Transgrid

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Maintaining reliable supply to Western Sydney

Notification of MCC Assessment

Region: Greater Sydney

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2. Executive Summary

On 19 December 2024 we completed the maintaining reliable supply to Western Sydney Regulatory Investment Test for Transmission (RIT-T). This RIT-T considered two credible options:

- Option 1 – Install a new 330/132 kV MVA transformer at Sydney West Bulk Supply Point (BSP)
- Option 2 – Establish a new 330/132 kV BSP at Mt Druitt and convert existing 132 kV Lines 932 and 219 to 330 kV

The RIT-T identified Option 1 as the preferred option. Capital costs for both Option 1 and Option 2 have increased since completion of the RIT-T.

We have performed a Material Change in Circumstance (MCC) Assessment to ascertain whether this increase constitutes a MCC as contemplated in the National Electricity Rules (NER)[1]. More specifically, this assessment examined whether the change in capital costs and timing resulted in a material change in circumstances, relating to the preferred option identified in the final RIT-T document, our Project Assessment Conclusions Report (PACR). In this MCC Assessment we refer to this as whether an 'MCC event' has occurred.

Section 3.2 of this MCC Assessment outlines the underlying factors affecting the cost. For Option 1 we have received contract pricing after going out to the market and the pricing received is within the +/- 10% of the central capital cost estimate (Class 3 estimate). Option 2 remains within +/- 25% (Class 4 estimate, see section 4.3) of the central capital cost estimate and has been escalated to FY26 dollars. Labour and material costs, alongside the high demand for projects of this nature in the industry is now significantly higher than those forecast in the PACR. The primary contributor to this increase was Ester fluid transformer pricing, higher contractor pricing, higher material costs and additional scope requiring more resources.

The Net Present Value (NPV) results (which determine which option is preferred) are presented below.

Option 1 remains the preferred option, despite its NPV falling from $908.12 million in the PACR to $865.64 million in this MCC Assessment.

Table E-1 Original and revised NPV of economic benefits relative to the base case ($m, 2024/25)

Assessment	Option 1	Option 2	Preferred Option
Original (as presented in the PACR)	908.12	797.38	Option 1
Revised (MCC Assessment)	865.64	624.58	Option 1

This MCC Assessment confirms that Option 1 remains the preferred option for maintaining reliable supply to Western Sydney. We therefore have concluded that an MCC event has not occurred. This MCC Assessment includes a statement that the preferred option remains the preferred option and sets out supporting information necessary to demonstrate that the preferred option identified remains the preferred option in section 5 (MCC Assessment results).[2]

[1] As per clause 5.16.4(o2)(2) of the NER
[2] As per clause 5.16A.4(o2)(2) of the NER

3. Context and purpose of this report

On 19 December 2024 we completed the maintaining reliable supply to Western Sydney Regulatory Investment Test for Transmission (RIT-T). This RIT-T considered two credible options:

Option 1 – Install a new 330/132 kV MVA transformer at Sydney West Bulk Supply Point (BSP)

This option 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.

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

This option involves developing a new 330/132 kV BSP at Mt Druitt next to the existing Endeavour Energy Mt Druitt zone substation and converting Line 932 and Line 219 (Sydney West - 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 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.

3.1. Background to the RIT-T

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

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)[3] is expected to exceed the firm transformer capacity at Sydney West BSP from 2026/27. The difference between forecast maximum demand and firm transformer capacity at this BSP will increase from 73 MVA in 2026/27 to 673 MVA in 2034/35.

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 4 MWh in 2026/27, increasing to approximately 331 MWh in 2031/32, and 149,500 MWh in 2047.

[3] Bulk supply point projections listed in Appendix 2, TAPR 2025. Transgrid, Transmission Annual Planning Report, August 2025, pp.144

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 undertook the RIT-T to assess options which will enable us to meet our reliability requirements at Sydney West BSP.[4] 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.

3.2. Capital cost changes since RIT-T completion

Table 1 shows that the capital costs for both Option 1 and Option 2 have changed since the PACR.

Table 1 Original and revised capital cost relative to the base case ($m, 2024-25)

Cost	Option 1	Option 2
Original[5] (as presented in the PACR)	$25.78	$83.28
Revised (MCC Assessment)	$40.84	$85.93

For comparison purposes, the costs are presented in $2024/25, which is what was used in the PACR. The current costs in $2025/26[6] are $41.79m for Option 1 and $87.93m for Option 2.

