  25% (in real \$2022-23). The work will be undertaken over a four-year period with all works expected to be completed by 2026/27. In addition, routine operating and maintenance costs are estimated at approximately \$0.25 million per annum (in real \$2022-23).

All works will be completed in accordance with the relevant standards and components shall be replaced to have minimal modification to the wider transmission network. Necessary outages of relevant assets in service will be planned appropriately in order to complete the works with minimal impact on the network. It is not anticipated that the project will have a significant impact on the environment in accordance with the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act).

## Exemption from preparing a Project Assessment Draft Report

Subject to additional credible options being identified during the consultation period, publication of a Project Assessment Draft Report (PADR) is not required for this RIT-T as we consider its investment in relation to the preferred option to be exempt from that part of the process under NER clause 5.16.4(z1). Production of a PADR is not required due to:

- the estimated capital cost of the proposed preferred option being less than \$46 million;<sup>2</sup>
- the PSCR states:
  - the proposed preferred option, together with the reasons for the proposed preferred option
  - the RIT-T is exempt from producing a PADR; and
  - the proposed preferred option and any other credible option will not have a material market benefit for the classes of market benefit specified in clause 5.15A.2(b)(4), with the exception of market benefits arising from changes in voluntary and involuntary load shedding;
- the RIT-T proponent considers that there were no PSCR submissions identifying additional credible options that could deliver a material market benefit; and
- the PACR must address any issues raised in relation to the proposed preferred option during the PSCR consultation.

We consider the investment in relation to Option 1 meets these criteria and therefore that we are exempt from producing a PADR under NER clause 5.16.4(z1).

In accordance with NER clause 5.16.4(z1)(4), the exemption from producing a PADR will no longer apply if we consider that an additional credible option that could deliver a material market benefit is identified during the consultation period. Accordingly, if we consider that any additional credible options are identified, we will produce a PADR which includes an NPV assessment of the net market benefit of each additional credible option.

Should we consider that no additional credible options were identified during the consultation period, we intend to produce a PACR that addresses all submissions received, including any issues in relation to the proposed preferred option raised during the consultation period, and presents our conclusion on the preferred option for this RIT-T.

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<sup>2</sup> Varied from \$43m to \$46m based on the [AER Final Determination: Cost threshold review](#) November 2021.

## Submissions and next steps

We welcome written submissions on materials contained in this PSCR. Submissions are due on 20 July 2024<sup>3</sup> and should be emailed to our Regulation team via [regulatory.consultation@transgrid.com.au](mailto:regulatory.consultation@transgrid.com.au).<sup>4</sup> In the subject field, please reference 'Supply to Sydney West 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. Subject to additional credible options being identified during consultation, we anticipate publication of a PACR in September 2024.

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<sup>3</sup> Consultation period is for 12 weeks, additional days have been added to cover public holidays.

<sup>4</sup> 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.

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# 1. Introduction

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Demand forecasts from Endeavour Energy show rapid demand growth in the Western Sydney and Aerotropolis areas due to the connection of new data centres and ongoing development of commercial and residential lands and associated infrastructure in the area. There is an emerging risk of unserved energy at the Sydney West Bulk Supply Point (BSP) due to increasing summer demand exceeding the firm capacity at the site. This will result in load shedding under single or multiple outages of 330/132 kV transformers at Sydney West BSP to ensure loads are within the ratings of the remaining in-service transformers.

We are applying the Regulatory Investment Test for Transmission (RIT-T) to options that allow Transgrid to meet expected demand and connection point reliability requirements in the Sydney West supply area. Publication of this Project Specification Consultation Report (PSCR) is the first step in the RIT-T process. As investment is needed to meet externally imposed regulatory obligations and service standards, we consider this a reliability correction action RIT-T.

## 1.1 Purpose of this report

The purpose of this PSCR<sup>5</sup> is to:

- set out the reasons why Transgrid proposes that action be taken (the ‘identified need’)
- present the options that Transgrid currently considers may help to address the identified need
- outline the technical characteristics that non-network options would need to provide
- summarise how we have assessed the options for addressing the identified need
- present the cost benefit assessment of all options for meeting the identified need
- identify the preferred option under the RIT-T assessment, and
- allow interested parties to make submissions and provide input to the RIT-T assessment.

## 1.2 Exemption from producing a Project Assessment Draft Report

Subject to the identification of additional credible options during the consultation period, publication of a Project Assessment Draft Report (PADR) is not required for this RIT-T as we consider that the conditions in clause 5.16.4(z1) of the NER exempting RIT-T proponents from providing a PADR have been met.

Specifically, production of a PADR is not required because:

- the estimated capital cost of the preferred option is less than \$46 million;<sup>6</sup>
- we have identified in this PSCR our preferred option and the reasons for that option, and noted that we will be exempt from publishing the PADR for our preferred option; and
- we consider that the preferred option and any other credible options will not have a material market benefit (other than benefits associated with changes in voluntary load curtailment and involuntary load shedding).

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<sup>5</sup> See Appendix A for the National Electricity Rules requirements.

<sup>6</sup> Varied from \$43m to \$46m based on the [AER Final Determination: Cost threshold review](#), November 2021.

### 1.3 Submissions and next steps

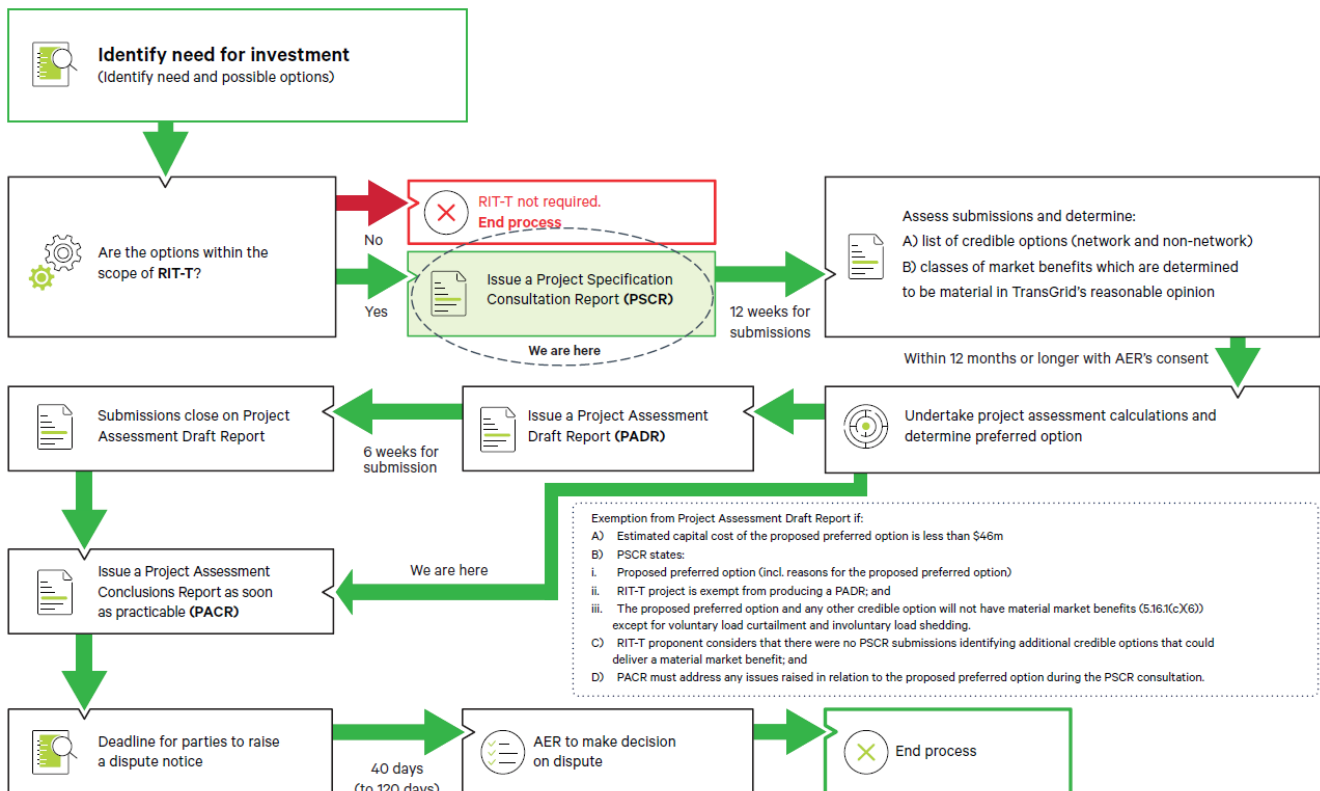
We welcome written submissions on materials contained in this PSCR. Submissions are particularly sought on the credible options presented and from potential proponents of non-network options that could meet the technical requirements set out in this PSCR. Submissions are due by 20 July 2024.

Submissions should be emailed to Transgrid’s Regulation team via [regulatory.consultation@Transgrid.com.au](mailto:regulatory.consultation@Transgrid.com.au).<sup>7</sup> In the subject field, please reference ‘Supply to Sydney West 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.

Should we consider that no additional credible options were identified during the consultation period, we intend to produce a Project Assessment Conclusions Report (PACR) that addresses all submissions received including any issues in relation to the proposed preferred option raised during the consultation period. Subject to no additional credible options being identified, a PACR is expected to be published by September 2024.

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



<sup>7</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.

## 2. The identified need

### 2.1 Background to the identified need

The Sydney West BSP supplies the Endeavour Energy distribution network in the central part of Greater Western Sydney. Sydney West BSP is supplied by seven 330 kV transmission lines, three from the north (line 20, 26 and 29), three from the west (line 32, 38 and 39), and one from the south (line 30). Sydney West also supplies inner metro load through 330 kV line 1C/1F and cable 43/44.

