AER Determination

Transgrid System Security Roadmap Operational Technology Contingent Project Application

November 2026

AUSTRALIAN ENERGY REGULATOR

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Executive summary

This document sets out our decision on Transgrid's contingent project application (CPA) for the System Security Roadmap Operational Technology upgrades.

Contingent projects are significant network augmentation projects that may arise during a regulatory control period but the need and/or timing is uncertain. While the expenditures for such projects do not form part of the total forecast expenditure in a revenue determination, the project costs may ultimately be recovered from customers if the requirements of the National Electricity Rules (NER) are met.

The System Security Roadmap Operational Technology project was first included in Transgrid's 2023–2028 revised revenue proposal. Transgrid's proposal sought funding for investments in operational technology that it considered to be required to continue to plan, maintain and operate its network securely in the transition towards higher penetration of renewables.[1] In our final decision on Transgrid's 2023–28 revenue determination we accepted the project as a contingent project with an estimated total cost of $88.2m ($2022–23). While the Australian Energy Market Operator (AEMO) has provided a submission in support of the proposed project stating it is consistent with the integrated system plan (ISP), this is not an ISP actionable project.[2]

On 1 May 2026, Transgrid submitted its CPA for its System Security Roadmap Operational Technology, proposing a capital expenditure (capex) of $163.5 million ($2022–23). Transgrid's contingent project application includes expenditure related to 10 integrated initiatives (along with project implementation costs) which Transgrid considers to be required to provide the preferred option.[3]

Transgrid's proposed total capital expenditure of $163.5 million ($2022–23) includes $75.3 million capital expenditure in the 2023–28 regulatory period. Transgrid proposed $0.8 million ($2022–23) operating expenditure (including debt raising costs) in 2027–28. Transgrid forecast an incremental increase in its smoothed revenue requirement of $3 million which it proposes to be recovered in 2027–28. Based on the forecast revenue adjustment, Transgrid submitted that the indicative increase in customer bills will be $0.30 per annum for residential customers and $0.80 per annum for small business customers in 2027–28.[4]

To be eligible to submit a CPA for the System Security Roadmap Operational Technology contingent project, Transgrid must meet the trigger event for the project as set out in the revenue determination.[5] The application must also include proposed capex that exceeds the

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1 Transgrid, *2023–28 Revised Revenue Proposal,* December 2022, p. 99.

2 AEMO, AEMO Letter of Support, September 2025.

3 Transgrid, *System Security Roadmap Operational Technology Upgrades Contingent Project Application,* May 2026, p. 21.

4 Transgrid, *System Security Roadmap Operational Technology Upgrades Contingent Project Application,* May 2026, p. 11.

5 NER, cl. 6A.8.2(a)(2).

materiality threshold of either $30 million, or 5% of the maximum allowed revenue (MAR) for the first year of the regulatory control period, whichever is the larger amount.

We are satisfied that Transgrid's CPA for system security roadmap operational technology satisfies the trigger event and that the proposed project capex exceeds the materiality threshold.

We have decided to amend Transgrid's 2023–28 revenue determination for the System Security Roadmap operational technology contingent project. In amending Transgrid's revenue determination, we have decided not to accept Transgrid's forecast capital expenditure of $163.5 million ($2022–23), and determine an alternative forecast for total capex of $64.1 million ($2022–23).

Our alternative forecast for total capex is $99.4 million lower than Transgrid's proposed forecast capex of $163.5 million. We developed and substituted an alternative estimate as our analysis led us to consider that Transgrid's proposed capex is not prudent and efficient nor reasonably required for the purposes of undertaking the project at this time.[6]

Our alternative estimate for forecast capex is based on an identified package of work to achieve the outcomes of part of the preferred option from the Regulatory Investment Test for Transmission (RIT-T), while realising a net benefit. That is, our alternative estimate for forecast capex is based on the part of the preferred option that demonstrates a net benefit, with other parts excluded. The incremental work needed to deliver further outcomes was not clearly demonstrated to provide a net benefit to consumers through our analysis of this CPA. If the benefit of those incremental projects is shown to justify the related costs in the future, it would be open to Transgrid to propose related expenditure in its proposal for the 2028–33 regulatory period.

Table 1 summarises our decision on the forecast prudent and efficient capex required to deliver the project, the estimated impact on the transmission component of a typical residential customer's electricity bill in New South Wales, and the incremental revenues that will be added to Transgrid's revenue determination in the 2023–28 period.

Table 1 Summary of forecast capex, revenues and bill impact

	Transgrid's application	AER's decision
Total capex ($2022–23) for System Security Roadmap Operational Technology contingent project	$163.5 million	$64.1 million
Total incremental revenue to be recovered from customers over 2027–28 ($ nominal, smoothed)	$3 million	$2.4 million
System security roadmap operational technology indicative average annual increase in residential electricity bills over 2027–28	$0.50[a]	$0.40

Source: Transgrid's application and AER analysis.
(a) Our decision uses a different approach to calculate the indicative average annual increase in residential electricity bills compared to Transgrid's application.

