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AusNet Services Transmission Revenue Proposal 2027-32

REVIEW OF PROPOSED MAJOR STATIONS REPEX PROJECTS

Public Version

Report prepared for:

AUSTRALIAN ENERGY REGULATOR

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Preface

This report has been prepared to assist the Australian Energy Regulator (AER) with its determination of a capex allowance for AusNet Services Transmission (AusNet) for the next regulatory period 1 April 2027 to 31 March 2032 (2027–32). The AER's determination is conducted in accordance with its responsibilities under the National Electricity Rules (NER).

This report covers a particular and limited scope as defined by the AER and should not be read as a comprehensive assessment of proposed expenditure that has been conducted making use of all available assessment methods. This report relies on information provided to EMCa by AusNet. EMCa disclaims liability for any errors or omissions, for the validity of information provided to EMCa by other parties, for the use of any information in this report by any party other than the AER and for the use of this report for any purpose other than the intended purpose. In particular, this report is not intended to be used to support business cases or business investment decisions nor is this report intended to be read as a legal interpretation of the NER or other legal instruments.

EMCa's opinions in this report include considerations of materiality to the requirements of the AER and opinions stated or inferred in this report should be read in relation to this over-arching purpose.

Except where specifically noted, this report was prepared based on information provided by AER staff prior to 19 December 2025 and any information provided subsequent to this time may not have been taken into account. Some numbers in this report may differ from those shown in AusNet's regulatory submission or other documents due to rounding.

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ABBREVIATIONS

Term	Definition
AACE	Association for the Advancement of Cost Engineering
ACR	Asset Condition Report
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AIS	Air Insulated Switchgear
AMS	Asset Management Strategy
AusNet	AusNet Services Transmission
BATS	Ballarat Terminal Station
BAU	Business As Usual
CB	Circuit breaker
CBBO	Bulk Oil Circuit Breaker
CBLT	Live Tank Circuit Breaker
CBMO	Minimum Oil Circuit Breaker
CDP	Construction Delivery Partner
CFC	Capital Finance Cost
CT	Current transformer
Current RCP	1 April 2022 to 31 March 2027 (2022–27)
DDP	Design Delivery Partner
DDTS	Dederang Terminal Station
DNSP	Distribution Network Service Providers
DP	Degree of Polymerisation
EMCa	Energy Market Consulting associates
GIL	Gas Insulated [Transmission] Line
GIS	Gas Insulated Switchgear
HWTS	Hazelwood Terminal Station
IASR	Inputs, Assumptions and Scenarios Report
IR	Information Request
ISP	Integrated System Plan
KTS	Keilor Terminal Station
LYPS	Loy Yang Power Station
MLTS	Moorabool Terminal Station
MVA	Mega Volt Ampere

Term	Definition
MWTS	Morwell Terminal Station
NER	National Electricity Rules
next RCP	1 April 2027 to 31 March 2032 (2027–32)
NPSD	Newport Power Station D
NPV	Net Present Value
NSP	Network Service Providers
OH	Overhead
OLTC	On-load Tap Changer
PACR	Project Assessment Conclusions Report
PCR	Project Change Request
PFF	Plant Failure Factor
PoF	Probability of Failure
PPR	Project Planning Report
RCP	Regulatory Control Period
RCTS	Red Cliffs Terminal Station
RIT-T	Regulatory Investment Test - Transmission
ROI	Remotely Operated Isolator
ROTS	Rowville Terminal Station
RP	Revenue Proposal or Regulatory Proposal
RRP	Revised Revenue/Regulatory Proposal
SHTS	Shepparton Terminal Station
SMTS	South Morang Terminal Station
SYTS	Sydenham Terminal Station
TCD	Transmission Cost Database
TCPR	Transmission Connection Planning Report
TRR	Transmission Revenue Reset
TSTS	Templestowe Terminal Station
TTS	Thomastown Terminal Station
VAPR	Victorian Annual Planning Report
VCR	Value of Customer Reliability
VT	Voltage Transformer
VTP	Victorian Transmission Plan
WACC	Weighted Average Cost of Capital
WOTS	Wodonga Terminal Station
WRL	Western Renewables Link

Term	Definition
WVTNP	Western Victoria Transmission Network Project
YPS	Yallourn Power Station

EXECUTIVE SUMMARY

Background

AER has asked EMCa to review AusNet Transmission's proposed major stations repex for the next regulatory period

1. The Australian Energy Regulator (AER) has engaged Energy Market Consulting associates (EMCa), in association with Kaihen Consulting, to review and provide advice on AusNet Services Transmission's ('AusNet') proposed major stations replacement expenditure ('repex') for the 1 April 2027 to 31 March 2032 (2027–32) regulatory control period ('next RCP'). Our review is based on information that AusNet provided and on aspects of the National Electricity Rules (NER) relevant to assessment of expenditure allowances.
2. We have reviewed each of the sixteen major stations projects included in AusNet's forecast repex. We have taken account of information provided in its Revenue Proposal (RP) including associated reports, business cases, models and workings that AusNet has provided, together with AusNet's responses to information requests. We also held an onsite review meeting with AusNet representatives on 5 December 2025 to clarify key aspects of AusNet's proposal.

AusNet proposes major stations repex totalling $1,121.1 million ($real 2026-27), driven mainly by a need to focus on its 500kV assets

3. AusNet expects to incur major stations repex during the 1 April 2022 to 31 March 2027 (2022–27) regulatory control period ('current RCP') that is lower than its allowance for this period, despite a total level of capital expenditure ('capex') that is higher than its capex allowance. AusNet has updated the scope and input cost for projects it had proposed to be completed as a part of its major stations repex program in the current RCP, resulting in changes to the project delivery timetable, with some of these projects extending into the next RCP.
4. For its new major stations replacement projects, the focus reflects a shift away from replacement of its 220kV assets commenced in the current RCP to replacement of higher value, more complex and more expensive 500kV assets. Replacement of its 500kV backbone assets, first established in the 1960s and 1970s, was previously signalled to stakeholders and AusNet has now identified specific replacement projects that it seeks to undertake in the next RCP.
5. AusNet proposes major stations repex for the next RCP totalling $1,121.1 million ($real 2026-27). This is in part due to changes in scope, cost and timing of its existing projects and the inclusion of new projects focussed on its 500kV assets.

Assessment of relevant forecasting methods

For the most part (though with exceptions that we note in our assessment) AusNet's methodologies have led it to identify prudent projects that need to be undertaken in the next period. However, its cost estimation process results in an overestimate bias.

6. For the most part, we consider that AusNet's forecasting methods for major stations repex have led it to identify prudent projects. However, we find evidence that the assumptions it has applied have tended to lead to a higher level of capex than is justified, relating to scope, insufficiently justified costing assumptions, and the calculation of expected energy unserved and Probability of Failure (PoF).
7. For the most part, AusNet's estimated costs reflect the outcome of a reasonable process. However, we consider that there is a systemic overstatement of cost estimates applicable

for a regulatory forecast by inclusion of certain cost allowances that are not justified (such as the contractor incentives), and instances where components of the costs are not adequately justified. Specifically, in the latter case, AusNet has not adequately demonstrated that it has reduced or removed provisions for uncertainty and risk, commensurate with improved scope maturity, such that there is a degree of remaining duplication.

8. We consider that the issues that we identified result in an overstatement of the benefits for some projects. Whilst we did not identify instances where this would change the preferred option that AusNet has proposed, we did identify instances where applying reasonable assumptions in AusNet's economic models would lead to later economic timing than AusNet had assumed.

9. Whilst the steps taken by AusNet to assess the deliverability of its proposed major stations repex program are likely to address delivery risks identified at the time of the submission, there remains some uncertainty with respect to the number of projects, competition for resources and access to labour over the next RCP.

Our assessment of major stations repex

For some projects, AusNet has not justified the need for or cost of certain aspects of proposed scope, the project timing within the next period or the need for the project within the next period

10. The focus of our assessment is to assess the extent to which the forecast expenditure is likely to meet the NER criteria, including whether there was evidence of the issues identified in Section 3 affecting the reasonableness of that forecast. We also applied sensitivity analysis to examine the robustness of the proposed options and the timing of the proposed replacement projects to variances in AusNet's input.

11. We consider that AusNet has reasonably justified the need and timing for most of its major stations replacement projects. In the course of our review, AusNet has made some changes to its forecast expenditure to reflect alternate delivery timing, and which we accept in our assessment.

12. Our assessment has considered projects that AusNet has identified as in-flight, corresponding with an approval prior to 2025; proposed projects commencing in the current RCP; and proposed projects commencing in the next RCP. For the projects identified as in-flight, we found instances where the proposed increase to the scope and corresponding increase to cost relative to what had previously been approved has not been sufficiently justified.

13. For the proposed projects, based on our review of the economic modelling that AusNet has provided, we found instances where the timing could be prudently deferred by one or more years, and in some cases beyond the end of the next RCP relative to AusNet's proposed project timing.

AusNet's cost estimation reflects an overestimation bias

14. We found examples of the issues that we identified in our review of AusNet's cost estimation process, which has led to an overestimate of the cost relative to an efficient cost allowance for the portfolio of projects that AusNet has proposed, and will likely deliver in the next RCP.

Implications to proposed expenditure for the major stations repex allowance

We consider that a reasonable repex allowance for the projects within our scope would be 20% to 30% less than AusNet has proposed, with a 'central' estimate of 26% less than Ausnet has proposed

15. Whilst the majority of AusNet's forecast major stations repex appears reasonable, the issues we have identified lead us to the view that its forecast major stations repex for the next RCP represents an overestimate of its prudent and efficient repex requirement.

16. We propose adjustments for the issues that we have identified, and which leads us to a central estimate of required capex for major stations repex that is approximately 26% lower than AusNet has proposed.

17. Whilst we have 'built up' our alternative estimate from the components of the program as AusNet has proposed, we consider that an appropriate interpretation of this alternative estimate is that in aggregate, an alternative capex allowance that is 20% to 30% less than AusNet has proposed, is a reasonable estimate of capex that would enable AusNet to address the issues that it has identified.

18. The timing for some of the projects proposed by AusNet is sensitive to the demand growth assumptions that AusNet has relied upon. This is primarily due to the estimate of expected unserved energy (EUE) that AusNet has calculated, and which is directly linked to its demand assumptions. For our review, we rely on the demand forecast and assumptions prepared by, and submitted with, AusNet's RP. However, we note in our assessments of the individual projects in Section 4 the impact of low and high demand growth scenarios for the AER's consideration.

1 INTRODUCTION

The Australian Energy Regulator (AER) has engaged Energy Market Consulting associates (EMCa), in association with Kaihen Consulting, to review and provide advice on AusNet Services Transmission's ('AusNet') proposed major stations replacement expenditure (repex) for the 1 April 2027 to 31 March 2032 (2027–32) regulatory control period ('next RCP'). Our review is based on information that AusNet provided and on aspects of the National Electricity Rules (NER) relevant to assessment of expenditure allowances.

We have reviewed each of the sixteen major stations projects included in AusNet's forecast repex. We have taken account of information provided in its Revenue Proposal (RP) including associated reports and workings that AusNet has provided, together with AusNet's responses to information requests (IR). We also held an onsite review meeting with AusNet representatives on 5 December 2025 to clarify key aspects of AusNet's proposal.

By agreement with the AER, we commenced our formal review in late November 2025, and as at the time of completing this report, we have shared the substance of our findings with the AER.

1.1 Purpose of this report

19. The purpose of this report is to provide the AER with a technical review of aspects of the expenditure that AusNet has proposed in its RP for the next RCP.

20. The assessment contained in this report is intended to assist the AER in its own analysis of the proposed expenditures allowance as an input to its Draft Determination on AusNet's revenue requirements for the next RCP.

1.2 Scope of requested work

21. The AER's definition of the scope of the required work is reproduced in Figure 1.1.

Figure 1.1: AER's definition of the scope of required work

Scope of work covered by this report

The key aspect for EMCa to assist is reviewing all major stations proposed repex including transformers, switchgear/circuit breakers and reactor replacement and being cognisant of how other replacement assets are being assessed by the AER.

1.3 Our review approach

1.3.1 Approach overview

22. In undertaking our review, we:

- completed a desktop review of the information provided to us by the AER;

- assisted the AER in preparing requests for information to AusNet, and reviewed the information provided by AusNet (via the AER); and
- Undertook an onsite meeting with AusNet on 5 December 2025. AusNet presented to our team on the scoped topics, and we had the opportunity to engage with AusNet to consolidate our understanding of its proposal.

23. AusNet provided the AER with responses to IRs and, where it added relevant information, these responses are referenced within this review.

24. We have subjected the findings presented in this report to our peer review and quality assurance processes and we presented summaries of our findings to the AER prior to finalising this report.

1.3.2 Conformance with NER requirements

25. In undertaking our review, we have been cognisant of the relevant aspects of the NER under which the AER is required to make its determination and relevant AER Guidelines.[1]

1.3.3 Technical review

26. Our assessments comprise a technical review. While we are aware of stakeholder inputs on aspects of what AusNet has proposed, our technical assessment framework is based on engineering considerations and economics.

27. We have sought to assess AusNet's expenditure proposal based on AusNet's analysis and AusNet's own assessment of technical requirements and economics and the analysis that it has provided to support its proposal. Our findings are therefore based on this supporting information and, to the extent that AusNet may subsequently provide additional information or a varied proposal, our assessment may differ from the findings presented in the current report.

28. We have been provided with a range of reports, internal documents including business cases, responses to IRs and modelling in support of what AusNet has proposed and our assessment takes account of this range of information provided. To the extent that we found discrepancies in this information, our default position is to revert to AusNet's RP documents as provided on its submission date, as the 'source of record' in respect of what we have assessed.

1.4 This report

1.4.1 Report content

29. Our main findings are summarised in the Executive Summary at the beginning of this report.

30. In subsequent sections, we describe the context for our assessment and present our findings:

- In Section 2 we provide an overview of the total capex that AusNet has proposed as context to our assessment.
- In Section 3 we provide our assessment of the governance and forecasting methods that are relevant to our assessment of the proposed major stations repex.
- In Section 4 we provide our assessment of each of the proposed major stations repex projects, and implications to the proposed capex of the issues that we have identified from that assessment.

[1] Including the AER's industry practice application note Asset Replacement Planning (2024).

1.4.2 Information sources

31. We have examined relevant documents that AusNet has published and/or provided to the AER in support of the areas of focus and projects that the AER has designated for review. This included further information at onsite meetings and further documents provided in response to our information requests. These documents are referenced directly where they are relevant to our findings.

32. Except where specifically noted, this report was prepared based on information provided by AER staff prior to 19 December 2025 and any information provided subsequent to this time may not have been taken into account.

33. Unless otherwise stated, documents that we reference in this report are AusNet documents comprising its RP and including the various appendices and annexures to that proposal.

34. We also reference responses to IRs, using the format IRXX QYY being the reference numbering applied by the AER to IRs and to specific question numbers within the IR. Noting the wider scope of the AER's determination, the AER has provided us with IR documents that it considers to be relevant to our review.

1.4.3 Presentation of expenditure amounts

35. Expenditure is presented in this report as $real 2026-27 as presented by AusNet in its revenue proposal and includes real cost escalation, unless stated otherwise. From AusNet's capex model, we can see that these amounts are direct costs only and exclude overheads. AusNet has also presented expenditure as $real March 2027 in its SCS capex model, and which we infer aligns with its regulatory year of 2026-27, ending March. We have adopted the conventions that align with those applied by AusNet in its source data.

36. In some cases, we have converted to this basis from information provided by the business in other terms making use of the same factors applied in AusNet's capex model, so as to present the expenditure on the same basis as presented by AusNet.

37. For some historical comparative data, AusNet has provided us only with information that includes Overheads (OH) and also has reference to inclusion of Capital Finance Costs (CFC). Where we have referred to such information, we have labelled it as such to the extent that AusNet has so defined it, though we note that it was not always clear which data included CFC and this may have been the source of some discrepancies.

38. While we have endeavoured to reconcile expenditure amounts presented in this report to source information, in some cases there may be discrepancies in source information provided to us and minor differences due to rounding. Any such discrepancies do not affect our findings.

2 BACKGROUND

AusNet is proposing a step increase in major stations repex for the next RCP. The increase is driven by a combination of projects that commenced in the 1 April 2022 to 31 March 2027 (2022–27) regulatory control period ('current RCP') and new projects that reflect a shift away from replacement of its 220kV assets to replacement of higher value, more complex and more expensive 500kV assets. AusNet notes that many of the new projects have been identified in previous plans, for replacement around the time of the next RCP.

Like other Network Service Providers (NSP) across the National Electricity Market (NEM), AusNet is responding to macro-economic changes including transformation of the electricity system including electrification of gas and transport. In Victoria there are specific policy settings that impact demand and are embedded into the demand forecasts that each of the NSPs have relied upon, including changes to the energy system and new projects identified by VicGrid's Victorian Transmission Plan (VTP). For this review, we rely on the demand forecast and assumptions prepared by, and submitted with, AusNet's RP.

2.1 Introduction

39. In this section, we provide an overview of AusNet's capex forecast for the next RCP and we contrast this with an analysis of the corresponding expenditure in the current RCP for the elements of the expenditure forecast under review.

40. We provide a breakdown of the proposed capex for the categories of expenditure we have been asked to review and point out some of the drivers for change that we explore in subsequent sections of this report.

2.2 Overview of proposed total capex

41. AusNet has forecast total net capex for the next RCP of $2,437.0 million (gross capex) as shown in Table 2.1.

Table 2.1: Total capex for next RCP by year ($m real March 27)

	2027-28	2028-29	2029-30	2030-31	2031-32	RCP Total
Replacement - Major Stations	258.2	298.8	248.9	189.9	125.4	1,121.1
Replacement - Other	206.0	187.6	87.3	86.8	87.3	655.0
Compliance	53.1	40.4	43.3	40.2	39.0	216.0
Resilience	6.7	6.8	6.8	6.9	6.9	34.0
ICT capex	51.4	58.1	45.2	51.7	49.8	256.1
Property capex	21.1	7.4	0.7	13.6	0.6	43.4
Fleet capex	1.3	2.8	3.6	3.2	1.2	12.1
Other non-network capex	4.1	5.0	5.1	2.1	2.1	18.4
Capitalised network overheads	16.8	17.2	14.3	13.2	11.9	73.5
Capitalised corporate overheads	2.0	2.1	1.9	2.0	2.0	10.0
TOTAL GROSS CAPEX	620.7	626.1	457.1	409.4	326.2	2,439.5
less disposals	0.4	0.5	0.5	0.5	0.5	2.5
TOTAL NET CAPEX	**620.2**	**625.7**	**456.6**	**408.9**	**325.7**	**2,437.0**

Source: AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

42. AusNet states that the forecast capex for the next RCP is '*2.2 times or $1,307m (real 2026-27) higher than our expected capex for the current 2022-27 regulatory period*'[2] and higher than the AER's regulatory allowance for the current RCP because of:

- Lower major stations repex in the current RCP, largely due to economic deferral (with increasing scope and/or labour and material costs)
- Higher asset replacement capex due to increasing labour and material cost, and inclusion of program expenditure not forecast in the allowance
- Lower compliance and resilience (previously named safety, security and compliance) capex, due to a combination of factors including re-categorisation of expenditure
- Higher ICT capex primarily due to program expenditure not reflected in the allowance
- Higher non-network capex due to unforeseen program expenditure.

43. The changes to the major stations repex in the current RCP are summarised in Table 2.2.

[2] AusNet Transmission Revenue proposal 2027-32. Page 67.