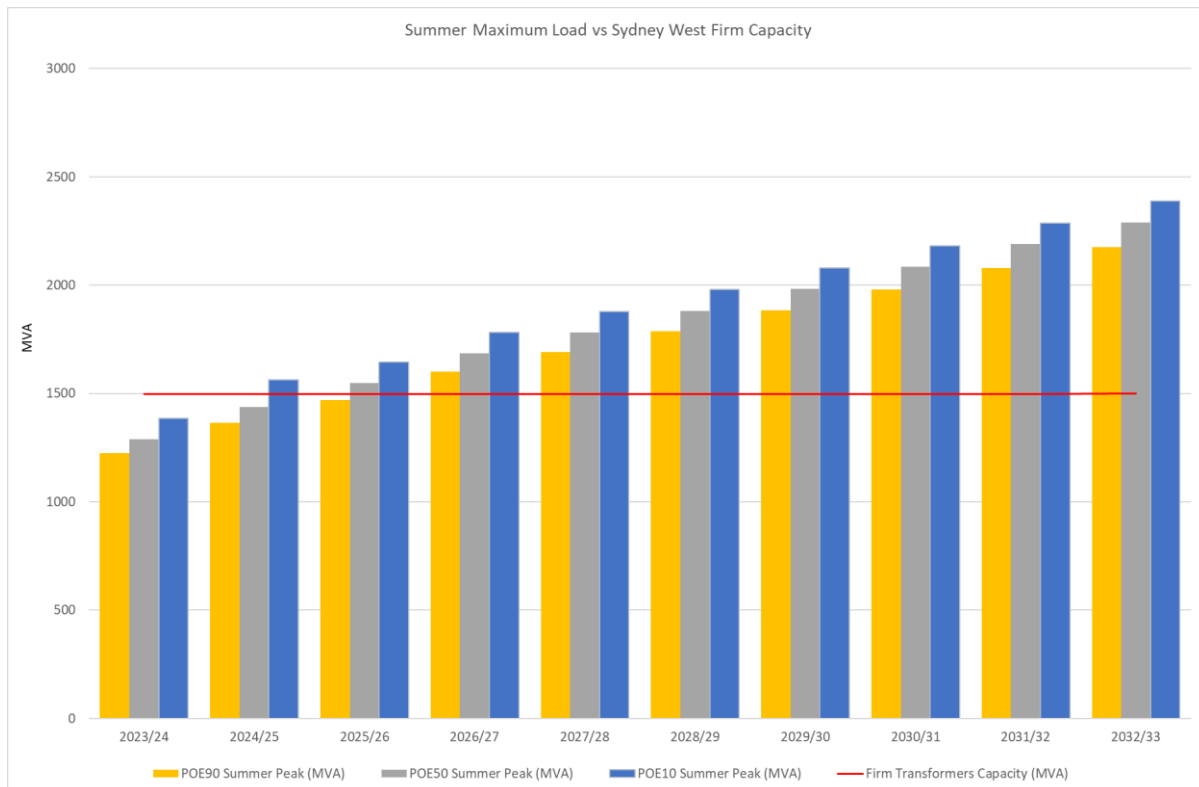
Endeavour Energy service the Blacktown, Mt Druitt, Wetherill Park and Leppington areas from our Sydney West BSP.

### 2.2 Description of the identified need

Endeavour Energy has forecast that demand for Sydney West BSP’s firm capacity is expected to grow rapidly, driven mainly by spot load including data centres, metro train lines and large commercial and residential development in the Aerotropolis.

In the absence of network investment, our central maximum demand forecast for the Western Sydney area (POE50 demand forecast) is expected to exceed the firm transformer capacity at Sydney West BSP from 2025/26. The difference between forecast maximum demand and firm transformer capacity at this BSP will increase from 48 MVA in 2025/26 to 791 MVA in 2032/33.

Figure 2-1 Gap between Sydney West Demand Forecast and N-1 Transformer Firm Capacity

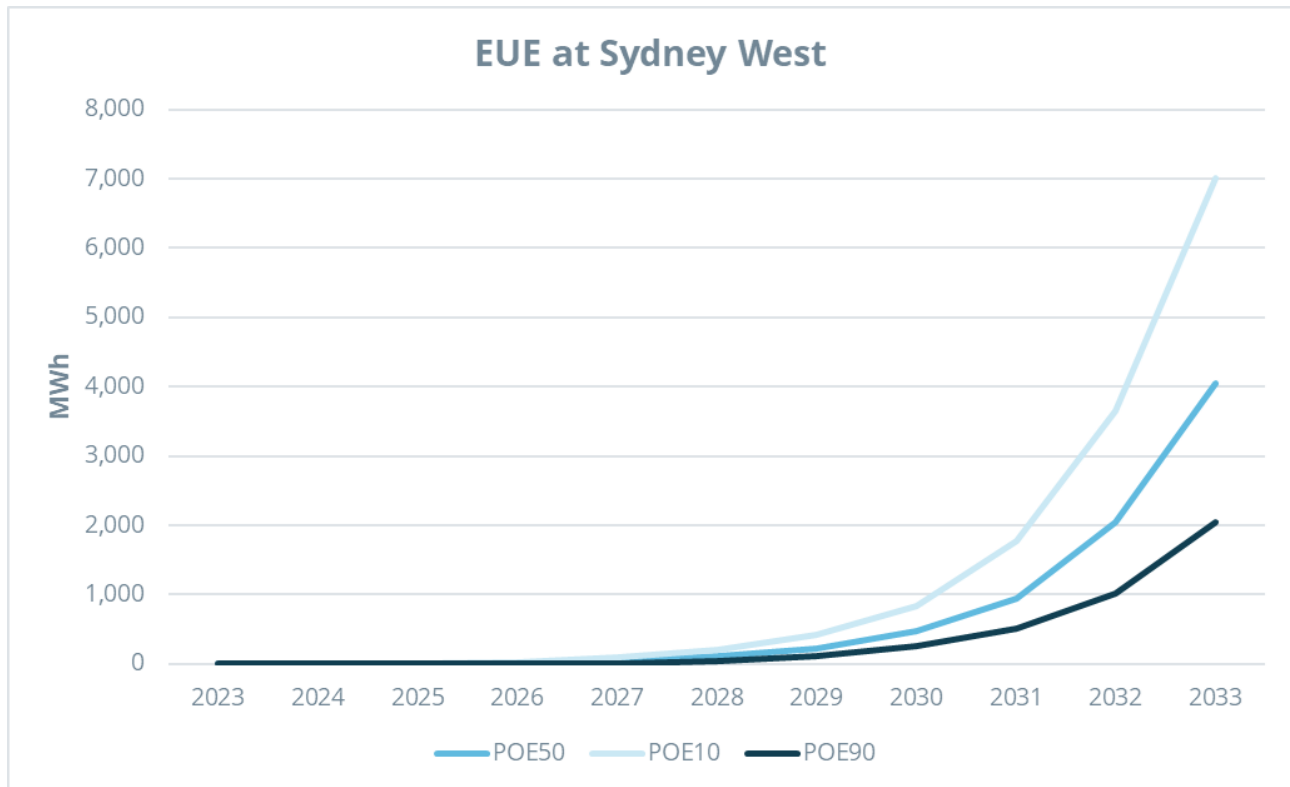


If there is a single or multiple outage of 330/132 kV transformers at the Sydney West BSP, and this contingency event occurs at or near times of high demand, load shedding will be required to maintain load



below the firm capacity of the remaining in-service transformers. Based on probabilistic planning studies of transformer failure rates and repair times under the central scenario, we estimate expected unserved energy of 5 MWh in 2025/26, increasing to approximately 2,036 MWh in 2031/32, and 11,307 MWh in 2047

Figure 2-2 Expected Unserved Energy at Sydney West BSP over time (financial years)



There is a requirement for us to meet this forecast increase in demand in the Sydney West area. Leaving this need unaddressed would substantially increase the risk of unserved energy under a single or multiple contingency events at Sydney West BSP, particularly during peak summer periods.

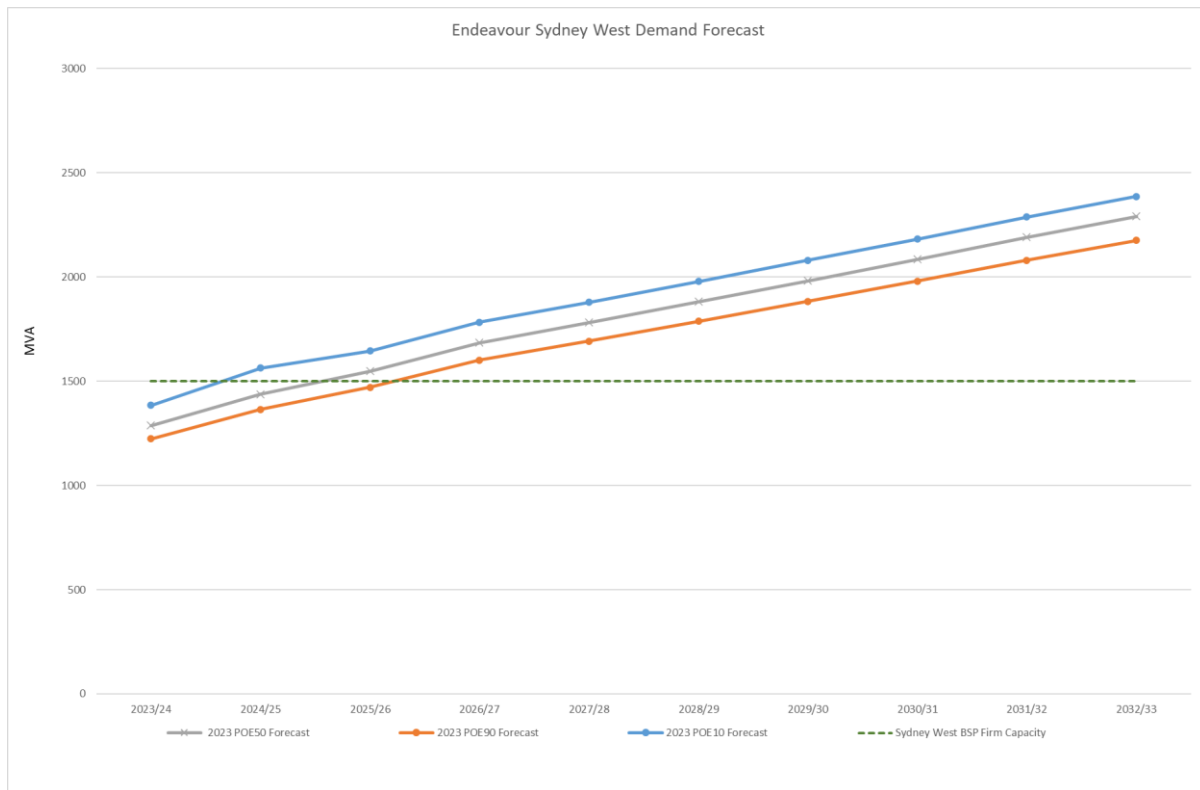
We have commenced this RIT-T to assess options which will enable us to meet our reliability requirements at Sydney West BSP. We consider this a ‘reliability corrective action’ under the RIT-T as the proposed investment is for the purpose of meeting externally imposed regulatory obligations and service standards, i.e., Schedule 5.1.4 of the NER.