6 NER, cl. 6A.8.2(g)(4).

Under the NER following this decision, Transgrid's revenue determination is now amended such that the incremental revenues we have approved in this determination will be added to Transgrid's total maximum allowed revenues for the 2023–28 period. This follows the process set out in clause 6A.8.2 of the NER. The increase in allowed revenues will be reflected in customer bills over the final year of the 2023–28 period (that is, 2027–28).

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1 System Security Roadmap Operational Technology Contingent Project

The System Security Roadmap Operational Technology project was first included in Transgrid's 2023–28 revised revenue proposal. Transgrid's proposal sought funding for investments in operational technology that it considered to be required to continue to plan, maintain and operate its network securely in the transition towards higher penetration of renewables.[7] In our Final Decision on Transgrid's 2023–28 revenue determination we accepted the project as a contingent project with an estimated total cost of $88.2m ($2022–23).

Transgrid commenced the RIT-T process with the publication of the Project Specification Consultation Report (PSCR) on 14 October 2024. The PSCR identified three credible options to meet the identified need of achieving net market benefits arising from investment in operational technologies and tools for use in control rooms and corporate offices.[8] The Project Assessment Conclusions Report (PACR), published on 8 October 2025, identified the preferred option as its 'proactive capability' option which provides a higher level of technical uplift relative to an alternative 'reactive capability' option. The preferred option would provide enhancements to Transgrid's existing operational technology and tools, in addition to several new capabilities, so that Transgrid can proactively plan for, and respond to, operational issues across its control room and corporate offices.[9]

Transgrid's contingent project application includes expenditure related to 10 integrated initiatives (along with project implementation costs) which Transgrid considers to be required to provide the preferred option.[10] Each initiative and its associated proposed cost are presented in Table 2 AER determined forecast capex by initiative compared to Transgrid's application ($m 2022–23) on page 12.

Transgrid's application sets out a proposed total cost of $163.5 million ($2022–23), of which $75.3 million would be in the 2023–28 regulatory period. Transgrid forecast an incremental increase in its smoothed revenue requirement of $3 million, all of which it proposed to recover in 2027–28.

Based on the forecast revenue adjustment, Transgrid submitted that the indicative increase in customer bills would be $0.30 per annum for residential customers and $0.80 per annum for small business customers in 2027–28.[11]

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7 Transgrid, *2023–28 Revised Revenue Proposal,* December 2022, p. 99.

8 Transgrid, *System Security Roadmap Operational Technology Upgrades RIT-T Project Specification Consultation Report,* 14 October 2024, p. 4.

9 Transgrid, *System Security Roadmap Operational Technology Upgrades RIT-T Project Assessment Consultations Report,* 8 October 2025, p. 6.

10 Transgrid, *System Security Roadmap Operational Technology Upgrades Contingent Project Application,* May 2026, p. 21.

11 Transgrid, *System Security Roadmap Operational Technology Upgrades Contingent Project Application,* May 2026, p. 11.

2 Summary of NER requirements

For a contingent project in a revenue determination, a transmission network service provider (TNSP) may submit a contingent project application to the AER if the trigger event for that project has occurred.[12] The information that a TNSP is required to include in its application to amend a revenue determination is set out under clause 6A.8.2(b) of the NER.

Transgrid submitted its application on 1 May 2026. As soon as practicable following receipt of the application, we must publish the application and invite written submissions on the application.[13] We must consider any written submissions on the application in making our determination and we must make our decision within 40 business days from the later of the date we receive the application and the date we receive any information required by us under clause 6A.8.2(h1).[14]

We published the application on 12 May 2026 and sought submissions until 5 June 2026. We received no written submissions from stakeholders. Since receiving the application, we have issued 2 information requests to Transgrid under clause 6A.8.2(h1). Transgrid provided the latest information in response on 11 September 2026. As a result, we are required to make our decision by 6 November 2026.

2.1 Eligibility to submit a CPA

To be eligible to submit a CPA for the System Security Roadmap Operational Technology contingent project, Transgrid must meet the trigger event for the project as set out in the revenue determination.[15]

NER clause 6A.8.A1(b)(2) also requires that the expenditure in the application exceeds either $30 million, or 5% of the MAR for the first year of the regulatory control period, whichever is the larger amount.