Table 2.2: Changes to major stations repex projects in the current RCP

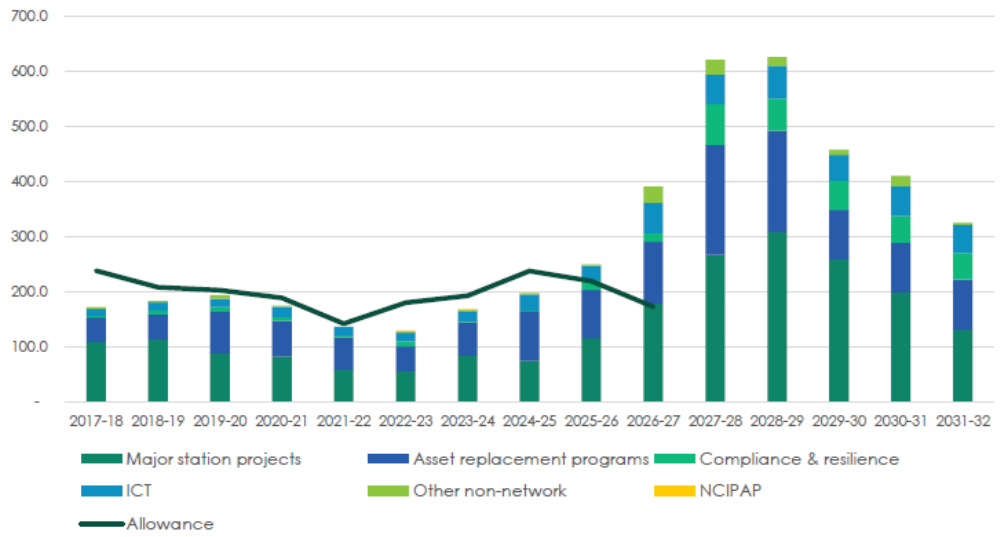
Current RCP project	Description of changes
Keilor Terminal Station 500/220kV transformer replacement	Scope revision from one to three 500/220kV transformers (A2, A3 and A4), one 220/66kV transformer, one 220kV CB and 220kV bus uprate. New project delivery timing.
South Morang Terminal Station 330/220kV transformer replacement	Currently underway. Scope revision to include an additional 700 MVA 330/220 kV transformer bank and associated protection and secondary systems (the single phase cold spare unit in the original project has been descoped). New project delivery timing.
South Morang Terminal Station 500kV GIS replacement	Changed from a staged approach to the replacement of the entire 500kV switchyard and of the F2 500/330kV transformer and control building due to rapidly deteriorating condition. New project delivery timing.
Moorabool Terminal Station circuit breaker (CB) replacement	Currently underway. Increasing labour and material costs contributing to a later project delivery timing.
Red Cliffs Terminal Station transformer and switchgear replacement	Currently underway. Scope revision from one 220/66kV 150MVA transformer to two 220/66kV 150MVA and two 66/22kV 33MVA transformers given further deterioration. New project delivery timing.
Loy Yang Power Station and Hazelwood Terminal Station 500kV CB replacement stage 2	Updated to reflect the timing of the Yallourn power station closure and increasing labour and material costs. New project delivery timing.
Sydenham Terminal Station 500kV GIS replacement	Currently underway. Delays experienced by the Western Renewables Link (WRL) project and extended scope.
Shepparton Terminal Station B2 and B3 transformer replacement	Increasing labour and material costs contributing to a later project delivery timing
Glenrowan Terminal Station 66kV CB replacement, Frankston Terminal Station 66kV CB replacement, and Horsham Terminal Station 66kV CB replacements	Deferral of project, to be delivered as part of asset replacement.

Source: AusNet transmission Revenue proposal 2027-32, pages 64-65

2.3 EMCa observations on prior RCP trends and performance

44. Figure 2.1 compares AusNet's actual/estimated capex for the current RCP and forecast capex for the next RCP.

Figure 2.1: Comparison of historical and forecast capex against regulated allowance, $m real 2026-27



Source: AusNet Transmission Revenue Proposal 2027-32, Figure 4-3

45. We observe step increases associated with most capex categories in the final years of the current RCP and for the next RCP.

46. For major stations repex, being the focus of our review, AusNet states that its replacement expenditure is shifting 'away from 220kV system assets to replacement of more complex and expensive 500kV assets. In the upcoming regulatory period, the focus will remain on these critical parts of the network.'[3]

47. Overall, AusNet is proposing major stations repex that is 129% higher than it expects to spend in the current RCP. A large proportion of the proposed repex is for the replacement of 500kV transformers, gas insulated lines and switchgear at six terminal stations: Keilor, Moorabool, South Morang, Hazelwood, Rowville and Sydenham terminal stations; as well as at Loy Yang Power Station.

2.4 Summary

48. AusNet expects to incur a level of capex by the end of the current RCP that is higher than its capex allowance, despite a lower estimated capex for its major stations repex. During the current RCP the proposed projects to be completed as a part of its major stations repex program were updated for scope and input cost changes, resulting in changes to the project delivery timeline, with projects extending into the next RCP.

49. The majority of AusNet's proposed major stations repex represents a shift away from replacement of its 220kV assets to replacement of higher value, more complex and more expensive 500kV assets. Replacement of its 500kV backbone assets, first established in the 1960s and 1970s, was previously signalled to stakeholders.

50. The uplift proposed for the next RCP is in part due to the proposed changes to scope, cost and timing for existing projects, and also the introduction of new projects.

[3] AusNet Transmission Revenue Proposal 2027-32. Page 67.

3 REVIEW OF RELEVANT GOVERNANCE AND FORECASTING METHODS

For the most part, we consider that AusNet's forecasting methods for major stations repex have led it to identify prudent projects. However, we find evidence that the assumptions it has applied have led to a higher level of capex, relating to scope, cost increases, and calculation of the unserved energy and PoF that lack evidence and which are in some cases overstated.

We found some application issues associated with AusNet's processes, which we consider result in an overstatement of the benefits of its analysis, however, do not result in a change of the preferred option that it has proposed. We also find evidence that indicates the proposed costs are higher than an efficient level.

AusNet has undertaken a deliverability assessment in response to the proposed increase in capex program and emerging challenges in the infrastructure market. We observe that AusNet has applied reasonable steps to review the deliverability of its proposed major stations repex program. The adjustments to the timing of individual projects that AusNet has made should assist with meeting its delivery timing. However, there remains some uncertainty with respect to the number of projects, competition for resources and access to labour for other parts of its program over the next RCP, which, given the material total capex uplift that AusNet is proposing, may impact the deliverability of its major stations program.

3.1 Introduction

51. In this section, we present our assessment of the governance and forecasting methods that AusNet has applied to forecasting its capex requirements for major stations repex projects. Specifically, we consider the methodologies used to determine and prioritise AusNet's list of projects, estimate the costs of those activities, and ensure the timing of the work is prudent and delivered efficiently.

52. We first consider relevant matters arising from the AER's decision for the current RCP, and then to the forecast capex.

53. We then consider the materials provided by AusNet and how they align with the requirements as defined in the AER guidance materials. The extent to which we have a complete set of information to undertake our assessment is critical to a determination that the proposed expenditure is prudent and efficient. AusNet has provided updates to its RP, which we summarise as matters that we have taken account of in our review.

54. We next consider whether AusNet has made any material changes to its governance arrangements during the current RCP, that have impacted its investment decision making and impacted either the nature or completeness of the information available to us. Following this we consider the governance, management and forecasting methods applied to the development of expenditure requirements for the next RCP, and whether these are likely to have led to a prudent and efficient forecast of requirements.

55. Our assessment of the governance, management and forecasting methods is not intended to be a comprehensive review, nor does it purport to represent all methods that AusNet has applied in determining its capex requirements for the next RCP. Rather we focus primarily on matters which we consider impact the forecast expenditure requirements for major stations repex, and as detailed in the subsequent sections of this report.

3.2 Matters arising from the AER's final decision for the current RCP

56. Given the increase in major stations repex proposed for the current RCP, we reviewed the basis for the final decision published by the AER to identify any areas of focus for our review of the increase that has been proposed for the next RCP.

57. In its final decision for the current RCP, the AER considers that AusNet had reasonably justified the need and timing of its proposed major stations repex projects. The AER also considered that AusNet had likely identified the efficient costs of its major stations projects, including updating of those costs included in its revised regulatory proposal (RRP).

58. In our review, we looked for evidence of any changes or departures from the plan developed for the current RCP, and of application of the processes that it had applied at that time. In addition, we considered whether AusNet had taken reasonable steps to assess the prudent and efficient timing and delivery of a further increase in its major stations repex for the next RCP.

59. In its assessment, the AER sought additional information to support the condition-based risk management methodology that AusNet had applied, and which it commented on in its final decision. This similarly formed an area of focus for our review.

3.3 Presentation of submission information

60. We considered the quality of the submission materials that AusNet provided in support of its RP.

The description of asset need is, in general, high-level in nature

61. AusNet provided a business case and/or Project Planning Report (PPR) (depending on the how far the project has progressed through its governance framework), a project asset condition report, cost estimates, economic model, and project change controls (as relevant).

62. We found that the materials describing the investment need and options analysis included limited detail for what we consider are high value and complex replacement projects. For example, the condition reports for in-flight projects were qualitative, and with a limited number of options considered for some projects. We had expected that AusNet would have access to a greater evidentiary basis of information to support its replacement planning, and particularly in the cases where it had progressed to project delivery.

63. In general, however, after consideration of AusNet's responses to our questions and discussions at the onsite meeting we were able to discern the need and basis for timing of the proposed projects. As explained in Section 4, there were some projects where we did not receive sufficient information to support the proposed change of scope and cost.

Differences in project costs exist across supporting documentation

64. We found differences between the project cost information provided in AusNet's documentation. Whilst the RP and capex model are expressed in real dollar terms, other sources of project cost information are in nominal terms. In addition, as the project moves though the project planning and delivery cycle, the costs differed, and those differences, in addition to changes due to inflation, were not documented.

65. We asked AusNet to compile a summary worksheet containing a complete list of all major stations capex projects, reconciling the total project capex included in the cost estimate workbooks, updated cost summary, economic model and PPRs with the capex model clearly identifying the dollar basis assumed and expenditure nominated in each year it is planned to be incurred. Also, to include any prior period expenditure to assist this process. Our aim was to assist with reconciling the information provided for the list of major stations projects included in the RP, and to determine the driver of the differences that we observed.

66. In response, AusNet provided a worksheet, however the values did not reconcile. AusNet states that differences often arise due to continuous updating of forecasts by the business:[4]

> *'We acknowledge that for a small number of projects, there are differences between the forecasts in the cost estimate supporting documentation and the economic model. Differences in project costs often arise due to continuous updating of forecasts by the business. As we continue to progress in flight projects, the estimated costs to complete works inevitably change. We recognise that the differences between forecasts in our submission introduce confusion and will aim to resolve discrepancies in our Revised Proposal. Despite these differences, we continue to consider our economic models to be relevant for your ongoing assessment, as they justify costs that are materially the same as what has been included in capital expenditure forecasts.'*

67. We accept that, for the purpose of the economic modelling and specifically determining the economic timing of the preferred option the argument presented by AusNet holds true. We also note that the differences are not large, in absolute terms or as a percentage of project costs. However, we would have expected that changes in project costs are addressed (and documented) as a part of robust expenditure governance.

AusNet clarified its application of projects as being in-flight

68. In addition to the categorisation of projects by activity, AusNet has also classified projects into:[5]

- 'in-flight' projects (those that obtained business case approval prior to 2025); and
- 'proposed' projects (those that obtained business case approval in 2025 or have not yet obtained business case approval).

69. In total, AusNet has proposed a total of eighteen projects, with five projects classified as 'in-flight' and thirteen projects as 'proposed.'

70. The in-flight projects comprise the following five projects:

- Moorabool Terminal Station (MLTS) CB Replacement
- Templestowe Terminal Station (TSTS) Tx and Switchgear Replacement
- Shepparton Terminal Station (SHTS) Transformer and CB Replacement
- Red Cliffs Terminal Station (RCTS) Transformer & Switchgear Replacement
- Sydenham Terminal Station (SYTS) 500kV GIS Replacement.

71. These projects have gained business case approval prior to 2025 and have since either undergone a Project Change Request (PCR) or will be undergoing a PCR which has/will increase the approved project capital expenditure.

72. Of the eighteen projects, one (TSTS Tx and Switchgear Replacement) is forecast to be completed in the current RCP and there is no expenditure planned in the next RCP and another is presented as a Contingent Project, and which is consequently also not included in the repex that AusNet has proposed. In total, therefore, we have reviewed the sixteen projects with expenditure proposed for the next RCP, comprising four in-flight projects and twelve 'proposed' projects.

73. The information provided for projects differs dependent on which category they fall into.

Condition reports were not provided for in-flight projects

74. Asset condition reports were not provided for projects nominated by AusNet as in-flight projects. On review of other supporting information provided by AusNet, we found that references to asset condition in that information was largely qualitative. We therefore asked

[4] AusNet response to information request, IR#001. Question 2.

[5] AusNet response to information request, IR#001. Question 7.

for asset condition reports to substantiate the qualitative descriptions of asset condition, expecting them to be of similar form as provided for proposed projects.

75. AusNet states that it did not have comprehensive asset condition reports readily available, and redirected us to review the PPR and Regulatory Investment Test for Transmission (RIT-T) reports:[6]

> *'Condition assessments were completed ahead of the investment decision but were not compiled into formal asset condition reports. Information on asset condition was considered at the time business cases were prepared and are available in following published RIT-Ts.'*

76. The information in these references was, however, also qualitative.

AusNet has updated its assessment of economic timing for in-flight projects

77. In response to one of our information requests, AusNet advised that the economic timings of the in-flight projects had changed, as shown in Table 3.1.

Table 3.1: Summary of economic timing changes for in-flight projects

Project	Initial Project Approval Date	Initial Economic Timing	Latest Project Change Request Date	Updated Economic Timing	2027-32 delivery timing
MLTS CB Replacement	02/09/2022	2026/27	31/10/2024	2024/25	2028/29
SHTS Transformer and CB Replacement	22/12/2021	2026/27	TBC	2028	2028/29
RCTS Transformer & Switchgear Replacement	04/09/2023	2028	TBC	2025	2028/29
SYTS 500kV GIS Replacement	15/12/2021	2025/26	10/05/2025	2025	2028/29

Source: AusNet response to IR#001, Question 7

78. We observe that the updated economic timing is, in general, similar or earlier than indicated by the initial economic timing. However, the delivery timing (at completion) was later than the economic timing and has been unchanged by AusNet.

3.4 Updates to the RP provided for some projects

79. We asked AusNet to provide relevant models/spreadsheets that demonstrate how the PoF values were calculated that are relied upon in the economic models of the proposed major stations repex for power transformers and CBs.

80. In its response, AusNet provided its source models and explained that it had identified an error in its analysis. After substitution of its assumptions, aligned with values used in the previous regulatory submission, the economic timing of several projects is later than it had initially proposed. AusNet states that these projects:[7]

> *'…are generally still economic before the year that they are delivered (i.e. the year of completion). This is because delivery timing for many projects has been adjusted to support the optimisation of our delivery program.'*

6 AusNet response to information request, IR#001. Question 13.

7 AusNet response to information request, IR#007. Question 1.

81. We summarise the changes based on AusNet's submission in Table 3.2.

Table 3.2: Changes to project timing from updated analysis of transformer projects by AusNet

Project name	Revised economic timing	Delivery timing	Comment
KTS 500/220kV Transformer Replacement	2031, deferral by 1 year	2031-32	No change
SMTS 500kV GIS and F2 Transformer Replacement	2030, no change	2032-33	No change
SMTS 330/220kV Transformer Replacement	2030, deferral by 1 year	2028-29	Retain the delivery timing of 2028-29.
WOTS Spare 330/66/22kV Transformer Procurement	2033, deferral by 3 years[8]	2032-33	Change the delivery timing to 2032-33 prior to the AER's draft decision
DDTS H3 330/220kV Transformer and CB Replacement	2033, deferral by 2 years	2032-33	No change[9]
TTS B4 Transformer Replacement	2032, deferral by 1 year	2030-31	Change the delivery timing to 2031-32 prior to the AER's draft decision, but conduct a further reassessment in our revised proposal
BATS B2 Transformer Replacement	2028, deferral by 3 years	2031-32	No change

Source: EMCa derived from IR#007, Table 1

82. We have taken account of this analysis in our assessment.

3.5 Assessment of matters relating to the governance arrangements and forecasting methods applied for the next RCP

83. Consistent with the overarching purpose, we focus primarily on matters that we consider impact the forecast expenditure requirements, detailed in the subsequent sections of this report.

3.5.1 Investment governance and prioritisation

AusNet has strengthened parts of its investment governance process

84. During our onsite review meeting with AusNet, we discussed changes that it had made to its' planning and governance processes, as a part of continuing to improve its' capital governance, and which are in progress. These include:[10]

8 The economic timing was listed as 2029 in the attachment to Question 2 of IR #001, however AusNet states this was in error and should have been 2030.

9 DDTS has been included as a contingent project.

10 AusNet onsite presentation.

- Additional rigour applied to its capital project governance processes and project level reporting, such as:
  - implementing a monthly Capital Project Forum with its Board to increase visibility and accountability of the largest projects
  - updated the process for developing capital projects, including new investment case approval and bringing forward select project development work (e.g. due diligence and site investigations, detailed cost estimates and risk register)
- Organisation restructure around business lines, aimed at strengthening organisational focus and accountability.

85. We understand many of these changes are driven from the AusNet Board and should assist with strengthening the governance and decision making of capital projects.

We were not provided with details of some PCRs which remained in development

86. AusNet included two projects[11] where the cost was proposed to be increased materially due to changes in scope. AusNet states that PCRs remained in development and are not available to be provided with the RP, or in response to our IR.

87. Whilst we expect that some projects may incur changes to the forecast cost, for example, in response to new information, and/or from the more detailed planning and design stages, this process has not yet been concluded for these projects. Therefore, inadequate information has been provided at this point in time to determine that the forecast is prudent and efficient for these projects. We comment on the implications of this in our assessment of the respective expenditure in Section 4 and expect that AusNet will submit improved information as part of its RRP.

AusNet has applied additional top-down checks

88. AusNet states that it has not identified an overlap in scope between the proposed major stations repex projects at terminal stations, and VicGrid's VTP:[12]

> *'Terminal station projects have also been assessed where overlaps have been identified. After consulting with VicGrid, AusNet will proceed with delivering the asset renewal projects at terminal stations as part of the TRR proposal. There is no overlap between the VTP scope and the TRR submission for this replacement.'*

89. AusNet has undertaken a top-down review and applied adjustment to its forecast capex to account for any overlap between the proposed major stations replacement, and asset replacement projects:[13]

> *'As the majority of major projects are initiated as a result of multiple closely identified replacements, much of the overlap has already been removed during the bottom up build.'*

90. We consider that application of a top-down review to remove overlaps across its projects, such as AusNet states that it has done, is prudent. AusNet states that the adjustments it has made are to the proposed 'asset replacement projects' and being separate to the major stations replacement projects, it is beyond the scope of our review to confirm that the adjustments have been made.

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11 SHTS Transformer and CB Replacement, and RCTS Transformer & Switchgear Replacement.