## 2.3 Assumptions underpinning the identified need

### 2.3.1 Demand forecasts

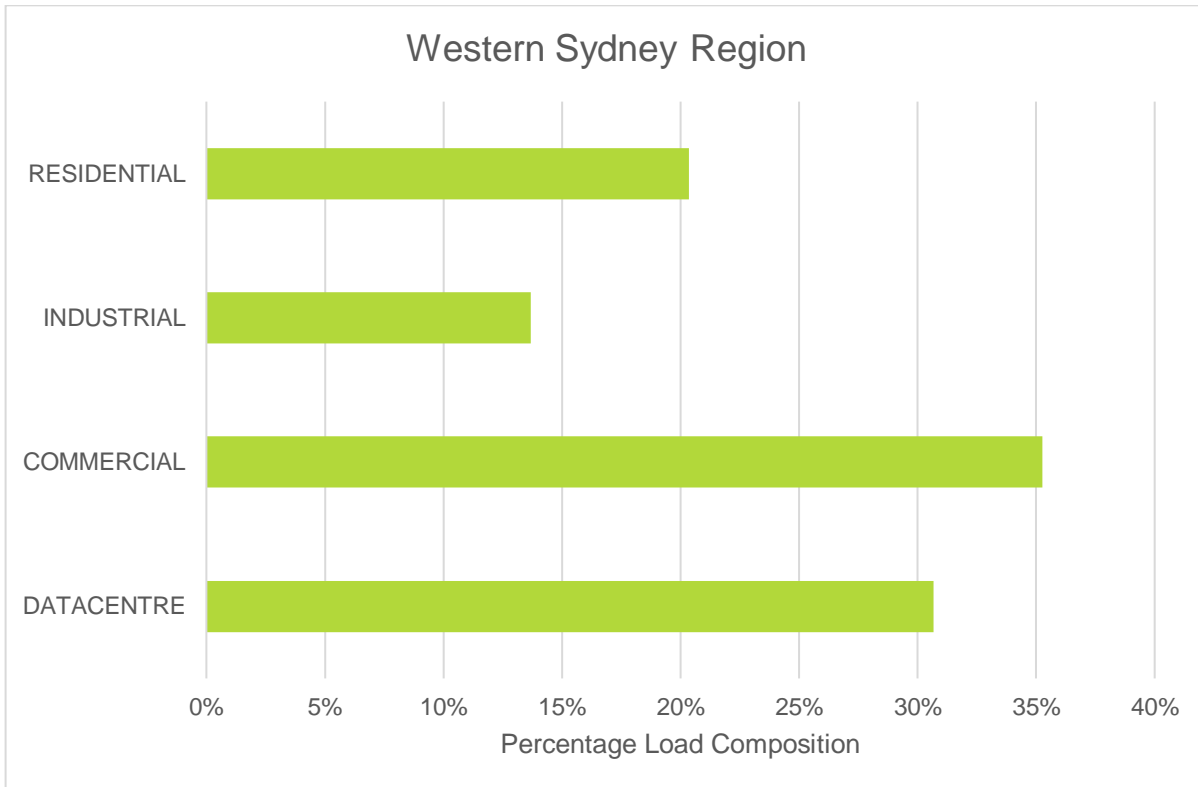
The figure below shows Endeavour Energy’s demand forecast in the Western Sydney area.

Figure 2-3 Endeavour Energy Sydney West Demand Forecast



The graph shows that demand will exceed Sydney West BSP's Firm Capacity under both the 2023 POE50 forecast and the 2023 POE10 forecast by 2025/26. The future load growth in the Sydney West area is expected to be largely driven by light commercial (warehouses) and residential developments, high demand data centres and construction of the Western Sydney (Nancy-Bird Walton) Airport and Metro Western Line.

Figure 2-4 TAPR 2023 Western Sydney Load Growth (MW)



### 2.3.2 Transformer failure rates and repair times

We have undertaken probabilistic planning studies based on transformer failure rates and repair times to assess the risk costs of load shedding risk at Sydney West BSP. The conditions of the transformers were based on the transformer health index methodology. A 72-day repair duration was used for the replacement of a failed transformer.

### 3. Options that meet the identified need

In this RIT-T, we consider credible options as those that would meet the identified need from a technical, commercial, and project delivery perspective.<sup>8</sup> This will include any credible options that are put forward by proponents in response to this PSCR.

Transgrid considers that there are two credible network options that can meet the identified need. These options are summarised in Table 3-1.

Table 3-1 Summary of the credible options

Option	Description	Estimated capex (\$M, 2022-23)	Expected commission date
1	Install a new 375 MVA 330/132 kV transformer at Sydney West BSP	\$24.78	2027/28
2	Establish a new 330/132 kV BSP at Mt Druitt and convert existing line 932 and 219 from 132 kV to 330 kV	\$80.05	2028/29

#### 3.1 Base case

Consistent with the RIT-T requirements, the assessment undertaken in this PSCR compares the costs and benefits of each credible option to a 'do nothing' base case. The base case is the (hypothetical) projected case if no action is taken, i.e.,<sup>9</sup>

*“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, there is no network development to address the identified need. Electricity supply in the Sydney West area will continue to be supplied by the existing capacity of the Sydney West BSP.

In this scenario, our central maximum demand forecast for the Western Sydney area (POE50 demand forecast) is expected to exceed the firm transformer capacity at Sydney West BSP from 2025/26. The difference between forecast maximum demand and the firm transformer capacity at this BSP will increase from 48 MVA in 2025/26 to 791MVA in 2032/33.

If there is a single or multiple outage of 330/132 kV transformers at the Sydney West BSP, and this contingency event occurs at or near times of high demand, load shedding will be required to maintain load below the firm capacity of the remaining in-service transformers. Based on probabilistic planning studies of transformer failure rates and repair times under the central scenario, we estimate expected unserved energy of 5 MWh in 2025/26, increasing to approximately 2,036 MWh in 2031/32, and 11,307 MWh in 2047

While this is not a situation we plan to encounter, and this RIT-T has been initiated specifically to avoid it, the assessment is required to use this base case as a common point of reference when estimating the net benefits of each credible option.

<sup>8</sup> As per clause 5.15.2(a) of the NER.

<sup>9</sup> AER, *Regulatory Investment Test for Transmission Application Guidelines*, October 2023, p. 22.

### 3.2 Option 1 – Install a new 375 MVA 330/132 kV transformer at Sydney West BSP

Option 1 involves installing a new 375 MVA 330/132 kV transformer at the existing Sydney West BSP. This option will increase the firm transformer capacity at Sydney West BSP by 375 MVA.

The capital cost of this option is approximately \$24.78 million  $\pm$  25% (in 22-23). The work will be undertaken over a four-year period with all works expected to be completed by 2026/27. This expenditure is comprised of:

- \$3.754 million in labour costs;
- \$8.30 million in materials costs; and
- \$12.72 million in expenses.

The timing of this expenditure is driven by the immediacy of the need to meet our reliability requirements. In addition, routine operating and maintenance costs are estimated at approximately \$0.25 million per annum (in \$2022-23). Table 3-2 below provides an annual breakdown of the capital expenditure and operating expenditure for Option 1.

Table 3-2 Annual breakdown for capital and operating costs for Option 1 (\$m, \$2022-23)

Years	Capital cost (\$M, 2022-23)	Operating costs (\$M/yr, 2022-23)
2023	-	-
2024	0.94	-
2025	1.82	-
2026	21.40	-
2027	0.61	-
2028	-	0.25
2029	-	0.25
2030	-	0.25
2031	-	0.25
2032	-	0.25
2033	-	0.25
2034	-	0.25
2035	-	0.25
2036	-	0.25
2037	-	0.25
2038	-	0.25
2039	-	0.25
2040	-	0.25
2041	-	0.25
2042	-	0.25
<b>Total</b>	<b>\$24.78</b>	<b>\$3.72</b>



All works will be completed in accordance with the relevant standards and components shall be replaced to have minimal modification to the wider transmission network. Necessary outages of relevant assets will be planned appropriately in order to complete the works with minimal impact on the network.

### 3.3 Option 2 – Establish a new 330/132 kV BSP at Mt Druitt and convert existing line 932 and 219 from 132 kV to 330 kV

Option 2 involves developing a new 330/132 kV BSP at Mt Druitt next to the existing Endeavour Energy Mt Druitt zone substation and converting lines 932 and 219 (from Sydney West to Mt Druitt) to 330 kV. Lines 932 and 219 were originally built as 330 kV double circuit lines and are currently operated at 132 kV. This option will also require 330 kV connection works at Sydney West substation. Endeavour Energy will also need to undertake rearrangements within their network to provide supply to Mamre zone substation as this substation presently loops in lines 939 and 219.

This option can provide up to 375 MVA additional supply capacity to meet existing Endeavour Energy load in the Sydney West area. This can be achieved by transferring the Mt Druitt, OneSteel and Rooty Hill from the Sydney West BSP to the new Mt Druitt BSP. Due to space limitations, no further capacity increases can be provided by the new Mt Druitt BSP.

The capital cost of this option is approximately \$80.05 million  $\pm$  25% (in \$2022-23). The work will be undertaken over a five-year period with all works expected to be completed by 2027/28. The timing of this expenditure is driven by the immediacy of the need to meet our reliability requirements. This expenditure is comprised of:

- \$12.94 million in labour costs;
- \$20.68 million in materials costs; and
- \$46.440 million in expenses.

In addition, routine operating and maintenance costs are estimated at approximately \$0.80 million per annum (in \$2022-23).

Table 3-3 Annual breakdown for capital and operating costs for Option 2 (\$m, \$2022-23)

Years	Capital cost (\$M, 2022-23)	Operating costs (\$M/yr, 2022-23)
2023	-	-
2024	0.80	-
2025	4.05	-
2026	14.29	-
2027	59.81	-
2028	1.10	-
2029	-	0.80
2030	-	0.80
2031	-	0.80
2032	-	0.80
2033	-	0.80

2034	-	0.80
2035	-	0.80
2036	-	0.80
2037	-	0.80
2038	-	0.80
2039	-	0.80
2040	-	0.80
2041	-	0.80
2042	-	0.80
<b>Total</b>	<b>\$80.05</b>	<b>\$11.21</b>

All works will be completed in accordance with the relevant standards and components shall be replaced to have minimal modification to the wider transmission network. Necessary outages of relevant assets will be planned appropriately in order to complete the works with minimal impact on the network.