2.2 Determination requirements

If we are satisfied the trigger event has occurred and the forecast total capital expenditure in the application exceeds the materiality threshold, we must then:[16]

- Determine the capital expenditure (capex), incremental operating expenditure (opex) and incremental revenue reasonably required for the purposes of undertaking the project, and the likely commencement and completion dates for the project (as applicable).[17]

12 NER, cl. 6A.8.2(a).

13 NER, cl. 6A.8.2(c).

14 NER, cl. 6A.8.2(d).

15 NER, cl. 6A.8.2(a)(2).

16 NER cll. 6A.8.2(e)(1C–1E) are not applicable in these circumstances.

17 NER, cl. 6A.8.2(e)(1).

- Determine the estimate of incremental revenue likely to be required in each remaining regulatory year as a result of the project.[18]
- Amend the relevant revenue determination in accordance with clause 6A.8.2(h).[19] Our decision may only adjust the forecast capex and opex and reflect these adjustments on the maximum allowed revenue and X factor for each regulatory year in the remainder of the regulatory control period.

In making the determinations required under clause 6A.8.2(e)(1), we must accept the relevant amounts and dates in the application if we are satisfied that:

- The forecast of the total capex for the project meets the threshold in clause 6A.8.1(b)(2)(iii).[20]
- The capex and opex in the application reasonably reflect the capex and opex criteria required to achieve the capex and opex objectives, taking into account the capex and opex factors.[21]
- The estimates of incremental revenue and the dates are reasonable.[22]

In making the determinations under clause 6A.8.2(e)(1) and determining whether to accept the amounts and dates in the application, we must have regard to the matters under clause 6A.8.2(g).[23] Having regard to the matters under clause 6A.8.2(g), if we are then satisfied of the matters in clause 6A.8.2(f), we must accept the amounts and dates proposed in the application.[24] If we are not satisfied, then we must determine the amounts and dates.

18 NER, cl. 6A.8.2(e)(1) and (2).
19 NER, cl. 6A.8.2(e)(3).
20 NER, cl. 6A.8.2(f)(1).
21 NER, cl. 6A.8.2(f)(2).
22 NER, cl. 6A.8.2(f)(3) and (4).
23 NER, cl. 6A.8.2(g).
24 NER, cl. 6A.8.2(f).

3 Project trigger and expenditure threshold

Under clause 6A.8.2(e) of the NER, we are required to determine the expenditure reasonably required and the incremental revenues necessary to deliver the contingent project if we are satisfied that the trigger event has occurred, and the project exceeds a cost threshold.

3.1 Assessment of trigger event

The trigger event for the project is outlined in Attachment 5 of Transgrid's 2023-28 revenue determination. The trigger event has occurred if the following criteria are met:

- AEMO's written support for the implementation of specific operational technology upgrades and tools for use in Transgrid's control rooms and corporate offices, following the successful completion of Early Works.
- Successful completion of a RIT-T, if a RIT-T is required, or equivalent economic evaluation which demonstrates that the preferred option (or part of the preferred option) that maximises net economic benefits is the investment in technological upgrades and tools that has written support from AEMO.
- Transgrid Board commitment to proceed with the development of the operational technology upgrades and tools (that has written support from AEMO), subject to the AER amending the Revenue Determination pursuant to the Rules.

We are satisfied that the trigger event has occurred, based on the fact that:

- Transgrid provided a Letter of Endorsement from AEMO in the application. The AER also consulted with AEMO directly and confirmed that the broad support in the letter covers all the specific modules Transgrid is proposing.
- Transgrid successfully completed a RIT-T on 8 October 2025, identifying a preferred option that includes enhancements to Transgrid's operational technology and tools, in addition to several new capabilities, so that Transgrid can proactively plan for, and respond to, operational issues across its control room and corporate offices.
- Transgrid provided in its application a letter setting out a commitment from Transgrid's Board to proceed with the project subject to the AER amending the revenue determination.

3.2 Assessment of expenditure threshold

We are satisfied that Transgrid's cost estimate exceeds the applicable materiality threshold.[25] Transgrid's proposed capex of $163.5 million exceeds both $30 million and 5% of Transgrid's 2023–24 MAR of $897.78 million.

[25] NER, cl. 6A.8.1(b)(2)(iii).

4 Prudent and efficient project expenditure

In forming our view, we have considered the capex criteria and the specific matters under clause 6A.8.2(g) of the NER. [26]

This section outlines our assessment of Transgrid's proposed expenditure for the System Security Roadmap Operational Technology project and our determination on the prudent and efficient expenditure reasonably necessary to undertake this project.

The forecast capex we determine is a key component to determining the incremental revenue Transgrid may recover over the 2023–28 regulatory control period. The forecast capex will also be added to the target capex for Transgrid's capital expenditure sharing scheme. Any incentive rewards and penalties Transgrid receives because of under or overspending on the project will be applied as additional revenue adjustments in the next regulatory control period.