12 AusNet Services - TRR 2027-32 Victorian Transmission Plan Interactions - 31 Oct 2025 – PUBLIC. Page 1.

13 Ibid.

3.5.2 Expenditure forecasting

AusNet has made several changes to the delivery timing for major stations projects

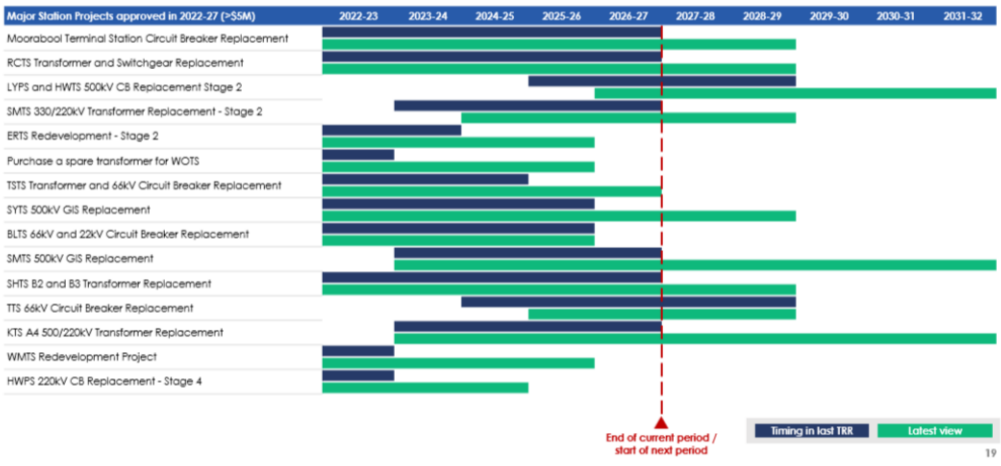
91. As discussed in Section 2, AusNet reviewed the economic and project timing for several projects arising from scope and input cost changes. In response to our request to better understand the changes that have occurred to the major stations repex program throughout the current RCP, we were provided with a summary of changes to cost, scope and timing for each of the proposed projects.

92. AusNet also states that:[14]

> *'At an overall level, some common factors have contributed to changes in cost, scope, and timing:*
>
> – **Major scope revisions** have occurred for the 4 largest major station projects, which have been driven by discussions with VicGrid and AEMO, and by further deterioration of assets which were planned for replacement. This in turn has resulted in some increases to cost and delays to delivery
>
> – **COVID-19-related delivery challenges** have impacted our portfolio overall, particularly in the early years of the current regulatory control period. This is because of the challenge of delivery physical works under COVID-19 restrictions, as well as supply chain disruption
>
> – **Changes to align with the timing of major augmentation programs** driven by AEMO and VicGrid have also impacted our program. This includes delays to works at Sydenham Terminal Station due to delays experienced by the Western Renewables Link project
>
> – **Unprecedented sector-wide cost escalation** during the 2022-27 period, driven by the COVID-19 pandemic and the Russian invasion of Ukraine, has also caused labour and material cost increases. This has the dual effect of increasing project costs, while delaying economic timing (that is, when a project should be undertaken).'

93. The changes to project delivery timing are summarised in Figure 3.1, and which indicate that the project delivery timing for projects approved for the current RCP are, in general, later than AusNet had originally assumed.

Figure 3.1: Changes in project delivery timing for major stations projects proposed for the current RCP (project value >$5m)



Source: AusNet response to IR#001, Question 3

[14] AusNet response to IR#001. Question 3.

There are several drivers of the proposed increase in the number and scope of projects in the next RCP

94. AusNet states that it is focussing on replacement of assets in its 500kV systems in the next RCP, as these assets are approaching end of life.

95. During our onsite discussion, AusNet stated that the replacement of the 500kV network had been identified many years earlier, and in subsequent planning reports with the work to be undertaken in the next RCP. We reviewed a limited sample of historical Victorian Annual Planning Reports (VAPR) and AusNet's 10-year asset renewal plans from the Australian Energy Market Operator's (AEMO) website, and we do see evidence of 500kV replacement projects having been identified, such as the gas insulated switchgear (GIS) replacement projects, and which form part of the VAPR.

96. Secondly, as AusNet undertook detailed design for the proposed projects, the scope for some projects increased in response to new information, such as environmental conditions and/or physical constraints at the station. During our onsite meeting, AusNet discussed a number of case studies that formed part of its major stations repex program.

97. In response to scope changes identified for several projects during the current RCP, AusNet reviewed its economic analysis to determine the economic timing of the proposed new projects, which in many cases resulted in a delay to the project compared with the original timing. The compounding effect of increased scope (and cost) and delayed timing has contributed to the increase in proposed expenditure for the next RCP.

AusNet, similar to other NSPs, has experienced large input cost increases

98. AusNet states that it has experienced material cost increases for its program, including major stations repex. AusNet refer to work undertaken by AEMO in updating its Transmission Cost Database (TCD):[15]

> *'AEMO's transmission cost database (TCD) is a national benchmark for cost reporting in the sector and reports approximately 60-80% real cost escalation between the 2021 TCD and the 2025 TCD.'*

99. Whilst we could not source these specific figures, they are directionally consistent with our own experience, and information relied upon by AEMO, including its 2025 Electricity Network Options Report:[16]

> *'An important result of this update [2025 Transmission Cost Database] was that project cost estimates produced using the updated Transmission Cost Database were, dependent on scope, approximately 25% to 55% higher (in real terms) for overhead lines than those in the 2023 update, and approximately 10% to 35% higher (in real terms) for substation projects.*
>
> *TNSPs and other jurisdictional planning bodies have advised AEMO that the recently observed real cost increases in tendering processes and project delivery which are informing this update to the Transmission Cost Database are primarily driven by:*
>
> *• sustained supply chain pressures on materials, equipment and workforce,*
>
> *• market competition driven by a high number of concurrent projects under development in the NEM,*
>
> *• project complexity, including an increased number of projects planned for remote areas,*
>
> *• social licence and additional community and landholder engagement along proposed transmission line routes,*

[15] AusNet Transmission Revenue Proposal 2037-32. Page 8.

[16] 2025 Electricity Network Options Report. AEMO. Page 32.

• scope revision as more detailed project assessments are completed, and

• additional contracting costs to account for risk allocation in engineering, procurement and construction contracts in response to pressures in the current market.'

100. In response to the changes in the costs that AusNet has estimated for each project, AusNet states that it has reviewed its economic analysis to determine the economic timing of the proposed new projects, and this in many cases resulted in a delay to the project compared with the original timing.

Demand forecast remains uncertain

101. A large part of the identified benefit for major stations projects is the rescued supply risk, which is a factor of the demand forecast assumed by AusNet. AusNet has adopted the AEMO forecast:[17]

'AusNet Services uses the Victorian connection point demand forecasts developed by AEMO as part of its 2024 VAPR to derive the capital expenditure forecasts.'

102. We have not been asked to review the demand forecast, and for the purpose of our review accept the demand forecast for each terminal station as proposed by AusNet.

103. In the event that the forecast demand at a terminal station decreases, then the supply risk would similarly be reduced, and in most cases would result in deferral of the economic timing relative to the economic timing that has been identified by AusNet. In our assessment, we consider those projects that are sensitive to changes in demand assumptions. However, this does not always imply project deferral as the timing of most of AusNet's major stations replacement projects is already later than indicated strictly by its economic timing assessment.

3.5.3 Condition based risk assessment

Asset management strategies

104. AusNet included an updated Asset Management Strategy (AMS) document for its transformers (AMS 10-67) and CB assets (AMS 10-54) that are relevant to our review of major stations repex.

105. In its description of at-risk transformers, AMS 10-67 refers to three terminal stations included in the major stations repex where transformers are proposed to be replaced:[18]

'Notably, several 330 kV and 500 kV shared network transformers located at SMTS, KTS, and DDTS exhibit a high failure likelihood with a Score of 4 [on a scale of 1 to 5].'

106. Major issues identified with the 300kV and 500kV fleet, and which are targeted for replacement, are summarised in Table 3.3.

[17] AusNet Services - TRR 2027-32 Appendix 4E Forecasts of Load Growth - 31 Oct 2025 – PUBLIC. Page 2.

[18] AMS 10-67 Power Transformers and Oil Filled Reactors. Page 11.

Table 3.3: Capex related issues impact major stations repex

Major issue	Description	Relevant projects
Moisture Content	Moisture reduces dielectric strength of oil-paper insulation, which can lead to the inception of partial discharges or dielectric thermal runaway at elevated ambient temperatures.	The H1 and H2 transformer banks at South Morang Terminal Station (SMTS) are exhibiting high transformer oil and insulation moisture levels. A project is currently underway to replace these transformers.
Paper Insulation Deterioration	Deterioration of paper winding insulation is influenced by temperature, moisture, oxygen, and certain byproducts of oil oxidation. When the degree of polymerisation (DP) of paper insulation drops below 200, the mechanical strength of the winding is reduced, making it unable to withstand through faults according to its original specification.	Estimated DP values from KTS A4 and MLTS No.2 500kV Shunt Reactors indicate that the paper insulation has reached the end of its operational life. These assets will be replaced under our proposed program.
Short Circuit Strength of Transformers	Thermal aging of transformer insulation leads to mechanical weakening of the insulation structure and increased risk of damage due to the sudden electromagnetic forces created by short circuit through currents.	The vulnerable units are being progressively replaced over multiple regulatory periods, including TTS B4 and BATS B2, as part of our proposed program.

Source: EMCa derived from AMS 10-67, Section 6.1

107. In its description of at-risk CBs, AMS 10-54 states that AusNet has been replacing Bulk Oil Circuit Breaker (CBBO) fleets for over 20 years and Minimum Oil Circuit Breaker (CBMO) over the last decade. AusNet states that CBBO, CBMO, and the first-generation 500kV Live Tank Circuit Breaker (CBLT) have the highest historical failure rates, with recent major failures, resulting in:[19]

> *'prioritised replacement efforts for CBBO ([redacted]), CBMO ([redacted]), and the first-generation 500kV CBLT ([redacted] to mitigate the risk of major failures.'*

108. The AMS documents indicate priorities for replacement, including those categories of transformer and CB assets that are intended to be delivered as a part of the major stations program.[20]

109. We note that the AMS for switchgear excluded GIS, and an updated copy of its relevant AMS for GIS assets was not provided with its RP. AusNet had provided an AMS for its GIS assets with its 2023-27 RP, and we reviewed that for relevant information. The AMS states that GIS bays that were in poor and very poor condition at that time are located at SMTS, SYTS and Newport Power Station D (NPSD). The GIS assets targeted for replacement in the next RCP are at these sites.

AusNet follows its risk assessment methodology for its risk-based programs, however a large part of its forecast repex relies on assessed condition information

110. AusNet has provided its asset risk assessment methodology AMS 01-09 which describes the methodologies used by AusNet to determine the asset risk and the mitigating methods for regulated network assets. In addition, AusNet states that it maintains a risk management system designed in accordance with AS ISO 31000 Risk Management – Guidelines.

111. In relation to its condition-based measurements, AusNet states:[21]

19 AusNet Services - TRR 2027-32 Technical AMS 10-54 Circuit Breakers - 31 Oct 2025 – CONFIDENTIAL.

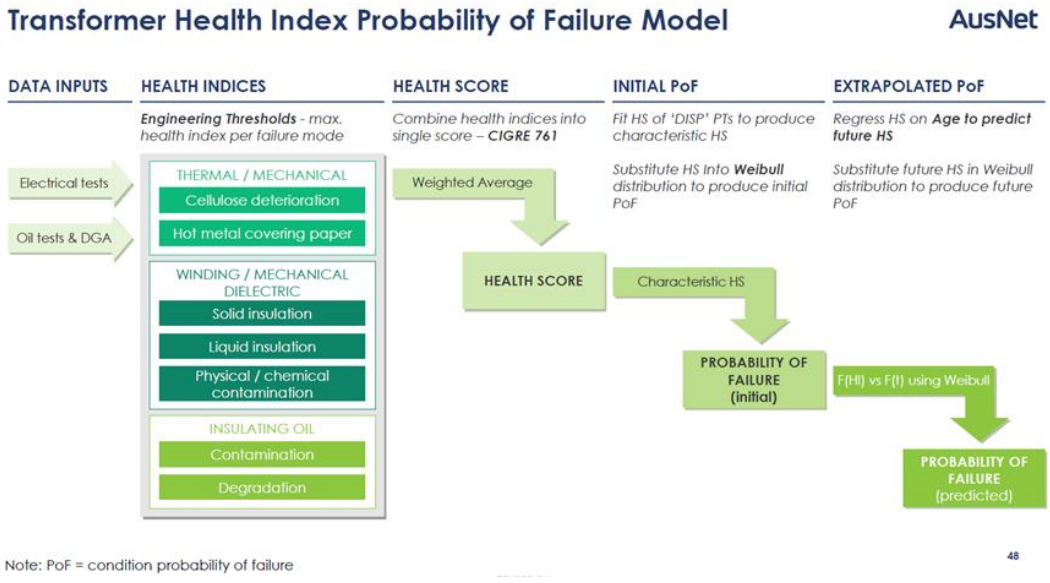
20 AusNet Services - TRR 2027-32 Technical AMS 10-54 Circuit Breakers - 31 Oct 2025 – CONFIDENTIAL. Section 7.4.

21 AusNet Services - TRR 2027-32 Technical AMS 10-67 Power Transformers and Oil Filled Reactors - 31 Oct 20. Page 19.

'Each measurement provides a Health Index (HI) rating from 1 to 5, where 1 indicates optimal health and 5 indicates worst health. These failure modes are based on diagnostic criteria derived from IEC and IEEE guidelines, CIGRE Technical Brochure 761 (Condition Assessment of Power Transformers), the Transformer Fleet's Asset Health Report (AHR 10-141), and the collective expertise of industry subject matter experts.'

112. For power transformers and CBs, AusNet uses health score and statistical methods to model the deterioration of the assets, and develops a representative Weibull distribution as shown in Figure 3.2 for power transformers and Figure 3.3 for CBs.

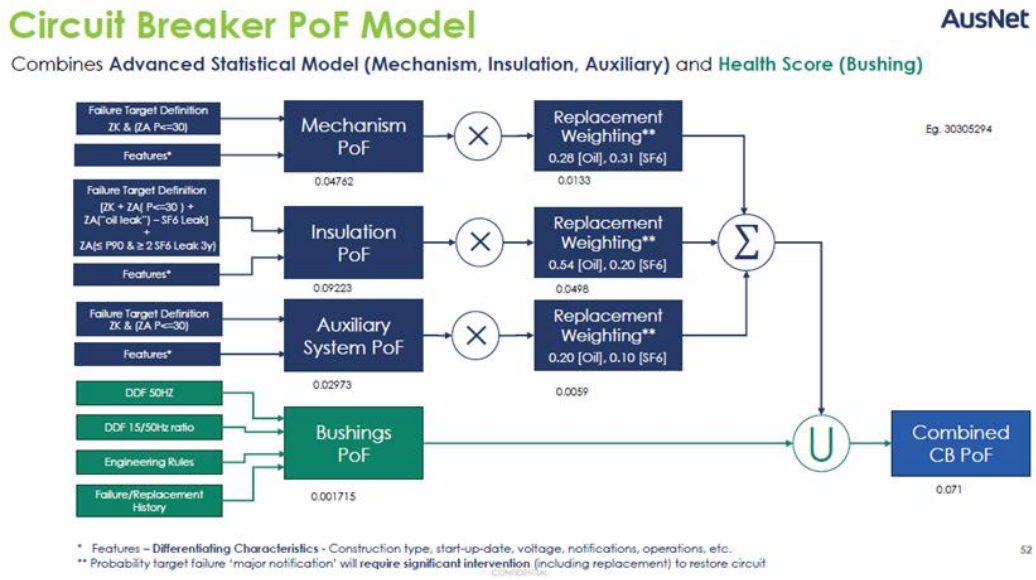
Figure 3.2: Overview of transformer failure model



Source: Onsite meeting presentation

113. AusNet describes a process to establish a failure relationship based on Health Score, which is then translated to a time-based Weibull distribution for transformers. For CBs, this combines a statistical model for mechanism, insulation, and auxiliary failures with a health model for bushing failure.

Figure 3.3: Overview of CB failure model



Source: Onsite meeting presentation

114. We observe that the information relied upon by AusNet for determining the PoF of a CB asset includes both ZK[22] and ZA[23] notifications, which we understand have very different implications for the risk of asset failure. For at least one project – Thomastown Terminal Station (TTS) 66kV CB replacement (type [redacted] – we observed that the level of aggregate risk suggests a volume of failures for the next five years that exceeded the volume of failures that AusNet had been experiencing in almost 20 years. The example ZA notifications provided to us were largely indicative of routine maintenance with low consequence, and if relied upon as an indication of failure, are likely to overstate the PoF.

115. Further review of the AMS for CBs identified that AusNet proposes to remove the remaining 66kV [redacted] CBs in the next RCP:[24]

> *'Although the average number of notifications per breaker over the past five years is only 1.3, likely due to the absence of online monitoring devices. Most [redacted] circuit breakers have already been progressively replaced and through current replacement projects at terminal stations such as TSTS, ERTS, and BLTS. The remaining units are scheduled for replacement under TRR 27–32.'*

116. AusNet also states that the porcelain bushings pose a risk of catastrophic failure, potentially endangering both assets and personnel in proximity, and absence of Original Equipment Manufacturer (OEM) support and limited refurbishment opportunities for this plant add to its justification for replacement of this plant.

117. Whilst the arguments in the AMS appear robust for this type of 66kV CB, given the identified risks and existing replacement program over multiple RCPs to address the risk, we remain concerned that use of notifications may overstate the CB PoF.

118. Whilst we did not see application of further scaling factors, we also found a statement by AusNet that may further inflate the CB PoF, if applied as described:[25]

---

22 ZK is defined in the CB AMS as Work order Notifications associated with failures (unplanned power interruptions), and also defect triggered corrective maintenance.

23 ZA is defined in the CB AMS as Work order Notifications associated with corrective actions from planned inspections, and also failure triggered corrective maintenance.

24 AusNet Services - TRR 2027-32 Technical AMS 10-54 Circuit Breakers - 31 Oct 2025 – CONFIDENTIAL.

25 AusNet Services - TRR 2027-32 Technical AMS 10-54 Circuit Breakers - 31 Oct 2025 – CONFIDENTIAL, Appendix C, Circuit Breaker failure rates and MTTR P(CB down).

'Consider multiplying the CB failure rate with a 1.3 factor to reflect that a circuit outage can be caused by other systems (protection, CT, isolators, etc.).'

119. Accordingly, we have closely reviewed the sensitivity of the option selection and economic timing to lower failure rates for CBs. As discussed in our assessment of individual projects in Section 4, we found that a small number of projects were sensitive to the assumed failure rate.

Failure parameters initially differed from current practice, and were subsequently amended to align with values applied in the current RCP

120. We noted a difference in the approach for transformers relative to what was documented in the Asset Renewal Planning Guide[26] and in the current RCP, as shown in Table 3.4.

Table 3.4: Comparison of failure parameters

Asset class	Parameters applied for current RCP	Proposed parameters for next RCP	
Source	AMS 01-09 29 Oct 2020, Table 22	AMS 10-24 30 Oct 2025, Table 7-2	AMS 01-09 31 Oct 2025, Table 25
CBs	η = 45, β = 3.5	η = 45, β = 3.5	MV: η = 65, β = 3.6 HV: η = 55, β = 3.6 EHV: η = 45, β = 3.5
Power transformers and oil-filled reactors	η = 50, β = 3.5	η = 50, β = 3.5	η(HS) = 63, β = 3.3. [63 HS = 45y, HS = 0.8192t - 26.228]

Source: As denoted in the table

121. During the onsite meeting, we were directed to the parameters for transformers as published in AMS 01-09 provided with AusNet's RP. We asked AusNet to provide all relevant models/spreadsheets that demonstrate how the PoF values were calculated that are relied upon in the economic models of the proposed major stations repex for power transformers and CBs.

122. We were provided with models that confirmed the application of the process that AusNet had described to us for transformers and CBs. However, the models did not produce an exact match of the PoF data series that had been relied upon in the economic models, for us to verify.