### 3.4 Options considered but not progressed

We have also considered whether other options could meet the identified need. Reasons these options were not progressed are summarised in Table 3-4.

Table 3-4 Options considered but not progressed

Option	Reason(s) for not progressing
Transfer Endeavour Energy load to a new Kemps Creek Bulk Supply Point	<p>We are considering longer term solutions to meet the significant growth in demand in the Greater Western Sydney area due to the development of the Aerotropolis precinct. In this regard, we are considering developing a new BSP in Kemps Creek to serve Endeavour Energy’s new distribution network around the new Western Sydney airport. Should this proceed, the expected commissioning date is 2027/28.</p> <p>While the new Kemps Creek BSP can partially offload the Sydney West BSP once it is completed, it cannot address the expected unserved energy that will arise at the Sydney West BSP in the near term. Further, building the Kemps Creek BSP earlier but without Endeavour Energy’s distribution network will not allow it to offload the Sydney West BSP. It follows that this option would not be technically feasible.</p>
Transfer Endeavour Energy load from the Sydney West BSP to the Vineyard BSP	<p>As Vineyard BSP is already experiencing high load growth and the supply capacity at Vineyard is reaching its limit within the planning horizon, this option is not technically feasible.</p>

### 3.5 No material inter-network impact is expected

Transgrid has considered whether the credible options listed above is expected to have material inter-regional impact<sup>10</sup>. A ‘material inter-network impact’ is defined in the NER as:

<sup>10</sup> As per clause 5.16.4(b)(6)(ii) of the NER.

*“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<sup>11</sup>:

- a decrease in power transfer capability between transmission networks or in another TNSP’s network of no more than the minimum of 3 per cent 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 per cent 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 consider that each credible option satisfies these conditions as it does not modify any aspect of transmission assets and will only have localised effects around Western Sydney. By reference to AEMO’s screening criteria, there is no material inter-network impacts associated with any of the credible options considered.

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<sup>11</sup> Inter-Regional Planning Committee. *“Final Determination: Criteria for Assessing Material Inter-Network Impact of Transmission Augmentations.”* Melbourne: Australian Energy Market Operator, 2004. Appendix 2 and 3. Accessed 23 June 2021. [https://aemo.com.au/-/media/files/electricity/nem/network\\_connections/transmission-and-distribution/170-0035-pdf.pdf](https://aemo.com.au/-/media/files/electricity/nem/network_connections/transmission-and-distribution/170-0035-pdf.pdf)

## 4. Technical characteristics for non-network options

We consider that non-network options may be able to assist with meeting the identified need and we encourage interested parties to submit their existing or potential non-network solution to support in addressing the identified need.

This section describes the technical characteristics and requirements that a non-network option would need to address the identified need up to Financial Year 2028. Non-network solutions will not be feasible beyond Financial Year 2028 because of the magnitude of the forecast load growth in the area supplied by the Sydney West Bulk Supply Point.

At this stage, it is not clear whether non-network solutions will be commercially and technically viable. We are interested in hearing from proponents on their individual solutions and costs. However, we note that the cost of the network options may act to effectively bound the cost available for any non-network options to be considered commercially feasible.

We consider that non-network options will involve potential demand management, embedded generation or energy storage systems to reduce the load below the limit of 1500 MVA at Sydney West BSP.

We encourage parties to make written submissions regarding the potential of non-network options to satisfy, or contribute to satisfying, the identified need for this RIT-T.

### 4.1. Demand management or embedded generation

The table below outlines the minimum operation characteristics (dispatch and availability) of the potential demand management or embedded generation solution.

Table 4-1 Summary of the technical characteristics

Financial Year	Capacity (MW)	Minimum dispatch - total volume (MWh)	Minimum dispatch - total hours	Maximum consecutive hours of dispatch	Expected dispatch incidents	Period of availability
2026	46	101	4	2	3	December to February
2027	176	2071	30	6	10	December to February

The embedded generation should be installed at points on the network that would help offset load from the Sydney West BSP - See *Location Requirements*.

### 4.2. Battery energy storage systems (BESS)

The table below outlines the minimum characteristics and operation of the BESS.

Table 4-2 Minimum characteristics and operation of the BESS

Financial Year	Power Capacity (MW)	Reserved Storage Capacity for Service (MWh)	Period of availability
2026	50	50	December to February
2027	180	350	December to February

The BESS should be installed in the network to help offset load from the Sydney West BSP – See *Location Requirements*.

The graphs below show an indicative demand profile that would need to be offset by a BESS.

Figure 4-1 FY 2026 indicative excess summer maximum demand – day profile

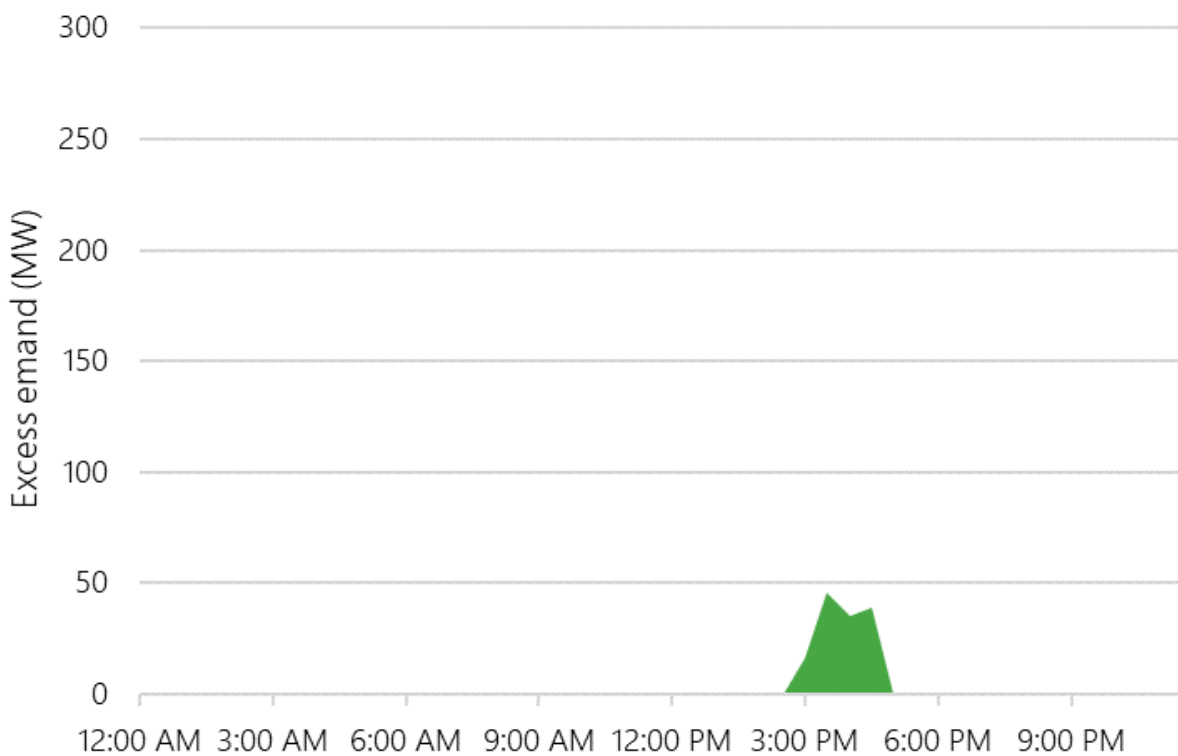
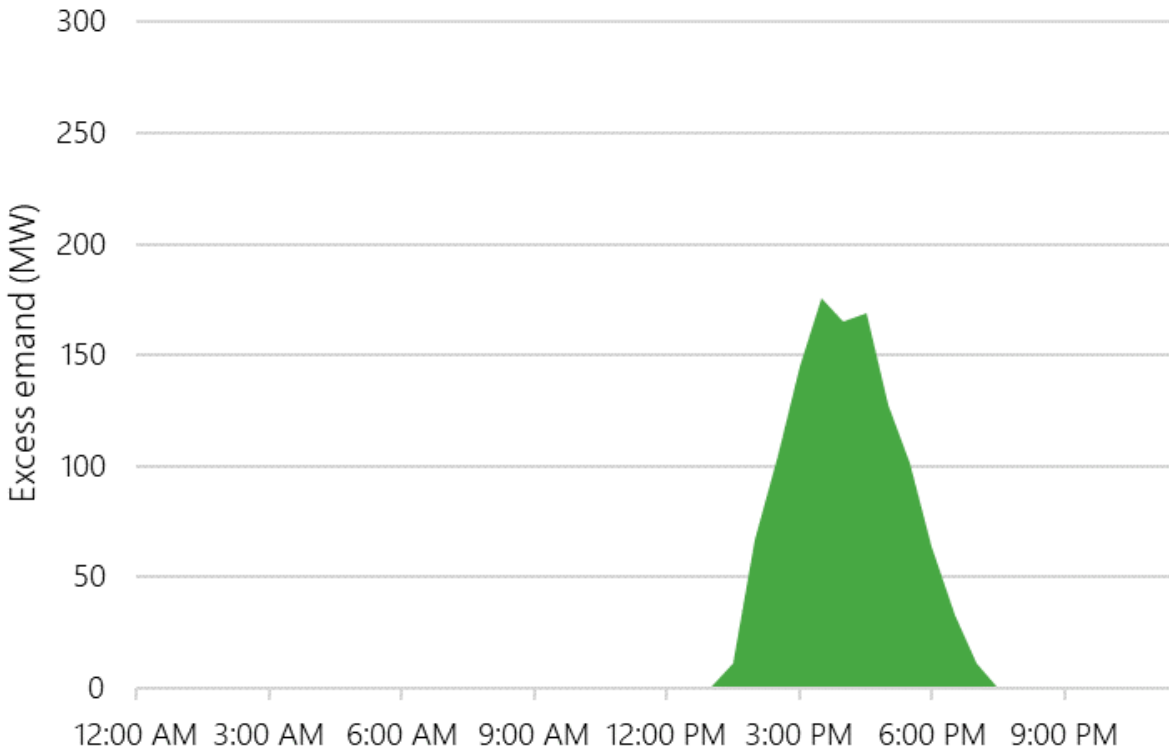