4.1 Forecast capital expenditure

Our determination includes forecast capex of $64.1 million, which is $99.4 million lower than Transgrid's proposed forecast capex of $163.5 million. We developed and substituted an alternative estimate as our analysis led us to consider that Transgrid's proposed capex was not prudent and efficient nor reasonably required for the purposes of undertaking the project.[27] Table 2 AER determined forecast capex by initiative compared to Transgrid's application ($m 2022–23) provides a comparison of our determination against Transgrid's proposed forecast capex contained in its CPA by initiative.[28]

In assessing the prudency and efficiency of Transgrid's costs, we considered various information to assess the scope and nature of Transgrid's activities. In addition to Transgrid's CPA, we also requested further information from Transgrid regarding the assumptions underpinning the proposed benefits, further details about how Transgrid built up the costs and benefits and further details regarding Transgrid's approach to maintaining project deliverability.[29]

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26 NER, cl. 6A.8.2(e)(1)(i) and (ii).

27 NER, cl. 6A.8.2(g)(4).

28 We note that several of the modules presented in Table 2 are separated in Transgrid's build up of costs, these being alarm management, visualisation and situational awareness enhancement, training technologies, operational document management system and operational planning systems.

29 NER, cl. 6A.8.2(g)(1).

Table 2 AER determined forecast capex by initiative compared to Transgrid's application ($m 2022–23)

Technology initiative	Transgrid's application	AER determination
Outage management[a]	1.4	1.8
Alarm management, visualisation and situation awareness enhancement	33.7	14.0
Fault level and system parameter monitoring and power system analysis capability	6.8	0
SCADA/AEMS system	33.2	24.3
Facilities	5.1	5.1
Data management and network modelling system	27.1	0
Training technologies, operational document management system and operational planning systems	13.1	0
Operational forecasts and look-ahead contingency assessment	4.1	0
Wide area monitoring	6.4	0
Smart Transmission Device Management	3.8	0
CPA submission	5.8	5.8
Program implementation	22.1	12.7
Total (excluding labour escalation and equity raising costs)	**162.5**	**63.6**
Labour escalation	0.2	0.2
Equity raising costs	0.8	0.3
Total capex	**163.5**	**64.1**

Source: AER Analysis and Transgrid, *System Security Roadmap Operational Technology Upgrades Contingent Project Application, May 2026,* May 2026, p. 8.

(a) Our determination includes higher capex for outage management as a result of reallocating shared costs among fewer initiatives.

Overall, we concluded that Transgrid's proposed incremental capex for the System Security Roadmap Operational Technology contingent project is not prudent and efficient. We determined that Transgrid's proposed capex of $163.5 million exceeds what is reasonably required for the purposes of undertaking the contingent project.[30] We have determined the amount of $64.1 million of forecast capex for the System Security Roadmap Operational Technology project to be prudent and efficient. This includes capex of $31.8 million within the 2023–28 regulatory control period as shown in Table 3.[31]

30 NER, cl. 6A.8.2(e)(1)(ii).

31 NER, cl. 6A.8.2(e)(1)(i).

Table 3 AER determination on System Security Roadmap Operational Technology capex in 2023–28 regulatory period ($ million, 2022-23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Transgrid's application	4.5	3.9	1.1	19.2	46.6	75.3
AER decision	4.0	1.1	1.1	11.1	14.6	31.8

Source: AER analysis of the capex model submitted in Transgrid's CPA.
Note: Numbers may not add up due to rounding.

In coming to our decision, we have had regard to the factors set out in clause 6A.8.2(g) , including:

- the information included in or accompanying the application
- submissions received in the course of consulting on the application (not applicable for this application)
- such analysis as is undertaken by or for the AER (discussed further in this section)
- the expenditure that would be incurred in respect of a contingent project by an efficient and prudent operator in the circumstances of Transgrid (discussed further in this section)
- the actual and expected capex of Transgrid for contingent projects during any preceding regulatory control periods (not applicable for this application)
- the extent to which the forecast capex for the contingent project is referable to arrangements with a person other than Transgrid that, in the opinion of the AER, do not reflect arm's length terms (not applicable for this application)
- the relative prices of operating and capital inputs in relation to the contingent project
- the substitution possibilities between opex and capex in relation to the contingent project
- whether the capex forecast for the contingent project is consistent with any incentive schemes that apply to Transgrid.

4.1.1 Risk allowance

In its bottom-up cost forecast, Transgrid included $15.6 million ($2022–23) in risk costs related to risks at both the individual technology initiative level and the overall project level.[32] We requested clarification on the justification for including this cost and further details on the cost calculation.

Transgrid responded that:[33]

> *Transgrid only included a contingency for Transgrid's own retained costs, not the vendors' costs. The $16.5 million[34] risk cost allowance (RCA) referenced in the*

[32] Transgrid, *System Security Roadmap Operational Technology Upgrades Contingent Project Application,* May 2026, p. 35.