- The underlying factors driving these cost changes include:
  - During the scoping phase, Transgrid's design team identified that the new No.6 Transformer, even with the installation of a four-sided fire wall, cannot adequately protect the 330 kV gantry cross beam above the transformer from a catastrophic fire. The gantry cross beam lies within the AS2067 fire clearance zone. In the event of a catastrophic fire, damage to the 330kV gantry could affect the neighbouring bay's gantry, potentially leading to the loss of a second transformer at Sydney West. To mitigate this risk, the design team has proposed using a 375 MVA Ester fluid transformer, which offers a higher flash point compared to traditional mineral oil transformers. However, Ester fluid transformer cost is significantly higher than a mineral oil transformer.
  - The project tested the market for a Design and Construct contract with competitive tenders being evaluated. The current market pricing reflects a significant increase in labour and material costs, alongside high demand for projects of this nature in the industry.
  - Principal Supplier Material cost (transformer, HV plant and secondary equipment) has increased from the time of the PACR estimate.

3.3. Operating cost changes since RIT-T completion

Table 2 shows that the operating costs for Option 1 and Option 2 both have changed since the PACR. The option 1 OPEX cost reduced due to a reduction in the allowance used to estimate the maintenance costs

[4] As part of a joint planning initiative with Endeavour Energy, a separate RIT-T was completed in September 2025 to address load growth in the Western Sydney region ("Meeting demand growth in the Western Sydney Aerotropolis 'Priority Growth Area'").
[5] Values escalated from 2021/22 to 2023/24 values in accordance with ABS real CPI data.
[6] Values de-escalated from 2025/26 to 2024/25 values in accordance with ABS real CPI data and RBA forecast Nov-2025.

associated with a new transformer bay. Option 2 OPEX increased due to the allowance used relative to the capital cost for all maintenance costs associated with an entire new substation.

Table 2 Original and revised operating cost relative to the base case ($m, 2024/25)

Cost	Option 1	Option 2
Original[7] (as presented in the PACR)	0.26	0.83
Revised (MCC Assessment)	0.21	0.86

3.4. Material change in circumstance provisions in the NER

The NER covers the situation where there has been a material change in circumstance following the publication of a PACR. It is important to note that the increase in the capital cost estimate for the project, whilst substantial, does not in itself mean that an MCC event has occurred for the purposes of the NER. The NER refers to a material change in circumstance as including, but not being limited to, a change to:

- key inputs and assumptions;
- the identified need described in the PACR; or
- the credible options assessed in the PACR.

Pursuant to these NER provisions, Transgrid has undertaken this MCC Assessment to evaluate whether the change in the capital cost for both options represent an MCC event.

[7] Values escalated from 2021/22 to 2023/24 values in accordance with ABS real CPI data.

4. Approach to the MCC Assessment

This section outlines the inputs and assumptions used to complete the MCC Assessment with updated capital costs for both Option 1 and Option 2:

4.1. Assessment against the base case

The costs and benefits of each option are compared against a 'do nothing' base case. 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 2026/27. The difference between forecast maximum demand and the firm transformer capacity at this BSP will increase from 73 MVA in 2026/27 to 673 MVA in 2034/35.

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 4 MWh in 2026/27, increasing to approximately 331 MWh in 2031/32, and 149,500 MWh in 2047.

While this is not a situation we plan to encounter, and this RIT-T was 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.

4.2. Assessment period and discount rate

This MCC Assessment makes use of a 20-year assessment period from 2022/23 to 2041/42. 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 have been calculated based on the undepreciated value of capital costs at the end of the analysis period. As a conservative assumption, we have effectively assumed that there are no additional cost and benefits after the analysis and period.

A real, pre-tax discount rate of 7 per cent has been adopted as the central assumption for the NPV analysis. We have additionally tested the sensitivity of the NPV results to a lower bound discount rate of 3 per cent and an upper bound discount rate of 10.0 per cent[8].

4.3. Approach to estimating option costs

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

[8] AEMO *'2025 Inputs, Assumptions and Scenarios Report'*, August 2025, pp 159.

For Option 1 we have received contract pricing after going out to the market and the pricing received is within the +/- 10% of the central capital cost estimate. An accuracy of +/- 10 per cent for cost estimates is consistent with industry best practice and aligns with the accuracy range of a 'Class 3 estimate', as defined in the Association for the Cost Engineering classification system. This approach has been taken due to Option 1 being identified as the preferred option in the RIT-T. All cost estimates are prepared in real, 2025/26 dollars. The cost estimates do not include or forecast any real cost escalation for materials.