Figure 4-2 FY 2027 indicative excess summer maximum demand – day profile

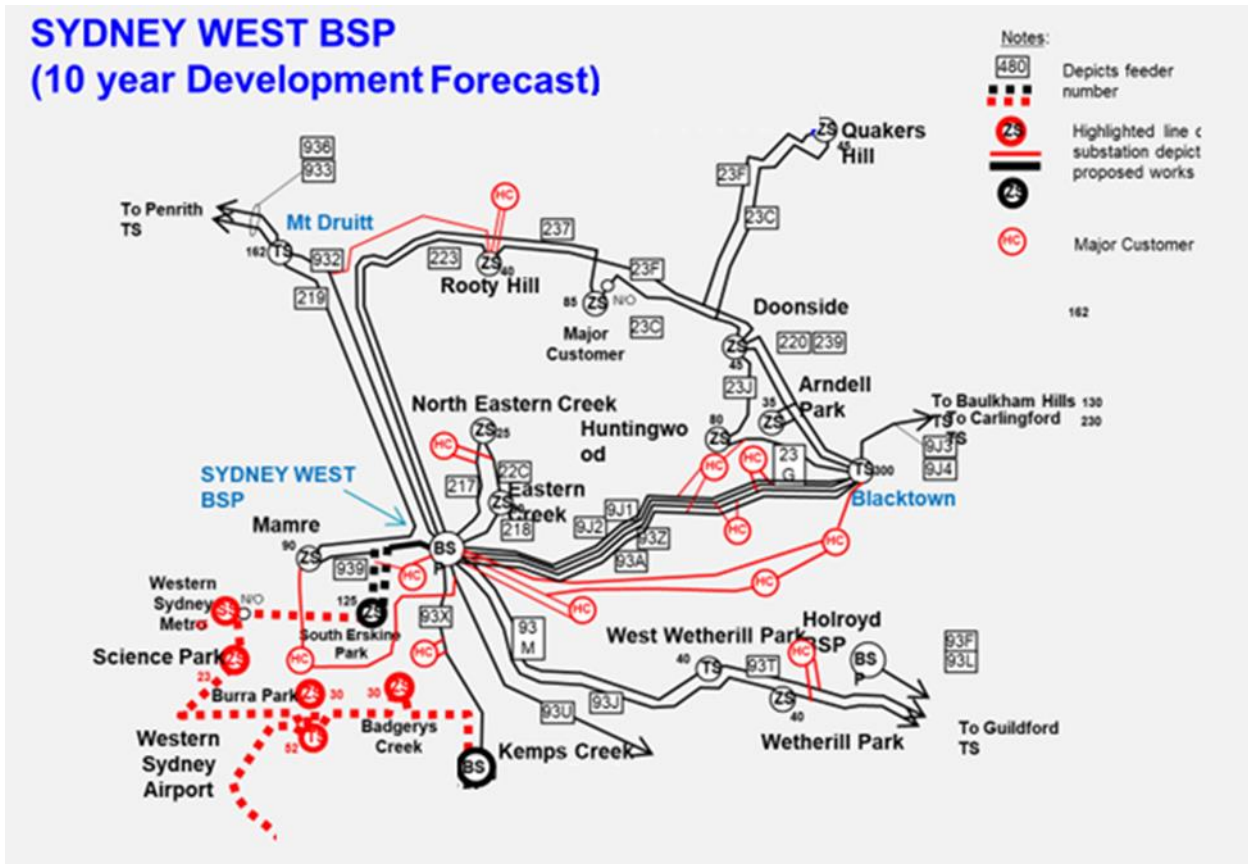


### 4.3. Location Requirements for Non-Network Options

To ensure service is provided to reduce the load below the limit of 1500 MVA at Sydney West BSP, elements providing the service must be connected directly to the Sydney West BSP, the following Zone Substations, or direct transmission network connections between Sydney West BSP and the following Zone Substations:

<ul style="list-style-type: none"> <li>- Arndell Park</li> <li>- Blacktown</li> <li>- Baulkham Hills</li> <li>- Carlingford</li> <li>- Doonside</li> <li>- Eastern Creek</li> <li>- Huntingwood</li> <li>- Mamre</li> </ul>	<ul style="list-style-type: none"> <li>- Mt Druitt</li> <li>- North Eastern Creek</li> <li>- Quakers Hill</li> <li>- Rooty Hill</li> <li>- South Erskine Park</li> <li>- West Wetherill Park</li> <li>- Wetherill Park</li> </ul>
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Figure 4-3 FY Sydney West BSP development forecast. Indicating existing and future substations and directly connected major customers in the relevant area (locations) for solutions



We welcome written submissions on materials contained in this PSCR. Submissions are due on 20 July 2024<sup>12</sup> and should be emailed to our Regulation team via [regulatory.consultation@transgrid.com.au](mailto:regulatory.consultation@transgrid.com.au).<sup>13</sup> In the subject field, please reference 'Supply to Sydney West area PSCR'.

<sup>12</sup> Consultation period is for 12 weeks, additional days have been added to cover public holidays.

<sup>13</sup> 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.

## 5. Materiality of market benefits

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The NER requires that all categories of market benefit identified in relation to the RIT-T are included in the RIT-T assessment, unless the TNSP can demonstrate that a specific category (or categories) is unlikely to be material in relation to the RIT-T assessment for a specific option.<sup>14</sup>

The PSCR is required to set out the classes of market benefit that the TNSP considers are not likely to be material for a particular RIT-T assessment.<sup>15</sup>

### 5.1 Avoided unserved energy is material

We consider that changes in involuntary load shedding are expected to be material for the credible options outlined in this RIT-T assessment. In the base case, load shedding would be expected to occur if there is a single or multiple outage of 330/132 kV transformers at the Sydney West BSP, and this contingency event occurs at or near times of high demand. Under these circumstances, load shedding will be required to maintain transformer load below the firm capacity of the remaining in-service transformers.

We have estimated expected load shedding under the base case and under each of the credible options. These forecasts were based on probabilistic planning studies of transformer failure rates and repair times. Each of the credible options significantly reduce the amount of expected load shedding that would occur. The avoided unserved energy for a credible option is calculated as the difference between the expected load shedding under the base case and the expected load shedding under the credible option.

### 5.2 Wholesale electricity market benefits are not material

The AER has recognised that if the credible options will not have an impact on the wholesale electricity market, then a number of classes of market benefits will not be material in the RIT-T assessment, and so do not need to be estimated.

Transgrid determines that the credible options in this RIT-T will not affect network constraints between competing generating centres and are therefore not expected to result in any change in dispatch outcomes and wholesale market prices. Transgrid therefore considers 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 Transgrid
- changes in ancillary services costs
- competition benefits

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<sup>14</sup> NER clause 5.15.A.2(5)

<sup>15</sup> NER clause 5.16.4(b)(6)(iii).

### 5.3 No other categories of market benefits are material

In addition to the classes of market benefits listed above, NER clause 5.16.1(c)(4) requires us to consider the following classes of market benefits, listed in **Error! Reference source not found.**, arising from each credible option. Transgrid considers that none of the classes of market benefits listed are material for this RIT-T assessment for the reasons in Table 5-1.

Table 5-1 Reasons non-wholesale electricity market benefits categories are considered not material

Market benefits	Reason
Differences in the timing of unrelated network expenditure	The credible options considered are all designed to meet required reliability requirements and are unlikely to affect decisions to undertake unrelated expenditure in the network. Consequently, material market benefits will neither be gained nor lost due to changes in the timing of expenditure from any of the options considered.
Option value	Given the immediate nature of the identified need, none of the credible options considered possess the flexibility required for there to be any option value.
Changes in network losses	We do not expect any material difference in transmission losses between options.

On 21 September 2023, the National Energy Objective (NEO) in the National Energy Laws (NEL) was amended to incorporate a new emissions reduction objective. Prior to the commencement of the amended Act, the NEO referred to the long-term interests of energy consumers with respect to price, quality, safety, reliability and security of supply of energy. The emissions reduction objective introduced by the Act adds reference to the long-term interests of energy consumers with respect to the achievement of targets set by a participating jurisdiction for reducing Australia’s greenhouse gas emissions, or that are likely to contribute to reducing Australia’s greenhouse gas emissions. The National Energy Rules were amended to give effect to the updated NEO on 1 February 2024.<sup>16</sup>

Transgrid supports greater consideration of emissions reduction within network planning and investment frameworks. These changes ensure network planning and investment frameworks support achievement of the Commonwealth Government’s net zero targets. Transgrid has set 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.<sup>17</sup>

We have applied the updated NEO to this RIT-T assessment and do not consider there to be any material changes to greenhouse gas emissions under the proposed options, as the proposed options are unlikely to significantly alter the generation mix across the NEM. Nonetheless, Transgrid is working to understand how to assess the value of expected changes in greenhouse gas emissions. Insights will be considered and

<sup>16</sup> Government of South Australia, National Electricity (South Australia) Act 1996—21.9.2023, clause 40 s.4(b)

<sup>17</sup> 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>

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

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This section outlines the approach that Transgrid has applied in assessing the net benefits associated with each of the credible options against the base case.

### 6.1 Assessment against the base case

As outlined in section 3.1, all costs and benefits considered have been measured against a base case where no network development is undertaken to address the identified need and electricity supply in the Western Sydney area will continue to be supplied by the existing capacity of the Sydney West BSP.

### 6.2 Assessment period and discount rate

A 20-year assessment period from 2022/23 to 2041/42 has been 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 includes a terminal value to capture the remaining asset life. This ensures that the capital cost of long-lived options over the assessment period is appropriately captured, and that all options have their costs and benefits assessed over a consistent period, irrespective of option type, technology or asset life. The terminal values are calculated as the undepreciated value of capital costs at the end of the analysis period.

A real, pre-tax discount rate of 7 per cent has been adopted in all scenarios presented in this PSCR, consistent with AEMO's 2023 Inputs, Assumptions and Scenarios Consultation Report (IASR).<sup>18</sup> 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 have therefore tested the sensitivity of the Central scenario results to a lower bound discount rate of 3 per cent.<sup>19</sup> We have also adopted an upper bound discount rate of 10.5 per cent (i.e., AEMO's 2023 Inputs, Assumptions and Scenarios Report).<sup>20</sup> We also tested the sensitivity of the Central scenario results including in relation to the capital costs, operating and maintenance costs and VCRs.