[33] Transgrid, *Response to AER information request*, 28 August 2026.

[34] The quoted number is in $2025–2026.

> *Operational Technology Upgrade – Direct Non-Labour – 11 Dec 2025 cost build-up relates to risks retained by Transgrid, including interface, timing, testing, integration, data quality and scope refinement risks. The vendor cost build-ups do not include risk-cost or contingency for those retained risks. Transgrid added the RCA separately, following a quantified risk assessment, on a P50 basis using Transgrid's Quantitative Risk and Schedule Cost Analysis (QRSCA).*

Transgrid has stated that risk costs included are only those retained by Transgrid, however we consider that there are some costs for risks that have been included that could be included in vendors firm-fixed-price contracts. One risk Transgrid identified is that testing may require more resourcing and rework than expected. We consider that this should be part of the fixed price contract with the system integrator.

Another identified risk relates to contract scope variation required after the contract has been executed. We found that Transgrid can mitigate the identified risks through responsible contractor management and management of the project as part of its broader program of capital projects, and hence there is no need for a cost allowance to offset these same risks.

We have not included the proposed risk costs in our alternative forecast.

4.1.2 Efficient costs for delivery partner

In its bottom-up cost forecast, Transgrid's estimate of direct non-labour costs for each initiative adopts an average of estimates provided by two system integrators. We requested further details regarding the cost estimates provided by the two system integrators.

Transgrid responded that:[35]

> *The cost estimate has been derived having regard to the purpose of the RFI as a market testing exercise, rather than a formal procurement process intended to identify a preferred supplier. Two system integrators provided independent and broadly comparable cost estimates. To ensure an objective and unbiased representation of efficient market costs, Transgrid adopted the average of these estimates. This approach avoids reliance on a single respondent and reflects a reasonable central estimate of prevailing market pricing.*

We consider that the efficient cost of this package of work should be no greater than the lower quote, as Transgrid has assessed that quote as being a conforming submission from a qualified supplier. Hence, we have used an alternative estimate for these costs, which corresponds to the quote that was lower overall.

4.1.3 AER analysis of the benefits of the project

Transgrid completed a RIT-T as part of meeting its trigger event for this project. Transgrid published the Project Assessment Conclusions Report (PACR) on 8 October 2025.

Market benefits in the PACR were estimated through 3 case studies:

- Case study 1 – a reduction in the likelihood of outages arising from an improvement to situational awareness and decision making – correlated to alarm

[35] Transgrid, *Response to AER information request*, 26 June 2026.

volumes and size of unserved energy events. It was estimated at $160.5 million present value (PV) in gross benefits.

- Case study 2 – an increase in network utilisation arising from improvements to the capability and capacity of monitoring and analysis systems, which reduces the number of binding inverter-based constraints across the network. It was estimated at $61.5 million (PV) in gross benefits.
- Case study 3 – improving operational outage planning through a reduction in the duration of switching time. It was estimated at $74.8 million (PV) in gross benefits.

We assessed the information provided as part of Transgrid's RIT-T process along with information provided in responses to our two information requests.

This assessment identified issues with the assumptions adopted to estimate benefits under all three case studies. Our assessment of each case study is set out below.

Case Study 1

Case Study 1 assesses the benefits from a reduction in the likelihood of outages which the project would provide from an improvement in situational awareness and decision making.[36] Situational awareness and decision making refers to the control room operator's ability to become aware of, understand, and respond to issues in the power system in real-time.

The benefits that arise from a reduced likelihood of outages from the improvements in operational technology have been estimated as a reduction in expected cost from unserved energy. This reduction in unserved energy is assumed to result from fewer missed alarms in Transgrid's control rooms under an investment case relative to a base case where there is no investment to improve Transgrid's operational capability.

The expected cost of unserved energy is estimated by multiplying the quantity of unserved energy by the Value of Customer Reliability. The benefits under the case study rely on several key assumptions:

- the average outage size that would occur in an expected unserved outage event, which Transgrid has estimated as 320 MWh in 2025 with forecast growth over the analysis period based on historical growth in substations on Transgrid's network
- the number of alarms per operator per day, which Transgrid assumes grows based on expected growth in renewable generation on Transgrid's network from AEMO's Integrated System Plan forecasts
- the risk of an unserved energy event of 1 in 1 million alarms where alarm volumes exceed 900 per operator per day.

In our further information requests, we requested the calculations and source of data used for calculations to arrive at the above material assumptions. We consider that the information provided by Transgrid does not support the assumptions that Transgrid has included in its Case Study 1 benefit analysis.

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[36] Transgrid, *System Security Roadmap Operational Technology Upgrades RIT-T Project Assessment Consultations Report*, 8 October 2025, p. 64.