123. In response to an information request, AusNet states that it had identified an error in the models relied upon in its economic analysis for transformers, and proposed adoption of values of η = 50 years and β = 3.5, which it referred to as the "50-year approach." AusNet states that these values were:[27]

'…consistent with values used in previous regulatory submissions, and were calibrated to annual replacement rates. These parameter values are translated to a health score set of values of 65 and 3.5 using the linear regression between health score and age. This preserves the condition adjustment as per the health score methodology.'

124. We were able to confirm that the revised values aligned with those applied in the current RCP as shown in Table 3.4.

125. In addition, AusNet provided a new calculation of PoF for its transformers included in the major stations repex, and which resulted in changes to the economic timing for some projects, which we have taken into account in our assessment in Section 4.

26 AusNet AMS 10-24 Asset Renewal Planning Guide, Table 7-2 Primary Asset Weibull Parameters.

27 AusNet response to information request, IR#007. Question 1.

126. Whilst we consider that the process described by AusNet, if applied consistently, should result in a reasonable estimate of PoF, we did not undertake an audit of the data, or seek to reproduce the modelling to verify this.

127. For CBs, we were not provided with the same level of information to allow us to understand and verify the application of its Health Indices, derivation of its modelling parameters, and calibration with observed experience.[28] We therefore researched how AusNet had demonstrated its process to the AER for the current RCP, and found materials included in its RRP for the current RCP.[29] We observe that AusNet has also retained the same modelling parameters for CBs as it had applied in the current RCP.

128. As shown in Table 3.5, the values applied by AusNet are broadly comparable to values published by Transgrid, however Transgrid does not publish values that are differentiated by voltage for CBs. The differences may lead to a slight advancement of replacement (higher PoF) for AusNet compared with Transgrid, due to the higher characteristic life and slightly higher beta value.

Table 3.5: Comparison of Weibull parameters – transformers and CBs

	AusNet	Transgrid
Transformer	η = 50, β = 3.5	η = 54.21, β = 3.61
CB	η = 45, β = 3.5 (EHV only)	η = 47.76, β = 4.3 (all voltages)

Source: AusNet response to IR007, question 1; AusNet AMS 01-09 and Transgrid Network Asset Health Framework

129. Whilst we would have expected to see evidence of calibration of the Weibull parameters to its asset fleet, the Weibull values applied by AusNet after correction, are consistent with those used for its current RCP, and of the order we would expect.

3.5.4 Expenditure assessment and justification

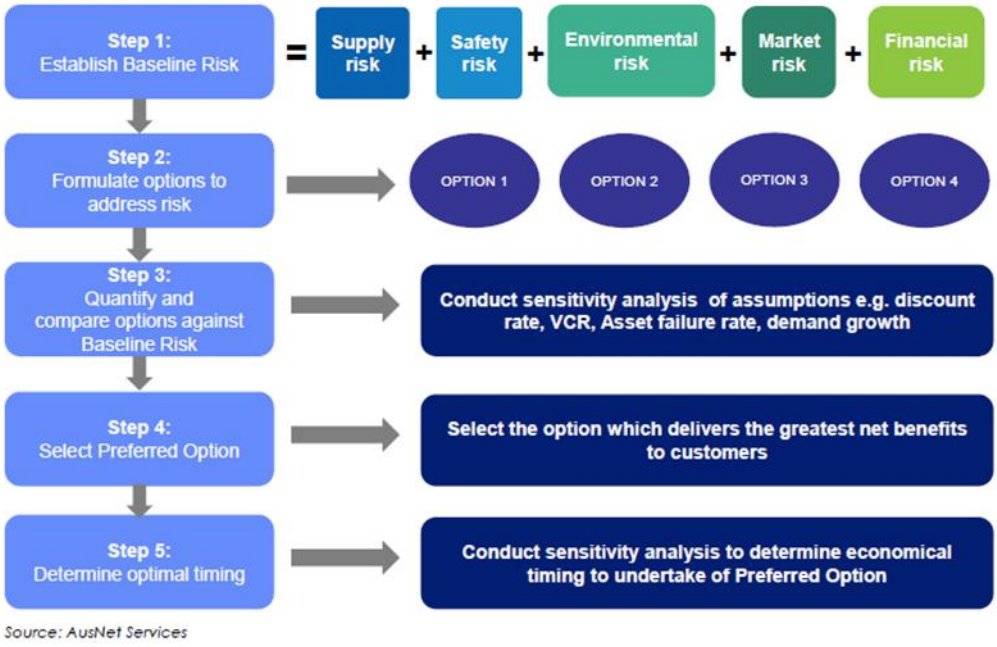
AusNet has applied a standard economic model to its assessment of major stations repex

130. AusNet's economic model considers sources of risk-cost for the base case and each of its options under assessment. AusNet calculates the economic timing as the intersection between the annuitised replacement cost, aligned with the proposed capex for the project, and the benefits by avoided risk-cost. We present an overview of AusNet's economic assessment framework in Figure 3.4.

[28] AusNet provided a model for outdoor bulk oil (CBBO) type, which are 66kV only.

[29] AusNet Services -TRR 2023-27 - Technical Document Transmission CB Weibull Analysis 21.xls.

Figure 3.4: AusNet economic assessment framework



Source: AusNet Transmission Revenue Proposal 2027-32, Figure 4-4

A large source of risk-cost relied on in economic models is associated with unserved energy

131. The largest source of risk, and major determinant of timing for major stations repex projects is the assessed unserved energy. AusNet has made use of the AER's 2024 Value of Customer Reliability (VCR) study values, based on either customer analysis from the Distribution Network Service Providers (DNSP) supply stations or use of a regional VCR for other sites. This is a reasonable approach.

132. We observe that the energy at-risk is driven by large increase in the demand forecast over the next RCP. AusNet has relied upon the AEMO connection point forecast. At our onsite meeting, AusNet stated that it had adjusted the AEMO connection point forecast to exclude some load, such as data centres, and as a result considers the demand forecast to be a conservative estimate.

133. For this review, we rely on the demand forecast and assumptions prepared by, and submitted with, AusNet's RP. However, we note in our assessments of the individual projects in Section 4 the impact of low and high demand growth scenarios for the AER's consideration.

An additional factor is applied by AusNet to account for underlying demand supplied by PV

134. We also observed that AusNet had applied a factor to some demand forecasts to account for the impact of solar PV, that is the underlying gross demand before impact of PV. Specifically, should the PV be unable to provide supply (e.g. due to an outage at the transmission or distribution level) the amount of demand affected is not only the net demand that was being supplied from the network but also the demand that was being supplied by the PV.

135. AusNet states that a factor had been previously applied to adjust the net demand to reflect the gross demand (i.e. including that supplied by the PV). More recently, and as applied to new projects for the next RCP,[30] AusNet has adjusted the net energy, to reflect the gross energy at-risk for the calculation of unserved energy. AusNet has developed summer and

[30] AusNet clarified that for some projects where expenditure had been included in the next RCP the former 'demand-based' adjustment had been undertaken.

winter PV factors that effectively scale the energy at-risk, by a value of up to 1.33 and 1.13 respectively.[31]

136. We accept that PV contributes to meeting customer load, and in the absence of PV (such as when the PV is disconnected because of a network outage) the demand (and energy) on the network that is unsupplied will be higher than the net demand (and energy) that were being provided by the network. We consider that the calculation method developed by AusNet is fairly coarse and may not take sufficient account of diversity or timing of the sources of energy in the calculation of energy at-risk, such that the PV factor as applied by AusNet may result in overstating the unserved energy. For the purposes of our assessment, we therefore considered how sensitive the outcome of AusNet's analysis was to the addition of this factor.

Additional factors have been added by AusNet that result in an increase to the assessed cost of each option

137. AusNet proposed additional factors for: (i) emergency replacement; and (ii) plant failure factor (PFF). In the former, AusNet states that the cost of replacement under emergency conditions (i.e. following a failure) will be higher and applied a factor ranging from 1.0 to 1.3 to the cost. We consider that the application of a factor such as this is consistent with industry practice, recognising that there is often a cost premium associated with operating under emergency conditions, with a value 1.2 typically applied.

138. In the latter case, AusNet's PFF is to account for equipment damage, to assets such as instrument transformers that are not included in the risk model, in addition to the modelled assets (e.g. transformers and CBs). In principle this reflects a sound approach.

139. The introduction of these factors results in a higher cost for the options under review and would therefore tend to defer the economic timing compared to if they were not applied. However, we did not identify instances where the application of these factors materially impacted the selection of the preferred option, or timing of the preferred option.

AusNet does not sufficiently account for uncertainty of its assumptions for some projects

140. Assuming an assessment period of 45 years (after the proposed investment, as AusNet has done) does not adequately take account of changes in the energy system, particularly where benefits are derived from market benefits (e.g. changes in generation), or other sources of benefit that are unlikely to persist for the entire assessment period.

141. The sources of the market benefits that AusNet has relied upon are hard-coded inputs and we have not been provided with details of the market modelling methods. It is not feasible to independently verify the quantification of benefits, other than by fully independent modelling. However, as projects are subject to RIT-T assessment, we would expect that AusNet has undertaken any market modelling consistent with the AER's RIT-T guidelines and making use of outputs of AEMO's Integrated System Plan (ISP).

142. As with any modelling involving forecasts, our caution would relate to the modelling assumptions, with increasing uncertainty further into the future.

143. In instances where we consider there is material uncertainty in the quantity of benefits that AusNet had assumed, we reviewed the impact of reducing the study period to 20 years which led to a reduction in the calculated NPV (all other things being equal). For the projects where we have applied this adjustment, we present the results in Section 4.

We have relied on AusNet's base case assumptions for its nominated discount rates

144. The AER[32] specifies the basis for determination of the discount rate as shown in Figure 3.5.

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31 We also saw evidence where the PV factor was set to 1.0 for some projects, and as a result had no effect on the expected unserved energy calculation.

32 Regulatory Investment Test for Transmission instrument - 2024 - Version 3. AER. Paragraphs 18-19.

Figure 3.5: Method for determining the discount rate to be applied – RIT-T instrument

Method for determining the discount rate to be applied

18. The RIT-T proponent must adopt the discount rate from the most recent inputs, assumptions and scenarios report unless it provides demonstrable reasons why a variation is necessary. If the RIT-T proponent decides to vary this parameter, this variation must be consistent with paragraph 19.

19. The present value calculations must use a commercial discount rate appropriate for the analysis of a private enterprise investment in the electricity sector. The discount rate used must be consistent with the cash flows being discounted.

145. Based on the information provided to us, AusNet has, in general, adopted the discount rates included in the 2025 Inputs, Assumptions and Scenarios Report (IASR) published by AEMO – corresponding to a low case of 3.0%, base case of 7.0% and high case of 10%. This also aligns with recent RIT-T projects such as the Victorian System Strength Requirement RIT-T Project[33] published in August 2025, which similarly adopted a real, pre-tax discount rate of 7% as the central assumption.

146. However, we also found instances where the base case discount rate in the economic model was 5.5%, which corresponds with the 2022 IASR, rather than 7.0%.[34]

147. We understand that the RIT-T guidelines require that sensitivity testing be conducted on the discount rate, with the regulated weighted average cost of capital (WACC) often used as the lower bound.[35] For the purpose of our review, we have based our assessment on the base case or central value that AusNet has nominated, and indicated where a project may be sensitive to changes to assumptions including the discount rate.

148. In one example, for the TTS CB replacement project, AusNet has based its analysis on the low case discount rate of 3.0% and which deviates from its approach to the assessment of economic timing for the remainder of its proposed projects. As discussed in our review of that project, we do not consider that AusNet has sufficiently demonstrated why this lower discount rate should be applied for this one project, in accordance with the RIT-T requirements.

3.5.5 Cost estimation and accuracy

AusNet's cost estimating methodology provides for refinement of project costs as projects mature

149. For the most part, AusNet has a reasonable cost estimating methodology which, if appropriately applied, should result in a reasonable estimate of its project costs. AusNet states that it based its costs on estimating tools that allow the cost estimate to be progressively refined as projects move through 'Stage Gates', including from options analysis to business case.

150. For our review, we found examples where the terminology applied by AusNet to describe the accuracy class of its cost estimates in the materials (e.g. as P50 class 5 and P75 class 3) that we were provided was confusing. Following discussion with AusNet during our onsite meeting, we understand that AusNet is changing its descriptions of estimation accuracy to align with the Association for the Advancement of Cost Engineering (AACE) methodology, and which has contributed to some confusion in the accuracy assigned to cost

33 Victorian System Strength Requirement RIT-T, Project Assessment Conclusions Report. 1 August 2025. Page 78.

34 Such as MLTS CB replacement project.

35 Regulatory Investment Test for Transmission instrument - 2024 - Version 3. AER. Paragraph 22.

estimates. AusNet has confirmed that the cost estimate applied for its capex forecast is the P50 midpoint estimate, which we have assumed for the purposes of our assessment.

151. AusNet also states that, for major stations repex, the development of a project risk allowance has followed a risk assessment process including application of Monte-Carlo analysis using simulation software,[36] considering both inherent and contingent risks associated with a project.[37]

152. In our assessment of the cost estimates, we looked for evidence of how AusNet had refined its cost assumptions taking account of increasing scope maturity, to improve the level of uncertainty and risk that would need to be accounted for in the scope estimate.

Historical cost estimating performance remains unclear

153. To understand how reflective AusNet's cost estimation process was of its actual out-turn costs, we asked AusNet to provide information on its recent cost estimating performance over the last five years for major stations repex projects (i.e. initial base line versus actual cost).[38] We would expect that AusNet would regularly review how well its estimates matched the actual costs incurred through market engagement, and that it would routinely update its standard building block costs used for estimates of new projects.

154. In its response, AusNet did not provide evidence of its cost estimating performance, but rather a comparison of cost estimates between forecast periods. Whilst this does show how cost estimates had changed for the purpose of the forecast, it does not show historical performance of its cost estimating process as the differences reflect a range of other factors, such as scope and timing changes, such that no conclusion on cost estimation can be drawn from it. It is the latter perspective which we consider is a reflection of how well, or not, AusNet's estimating processes are updated to reflect market conditions and whether an over- or under-estimation bias may be present.

Like other Australian NSPs, AusNet has already incurred increases to its input costs

155. AusNet has proposed large cost increases for several projects included in its forecast capex for the next RCP, relative to the costings that it estimated for these projects in the current RCP. In response to our IR seeking a better understanding of the drivers of increasing project costs claimed to have been incurred in the current RCP, and which will persist into the next RCP, AusNet states:[39]

> *'Significant increases in the cost of construction have also occurred in the last 5 years and have impacted our proposal. AEMO's transmission cost database (TCD) is a national benchmark for cost reporting in the sector and reports approximately 60-80% real cost escalation between the 2021 TCD and the 2025 TCD. AEMO reports this reflects sustained supply chain pressures (on materials, equipment and workforce), market competition driven in the NEM, project complexity, social license and landholder engagement factors, and additional contracting costs. These pressures are mirrored in our own cost escalation experience.'*

156. Absent comparison with recent projects, or an indication of cost estimating performance (as noted above), we looked at the formation of the cost estimates, which is based on the following:

- AusNet has established panels for Design Delivery Partner (DDP) and Construction Delivery Partner (CDP) which are market tested
- AusNet provided a summary and detailed cost estimate for most projects, that itemise the scope items

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36 We were not provided with the results of the risk assessment, or other inputs relied upon by AusNet in undertaking its risk modelling.

37 AusNet Services – TRR 2027-32 – Appendix 4D Project Cost Estimating Methodology – 31 Oct 2025 – PUBLIC.

38 AusNet's response to Information Request IR#001. Question 11.

39 AusNet's response to Information Request IR#001. Question 9.

- AusNet described a project gating process which includes progressive refinement of the scope and cost
- Recent changes to its project governance processes have increased the scrutiny on investment decisions by the Board, and
- Changes are subjected to a formal PCR process, which includes reviewing the economics of the project.

157. We consider these features are indicative of good practice. As a further check, we looked at the reasonableness of key allowance and uncertainty factors that AusNet had included.

Application of contractor incentives has not been adequately justified

158. We understand that AusNet has entered into commercial arrangements with design and construction contractors, which include a provision of [redacted] as an incentive payment. The incentive applies to all major stations repex projects and, according to AusNet, is payable only if agreed performance targets are achieved for that project [redacted] We estimate that the contractor incentive accounts for approximately 3% of the aggregate total direct costs for the projects within our scope.

159. Whilst consideration of contractual incentives that act to promote innovation and efficiency improvements or offset cost increases are consistent with AER guidance and good practice, AusNet has not demonstrated how its proposed contractor incentives achieve this.

160. We understand from our onsite discussion with AusNet that the contractor incentives are based on delivery of a range of KPIs nominated by AusNet, however we did not see a clear linkage to value for consumers. [redacted] We are aware of lower incentive amounts of between 1% and 3.5% included in cost estimates for recent 'mega' transmission projects undertaken by other NSPs, but not for projects that fall within a portfolio of projects such as proposed by AusNet.

161. In summary, we conclude that AusNet has not demonstrated that inclusion of contractor incentives which we estimate account for approximately 3% of the assumed total cost of projects is reflective of the efficient cost of the proposed projects.

We found examples of allowances that collectively result in cost estimates above an efficient level

162. We understand that AusNet's cost estimates are progressively refined as projects move through project lifecycle Stage Gates. Cost estimates that we have been provided include:

- Indicative cost estimates (Class 5) used for options analysis, and
- Cost estimates (Class 3) used for business cases.

163. The key difference explained to us is that additional information is available at the time of business case preparation, which makes use of AusNet's expert estimator tool and @Risk simulation software for inclusion in the cost estimate. Prior to that, the indicative estimate is developed through a desktop exercise, with allowances allocated for loosely defined scope items and project uncertainties allocated for unknowns.

164. AusNet states that the 'key differences between an Indicative Estimate and a Planning Estimate lie in the level of scope certainty, the detail available, and the use of built-up and standard pricing rather than broad allowances.'[40]

165. AusNet has provided copies of detailed and summary cost estimates for the projects proposed for the next RCP, with the former providing a large amount of detail of included

[40] AusNet Services – TRR 2027-32 – Appendix 4D Project Cost Estimating Methodology – 31 Oct 2025 – PUBLIC. Page 12.

cost items in forming the cost estimate. We observed the inclusion of broad cost allowances in class 3 cost estimates, when we had expected that the use of broad allowances was to be reduced as the scope accuracy had improved. Furthermore, we expected that where scope uncertainties remained, these would be probability-weighted and included as a risk allowance, consistent with AusNet's description of its cost estimating methodology as the scope matured but not included in both cost components. However, we saw evidence of detailed design and project management costs that have a wide variation between projects, independent of scope maturity and which were in most instances included at a higher percentage of the project costs than we would expect (after taking into account project complexity and other relevant factors).

There is duplication in the provisions made for uncertainty and risk

166. In considering the cost of uncertainty and risk, it is important to first determine whether the direct cost assumed by AusNet makes no other allowance for uncertainty and risk within each of the nominated components. If that is true, then there is a case for adding a risk allowance for asymmetric uncertainty outcomes, to the extent that the uncertainty results in additional cost, based on the methods adopted by AusNet. However, we consider that based on the information available to us, AusNet has tended to include uncertainty for a number of factors both in its direct cost estimate and in its calculation of its P50 risk allowance, such that there is a level of duplication of cost. For example, including a cost allowance for risk or uncertainty in the direct cost and also in the project risk allowance potentially ignores the possibility that the project experiences a level of risk (e.g. project delay or scope/cost increase) that is less than included in the direct cost estimate, therefore skewing the cost estimate.

167. We observed cost allowances in the base cost estimate that we consider would similarly be accounted for within the calculation of the project risk allowance such as for adverse weather and adverse ground conditions and therefore are likely to be at least in part duplicated.