### 6.3 Approach to estimating option 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.

The cost estimates are developed using our 'MTWO' cost estimating system. This system utilises historical average costs, updated by the costs of the most recently implemented project with similar scope. All

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<sup>18</sup> AEMO '2023 Inputs, Assumptions and Scenarios Report', July 2023, p 123.

<sup>19</sup> 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>

<sup>20</sup> AEMO '2023 Inputs, Assumptions and Scenarios Report', July 2023, p 123.



estimates in MTWO are developed to deliver a 'P50' portfolio value for a total program of works (i.e., there is an equal likelihood of over- or under-spending the estimate total).<sup>21</sup>

We estimate that actual costs will be within +/- 25 per cent of the central capital cost estimate. 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 Association for the Cost Engineering classification system.

All cost estimates are prepared in real, 2022-23 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.

#### 6.4 The options have been assessed against three reasonable 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 RIT-T must include any of the ISP scenarios from the most recent IASR that are relevant unless:<sup>22</sup>

- the RIT-T proponent demonstrates why it is necessary to vary, omit or add a reasonable scenario to what was in the most recent IASR, and
- the new or varied reasonable scenarios are consistent with the requirements for reasonable scenarios set out in the RIT-T instrument.

The AER's RIT-T Guidelines clarifies that the number and choice of reasonable scenarios must be appropriate to the credible options under consideration, and that the choice of reasonable scenarios must reflect any variables or parameters that are likely to affect the ranking or sign of the net benefit of any credible option.<sup>23</sup>

For the purposes of this RIT-T, we consider that the ISP scenarios are not relevant. The key input parameter that is likely to affect the ranking or sign of the net market benefits of the credible options is expected maximum demand in Western Sydney. This input is independent from the assumptions underpinning the ISP scenarios, which are much broader in scope and do not adequately account for the highly localised identified need in this RIT-T. It follows that adopting the ISP scenarios would not be consistent with adopting scenarios that reflect parameters that could reasonably change the ranking or sign of the net market benefits of the credible options.

<sup>21</sup> 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.

<sup>22</sup> AER, *Regulatory Investment Test for Transmission Application Guidelines*, October 2023, p. 43

<sup>23</sup> AER, *Regulatory Investment Test for Transmission Application Guidelines*, October 2023, p. 44

In line with the RIT-T Guideline, we have constructed reasonable alternative scenarios. To do this, we developed a **Central Scenario** which reflects our best estimate of each of the modelling parameters, including maximum demand, and capital and operating costs. This was based on local demand forecasts provided by Endeavour Energy that are able to capture the expected significant growth in demand driven by spot load including data centres, metro train lines and large commercial and residential development around the new airport in Western Sydney.

As indicated above, we consider that the key input parameter that is likely to affect the ranking or sign of the net market benefits of the credible options is maximum demand in Western Sydney. We do not consider that variations in other parameters of the Central Scenario are likely to affect the outcome of the RIT-T assessment. In view of this, we have developed additional reasonable scenarios that reflect variations in maximum demand while holding other parameters the same as the Central Scenario.

In summary, we have developed the following scenarios:

- ‘Central scenario’ - assumes POE50 demand to be able to reflect our best estimate of maximum demand in Western Sydney.
- ‘Low demand’ scenario - assumes POE90 demand estimates to investigate a lower bound of maximum demand in Western Sydney.
- ‘High demand’ scenario - assumes POE10 demand estimates to investigate an upper bound of maximum demand Western Sydney.

The NPV results in this PSCR are reported for each scenario, as well as on a weighted basis. As we have no evidence or rationale for assigning a higher probability for one reasonable scenario over another, we have weighted each reasonable scenario equally.<sup>24</sup>

A summary of the key variables in each scenario is presented in the table below.

Table 6-1 Summary of scenarios

Variable / Scenario	Central scenario	Low demand scenario	High demand scenario
Scenario weighting	1/3	1/3	1/3
Discount rate	7.00%	7.00%	7.00%
Value of Customer Reliability (VCR) (\$2022-23 m)	\$38.30/kWh	\$38.30/kWh	\$38.30/kWh
Minimum demand forecast	POE50	POE90	POE10
Network capital costs	Base estimate	Base estimate	Base estimate
Operating and maintenance costs	Base estimate	Base estimate	Base estimate
Avoided load shedding	Base estimate	Low demand forecast	High demand forecast

In addition to the scenario analysis, we undertook sensitivity analysis on key variables under the Central scenario, including in relation to capital costs and the discount rate.

<sup>24</sup> As per: AER, *Regulatory Investment Test for Transmission Application Guidelines*, October 2023, p. 53

## 6.5 Approach to calculating load-weighted VCRs

The VCR is typically reported in dollars per kWh and is an important parameter for estimating classes of market benefits that relate to reliability. Consistent with the AER’s RIT-T Guideline, we have developed VCR estimates that are based on the estimates developed and consulted on by the AER, weighted to reflect the mix of customers that are likely to be affected by the options.

We first calculated weights according to the loads of different customer types in the Western Sydney area. We relied on customer types and customer numbers published by Endeavour Energy in its FY22 Disclosure Report (The Energy Charter).<sup>25</sup> We assumed different loads per annum (MWh/annum) for each of these customer types and computed weights according to each customer type’s load. For the Residential and Commercial customer type load per annum assumptions of 4.91MWh/annum and 10.03MWh/annum, we relied on the AER’s Default Market Offer 2023-24 Final Determination for the annual usage benchmark assumptions for the ‘residential without controlled load’ and ‘small business without controlled load’ customer groups within the Endeavour Energy distribution zone, respectively.<sup>26</sup> However, given a lack of data published by the AER regarding the Industrial customer type’s load per annum, we assumed a conservative estimate of 160 MWh per annum that is based on the minimum electricity consumption assumed for the Industrial customer type that is published in Endeavour Energy’s 2021/22 Energy Charter Disclosure Report.<sup>27</sup>

Table 6-2 Weighted mix of customers affected by the options

Customer type	Electricity consumption	Number of customers	Load per annum (MWh/annum)	Total load (MWh/annum)	Weights by load
Residential	< 160 MWh per annum	980,583	4.91	4,804,857	72%
Commercial	< 160 MWh per annum	88,766	10.03	887,660	13%
Industrial	> 160 MWh per annum	5,879	160.00	940,640	14%

We then applied the AER’s most recent VCR estimates for each of these different customer types. This is shown in Table 6-3 below.<sup>28</sup> We note the AER publishes a range of VCRs for the ‘industrial’ customer type, i.e., Agriculture, Metals, Mines etc. In contrast, data on industrial customer loads from Endeavour Energy is not disaggregated by these same categories. As a result, we have assumed an equal weight for each sub-category within the AER’s ‘Industrial’ category. We do not expect this assumption will affect the choice of the preferred option.

<sup>25</sup> Endeavour Energy, 2021/22 Energy Charter Disclosure Report- [https://www.endeavourenergy.com.au/\\_\\_data/assets/pdf\\_file/0030/46785/2021-2022-Energy-Charter-Disclosure-Report.pdf](https://www.endeavourenergy.com.au/__data/assets/pdf_file/0030/46785/2021-2022-Energy-Charter-Disclosure-Report.pdf)

<sup>26</sup> AER’s Default market offer prices 2023–24: Final determination (Table 2.1)

<sup>27</sup> This figure has been taken from Endeavour Energy’s FY21 Disclosure Report (p5) as a conservative estimate of load per annum for the ‘industrial’ customer type

<sup>28</sup> The VCR values have been taken from the most recent VCR update from the AER, i.e.: AER, Annual update – VCR review final decision – Appendices A –E, December 2022. These values have also been inflated by Australian CPI from June 2022 to June 2023 to convert to FY\$2023.

Table 6-3 Weights for each customer type

Type	Weight (%)	VCR (\$/kWh) (\$2022-23)
Residential	72.46%	30.49
Commercial	13.39%	52.53,
Agriculture (Industrial)	2.83%	44.68
Industrial (Industrial)	2.83%	75.25
Industrial (Industrial)	2.83%	139.19
Metals (Industrial)	2.83%	23.43
Mines (Industrial)	2.83%	41.48
<b>Weighted total</b>		38.30

Using this information, we were able to calculate the load-weighted VCR presented in **Error! Reference source not found.** which has been applied in all three scenarios.

## 7. Assessment of credible options

This section outlines the assessment Transgrid has undertaken of the credible options. The assessment compares the costs and benefits of the option to a base case 'do nothing' option, where no network development is undertaken to address the identified need and electricity supply in the Western Sydney area will continue to be supplied by the existing capacity of the Sydney West BSP.

### 7.1 Estimated gross benefits

The table below summarises the gross benefit estimated for each of the options relative to the base case in present value terms for the assessment period. The benefits included in this assessment are avoided involuntary load shedding.

Table 7-1 NPV of gross economic benefits relative to the base case (\$2022-23 m)

Option	Central scenario	Low demand scenario	High demand scenario	Weighted scenario
<i>Scenario weighting</i>	1/3	1/3	1/3	
Option 1	839.32	427.85	1,452.04	906.40
Option 2	761.72	380.99	1,343.38	828.70

The results show that under all four scenarios, the estimated gross benefits in NPV terms from Option 1 are higher than Option 2. However, the extent of this difference differs across scenarios. Under the High demand scenario, the gross benefits from Option 1 are greater than Option 2 by a difference of \$108.66m (\$2022-23) whereas under the Low demand scenario, Option 1 is greater than Option 2 by a difference of \$77.60m (\$2022-23).

### 7.2 Estimated costs

The table below summarises the capital costs, and the operating and maintenance costs, of each option relative to the base case in present value terms for the assessment period.

Table 7-2 NPV of capital and operating costs relative to the base case (\$2022-23 m)

Option	Central scenario	Low demand scenario	High demand scenario	Weighted scenario
<i>Scenario weighting</i>	1/3	1/3	1/3	
Option 1	22.13	22.13	22.13	22.13
Option 2	67.35	67.35	67.35	67.35

The results show that the estimated total cost in NPV terms incurred from implementing Option 1 is lower than Option 2 across all four scenarios.