The average outage size that Transgrid adopted of 320 MWh is based on an average of only historical outage events that exceed 100 MWh. Transgrid did not provide supporting evidence for why historical outages of less than 100 MWh were not included in the calculation of average outage size. We consider that including all historical outages would be a more reasonable approach where there is a lack of a reasonable basis for deviation.

The growth rate of the average outage size over the analysis period is based on growth in substations, of which a majority would be generation connection substations given the growth in renewable generation forecast in Transgrid's network. We consider generation connection substations would be unlikely to result in a loss of load in the event of an outage, where AEMO manages generation reserves as part of system security. Therefore, we consider a more reasonable assumption would involve growth based on expected growth in switching assets which directly correlates with asset-level failures and alarm generating events that operators must manage.

Transgrid assumed that the number of alarms will grow in line with growth in renewable generation on Transgrid's network. Although more renewable generation would produce more alarms, we consider these additional alarms are unlikely to increase outage risk because missing them is less likely to result in a loss of load. In addition, renewable generation connection substations that cut into existing feeders tend to be low complexity with a small number of switching elements and as such do not present the same likelihood of alarm generation per site as large substations that supply customer load. Therefore, we consider a more reasonable assumption would be to estimate growth in alarms based on historical growth in switching assets (air insulated circuit breakers and GIS modules) and reported counts of exit nodes from Regulatory Information Notices and Annual Information Order responses.

Using the more reasonable assumptions identified above results in a decrease in the present value of gross benefit for this case study from $160.5 million to $0.7 million.

Case Study 2

Case Study 2 assesses the benefits from an increase in network utilisation arising from improvements to the capability and capacity of monitoring and analysis systems, which reduces the number of binding inverter-based constraints across the network. It was estimated at $61.5 million (PV) in gross benefits.

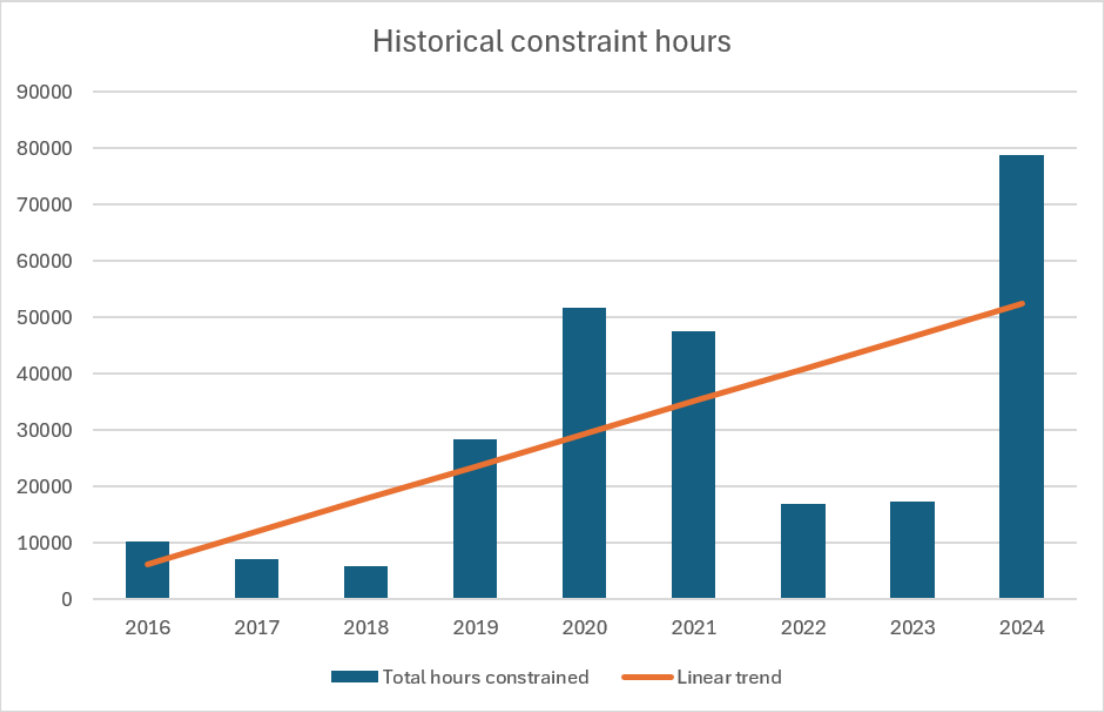
To estimate the benefits of reduced curtailment in renewable generation, Transgrid has forecast the number of hours in which renewable generators are constrained over the analysis period under an investment case and the base case. The number of constraint hours is used to calculate the amount of renewable generation which can displace thermal generation per constraint hour and then savings in short run marginal costs and emissions reductions are calculated.