3.5.6 Delivery strategy and risk

Proposed project timing reflects AusNet's deliverability assessment

168. The AER has published expenditure assessment guidance based on determining optimal timing using the annualised cost and annual risk/benefit, which if applied correctly should indicate timing that aligns with the point at which the NPV is maximised.

169. AusNet determines the economic timing of its proposed projects in accordance with the AER asset retirement guideline, specifically where the benefits from mitigating the identified risks of asset failure exceeds the annualised cost of the replacement of those assets.

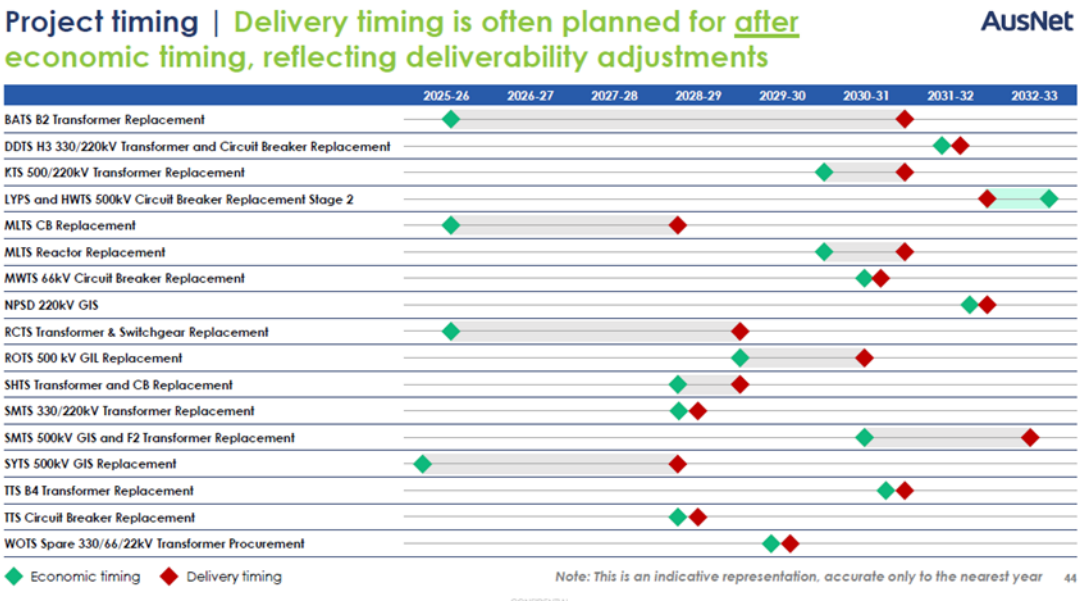
170. Given the assessment of economic timing, the delivery date is then based on its assessment of four deliverability challenges:[41]

- Internal and partner labour capability
- Procurement of long-lead time materials
- Outage availability
- Planning approvals.

171. During our onsite discussion, AusNet provided a summary of projects included for the next RCP as shown in Figure 3.6 which indicates project timing that is, in general, later than the economic timing derived by AusNet through its economic modelling.

[41] AusNet Services – TRR 2027-32 – Appendix 4G Deliverability Strategy – 31 Oct 2025 – CONFIDENTIAL.

Figure 3.6: Comparison of economic timing vs delivery timing for major stations repex projects



Source: Onsite presentation, slide 44

AusNet's deliverability assessment for major stations repex is reasonable

172. We have not undertaken an exhaustive assessment of AusNet's delivery strategy or deliverability assessment of all parts of its proposed capex program. As a part of our assessment of the proposed expenditure for nominated projects, we consider whether specific delivery risks are present and whether AusNet has taken sufficient account of these in its forecast of expenditure requirements.

173. The combination of projects continuing from the current RCP, and high cost/high value projects commencing in the next RCP has contributed to the step increase in proposed major stations repex.

174. We observe that AusNet has applied reasonable steps to review the deliverability of its proposed major stations repex program, across the dimensions of labour, materials, outages and approvals. The adjustments to the timing of individual projects that AusNet has made should assist with meeting its delivery timing. However, there remains some uncertainty with respect to the number of projects, competition for resources and access to labour for other parts of its program over the next RCP, which, given the material capex uplift that AusNet is proposing, may impact the deliverability of the overall capex program, and which is beyond the scope of our review.

3.6 Summary and implications for the aspects of expenditure we have been asked to review

3.6.1 Summary

Information provided by AusNet was sufficient for our review

175. In general, we found that the information provided was adequate to support our review process. AusNet has updated parts of its submission, and we have taken account of this updated information in our assessment of the individual projects in Section 4.

176. AusNet provided a combination of business cases or PPRs, summary asset condition reports, cost estimates, economic models and project change controls.

We identified evidence where the assumed capex was overestimated relative to an efficient level of capex

177. For the most part, we consider that AusNet's forecasting methods for major stations repex have led it to identify prudent projects. We also found evidence that the assumptions may lead to a higher level of capex, and which we review in Section 4. These include the following:

- The documentation we reviewed did not make clear the changes to scope and timing made throughout the project lifecycle. We highlighted to AusNet changes in how the project costs were represented, which was further compounded by expressing project costs on a different base, and different inclusions. We expected AusNet's project controls would explicitly recognise and reconcile these differences, but they did not. Nonetheless, we were satisfied after further investigation that the differences are relatively minor and do not impact the selection of options for the next RCP.
- We found that several projects included a wider scope than the title and description would suggest, often including additional replacement and site upgrade works. Whilst it is likely this is an efficient scope addition, the increase in scope that AusNet had proposed was not clear from the discussion of options for some projects.
- Whilst we noted the recent cost increases impacting the industry, including AusNet, we found instances where the allowances retained in the cost estimates by AusNet are likely to result in a higher estimate of cost, or that the allowances were not sufficiently justified as reasonable or efficient.

We identified evidence where the assumed benefits were overstated for some projects

178. We found some application issues associated with AusNet's processes, which we consider result in an overstatement of the benefits of its analysis, however adjustment to correct for these issues does not change AusNet's preferred option for each project:

- In terms of its application of PoF, we found evidence that indicates that the PoF assumed in AusNet's economic model may be higher than an efficient level for some projects, including testing how sensitive the project is to the specific failure rate assumptions for that project.
- We also found that AusNet has applied a scaling factor to its calculation of Unserved Energy, referred to as the PV factor. For the purposes of our assessment, we focussed on whether the application of this factor was likely to advance the timing of projects relative to if the factor had not been applied, through sensitivity analysis of AusNet's modelling.
- Market-based benefits associated with generator dispatch may be overstated because the benefits are assumed to accrue over a 45-year assessment period - there is considerable uncertainty in this benefit stream, particularly in the later years. We therefore considered a shorter assessment period for these projects.

At the time of submission, and based on the information available at the time, AusNet has undertaken a reasonable assessment of the delivery risk of its proposed major stations repex program

179. In relation to portfolio management, we observe that the steps undertaken by AusNet have, in general, resulted in project timing that is later than the economic timing indicated by AusNet's economic modelling. We observe that the proposed repex includes a combination of new projects and projects that were commenced in the current RCP and now being delivered over a longer time period, extending into the next RCP. In both cases, the scope and costs have increased relative to forecasts prepared for the current RCP.

180. Whilst the steps taken by AusNet to assess the deliverability of its proposed major stations repex program are likely to account for delivery risks identified at the time of the submission, there remains some uncertainty with respect to the number of projects, competition for resources and access to labour over the next RCP.

3.6.2 Implications for forecast capex

181. Of the issues that we have identified:

- We find that the cost estimates are higher than an efficient level with the inclusion of allowances that are not adequately justified as being reasonable and efficient; and
- Some aspects of AusNet's analysis may result in an overstatement of the benefits that it has assumed in its analysis of economic timing, and which we review for each project in Section 4.

182. In subsequent sections of this report, we have reviewed evidence of the application of AusNet's governance arrangements and forecasting methods, and whether any of the issues impact the expenditure forecast proposed for individual projects.

4 REVIEW OF PROPOSED MAJOR STATIONS REPEX

We reviewed the information provided by AusNet to support its proposed major stations repex program, including its business cases and relevant supporting information. Our focus is to assess the extent to which the forecast expenditure is likely to meet the NER criteria, and whether there was evidence of the issues identified in Section 3 that affect the reasonableness of AusNet's forecast. We also applied sensitivity analysis to examine the robustness of the proposed options and the timing of the proposed replacement projects to variances in AusNet's input assumptions to confirm the robustness of AusNet's analysis.

We find that AusNet has reasonably justified the need for undertaking most of its major stations projects in the next RCP. In response to our requests for additional information, AusNet has proposed changes to its forecast expenditure to reflect alternate delivery timing, and we accept that alternate delivery timing in our assessment.

Whilst we have tested the sensitivity of the projects to the demand forecast, it is beyond our scope to review the demand forecast itself. If demand does not eventuate as AusNet has assumed, this may lead to re-prioritisation of some proposed repex against other works, consistent with what AusNet states it has undertaken in the current RCP, particularly in cases where deliverability issues may emerge.

For the cases where we consider that AusNet has not sufficiently justified the need for inclusion of projects to be undertaken in the next RCP, we found a combination of issues relating to additional scope/cost that AusNet has not been adequately explained or justified, or where the delivery timing is likely to be later than AusNet has assumed and which leads to deferral of some projects. As we have discussed in Section 3, we identified instances where AusNet's estimate of cost is likely to lead to an overestimate relative to the efficient project cost.

Our assessment suggests that AusNet's proposed expenditure of $1,121.1 million represents an overstatement of an efficient level of repex.

4.1 What AusNet has proposed

4.1.1 Overview

183. AusNet has proposed $1,121.1 million for major stations repex for the next RCP, representing an average annual expenditure of approximately $224 million. In parts of its RP, AusNet refers to a total of $1,161.8 million, which includes overheads. Our assessment is based on the direct expenditure only.

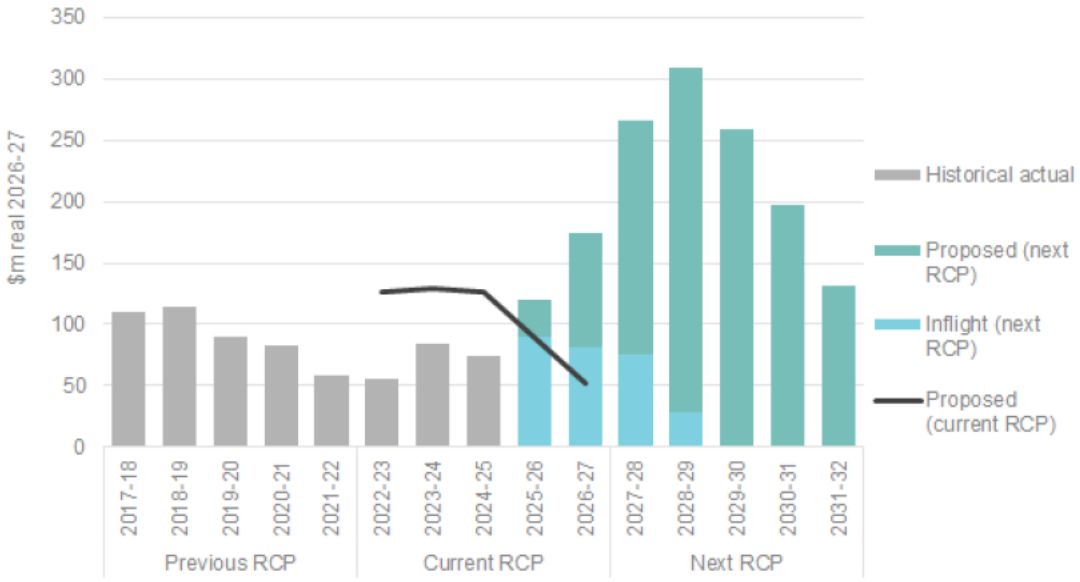
Table 4.1: Major station repex ($m real March 2027)

Project / category	2027-28	2028-29	2029-30	2030-31	2031-32	RCP Total
Total (direct expenditure)	258.2	298.8	248.9	189.9	125.4	**1,121.1**
Overheads	8.3	9.6	9.2	7.7	5.8	**40.7**
Total (direct + overheads)	**266.5**	**308.4**	**258.2**	**197.6**	**131.1**	**1,161.8**

Source: EMCa derived from AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

184. As discussed in Section 2 and shown in Figure 4.1 for major stations repex only, AusNet has delivered lower capex than it had proposed in first few years of the current RCP, however, and is proposing a step increase driven by new projects. For the figure below, we have shown the historical and forecast major stations repex including overheads as this was the basis of the data provided to us.

Figure 4.1: Major station repex by category – gross capex including overheads ($m real March 2027)[42]



Source: EMCa derived from AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025, AusNet Transmission Revenue Proposal 2027-32 Table 4-14 and AusNet Transmission Revised Revenue Proposal 2023-27 Table 3-1

185. The majority of AusNet's proposed major stations repex is for 500kV assets. These were initially developed in the late 1960s and early 1970s and, in successive strategic asset management planning documents, AusNet has flagged a likely need for a significant round of replacement activity in and around the late 2020's and early 2030s. That time has now come, and AusNet has sought to identify the specific replacement projects that are now required. For these assets, we would not expect the program of work that it proposes for the next RCP to be indicative of an ongoing uplift in replacement activity, but rather to reflect a particular stage in the long-term lifecycle of work required to maintain the serviceability of these assets.

4.1.2 Proposed repex by project

186. In Table 4.2, we show the proposed major stations repex of $1,121.1 million by project for the next RCP. A number of these projects commenced in the current RCP and have or will incur significant expenditure in the current RCP. In other cases, projects will continue into the subsequent RCP. The expenditure prior to, or beyond the next RCP is not shown.

[42] We observed a small difference in quoted figures for the years 2025-26 and 2026-27 between data sources.

Table 4.2: Major station repex by project for next RCP ($m, real March 2027)

Project / category	2027-28	2028-29	2029-30	2030-31	2031-32	RCP Total
Major Station						
MLTS CB Replacement	11.8	0.4	-	-	-	**12.3**
SHTS Transformer and CB Replacement	11.5	6.9	-	-	-	**18.4**
RCTS Transformer & Switchgear Replacement	20.4	14.7	-	-	-	**35.1**
SYTS 500kV GIS Replacement	29.1	4.9	-	-	-	**34.1**
KTS 500/220kV Transformer Replacement	69.0	69.5	57.6	19.4	10.7	**226.2**
SMTS 500kV GIS and F2 Transformer Replacement	24.0	67.0	68.8	61.2	43.2	**264.3**
SMTS 330/220kV Transformer Replacement	54.1	48.0	-	-	-	**102.1**
NPSD 220kV GIS	3.0	18.5	47.2	47.5	35.9	**152.0**
WOTS Spare 330/66/22kV Transformer Procurement	2.1	6.8	3.3	-	-	**12.1**
Power Cables (Major Projects)						
ROTS 500 kV GIL Replacement	7.6	24.4	20.1	8.8	-	**60.9**
Circuit Breakers (Major Projects)						
TTS CB Replacement	19.6	11.2	-	-	-	**30.8**
LYPS and HWTS 500kV CB Replacement Stage 2	4.4	8.7	11.5	23.3	17.7	**65.6**
MWTS 66kV CB Replacement	-	1.1	3.4	5.6	11.7	**21.9**
Power Transformers and Oil Filled Reactors (Major Projects)						
MLTS Reactor Replacement	0.1	4.0	9.1	5.4	-	**18.5**
BATS B2 Transformer Replacement	-	4.9	19.0	14.9	6.1	**45.0**
TTS B4 Transformer Replacement	1.4	7.7	8.9	3.8	-	**21.8**
Total	**258.2**	**298.8**	**248.9**	**189.9**	**125.4**	**1,121.1**

Source: EMCa derived from AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

187. In addition to the above, AusNet has included Dederang Terminal Station (DDTS) H3 330/220kV Transformer and CB Replacement as a contingent project in its RP. We have not been asked to review this project.

188. AusNet has also provided the estimated expenditure that it expects to incur across the final two years of the current RCP (being 2025-26 and 2026-27) and next RCP for the nominated projects, by project category. We found instances where the totals indicated for each project by AusNet did not reflect the total project expenditure, and which we inferred was likely due to expenditure being incurred prior to 2025-26 or continuing beyond 2031-32 and into the subsequent RCP (2032-37).

189. We asked AusNet for project information including its latest estimates for the total project cost,[43] and have used this information as a reference for our project assessment. Where relevant we have included the total project cost in our project assessment that follows.

190. We considered the total project scope, cost and timing in our assessment, including for projects that have commenced and are proposed to be delivered across multiple regulatory periods. We have retained the use of the project titles that AusNet has referred to in our

[43] AusNet's response to information request, IR#001 – Attachment to Question 3 – 20251203 – PUBLIC.

assessment, however we observe that the scope of the project often extends beyond the assets directly referred to in the project title.

4.2 Our assessment of in-flight projects

191. In this section we assess the proposed $99.9 million in the next RCP on the four projects that AusNet has categorised as in-flight projects, being those that obtained business case approval prior to 2025 and where expenditure is forecast to be included in the next RCP.[44]

4.2.1 Moorabool Terminal Station (MLTS) CB Replacement

Project overview

Scope and timing

192. The project commenced in the current RCP and is included in AusNet's RP for the next RCP at a cost of $12.3 million ($2027, direct costs only) to replace selected MLTS 500kV and 220kV assets:

- 8 x 500kV CBs
- 10 x 220kV CBs
- 20 sets of three phase isolators, and 56 instrument transformers associated with the CBs.

193. The driver of the project is the poor condition of the selected assets, which collectively present a material risk of asset failure. The financial consequences of not replacing the nominated assets are linked by AusNet primarily to electricity supply interruption and additional generation cost. The project business case was approved in late 2022 and the work was initially planned to be completed in March 2027.

Current RCP capex allowance and proposed expenditure in the next RCP

194. Table 4.3 compares the current RCP and whole of project costs, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. These figures show an increase in the latest estimate of the total project cost relative to AusNet's whole of project cost estimate at the time that it prepared its 2022-27 TRR. The sum of AusNet's reported actual capex for the current RCP and its forecast for the next RCP is lower than this total, and this difference is not explained by AusNet. [45]

[44] This excludes the replacement of transformer and switchgear at TSTS which is forecast to be completed in the current RCP as there is no expenditure planned in the next RCP. Our focus is reviewing expenditure proposed for the next RCP, and therefore we have not included this project in our review.

[45] We observe similar discrepancies in equivalent tables that we show for other projects. However, this does not affect our review which is of project justification and AusNet's proposed direct cost allowance for the next RCP. Explanatory footnotes for this table also apply to equivalent tables for the other projects reviewed.

Table 4.3: MLTS CB replacement – project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 actual capex	2022-27 TRR estimate	Latest project cost estimate[46]	2027-32 forecast[47]	Actual capex + forecast[48]
34.6	50.8	**35.0**	**70.9**	12.6	**63.4**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

195. A PCR was approved in October 2024[49] which outlines the reasons for the cost increase comprising an increased scope and cost. The PCR also extended the project completion date to 2028.

Assessment of proposed expenditure

Asset condition assessment information is qualitative but supports the need to consider remedial action

196. The business case identifies the MLTS 500kV and 220kV CBs and associated isolators and instrument transformers (CTs and VTs) that are in poor (C4)[50] or very poor (C5)[51] condition. For example, all eight 500kV CBs and seven of the ten 220kV CBs are classified as C5. The qualitative description of the issues with the CBs supports the condition categories, however they were not supported by quantitative analysis, which we would expect to see.