### 7.3 Estimated net economic benefits

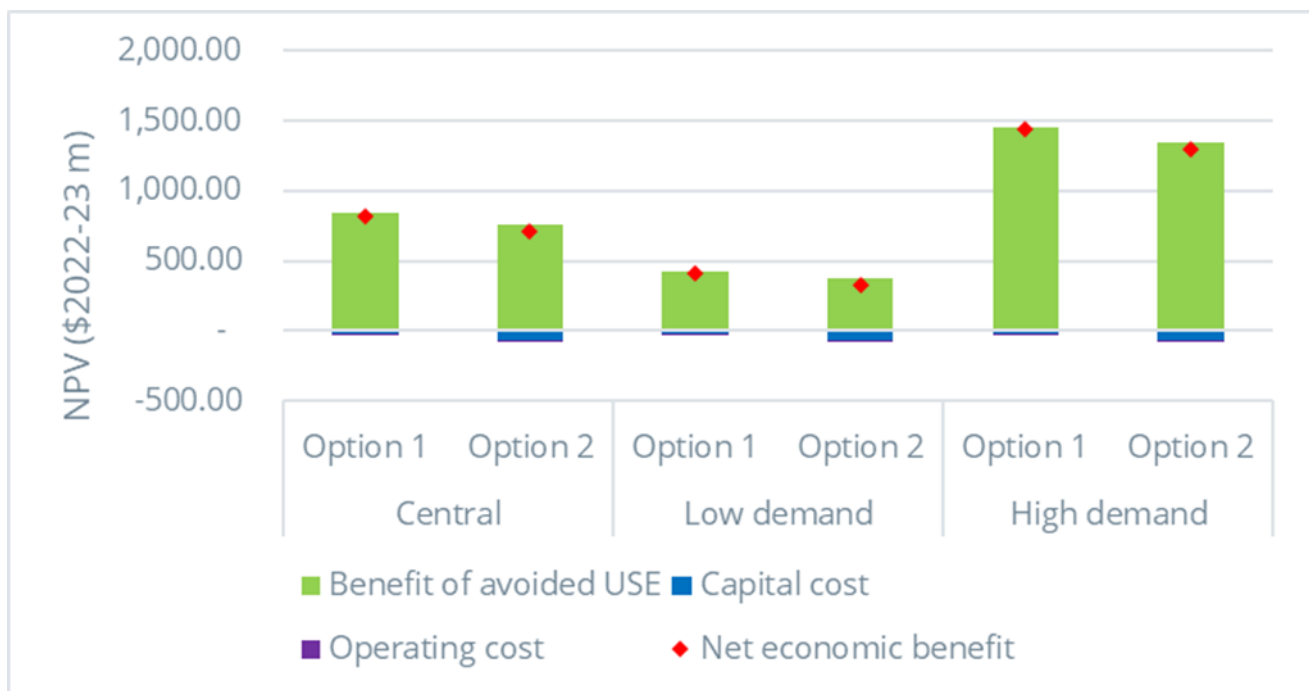
The net economic benefits are the estimated gross benefits less the estimated costs. The table below summarises the net present value of the net economic benefits for each credible option across the three scenarios, and on a weighted basis. The table also shows a ranking of the options, where options with a higher net economic benefit under the weighted scenario are accorded a higher rank.

The table shows that Option 1 is found to have the greatest net economic benefits of the options considered and is therefore our preferred option.

Table 7-3 NPV of net economic benefits relative to the base case (\$2022-23 m)

Option	Central scenario	Low demand scenario	High demand scenario	Weighted scenario	Ranking
<i>Scenario weighting</i>	<i>1/3</i>	<i>1/3</i>	<i>1/3</i>		
Option 1	823.13	411.66	1,435.86	890.22	1
Option 2	714.13	333.39	1,295.78	781.10	2

Figure 7-1 NPV of net economic benefits (\$2022-23 m)



Overall, the figure above shows that Option 1 is ranked higher than Option 2 in every scenario.

### 7.4 Sensitivity testing

We have considered the robustness of the RIT-T assessment by undertaking a range of sensitivity testing. The purpose of this testing is to examine how the net economic benefit of the credible options changes with respect to changes in key modelling assumptions. The factors tested as part of the sensitivity analysis for this PSCR are:

- Scenario weights
- Higher or lower VCRs
- Higher or lower network capital costs of the credible options
- Higher or lower operating and maintenance costs of the credible options
- Alternate commercial discount rate assumptions.

The sensitivity testing was undertaken against the Central scenario. Specifically, we individually varied each factor identified above and estimated the net economic benefit in that scenario relative to the base case while holding all other assumptions under the Central scenario constant. The results of the sensitivity tests are set out in the sections below.

### 7.4.1 Scenario weights

Since Option 1's net economic benefit is greater than Option 2's net economic benefit in all three scenarios, there is no reasonable combination of scenario weights that would change the RIT-T outcome.

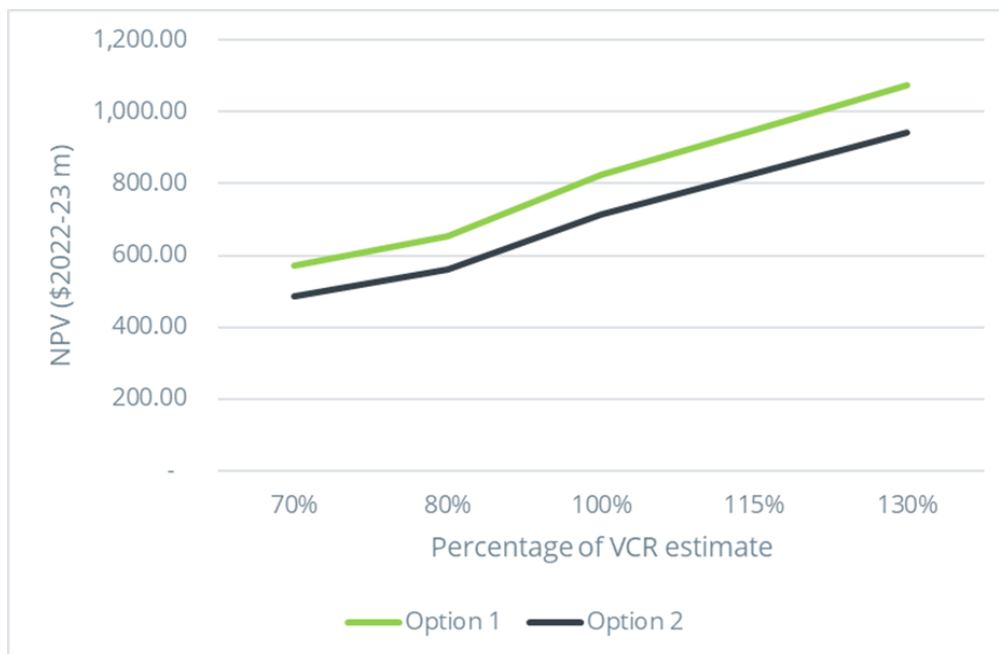
### 7.4.2 Value of customer reliability

We estimated the net economic benefit of each option by adopting a VCR that is 30% higher (the 'High VCR' scenario) and 30% lower (the 'Low VCR' scenario) than the estimate of VCR adopted in our Central scenario. The results of this analysis are presented in the table and figure below.

Table 7-4 NPV of net economic benefits relative to the base case under a lower and higher VCR (\$2022-23 m)

Option/scenario	Low VCR	High VCR	Ranking
<i>Sensitivity</i>	<i>Central estimate - 30%</i>	<i>Central estimate + 30%</i>	
Option 1	571.34	1,074.93	1
Option 2	485.61	942.64	2

Figure 7-2 NPV of net economic benefits relative to the base case under a lower and higher VCR (\$2022-23 m)





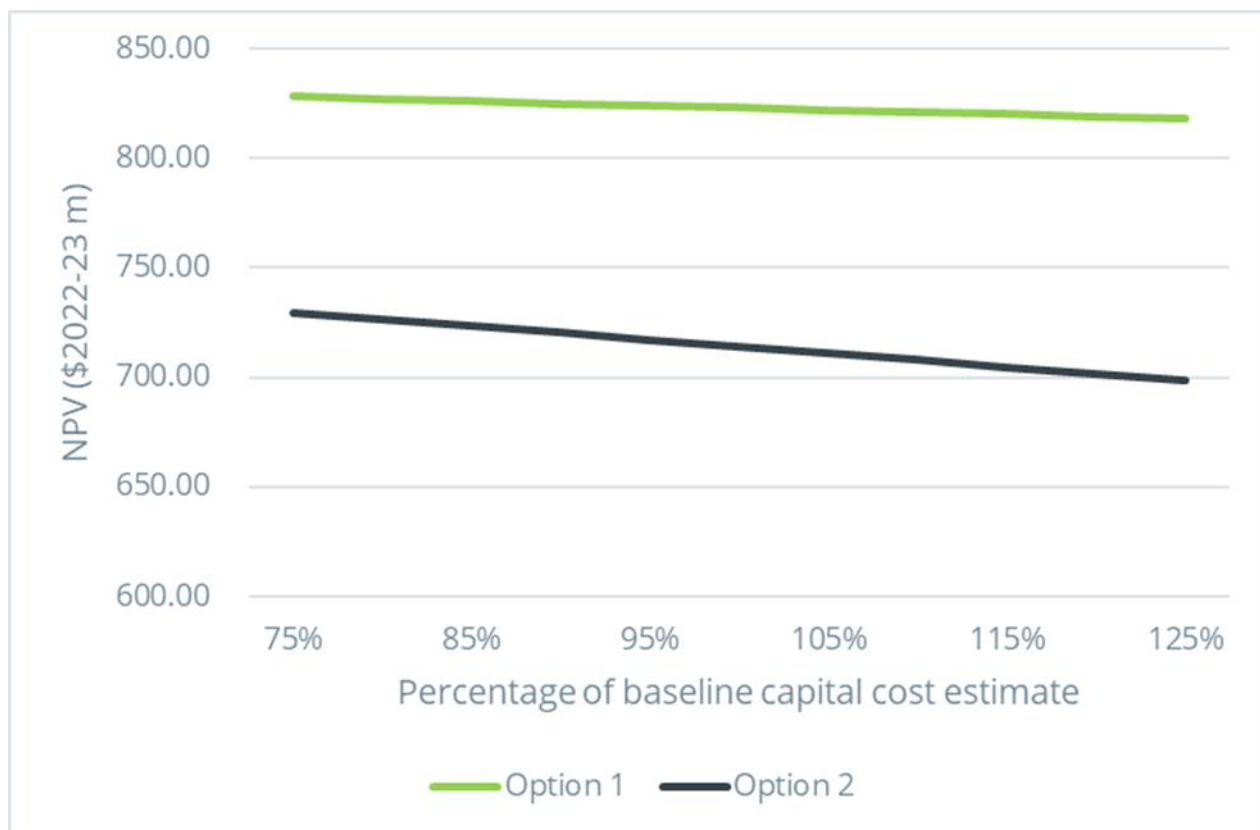
### 7.4.3 Network capital costs

We estimated the net economic benefit of each option by adopting capital costs for each option that are 25% higher (the 'High capex' scenario) and 25% lower (the 'Low capex' scenario) than the capital cost estimates in our Central scenario. The results of this analysis are presented in the table and figure below.