This case study relies on a forecast of the number of hours that renewable generators are constrained over the analysis period, which is based on the number of constraint hours in 2024 only (78,916 constraint hours).

In our further information requests, we requested the calculations and source of data used for those calculations to arrive at the above material assumption. We consider that the information provided from Transgrid does not support the assumption that Transgrid has included in its Case Study 2 benefit analysis.

We found that compared to the previous 10 years, 2024 constraint hours appears to be an outlier with significantly higher constraint hours than previous years as shown in Figure 1.

Figure 1 Number of historical constrained hours in Transgrid's network



Source: IR2 constraint data and AER analysis

We consider that a more reasonable estimate is a linear projection over the last 10 years which provides a base estimate of 52,409 constraint hours. This accounts for the increase in hours constrained which has been observed over the period yet lowers the effect of the 2024 outlier. This reduction in the estimate of constraint hours results in a decrease in the gross benefit from $61.5 million to $41 million.

Case Study 3

Case study 3 assesses the benefit from improving operational outage planning through a reduction in switching time required for transitioning network assets from one configuration to another during an outage or system change.[37] It was estimated to provide gross benefits of $74.8 million (PV).

To estimate the benefits of reduced switching times for generators following outages, Transgrid has forecast the number of outages under an investment option the base case without investment in operational technology improvements.

Transgrid has used all outages on its network over a 6-month period in the second half of 2023. While Transgrid has conservatively adopted only outages in a 6-month period, and assumed this as a yearly base, the outages which are included have not been supported with

[37] Transgrid, *System Security Roadmap Operational Technology Upgrades RIT-T Project Assessment Consultations Report*, 8 October 2025, p. 79.

evidence on how they would affect connected generators. Some of the included outages would be highly unlikely to affect generators.

We consider it is difficult to determine an alternative assumption without understanding which included outages would affect generators, however Transgrid's assumption may not be unreasonable as it implicitly assumes half of the outages would not affect generators.

As such we have not made any alternative assumptions for Case Study 3.

Summary of cost benefit analysis

After examining Transgrid's estimation of benefits, we found that the parts of the project aimed at delivering outcomes from Case Studies 1 and 2 in the RIT-T have negative net benefits when assessed under more reasonable assumptions. That is, the initiatives required for Case studies 1 and 2 do not justify their additional costs.

The initiatives required to deliver outcomes from case study 3 is the only set of initiatives with a demonstrated net benefit. It delivers a defined, near-term operational outcome of improved outage planning and shorter switching times.

In response to information requests, Transgrid identified the modules necessary to achieve the outcomes of each case study from the cost benefit analysis. Transgrid also identified which modules were interrelated, in that they are dependent on the delivery of other modules. Through Transgrid's identification and our analysis we found that Outage management and SCADA/AEMS system are required to deliver the benefit of case study 3, and further that these modules are dependent on the delivery of work for Facilities and Visualisation and situational awareness technology enhancements.[38]

Costs in the application for Case Study 3 are $67 million (PV) for a gross benefit of $75 million (PV), so this part of the project is net beneficial.[39]

Under our alternative assumptions Case Study 1 has a gross benefit of $0.7 million (PV) compared to a cost (incremental to and excluding costs for Case Study 3 modules) of $86 million (PV), excluding project implementation and application costs. This part of the project does not provide a net benefit.

Costs in the application for Case Study 2 (incremental to and excluding costs for Case Study 3 modules and project implementation and application costs) are approximately $68 million (PV) for a gross benefit of $41 million (PV). This part of the project does not provide a net benefit. Hence, we have only included costs associated with case study 3 in our estimate of the prudent and efficient costs for this project.

4.1.4 Project implementation costs

Transgrid's proposed capex includes project implementation costs of $22.1 million which consists of $15.6 million of direct costs, $4.4 million of labour costs and $2.1 million of indirect costs. We have determined a lower capex of $12.7 million for project implementation to account for our decision to allow only expenditure related to case study 3. We set out our

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38 Transgrid, *Response to AER information request*, 3 July 2026.

39 We have calculated present value of capital costs for Case Study 3 based on indicative costs Transgrid provided for case study 3 in its application. This cost includes refresh costs required over the analysis period.

approach to calculating a revised amount for project implementation costs below.[40] The amendment we have applied involved:

- calculating the percentage that project implementation costs (excluding risk costs) make up of total capex in Transgrid's proposal (with risk costs and project implementation costs removed)
- multiplying this percentage by total capex for case study 3 initiatives (excluding risk costs) to calculate the alternative estimate for project implementation costs.