197. As discussed in Section 3.3, we asked AusNet for information to substantiate the qualitative descriptions of asset condition, however we were advised that a relevant Asset Condition Report (ACR) or equivalent was not available and to refer instead to the PPR.[52] However, the PPR does not provide quantitative analysis to support the C4/C5 classifications. We also reviewed the transformer AMS for relevant information on the MLTS CBs[53] and we note that:

- There have been large numbers of notifications[54] for 500kV and 220kV CBs
- 500kV and 220kV breakers of the make at MLTS have suffered widespread and recurring issues, and
- Since 2003 there have been nine major CB failures at MLTS (1 x 500kV and 8x 220 kV).

198. This does provide some substantiation of the qualitative condition descriptions of the MLTS CBs.[55] On balance, we consider that the classifications appear to be reasonable and we are satisfied that the nominated C4 and C5 condition switchgear should be considered for replacement.

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46 Provided by AusNet IR#001, Question 3

47 Total escalated costs including overheads sourced from the AusNet capex model.

48 EMCa calculation, summing AusNet's reported 2022-27 actual (from IR#001, Q3) and AusNet's 2027-32 forecast including overheads (from capex model).

49 AusNet Services - Project Change Request - MLTS CB Replacement INFLIGHT - 31 Oct 2025 - CONF(30883671.1).

50 Remedial action or replace in 2-10 years.

51 Remedial action within 1-5 years.

52 AusNet's response to information request, IR#001 – AusNet Responses on Major Station Projects – 20251203-CONF. Question 13.

53 TRR 2027-32 Technical AMS 10-54 Circuit Breakers – 31 Oct 2025 – CONFIDENTIAL(30883744.1).

54 Combination of work orders associated with failures and for corrective actions – separate data is not provided.

55 For example, for the 500kV CBs: Flange corrosion; SF6 leakage; hydraulic mechanism seal deterioration; limited spares; large component parts are not replaceable; manufacturer support is limited; refurbishment is thus not a viable economic option.

Options analysis is adequate and the selected option is the prudent choice

199. The business case considers the Business as Usual (BAU) approach, involving repair/maintenance but not replacement, and two options. A third option is included in AusNet's (updated) economic model:[56]

- Option 1: Replacement of 500kV and 220kV switchgear by 2026 (preferred option)
- Option 2: Staged replacement – defer 220kV switchgear
- Option 3: Staged replacement – defer 500kV switchgear.

200. The economic model compares the 'NPV costs' and 'NPV benefits',[57] for the BAU case, the three options, and a range of sensitivity studies.[58] The economic benefits of the proposed replacement program derive primarily from:[59]

> *'…the market impact from an asset failure, which will impact customers through higher electricity cost as generators will have to be operated out of merit and involutory [sic] load shedding may be required due to network constraints.'*

201. AusNet models the supply risk (consequences) associated with N-1 outages affecting three 500kV lines and three 220kV lines, with the 500kV line outages leading to the highest consequences. Three market scenarios are considered: (i) AEMO's Step Change; (ii) AEMO's Slow Change; and (iii) a 'Stress Test' scenario.[60] The economic impacts of modelling these three scenarios are however hard-coded into the spreadsheet and we are unable to assess them directly.

202. The second highest benefit for the three options derives from the reduction in the probabilistic cost of replacement of switchgear on failure compared to the BAU case. The derivation of the annual cost is largely dependent on the probability of asset failure, which in this case we consider to be reasonably derived.

203. The result of AusNet's analysis is that Option 1 has the highest NPV under base case assumptions and under all sensitivity studies.[61] The Option 1 NPV of $77.5 million ($2025)[62] is shown in Table 4.4.

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56 Project Economic Model – MLTS CB Replacement INFLIGHT – 31 Oct 2025 – CONF(30883670.1); which among other things assumes an updated capital cost for the preferred option of $60.7 million, compared to the PPR assumption of $34.6 million.

57 The base case is used as the counterfactual.

58 Base case, high case, low case, varying discount rate (5.5%, 7.5%, 2%), VCR (±25%), Asset Failure Rate (±25%), Demand Growth (±15%), and Capital Cost (±15%).

59 RIT-T PACR, Maintain Reliable Transmission Network Services at Moorabool Terminal Station. Page 10.

60 AEMO's Slow Change Scenario and high capital cost.

61 Base case assumptions are varied in sensitivity analyses for: discount rate, VCR, asset failure rate, demand growth and capital cost.

62 AusNet's response to information request, IR#001 – Attachment to Question 2 – 20251203, which corresponds to the economic model.

Table 4.4: MLTS CB replacement – modelling outputs ($m real 2025)[63]

Option	Option description	Total modelled cost[64]	PV of costs[65]	NPV option benefit (relative to BAU)[66]
0	Business as Usual	$0.0	$137.4	$0.0
1	Integrated Replacement **(preferred)**	$60.7	$59.9	$77.5
2	Staged Replacement - Defer 220 kV Switchgear	$49.2	$65.5	$71.8
3	Staged Replacement - Defer 500 kV Switchgear	$14.6	$75.0	$62.3

Source: 5.5.27 - AusNet Services - Project Economic Model - MLTS CB Replacement INFLIGHT - 31 Oct 2025 - CONF

A shorter study period results in significantly lower benefits, but doesn't change the selected option

204. The economic model includes a study period of 45 years, with the Option 1 benefits (avoided costs) building over the entire period, to the extent that a significant proportion of the PV benefits accrue after 2033. In our view, there is considerable uncertainty in the quantity of market risk benefits beyond even a 10-year study period. We therefore considered the results of reducing the study period to 20 years, which led to a reduction in the NPV from $77.5 million to $22.9 million ($2025) (all other things being equal) for the preferred option. Assessment across other options continues to support the selection of the preferred option.

Economic timing is 2026 which is earlier than the revised project completion date of 2028

205. The base case economic timing is 2026, however the revised and current scheduled project completion date is 2028.[67] We see no grounds for prudently deferring the project into the subsequent RCP.

206. The economic timing is most sensitive to changes in the plant failure rate. Using the sensitivity analysis undertaken by AusNet as shown in Figure 4.2, the annual benefits can be seen to increase in 2026 and 2029.[68] Reducing the PoF of the switchgear by 25% defers the economic timing to 2028 or 2029, which is well within the next RCP and, in any case, aligns with AusNet's scheduled project timing.

63 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

64 The total modelled cost refers to the cost assumed for the next RCP only. Where AusNet has assumed a staged approach for some of its options, and which includes additional cost beyond the end of the next RCP, this has been included in the calculation of the PV of costs and NPV. Explanatory footnotes for this table also apply to equivalent tables for the other projects reviewed.

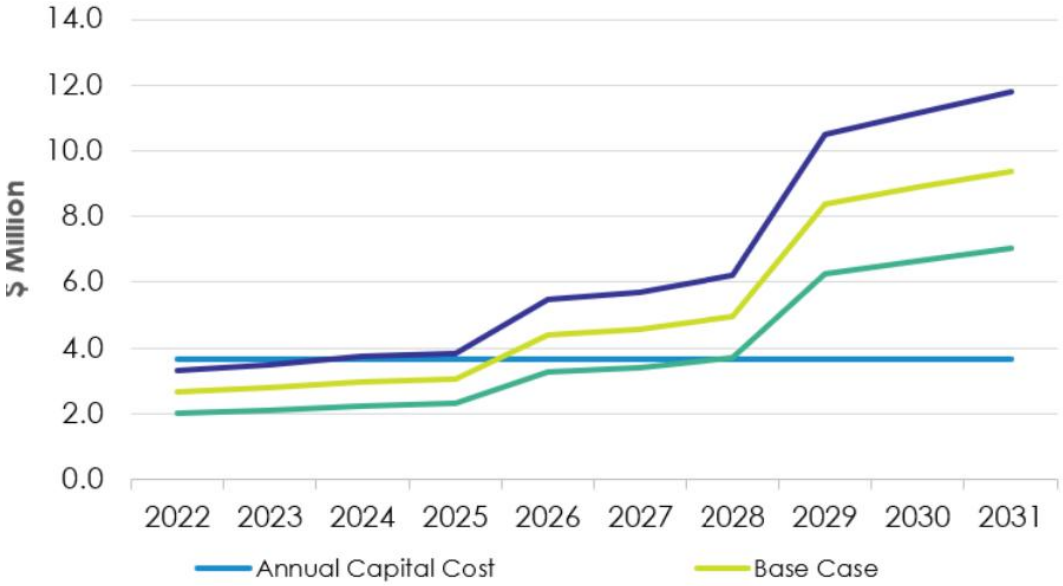
65 Comprises the PV of risk costs plus the PV of repex and associated opex for each option.

66 PV of BAU costs less PV of option cost

67 Which was adjusted from the economic timing due to delivery constraints, per AusNet's response to information request, IR#001 – Attachment to Question 2 – 20251203- PUBLIC.

68 We assume these are related to market impact costs following retirement of coal-fired generators.

Figure 4.2: Failure rate sensitivity of preferred Option 1 – MLTS CB replacement



Source: Project Economic Model – MLTS CB Replacement INFLIGHT – 31 Oct 2025 – CONF(30883670.1)

The initial cost estimate was updated following the CDP tender process

207. The factors identified by AusNet contributing to the higher cost forecast post the completion of the CDP tender process were:[69]

- Higher than anticipated inflation increases: a 35% nominal increase from the business case estimate in less than two years
- Estimate shortfalls:
  - footings and structures – more than doubled despite reduced scope
  - secondary works – no allowance for cable pulling
  - outage cost – incorrect rate used
  - CDP indirect cost – AusNet estimate omitted eight components included in tendered price, amounting to a three-fold increase, and
- Altered construction methodology: to move from a 'conventional construction sequence' to a staged cutover sequence to reduce the need for lengthy outages and thereby reduce significant 500kV network security risk.

208. The PCR outlines the scope change, which included construction of temporary infrastructure to reduce outage duration, and for most outages to be carried out overnight (at additional cost).

209. We are satisfied that the revision to the cost estimate was necessary given that the uplift is based on a combination of tendered prices and a prudent change to the construction methodology (to reduce network risk).

Summary of findings

210. The need to undertake a project to address the condition of CB assets at MLTS in the next RCP is prudent and the scope reasonable.

211. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

69 RIT-T PACR, Maintain Reliable Transmission Network Services at Moorabool Terminal Station. Pages 2-3.

4.2.2 Shepparton Terminal Station (SHTS) Transformer and CB Replacement

Project overview

Project and scope details

212. SHTS was commissioned in the late 1960's and serves as the main transmission service connection point for distribution of electricity by Powercor to communities in the towns of Shepparton, Echuca, Mooroopna, Yarrawonga, Kyabram, Cobram, Numurkah, Tatura, Rochester, Nathalia, Tongala, and Rushworth.

213. According to the business case, AusNet proposes the replacement of two 220/66 kV power transformers and twelve 66kV CBs and associated primary and secondary assets in poor condition at SHTS by June 2026.[70] AusNet describes the condition as having deteriorated to a level where there is a material risk of asset failure.

214. The preferred option is the integrated replacement of the two transformers and twelve CBs and associated primary and secondary equipment by 2026/27 and has included $18.4 million ($2027, direct costs only) to complete the project in the next RCP.

215. AusNet, with Powercor, has determined that there is an enduring need for electricity supply services in the area, with demand forecast to increase.

Current RCP capex allowance and proposed expenditure in the next RCP

216. AusNet included the project in its initial RP for the current RCP. AusNet's RRP for the current period indicated an increase in cost of this project from $17.0 million (real 2021-22) to $37.1 million (real 2021-22).

217. AusNet demonstrated to the AER that the ISP shared transmission network investment associated with VNI-West does not impact on the asset renewal investment proposed at SHTS. The AER included the project in the capex allowance for the current RCP.

218. Table 4.5 compares the current RCP and whole of project costs, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. These figures show an increase in the latest estimate of the total project cost relative to AusNet's whole of project cost estimate at the time that it prepared its 2022-27 TRR, and which reasonably aligns with the sum of AusNet's actual capex for the current RCP and its forecast for the next RCP.

Table 4.5: SHTS Transformer and CB Replacement – project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 actual capex	2022-27 TRR estimate	Latest project cost estimate	2027-32 forecast[71]	Actual capex + forecast
45.6	46.3	**46.1**	**64.6**	**19.0**	**65.3**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

Assessment of proposed expenditure

Asset condition indicates a need for intervention

219. The latest asset condition assessment for SHTS was conducted in 2019 and revealed that some assets at the terminal station are in poor condition (C4) or very poor condition (C5).

[70] AusNet Services – Project Business Case – SHTS T and CB R INFLIGHT – 31 Oct 2025 – CONF.

[71] Total escalated costs including overheads sourced from the capex model.

- B2 and B3 transformers were commissioned in the late 1960's and a design issue (buckling 66 kV windings) has been identified for these two [redacted] transformers. Transformers are considered to be C4.
- Ten of the thirty 66 kV CBs, including three bus tie CBs, are in C4 or C5 condition and are approaching their end of economic and technical life. A further two 66kV CBs are identified for replacement as their associated current transformers need to be replaced in accordance with AusNet's asset management strategy.
- Several instrument transformers are assessed as C4 and C5.

220. We consider that the condition information provided indicates that the switchgear should be considered for replacement.

Selection of preferred option analysis is reasonable

221. AusNet's preferred option is the integrated replacement of both transformers (Option 1) as shown in Table 4.6, on the basis that it provides the highest net benefits.

Table 4.6: SHTS Transformer and CB replacement – modelling outputs ($m real 2025) [72]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$131.0	$0.0
1	Integrated Replacement (Both Tx) (preferred)	$67.4	$64.5	$66.5
2	Integrated Replacement (One Tx)	$66.8	$71.4	$59.5

Source: 5.5.60 - AusNet Services - Project Economic Model - SHTS T and CB R INFLIGHT - 31 Oct 2025 - CONF

AusNet has proposed additional scope for this project that results in a higher cost, however the detail is not provided

222. AusNet's Project Assessment Conclusions Report (PACR) was published in October 2021 as the third and final step in the RIT-T process. The preferred integrated replacement option and project timing of 2026-27 remained unchanged in its analysis with an estimated capital cost of $39.9 million ($ basis not provided). We have not identified the source of the cost estimate referred in its PACR, as it differs from other cost information we have been provided. However, we consider that it closely aligns with the cost of $37.1 million ($real 2021-22) included in its RRP for the current RCP.

223. AusNet has provided a project cost update summary dated October 2025 to explain the basis of the proposed capex it has now included for the next RCP, and which is based on its updated and higher total project cost estimate of $64.6 million including overheads. The project cost update does not provide sufficient detail or justification for the scope increase, other than to state that:

- During the planning permit approval stage, noise, surface drainage compliance issues, and limitations on outage availabilities were discovered which required significant partial re-design to address the issues
- AusNet intends to increase the scope of the project
- A formal project change request for additional budget is being prepared but is not yet available.

224. We asked AusNet to provide an explanation for the differences in project expenditure included in the provided information. For example, the project cost update summary for SHTS refers to a revised project expenditure of $64.6 million ($real 2027) however this does

[72] In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

not align with the figure in the capex model of $42.2 million ($real 2027). In its response, AusNet stated that the differences refer to different forecast periods, and the inclusion of overheads. We have re-produced the full response in Table 4.7 to illustrate the difference. AusNet states that its economic analysis justifies costs that are at least as high as what has been included in the regulatory models.

Table 4.7: Comparison of sources of cost information

Number quoted in proposal	Years included	Basis	Notes
$64.6M (Document 5.5.59)	RY23 to RY29	Real 2027 dollars, including overheads	This number reflects capex in regulatory years RY26 and RY27 consistent with what is used in our RAB Roll Forward Model. Removing the $21.4M quoted in the document for the years RY23-25, this produces a RY26-29 forecast of $43.2M.
$42.2M (capex model > Calc| Project Costs As Inc > V12:Y12)	RY26 to RY29	Real 2027 dollars, excluding overheads	As this number excludes overheads, it is not comparable to the other numbers
$44.0M (capex model > Calc| Project Costs As Inc > BB12:BE12)	RY26 to RY29	Real 2027 dollars, including overheads	This number is slightly different than the $43.2M mentioned above due to a difference in forecasts for RY26 and RY27 – the RY26 and 27 forecasts for this project used in the capex model are $0.8M higher than what has been rolled into the RAB.
$67.4M (SHTS Economic Model, document 5.5.60)	Calendar year 2023 to 2029	Real 2024 dollars, including overheads	The total project costs used in the economic model for SHTS are based on a forecast produced in 2024.

Source: AusNet's response to information request, IR#001 – Attachment to Question 2 – 20251203 – PUBLIC, Question 20

225. Whilst this explanation has been useful, it highlights the differences in project cost information and presentation of cost information we have found in our review. We have found similar issues across most of the projects we have reviewed, however we have not included a similar analysis for the remainder of the projects in this report.

We are unable to assess the reasonableness of AusNet's proposed scope and cost estimate for the additional work to be undertaken in the next RCP

226. The project cost update summary describes the proposed scope changes that result in an increase in project costs. AusNet's project cost update reflects its estimate following detailed design including increases of scope required to complete the project but has not yet completed a detailed cost estimate as it has not yet gone to market for construction costs. Accordingly, AusNet has not yet developed its PCR, and therefore not completed its PCR review process.

227. AusNet considers that the expected increase in cost that it has included in its forecast repex reflects the combination of expected: (i) cost increases in the marketplace; and (ii) changes in scope. However, the final cost is not yet known as the scope has not been finalised and the costs not subjected to market engagement processes. Also, the scope change has not been subject to AusNet's own PCR review processes, which may affect the cost, scope and timing of what is actually delivered.

228. In its response to one of our questions, AusNet indicated that the PCR will '*confirm a further change to costs*.'[73]

[73] AusNet's response to information request, IR#001 – Attachment to Question 2 – 20251203 – PUBLIC, Question 20

229. Without the updated PCR we are unable to assess the basis for the scope and cost forecast for the additional work to be undertaken in the next RCP. We were not provided with details of the cost increase, and therefore absent better information, we assume that the proposed cost and scope increase accounts for approximately $18.5 million, as derived from Table 4.5.[74] While noting that this figure includes AusNet overheads, it is similar to the direct cost of $18.4 million for the next RCP that AusNet has proposed.

The economic timing to deliver this project is within the next RCP

230. The economic model includes a higher value of capex, once inflated to 2026-27 dollars, than indicated in AusNet's documentation. Whilst a higher capex value is likely to defer the timing, rather than bring forward timing, we consider that the timing using that higher value of capex would likely remain within the next RCP and would suggest that the project is economic by 2028. AusNet has proposed the project to be completed by 2029.

Summary of findings

231. Despite the apparent inconsistencies in AusNet's information, the need to undertake a project to address the condition of transformer and CB assets at SHTS in the next RCP is prudent.

232. However, we do not consider that AusNet has sufficiently justified the proposed cost and scope increase for this project. That remains the subject of its PCR process and has not been included with its submission.

233. We also found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

4.2.3 Red Cliffs Terminal Station (RCTS) Transformer & Switchgear Replacement

Project overview

Scope and timing

234. This inflight project is to replace:

- Two 70 MVA 220/66/22kV transformers (B1 and B2) with two 150MVA 220/66kV transformers
- Two 35MVA 220/22kV transformers (L1 and L2) with 33MVA 66/22kV transformers
- Selected 66kV and 22kV instrument transformers and associated primary and secondary equipment, and
- Two 220kV Remote Operated Isolators (ROI).

235. The project driver is stated as poor asset condition.

236. The scope also includes upgrades to station access roads and mitigation of physical constraints to support transformer transport. The project is scheduled to be completed in February 2029 after commencing in 2022-23. AusNet has included a cost of $35.1 million ($2027, direct costs only) in the next RCP.