For Option 2 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 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).[9] The estimate for Option 2 is based on desktop analysis and remains within +/- 25% of the capital cost estimate presented in the PACR (Class 4 estimate). The estimate has not been further assessed as we do not plan to progress with this option because it was not identified as our preferred option in the RIT-T.

Routine operating and maintenance costs are based on works of similar nature. Given that there is an incremental routine operating and maintenance costs saving in the options compared to the base case, this is a net benefit in the assessment.

4.4. Value of customer 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).[10] 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 4.90MWh/annum and 10.00MWh/annum, we relied on the AER's Default Market Offer 2024-25 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.[11] However, given the lack of data published by the AER on Industrial customer's load per annum, we assumed a conservative estimate of 160.00 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.[12]

[9] 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.

[10] The latest published figures are provided in Endeavour Energy's 2021/22 Energy Charter Disclosure Report https://www.endeavourenergy.com.au/__data/assets/pdf_file/0030/46785/2021-2022-Energy-Charter-DisclosureReport.pdf

[11] AER's Default market offer prices 2024–25: Final determination (Table 2.1)

[12] 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

Table 2 Weighted mix of customers affected by the options

Customer type	Electricity consumption	Number of customers	Load per customer (MWh/annum)	Total load (MWh/annum)	Weights by load
Residential	< 160 MWh per annum	980,583	4.90	4,804,857	72%
Commercial	< 160 MWh per annum	88,766	10.00	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 5-2 below.[13] 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 subcategory within the AER's 'Industrial' category. We do not expect this assumption will affect the choice of the preferred option.

Table 3 Weights for each customer type

Type	Weight	VCR ($/kWh) ($2024/25)
Residential	72.44%	38.53
Commercial	13.38%	34.39
Agriculture (Industrial)	2.84%	22.25
Industrial (Industrial)[14]	2.84%	33.49
Industrial (Industrial)[15]	2.84%	12.22
Metals (Industrial)	2.84%	5.38
Mines (Industrial)	2.84%	10.63
Weighted total		**34.89**

Using this information, we were able to calculate the load-weighted VCR presented in Table 3 which has been applied in all three scenarios.

4.5. Three different scenarios were modelled

The RIT-T must include any of the ISP scenarios from the most recent IASR that are relevant unless[16]

[13] 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 2023. These values have also been inflated by Australian CPI from September 2023 to September 2024.
[14] Small-medium industrial users (less than 10 MVA)
[15] Large industrial users (greater than 10 MVA)
[16] AER, *Application Guidelines Regulatory Investment Test for Transmission*, November 2024, pp.33

- 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 clarify 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[17] .

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.

In line with the RIT-T Guidelines, we 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 this MCC Assessment. In view of this, we 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 PACR 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.[18] A summary of the key variables in each scenario is presented in the table below.

[17] AER, *Application Guidelines Regulatory Investment Test for Transmission*, November 2024, pp.43.
[18] As per: AER, Regulatory Investment Test for Transmission Application Guidelines, October 2023, p.53

Table 5-3 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) ($2024/25m)	$34.89kWh	$34.89/kWh	$34.89/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

4.6. Sensitivity analysis

In addition to the scenario analysis, we have considered the robustness of the MCC Assessment outcome through undertaking various sensitivity testing.

The range of factors tested as part of the sensitivity analysis in this PACR are:

- lower and higher assumed capital and operating costs;
- lower and higher VCR; and
- alternate commercial discount rate assumptions.

In addition, we have also sought to identify the 'boundary value' for key variables beyond which the outcome of the analysis would change, including the amount by which capital costs would need to increase for the preferred option to no longer be preferred.

5. MCC assessment results

5.1. Original NPV results from the PACR

Original results presented within the PACR are shown in Table 2 below.

Table 2 Initial NPV of economic benefits relative to the base case ($m, 2024/25), as presented in the PACR

Option	Weighted scenario
Option 1	$908.12
Option 2	$797.38

5.2. NPV results from this MCC Assessment

NPV results from this MCC Assessment are shown in Table 3 below.

Table 3 NPV of economic benefits relative to the base case ($m, 2024/25), as presented in this MCC Assessment.

Option	Weighted scenario
Option 1	865.64
Option 2	624.58

6. Conclusion and recommendation

This MCC Assessment has found that Option 1 (install a new 330/132 kV 375 MVA transformer at Sydney West BSP) remains the preferred option, despite its NPV falling from $908.12 million in the PACR to $865.64 million (real $2024/25) in this MCC Assessment. As a result, an MCC event has not occurred.

Therefore, it is recommended that Transgrid continue to deliver the project using Option 1, installation of a new 330/132 kV 375 MVA transformer at Sydney West BSP.