4.2 Commencement and completion dates

In making the determinations required under clause 6A.8.2(e)(1), we must accept the relevant dates in the application if we are satisfied that the likely commencement and completion dates for the contingent project are reasonable.[41]

We are satisfied that the proposed dates of commencement and completion of the System Security Roadmap Operational Technology are reasonable, as:

- Transgrid supplied information outlining the timeline and interdependencies of all proposed scopes of work. The information, supplied in the application and in responses to information requests, sets out a reasonable and likely timeline for carrying out the work.
- Transgrid's application identified its intention to commence work in July 2026, following the completion of early works. The expectation for early works was established in Transgrid's 2023–28 revenue determination. Transgrid's early works activities included completion of the RIT-T process, independent technical assessments and market testing to validate scope, costs and delivery approach.
- Transgrid identified a target delivery date for all work by July 2031. Its completion date is likely to be by July 2031, as this corresponds to the delivery date of the latest module of work needed to deliver the scope of works that the AER has found to be in the long-term interest of consumers.

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40 We note that we have removed risk costs from the calculations to ensure a consistent basis between Transgrid's proposal and our determination which accounts for the issues in sections 4.1.1 to 4.1.3.

41 NER, cl. 6A.8.2(f)(4).

5 Calculation of incremental allowed revenues

This section sets out our calculation of the incremental revenue that Transgrid would recover from customers over the 2023–28 period to account for our determination of efficient project costs. We have applied an annual building block revenue approach in accordance with clause 6A.8.2(h) of the NER. Transgrid's application is based on this approach. The incremental revenues are calculated based on the capex and opex that we have determined and otherwise in accordance with Transgrid's application.[42]

Table 4 shows that Transgrid is to recover $2.4 million ($ nominal, smoothed) in additional revenues for the System Security Roadmap Operational Technology Project from customers over the final year of the 2023–28 period.

As a result of recovering these revenues, we estimate that the transmission component of a typical residential customer's electricity bill in New South Wales would increase on average by $0.40 per annum over the final year of the 2023–28 period (that is, 2027–28).[43]

Table 5 provides the effect of the resultant incremental increase in revenues on Transgrid's total annual building block revenue requirement (unsmoothed), expected maximum allowed revenues, and the X-factors over the 2023–28 period.

42 NER, cl. 6A.8.2(e)(2).

43 The estimated bill impact is based on a residential customer bill of around $1,800 in 2026–27 with transmission component accounts for around 8.6% of the total bill.

Table 4 Incremental revenue calculation ($ million, nominal)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Return on capital	-	0.2	0.3	0.4	1.2	2.1
Return of capital[a]	-	-0.1	-0.1	-0.2	-0.1	-0.5
Straight-line depreciation[b]	-	0.0	0.0	0.0	0.5	0.5
Less: inflation indexation on opening RAB	-	0.1	0.2	0.2	0.6	1.0
Operating expenditure	-	0.0	0.0	0.0	0.9	0.9
Revenue adjustments	-	-	-	-	-	-
Net tax amount[c]	-	-0.0	-0.0	-0.0	-0.1	-0.1
Annual building block revenue requirement (unsmoothed)	-	0.1	0.2	0.2	1.9	2.4
Annual expected MAR (smoothed)	-	-	-	-	2.4	**2.4**
Increase to annual expected MAR (smoothed) (%)	-	-	-	-	0.18%	0.04%

Source: AER analysis.

(a) Regulatory depreciation (return of capital) consists of straight-line depreciation net of indexation of the RAB. The straight-line depreciation is calculated based on as commissioned basis while the indexation of the RAB is calculated on a as incurred basis. The negative incremental regulatory depreciation is a result of a much higher as incurred capex approved in the 2023–28 period compared to as commissioned capex..

(b) Based on as-commissioned capex.

(c) The negative incremental net tax amount in this decision is due to the growth in tax expenses, primarily the tax depreciation, being higher than the incremental increase in taxable income as a result of the contingent project.

Table 5 Annual building block revenue requirement, expected MAR and X-factors ($ million, nominal)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Annual building block revenue requirement (unsmoothed)	866	968	1,125	1,320	1,385	5,663
Annual expected MAR (smoothed)	924	960	1,108	1,277	1,385	5,654
X-factors (%)[a]	0.0%	-0.9%	-12.2%	-12.0%	-5.4%	n/a

Source: AER analysis.

(a) The X factors will be revised to reflect the annual return on debt update. Under the CPI–X framework, the X factor measures the real rate of change in annual expected MAR from one year to the next. A negative X factor represents a real increase in revenue. Conversely, a positive X factor represents a real decrease in revenue.

Glossary

Shortened form	Description
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
capex	capital expenditure
CPA	contingent project application
GIS	geographic information system
ISP	Integrated System Plan
MAR	maximum allowed revenue
NER	National Electricity Rules
opex	operating expenditure
RAB	regulatory asset base
RIT-T	Regulatory Investment Test for Transmission
TNSP	Transmission Network Service Provider