Current RCP capex allowance and proposed expenditure in the next RCP

237. AusNet included the project in its RRP for the current RCP. According to Table 2.2, the original scope was expanded from one 220/66kV 150MVA transformer to two 220/66kV 150MVA transformers and two 66/22kV transformers, and also did not include the further additions of ROIs nor the upgrades to access roads and other civil works.

[74] This was determined as being the difference between the estimated project cost of $64.6 million ($2027) per IR001 Q3 and the last known total project cost of $46.1 million ($2027) per IR#001 Q3

238. Table 4.8 compares the current RCP and whole of project costs, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. These figures show an increase in the latest estimate of the total project cost relative to AusNet's whole of project cost estimate at the time that it prepared its 2022-27 TRR, and which reasonably aligns with the sum of AusNet's reported actual capex for the current RCP and its forecast for the next RCP.

239. AusNet's project cost update summary states that the scope was further amended to reflect matters identified in the design phase and subsequent to the business case including the ROIs and civil works referred to above.

Table 4.8: RCTS transformer and switchgear replacement project – project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Next RCP project cost	
2022-27 allowance	2022-27 actual capex	2022-27 TRR estimate	Latest project cost estimate	2027-32 forecast[75]	Actual capex + forecast
27.8	41.4	**27.9**	**77.4**	36.3	**77.7**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

Assessment of proposed expenditure

Asset condition assessment information is qualitative but supports the need to consider remedial action

240. RCTS provides an electricity supply service to Red Cliffs and the surrounding area, which, according to the demand forecast, will be required for the foreseeable future. AusNet advises that the poor condition of some of the assets at the terminal station poses an elevated likelihood of asset failures, which would result in prolonged supply outages.

241. AusNet has provided qualitative descriptions of the asset condition, which we summarise as follows:[76]

- Of the three 220/66kV transformers at RCTS, B1 and B2 are assessed by AusNet to be in poor condition (C4). The other transformer, B3, is in satisfactory condition. AusNet advises that B1 was commissioned in 1974 (51 years old), B2 was commissioned in 1987 (38 years old), and there was no suitable spare transformer(s) to replace either should they fail
- L1 and L2 have both been in service since 1962 (63 years old) and are assessed by AusNet to be in poor condition (C4) and require remedial action within the next 5 years
- Ten of the 34 x 66kV current transformers at RCTS are assessed by AusNet to be in very poor condition (C5), with another seven to be in poor condition (C4). The two RCTS 66kV voltage transformers are also in poor condition (C4). Of the 18 22kV RCTS current transformers, one is in very poor condition (C5) and five are in poor condition (C4). Two of the eight 22kV RCTS voltage transformers are in poor condition (C4); our understanding is that AusNet proposes replacing all of these assets over the project duration, and
- There is no mention of the condition of the three 22kV CBs in the information we have been provided.

242. We asked AusNet for information to support the qualitative asset condition descriptions, however we were advised that an ACR for the in-scope assets was not available and to

[75] Total escalated costs including overheads sourced from the capex model.

[76] Project Planning Report – RCTS Transformer _ SG Repl INFLIGHT – 31 Oct 2025 –(30883566.1). Section 2.2.

refer instead to the relevant PPR.[77] However, the PPR does not provide quantitative analysis to support the C4/C5 classifications. We also referred to the Power Transformer and CB AMS documents, however it was difficult to isolate information pertaining to the condition of the RCTS transformers and switchgear.

243. We are unable to substantiate the basis for the qualitative analysis presented in the documents provided, and which are essentially just statements about the age of the assets. However, given that this is an in-flight project, we have assessed the project on the basis that the classifications are nevertheless reasonable and, based on them, that remedial action is likely to be required, with the scope and timing established through option analysis.

Options analysis supports the selection of Option 1 (integrated replacement)

244. The following options were assessed in the Project Assessment Conclusions report, published in September 2023, to identify the preferred solution:[78]

- BAU: No mitigating action beyond existing measures to address the identified risk
- Option 1: Integrated replacement of the four transformers and associated assets (preferred)
- Option 2: Defer integrated replacement by 5 years.

245. There is no information in the documents provided that refers to the justification for replacing the two 70 MVA 220/66/22kV transformers with two 150MVA 220/66kV transformers. However:

- 150MVA 220/66kV is now the standard 220/66kV size at AusNet, and
- Our understanding is that this work, together with the replacement of three CBs and 'several' instrument transformers, was accepted by the AER in its final decision for the current RCP and will be undertaken in the current RCP.

246. Option 2 includes refurbishment of transformers B1 and B2 at an estimated cost of $3 million to support the deferment of asset replacement by five years by '*addressing urgent condition related issues*.'[79]

247. The provided economic model[80] compares the BAU case, the two options, and a range of sensitivity studies.[81]

248. The economic benefits of the proposed replacement program derive primarily from the avoided supply risk (avoided involuntary load shedding following N-1, N-2, and N-3 transformer outages and 220kV switching[82]), and from the reduced probabilistic cost of emergency asset replacement.[83]

> *'The total supply risk cost is calculated by estimating the impacts of different combinations of relevant forced outages to reliability of supply and weighting them by their probabilities of occurrence.'*

249. Option 1 has the highest NPV under the base case and under all sensitivity studies. The NPV of $56.6 million ($2025)[84] for Option 1 is strongly positive as shown in Table 4.9. We

77 AusNet's response to information request, IR#001 – AusNet Responses on Major Station Projects – 20251203-CONF. Question 13

78 Project Planning Report – RCTS Transformer _ SG Repl INFLIGHT – 31 Oct 2025 –(30883566.1). Section 3.

79 Project Planning Report – RCTS Transformer _ SG Repl INFLIGHT – 31 Oct 2025 –(30883566.1). Section 3.2

80 Project Economic Model – MLTS Reactor Replacement – 31 Oct 2025 – CONF(30883675.1); which among other things assumes a capital cost for the preferred option of $19.0m (real 2027).

81 Base case, high case, low case, varying discount rate (7%, 10%, 3%), VCR (±25%), Asset Failure Rate (±25%), Demand Growth (±15%), and Capital Cost (±15%).

82 Driven by the failure probability of the 220/66/22kV transformer group 220kV neutral CTs which are classified as C5.

83 RIT-T PACR, Maintain Reliable Transmission Network Services at Moorabool Terminal Station. Page 10.

84 AusNet's response to information request, IR#001 – Attachment to Question 2 – 20251203, which corresponds with the economic model.

consider the results of the sensitivity of the economic timing of Option 1 in the sub-sections below.

Table 4.9: RCTS Transformer and switchgear replacement – modelling outputs ($m real 2025)[85]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$143.0	$0.0
1	Integrated Replacement (preferred)	$82.2	$86.4	$56.6
2	Deferred Replacement	$82.2	$100.9	$42.1

Source: 5.5.48 - AusNet Services - Project Economic Model - RCTS T _ Switchgear R INFLIGHT - 31 Oct 2025 - CONF

The economic timing does not move beyond the next RCP under a range of sensitivity studies

250. The economically optimum timing from AusNet's model is 2025, which is well before AusNet's planned project completion year of 2029.

251. AusNet's project economic model provides the results from varying five factors around the base case assumptions. Whilst the resulting economic timing would be deferred by up to five years with a negative combination of these factors (demand growth -15%, fault rate reduced by 25%, or discount rate increased to 10.5% from 7%), the economic timing remains well within the 2032 cutoff for the next RCP.

252. On this basis, we consider the planned completion of 2029 to be reasonable, noting that our understanding is that the delay is due to delivery constraints.[86]

We are unable to assess the reasonableness of AusNet's proposed scope and cost estimate for the additional work to be undertaken in the next RCP

253. The documents provided by AusNet did not provide adequate information about the revised scope for the project. The Project Cost Update Summary provided identifies the expenditure by regulatory year in the current RCP, however, provides no explanation of the works that have been or are forecast to be delivered in the current RCP to facilitate review the proposed change.[87] Thus, the actual scope of work to be undertaken in the next RCP is similarly not clear from the documents provided, nor is the justification for the additional scope identified in the project cost update summary, being:

- 2 x 220kV ROIs (each with double earth switch configuration), and
- Upgrades to station access roads and mitigation of physical constraints to support the safe delivery of new transformers and removal of decommissioned transformer units.

254. In response to our request for a relevant cost estimate and for substantiation of the scope, we were advised by AusNet that:[88]

> *'Costs realised from the market have exceeded original estimates, and is believed to now exceed the current approved value in the Business Case, triggering a Project Change Request (PCR); which is prepared for projects with changes in scope and cost. As part of standard AusNet process, a new Control Estimate is performed as part of the*

85 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

86 AusNet's response to information request, IR#001 – Attachment to Question 2 – 20251203 – PUBLIC.

87 Project Cost Update Summary – RCTS Transformer _ SG Repl INFLIGHT – 31 Oct 2025(30883565.1). Page 2.

88 AusNet's response to information request, IR#001 – AusNet Responses on Major Station projects – 20251201 – CONF – PARTIAL. Question 22.

PCR process to re-estimate total costs…AusNet will prepare a detailed cost estimate report as part of the PCR document; this is expected to occur in early 2026.'

255. As we were not provided with details of the cost increase, and in the absence of better information, we assume that the proposed cost and scope increase accounts for approximately $10.3 million, being the difference between the estimated total project cost of $77.4 million ($2027) in Table 4.8 and the approved business case value of $56.3 million ($2023) escalated to $2027. While noting that this figure includes AusNet overheads, we consider that this is a reasonable approximation for the purpose of our assessment.

Summary of findings

256. Undertaking a project to address the condition of transformer and switchgear assets at RCTS in the next RCP is prudent, noting that AusNet commenced the project in the current RCP.

257. However, we do not consider that AusNet has sufficiently justified the proposed cost and scope increase for this project, that remains the subject of its PCR process and has not been included with its submission.

258. We also found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

4.2.4 Sydenham Terminal Station (SYTS) 500kV GIS Replacement

Project overview

Project and scope details

259. SYTS serves as a 500 kV switching station located inside the Melbourne metropolitan area, part of the main 500 kV transmission network in Victoria.

260. According to the business case, AusNet proposes to replace the existing 500 kV GIS by March 2026. The condition of the GIS has been assessed as poor (C4) with a high failure risk. It is to be replaced with 500 kV air insulated switchgear (AIS), commencing in the current RCP.

261. AusNet's asset management strategy for the 500 kV GIS at SYTS is to replace rather than refurbish as this technology is no longer supported by the supplier, limited spares are available and previous refurbishment of the GIS did not deliver the desired results. AusNet considers that the GIS at SYTS has reached the end of its technical life and has included $34.1 million ($2027, direct costs only) in the next RCP to complete the replacement of the GIS.

262. AusNet has determined that there is an enduring need for the terminal station based on transmission network developments foreshadowed in AEMO's ISP.

Current RCP capex allowance and proposed expenditure in the next RCP

263. Table 4.10 compares the current RCP and whole of project costs, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. These figures show an increase in the latest estimate of the total project cost relative to AusNet's whole of project cost estimate at the time that it prepared its 2022-27 TRR, with a potential source of increases due to higher indirect costs. The sum of AusNet's reported actual capex for the current RCP and its forecast for the next RCP is lower than this updated total, and this may similarly be due to the treatment of indirect costs, however, is not explained.

Table 4.10: SYTS 500kV GIS Replacement – project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 actual capex	2022-27 TRR estimate	Latest project cost estimate	2027-32 forecast[89]	Actual capex + forecast
97.8	74.5	**98.8**	**123.5**	35.2	**109.7**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

Assessment of proposed expenditure

Asset condition assessment information supports the need to consider remedial action

264. The GIS, which is 41 years old, is in a poor condition despite a major refurbishment that was undertaken around six years ago. The GIS is no longer supported by the original equipment manufacturer ([redacted]) and AusNet has only a limited number of spares to repair asset failures. The mean time to restore supply following an asset failure is expected to be significant, especially in the event of multiple failures.

Selection of preferred option is reasonable

265. The preferred option is a new outdoor 500 kV AIS switchyard to replace the existing outdoor gas insulated switchyard at SYTS, by 2026. Of the options assessed, as shown in Table 4.11, we consider that this is a reasonable option.

Table 4.11: SYTS GIS replacement – modelling outputs ($m real 2025)[90]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$184.9	$0.0
1	Replace with AIS (preferred)	$117.2	$106.3	$78.6
2	Replace with GIS	$220.0	$170.3	$14.6
3	Replace with AIS in green filed location	$250.0	$180.7	$4.3

Source: 5.5.81 - AusNet Services - Project Economic Model - SYTS 500kV GIS R INFLIGHT - 31 Oct 2025 – CONF

266. A RIT-T was completed and no alternatives to the network options proposed were received during the consultation phase of the RIT-T.

The proposed SYTS replacement project forms part of a broader program impacting SYTS

267. [redacted]

89 Total escalated costs including overheads sourced from the capex model

90 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

91 AusNet Services - Project Board Paper - SYTS 500kV GIS R INFLIGHT - 31 Oct 2025 – CONF.

Project has been delayed from its original delivery timing

268. AusNet included the project in its initial RP for the current RCP. AusNet's RRP at the time indicated an increase in cost of this project,[92] and deferral of the project by one year to 2026.

269. [redacted]

270. In response to our information request, AusNet also states that works at SYTS had experienced delays due to other projects:[93]

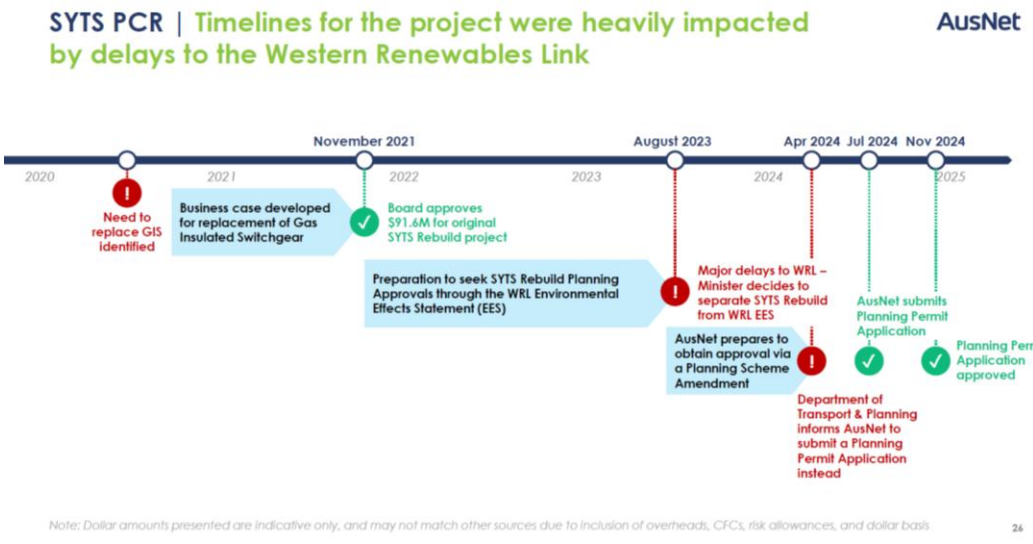
> *'Changes to align with the timing of major augmentation programs driven by AEMO and VicGrid have also impacted our program. This includes delays to works at Sydenham Terminal Station due to delays experienced by the Western Renewables Link project.'*

Further changes to project timing due to approval delays

271. AusNet provided a copy of a Board paper (not dated) that included approval for an additional $31.3 million (nominal) capex to a total project cost of $122.9 million (nominal) including finance charges, overheads and management reserve. The AusNet Board originally approved a $91.6 million (nominal) Business Case in November 2021, and this was subsequently included in the capex allowance in the decision for the current RCP.

272. Planning approval delays (including arising from the related WRL project) have postponed the start of physical works at SYTS, leading to increased budget requirements.

Figure 4.3: Summary of delays to SYTS project



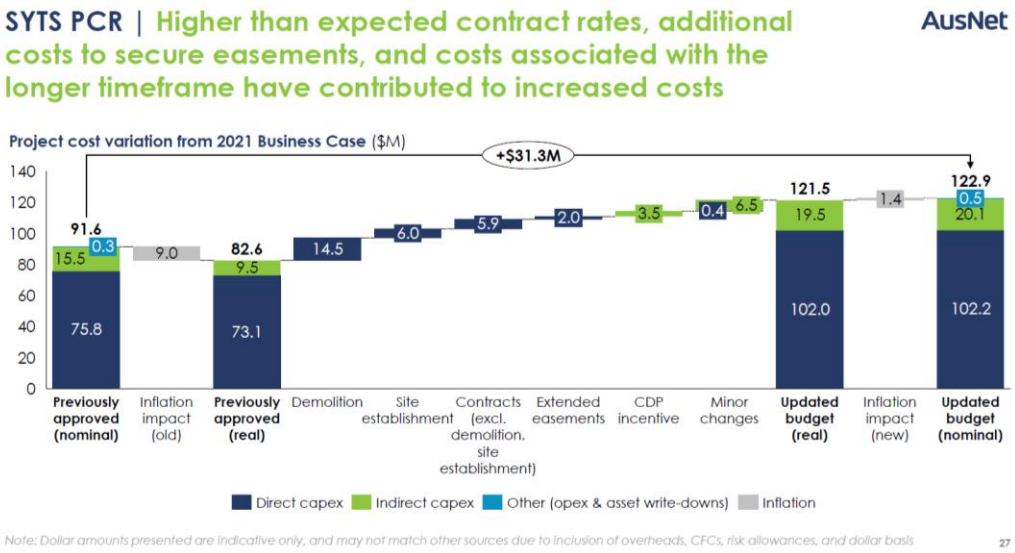
Source: AusNet onsite presentation to AER/EMCa

273. AusNet states that it has conducted market testing to validate delivery partner prices, with the changes requiring a 19-month delay (from September 2025 to April 2027) and $31.3 million (nominal) increase to the budget comprising a range of cost increases / revisions, and the scope has been expanded to include the procurement of extended easements at 1 Holden Road for the SYTS rebuild. We show the build-up of costs in Figure 4.4.

92 AusNet Services TRR 2023-27 RRP – 1 September 2021. Table 3-3.

93 AusNet response to information request, IR#001. Question 3.

Figure 4.4: Summary of SYTS project cost movement



Source: AusNet onsite presentation to AER/EMCa

274. The cost movements illustrated in Figure 4.4 are similar in magnitude to those indicated in Table 4.10.

275. We understand that the SYTS 500kV GIS Replacement Board paper provided approval of the PCR and therefore contains similar material. In addition to the AIS date extended to April 2027, the PCR included an extension to the project completion date, updated from 30 December 2025 to March 2028:[94]

> *'The extended Project Completion (i.e. close out) period is necessary to ensure a safe and methodical demolition, removal, and off-site disposal of existing GIS assets (filled with greenhouse gas SF6), associated drive mechanisms (filled with hydraulic oils), and other steel infrastructure, incl. full reinstatement of the existing switchyard. This approach mitigates potential risks to personnel and the environment.'*

276. In the capex model, the updated forecast expenditure extends to 2028-29 and follows a similar profile to that included in the PCR and Board paper. We therefore assume that the focus of the extended project completion described above is similarly reflected in the capex model.

Summary of findings

277. The need to undertake a project to address the condition of GIS assets at SYTS in the next RCP is prudent and the scope reasonable.

278. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

4.3 Our assessment of proposed projects (proposed to commence in the current RCP)

279. In this section we assess the proposed $271.3 million on the 6 projects[95] that AusNet has categorised as 'proposed' projects being those that obtained business case approval in

94 AusNet Services - Project Change Request - SYTS 500kV GIS R INFLIGHT - 31 Oct 2025 - CONF(30883714.1).

95 We have assessed the (i) 500kV GIS and transformer replacement and (ii) 300/220kV transformer replacement at SMTS together.