Table 7-5 Net economic benefits relative to the base case under lower and higher capital costs (\$2022-23 m)

Option/scenario	Low capex	High capex	Ranking
<i>Sensitivity</i>	<i>Central estimate - 25%</i>	<i>Central estimate + 25%</i>	
Option 1	828.23	818.03	1
Option 2	729.72	698.53	2

Figure 7-3 Net economic benefits relative to the base case under lower and higher capital costs (\$2022-23 m)



We have also undertaken a threshold analysis to identify whether a change in capital cost estimates would change the RIT-T outcome. Specifically, we considered whether an increase or decrease in the capital costs of one option (while holding the capital costs of the other options constant) would change the RIT-T outcome. Our results suggest that Option 1's capital cost would need to increase by more than 634% of its baseline estimate in order to change the RIT-T outcome (i.e., for Option 2 to have a higher ranking than Option 1).

Additionally, Option 2’s capital cost would need to decrease by more than 75% of its baseline estimate in order to change the RIT-T outcome (i.e., for Option 2 to have a higher ranking than Option 1).

Such changes in capital costs are outside the expected range of costs and, as such, our result of Option 1 being the preferred option is robust to reasonable capital cost sensitivities

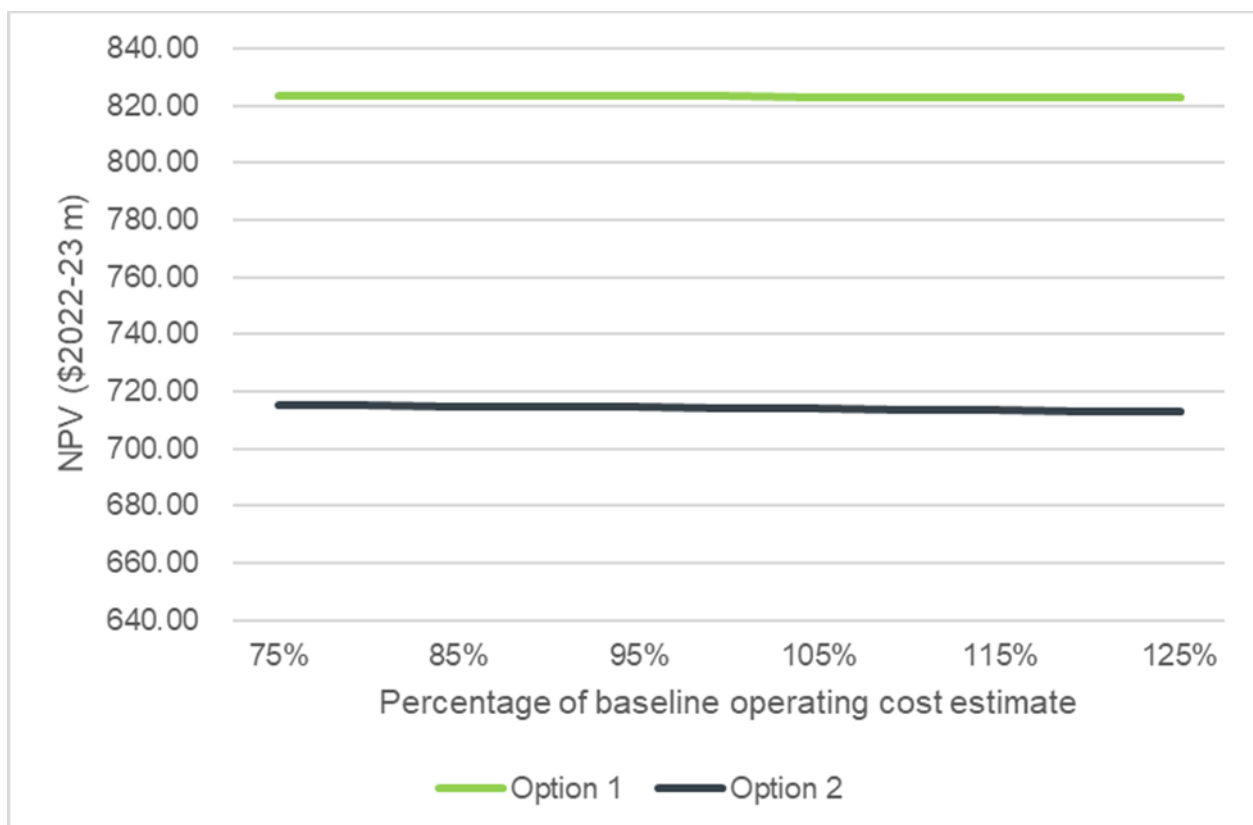
#### 7.4.4 Operating and maintenance costs

We estimated the net economic benefit of each option by adopting operating and maintenance costs for each option that are 25% higher (the ‘High opex’ scenario) and 25% lower (the ‘Low opex’ scenario) than the operating and maintenance cost estimates in our Central scenario. The results of this analysis are presented in the table and figure below.

Table 7-6 Net economic benefits relative to the base case under lower and higher operating and maintenance costs (\$2022-23 m)

Option/scenario	Low opex	High opex	Ranking
<i>Sensitivity</i>	<i>Central estimate - 25%</i>	<i>Central estimate + 25%</i>	
Option 1	823.56	822.70	1
Option 2	715.37	712.88	2

Figure 7-4 : Net economic benefits relative to the base case under lower and higher operating and maintenance costs (\$2022-23 m)



### 7.4.5 Discount rate

We estimated the net economic benefit of each option by adopting a low discount rate of 3.0% (the ‘Low discount rate’ scenario) and a high discount rate of 10.5% (the ‘High discount rate’ scenario). The results of this analysis are presented in the table and figure below.

Table 7-7 Net economic benefits relative to the base case under a lower and higher discount rates (\$2022-23 m)

Option/scenario	Low discount rate	High discount rate	Ranking
<i>Sensitivity</i>	3.0%	10.5%	
Option 1	1,427.49	521.97	1
Option 2	1,269.68	440.42	2

Figure 7-5 Net economic benefits relative to the base case under a lower and higher discount rates (\$2022-23 m)



We have also undertaken a threshold analysis to identify whether a change in the discount rate would change the RIT-T outcome. Our approach involved solving for the discount rate that would result Option 1 not being the preferred option. Our results suggest that there is no reasonable discount rate that would change the RIT-T outcome.

## 8. Draft conclusion and exemption from preparing a PADR

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Implementation of Option 1, which involves installing a new 375 MVA 330/132 kV transformer at Sydney West BSP, is the preferred option at this stage of the RIT-T process.

The capital cost of this option is approximately \$24.78 million (in \$2022-23). The work will be undertaken over a four-year period with all works expected to be completed by 2026/27. Routine operating and maintenance costs are estimated at approximately \$0.25 million per annum (in \$2022-23).

Subject to the identification of additional credible options during the consultation period, publication of a Project Assessment Draft Report (PADR) is not required for this RIT-T as we consider that the conditions in clause 5.16.4(z1) of the NER exempting RIT-T proponents from providing a PADR have been met.

Specifically, production of a PADR is not required because:

- the estimated capital cost of the preferred option is less than \$46 million;<sup>29</sup>
- we have identified in this PSCR our preferred option and the reasons for that option, and noted that we will be exempt from publishing the PADR for our preferred option; and
- we consider that the preferred option and any other credible options do not have a material market benefit (other than benefits associated with changes in voluntary load curtailment and involuntary load shedding).

If an additional credible option that could deliver a material market benefit is identified during the consultation period, then we will produce a PADR that includes an NPV assessment of the net economic benefit of each additional credible option.

If no additional credible options with material market benefits are identified during the consultation period, then the next step in this RIT-T will be the publication of a PACR that addresses all submissions received, including any issues in relation to the proposed preferred option raised during the consultation period.<sup>30</sup>

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<sup>29</sup> Varied from \$43m to \$46m based on the [AER Final Determination: Cost threshold review](#), November 2021.

<sup>30</sup> In accordance with NER clause 5.16.4(z2).

## 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 207.

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) 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) the technical characteristics of the identified need that a non-network option would be required to deliver, such as: <ul style="list-style-type: none"> <li>(i) the size of load reduction of additional supply;</li> <li>(ii) location; and</li> <li>(iii) operating profile;</li> </ul>	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 Integrated System 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, alternative 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: <ul style="list-style-type: none"> <li>(i) the technical characteristics of the credible option;</li> <li>(ii) whether the credible option is reasonably likely to have a material inter-network impact;</li> <li>(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;</li> <li>(iv) the estimated construction timetable and commissioning date; and</li> <li>(v) to the extent practicable, the total indicative capital and operating and maintenance costs.</li> </ul>	3 & 5

Rules clause	Summary of requirements	Relevant section
5.16.4(z1)	<p>A RIT-T proponent is exempt from [preparing a PADR] (paragraphs (j) to (s)) if:</p> <ol style="list-style-type: none"> <li>1. the estimated capital cost of the proposed preferred option is less than \$35 million<sup>31</sup> (as varied in accordance with a cost threshold determination);</li> <li>2. the relevant Network Service Provider has identified in its project specification consultation report: (i) its proposed preferred option; (ii) its reasons for the proposed preferred option; and (iii) that its RIT-T project has the benefit of this exemption;</li> <li>3. the RIT-T proponent considers, in accordance with clause 5.15A.2(b)(6), that the proposed preferred option and any other credible option in respect of the identified need will not have a material market benefit for the classes of market benefit specified in clause 5.15A.2(b)(4) except those classes specified in clauses 5.15A.2(b)(ii) and (iii), and has stated this in its project specification consultation report; and</li> <li>4. the RIT-T proponent forms the view that no submissions were received on the project specification consultation report which identified additional credible options that could deliver a material market benefit.</li> </ol>	8

<sup>31</sup> Varied to \$46m based on the [AER Final Determination: Cost threshold review](#) November 2021.