2025 or have not yet obtained business case approval and are proposed to commence in the last two years of the current RCP.

4.3.1 Keilor Terminal Station (KTS) 500/220kV Transformer Replacement

Project Overview

Scope, cost and timing

280. AusNet proposes replacement of the A2, A3, and A4 500/220kV transformers at KTS with 1000MVA 500/220kV transformers (and to undertake associated primary, secondary, and civil and structural works[96]) at a forecast cost of $226.2 million ($2027, direct costs only) in the next RCP.

281. The driver of the project is the deteriorated condition of the transformers. AusNet's economic modelling of the asset failure risk demonstrates that it is not economic to continue to provide transmission network services with the existing assets at KTS beyond 2029. AusNet propose completing the replacement of the four transformers by 2032 due to delivery constraints.

Current RCP capex allowance and proposed expenditure in the next RCP

282. AusNet included replacement of only transformer A4 in its current period RP and it was earmarked for completion within the current RCP. AusNet's RRP at that time indicated a reduction in cost of this project from $71.3 million (real 2021-22) to $70.4 million (real 2021-22),[97] and deferral of the project by two years.

283. Table 4.12 compares the costs in the current RCP and whole of project costs, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. These figures reflect the wider scope of work than was included for the current RCP, and the proposed increase in the latest estimate of the total project cost relative to AusNet's whole of project cost estimate at the time that it prepared its 2022-27 TRR. As reported in Table 2.2, the wider scope refers to revision from replacement of one to three 500/220kV transformers, one 220/66kV transformer, one 220kV CB and 220kV bus uprate.

284. The sum of AusNet's reported actual capex for the current RCP and its forecast for the next RCP is lower than this total, and this difference is not explained by AusNet.

Table 4.12: KTS transformer replacement– project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 Actual Capex	2022-27 TRR estimate	Latest Project Cost estimate	2027-32 forecast[98]	Actual capex + forecast
86.4	41.6	**86.4**	**289.9**	234.1	**275.7**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

96 Including a new 500kV Bay No. 5, 500kV bus extension, upgrade No 1, 2, 3 200kV Bus, lines relocations, new protection and SCADA equipment, earthworks, road works, new and upgraded footings and structures in the 500kV and 220kV years, fault level mitigation works, drainage and environmental (oil holding) modifications, fire system upgrade (refer to Project Detailed Cost Summary – KTS A Transformer Replacement – 31 Oct 2025 – (30883661.1)

97 AusNet Services TRR 2023-27 RRP – 1 September 2021. Table 3-3.

98 Total escalated costs including overheads sourced from the capex model.

Assessment of proposed expenditure

Asset condition assessment supports the need to consider remedial actions on four transformers, not just transformer A4

285. KTS was established in 1970 in the northwest of Greater Melbourne and has three 750 MVA 500/220 kV transformers and five 150 MVA 220/66 kV transformers. Based on AEMO's ISP, the VAPR, and the Transmission Connection Planning Report (TCPR), AusNet Services reasonably expects that the services from KTS will be required for the foreseeable future.[99]

286. AusNet originally identified that one KTS transformer (A4) was in poor condition and it would be prudent to replace it in the current RCP. However, it subsequently concluded from its updated condition assessment program that the condition of the three 500/220 kV transformers (A2, A3 and A4) and one of the 220/66 kV transformers (B4) are in poor (C4)[100] to very poor condition (C5)[101] with increased risk of failure.[102]

287. We are satisfied from the ACR that:

- The condition classifications of the four transformers are reasonably assessed by AusNet
- Refurbishment of the transformers is not a viable option as the core and windings of the transformers have been assessed to be in a poor to very poor condition and the required specialist refurbishment facilities are not available in Australia,[103] and
- Associated secondary systems are at or near end of life.

288. We are therefore satisfied that it is prudent for AusNet to consider options to replace the nominated transformers.

AusNet's options analysis is sufficient to support selection of the proposed Option 2

289. AusNet has considered three options in addition to the BAU approach:[104]

- Option 1: Like-for-like replacement of the A2, A3 and A4 500/220kV transformers
- Option 2: Replacement of the A2, A3 and A4 transformers with standard metro 1000 MVA 500/220kV transformers (preferred)
- Option 3: Deferred replacement with standard metro 1000MVA 500/220kV transformers.

290. Replacement of transformer B4 is not mentioned in AusNet's option descriptions, but it is a common feature of the expanded description of each option in the PPR and was assessed as being in condition C5.

291. AusNet has considered a reasonable range of options. The major source of benefit in AusNet's economic modelling in support of the option selection process is avoided involuntary load shedding (N-1 and N-2 'Supply risk' in the model). The secondary benefit is the avoided probabilistic cost of reactive asset replacement. Tertiary benefits include avoided safety risks, environment risks, and collateral damage risks to adjacent plant.

99 Project Planning Report – KTS A Transformer Replacement – 31 Oct 2025 – PUBLIC(30883547.1). Page 5.

100 Transformer A3.

101 Transformer A2, A4, and B4.

102 Project Asset Condition Report – KTS A Transformer Replacement – 31 Oct 2025 (30883662.1).

103 Project Business Case – KTS A Transformer Replacement – 31 Oct 2025 –(30883661.1). Page 4.

104 Project Planning Report – KTS A Transformer Replacement – 31 Oct 2025 – PUBLIC(30883547.1). Page 2.

Table 4.13: KTS transformer replacement – modelling outputs ($m real 2025) [105]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$1,072.8	$0.0
1	Replace with 750 MVA transformers	$277.8	$228.7	$844.0
2	Replace with 1000 MVA transformers (preferred)	$275.0	$226.7	$846.1
3	Deferred replacement with 1000 MVA transformers	$274.8	$320.3	$752.4

Source: 5.5.16 - AusNet Services - Project Economic Model - KTS A Transformer Replacement - 31 Oct 2025 - CONF

292. AusNet selected Option 2, which assumes a capital cost approximately $3 million lower than Option 1 because AusNet has allowed for the purchase of a spare phase transformer for Option 1. This is essentially the difference in NPV between the two options, with the Option 2 NPV determined to be $846.1 million ($2025).[106] Option 3 (deferral) has a significantly lower NPV for the base case assumptions. We also note the advice from AusNet that supports selection of Option 2:[107]

> *'…joint planning with AEMO and VicGrid secured support from the planners for the asset replacement project at KTS, which will be undertaken with larger, standard-size metro 500/220 kV transformers rated at 1000 MVA, due to both asset risk and demand growth considerations. In particular, the preferred solution for the KTS 500/220kV transformer replacement project is incorporated in the Victorian Transmission Plan, following consultation with VicGrid to confirm AusNet will undertake this project as part of the 2027-32 major stations program.'*

293. Nonetheless, we considered the impact of reducing the study period to 20 years after noting that the majority of the modelled benefits accrue after 2036. The NPV for Option 2 is still strongly positive and again slightly higher than Option 1 and significantly higher than Option 3. This confirms that Option 2 is the superior option of those considered by AusNet.

The economic timing is very sensitive to the demand forecast

294. AusNet's economic model results in economic timing of 2030, noting that AusNet plans to complete the work in FY32 due to delivery constraints.

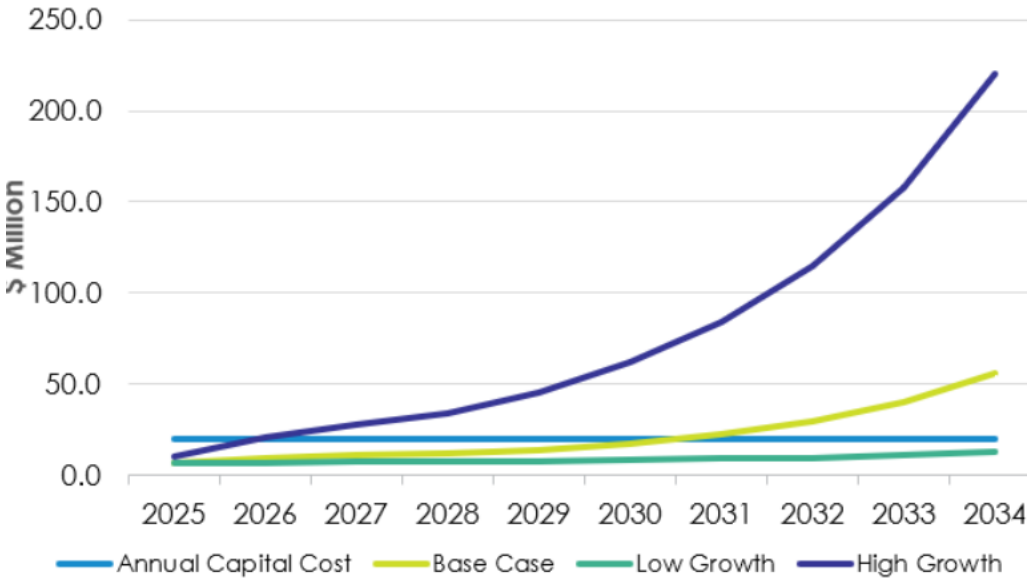
295. Our review of AusNet's sensitivity analysis indicated that the project was sensitive to changes in the demand forecast as shown in Figure 4.5. Based on its original modelling, a 15% lower demand forecast than it had assumed in its base case forecast, resulted in deferral of the economic timing well beyond the end of the next RCP. An alternative Low Growth scenario of -10% of the base case results in the economic timing of 2034, whereas a -5% Low Growth assumption defers the economic timing to 2032 (i.e. within the next RCP).

105 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

106 Project Economic Model – KTS A transformer Replacement – 31 Oct 2025 – CONF(30883664.1).

107 AusNet's response to information request, IR#001 – AusNet Responses on Major Projects – 20251201 – CONF – PARTIAL. Page 4.

Figure 4.5: Sensitivity analysis for KTS transformer replacement – demand forecast[108]



Source: Project Economic Model – KTS A Transformer Replacement – 31 Oct 2025 – CONF(30883663.1)

296. In response to an information request,[109] AusNet states that it identified an error in its PoF derivation (refer to Section 3.4), and after correction the economic timing for this project is updated to 2032 for its Base Case. We consider that applying similar sensitivity analysis for demand may similarly defer the project beyond the end of the next RCP.

AusNet proposes a RIT-T re-opening trigger given the sensitivity of the project to the demand forecast

297. AusNet states that:[110]

> *'Since the cost of Option 1 is estimated to be slightly higher than Option 2 and the benefits of Option 2 is [sic] higher than Option 1 there need [sic] to be a reversal of these factors, or a significant change in one of the assumptions for the preferred option to change from what has been concluded in the RIT-T.'*

298. AusNet further states that it will take into account the 2025 AEMO and 2025 Distribution Business demand forecasts when they are available to assess whether the preferred option remains the same. It proposes that no growth or negative growth would be a Material Change in Circumstance and be a re-opening trigger for the RIT-T.

299. AusNet plans to execute contracts for the replacement transformers by the end of 2025 which will incur considerable sunk costs.

300. We expect that AusNet's RRP will address this matter, although the capital cost difference between Options 1 and 2 is small, so the more important issue is any revision to the economic timing with a significant change in assumptions (most likely the demand forecast).

Summary of findings

301. Given the condition of the transformer assets at KTS, it is prudent for AusNet to consider remedial action.

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108 This is before the modified derivation of the PoF which leads to the base case economic timing in 2032, as discussed in Section 3.4.

109 AusNet's response to information request, IR#007 – AusNet Responses on EMCa follow up – 20251215. Table 1.

110 Project Planning Report – KT A transformer Replacement – 31 Oct 2025 – PUBLIC(30883547.1). Page 12.

302. We are satisfied that replacement of the transformers is likely to be the best approach (i.e. rather than refurbishment) and that replacing the 750MVA 500/220kV transformers with 'standard' 1000MVA transformers is justified given the support from AEMO and VicGrid.

303. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

304. The economic timing is very sensitive to the demand growth forecast, and we consider it prudent for AusNet to revisit the implications of the 2025 demand forecast, as it proposes to do, as soon as practicable to assess the impact on the scope and timing of the work, noting the possibility that this could result in a case for prudent deferral beyond the next RCP.

4.3.2 South Morang Terminal Station (SMTS) 500kV GIS and F2 Transformer Replacement, and 330/220kV Transformer Replacement

Project overview

Project and scope details

305. SMTS is an important terminal station in the transmission network backbone of Victoria.

306. AusNet has provided two separate business cases as follows:

- Replacement of existing 500 kV GIS, one 1000MVA 500/330kV transformer (F2) and one 330kV CB with associated protection and control systems, to be commenced in the current RCP and completed in the next RCP. The GIS is proposed to be replaced with 500kV AIS and transformer with a similar rated unit.[111] AusNet has included $264.3 million ($2027, direct costs only) in the next RCP.
- Replacement of two 700 MVA 330/220 kV transformers (H1 and H2 transformers) with their associated protection and control systems. To be replaced with an in-service and a hot spare transformer bank.[112] AusNet has included $102.1 million ($2027 direct costs only) in the next RCP.

307. AusNet states that the projects are not expected to have an impact on one another and have been considered when the scope and cost for each project was prepared.

Current RCP capex allowance and proposed expenditure in the next RCP

308. Table 4.14 and Table 4.15 compare the current RCP and whole of project costs for the replacement projects planned at SMTS, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. We observe material increases in the expected project costs for each project relative to AusNet's whole of project cost estimates at the time that it prepared its 2022-27 TRR. According to information provided in Table 2.2, the wider scope refers to revision a staged approach to replacement of the entire 500kV switchyard and of the F2 500/3330kV transformer and control building for the GIS replacement project; and an additional 330/220kV 700MVA transformer back and secondary systems, with the original cold spare unit descoped for the transformer replacement project.

309. The sum of AusNet's reported actual capex for the current RCP and its forecast for the next RCP is lower than this total for each project, and this difference is not explained by AusNet.

111 AusNet Services - Project Business Case - SMTS 500kV GIS and F2 T R - 31 Oct 2025 – CONF.

112 AusNet Services - Project Business Case - SMTS H T Replacement - 31 Oct 2025 – CONF.

Table 4.14: SMTS 500kV GIS Replacement – project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 actual Capex	2022-27 TRR estimate	Latest project cost estimate	2027-32 forecast[113]	Actual capex + forecast
21.7	24.9	**21.7**	**315.8**	274.3	**299.1**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

Table 4.15: SMTS 330/220kV Transformer Replacement Stage 2– project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 actual capex	2022-27 TRR estimate	Latest project cost estimate	2027-32 forecast[114]	Actual capex + forecast
52.9	43.2	**52.9**	**154.6**	105.4	**148.6**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

Assessment of proposed expenditure

Projects are proposed and considered separately

310. Whilst our assessment considers both the 500kV switchgear and F2 transformer replacement, and the 330/220kV transformer projects at SMTS, we recognise that these projects are proposed as separate projects by AusNet, within separate parts of the terminal station. We consider this appropriate for the scope of projects.

Asset condition assessment supports intervention

311. AusNet has included condition assessment reports for both projects.

312. For the 500kV GIS and F2 transformer replacement project:

- The 500kV GIS, F2 transformer and the F2 transformer No.2 330kV bus CB have been assessed to be in poor condition (C4) and present a risk of asset failure. AusNet states that the GIS has become technically obsolete, limited spares available to respond to failures and results in significant SF6 gas leakage and assessed to be in very poor condition (C5). The GIS was installed in 1981 and the transformer 1982. AusNet consider that SMTS is also amongst the poorest performing GIS stations, with 92% of CBs in poor health (C4).
- AusNet has considered refurbishment of the GIS system, however the design of the system and time required to complete a full refurbishment versus the possible life extension are considered to offset any benefit.
- The F2 transformer bank is considered to be in an advanced deteriorated condition, very poor health (C5) with the dominant risk associated with winding failures and on-load tap changer (OLTC).

313. For the 330/220kV transformer replacement project:

- The two transformers and secondary systems have been assessed to be in poor condition (C5) and present a risk of asset failure. The H1 and H2 transformers have been in service since 1967/1968 and will be more than 60 years old by the time they are

[113] Total escalated costs including overheads sourced from the capex model.

[114] Total escalated costs including overheads sourced from the capex model.

replaced, and a risk analysis shows that it is no longer economical to continue to provide transmission network services.

- The identified condition issues include loose windings and core laminations, high moisture content in insulation, deteriorated oil and outdated and unsupported components.
- In 2018, a H3 transformer was installed as the first stage of the replacement of the SMTS 330/220 kV transformers. This reduced the reliance on the original H1 and H2 transformers, allowing H2 to serve as a hot spare providing a resilience benefit. Recent condition assessments show the H1 & H2 transformers are now in poor condition (C4), having been in service for more than 58 years.

314. We consider that the condition information provided by AusNet, when considered alongside the proposed replacement options supports consideration of asset replacement in the next RCP.

Projects were commenced in the current RCP

315. AusNet included both replacement projects at SMTS in its initial RP for the current RCP. In its RP and RRP for the current RCP, AusNet indicated a deferral of the 330/220kV transformer project and 500kV GIS replacement projects by two years (relative to economic timing) due to smoothing aimed at minimising deliverability risk.[115] Based on information provided by AusNet, we infer the initial delivery timing to be by 2026-27.

316. Our reading of the initial RP for the current RCP indicated the following scope:

- The 500kV GIS replacement project includes replacement of only part of the 500 kV GIS assets.
- The replacement of the 330/220kV transformer project is stage 2, with stage 1 comprising a new H3 transformer and retaining the H2 transformer as a hot spare. The stage 2 project includes replacement of two transformers and associated switchgear, and retirement of the old H1 and H2 transformers.

317. We also note that:

- AusNet has already delayed the planned replacement of the F2 transformer (beyond the current RCP) due to decreased consequences of failure arising from the 2nd transformer installed at SMTS as a part of the VNI-Minor project.
- VicGrid and AEMO have requested that AusNet advance the replacement of the 330/220kV transformer replacement given its importance to the broader transmission network and security of Victoria's electricity supply.[116] We understand this is also related to the need for additional capacity at SMTS following the planned retirement at Yallourn.[117]

318. For the next RCP, AusNet has proposed delivery timing of 2028-29 for the 330/220kV transformer project and 2031-32 for the 500kV GIS and F2 transformer replacement project.

319. The large increase in total project cost relative to the initial RP indicated in Table 4.14 and Table 4.15 is the result of large scope increases (as indicate in Table 2.2), including:

- An additional 700MVA 300/220kV transformer and secondary systems, and
- A change from a staged approach to the replacement of the entire 500kV switchyard and F2 transformer.

Selection of preferred option is reasonable

320. The preferred option as shown in Table 4.16 and Table 4.17 for each of the replacement projects planned for SMTS is reasonable, based on assessment of the highest benefit.

115 AusNet Services TRR 2023-27 RRP – 1 September 2021. Page 60.

116 AusNet Services - Project Board Paper - SMTS H T Replacement - 31 Oct 2025 – CONFIDENTIAL. Page 1.

117 AusNet Services - Project Board Paper - SMTS H T Replacement - 31 Oct 2025 – CONFIDENTIAL. Page 2.

Table 4.16: SMTS 500kV GIS and transformer replacement – modelling outputs ($m real 2025)[118]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$1,971.1	$0.0
1	Integrated replacement of the 500kV GIS and F2 transformer (preferred)	$299.1	$252.1	$1,719.0
2	Integrated replacement of the 500kV GIS and F2 transformer deferred by four years	$299.1	$424.5	$1,546.7

Source: 5.5.66 - AusNet Services - Project Economic Model - SMTS 500kV GIS and F2 T R - 31 Oct 2025 - CONF

Table 4.17: SMTS 330/220kV transformer replacement – modelling outputs ($m real 2025)[119]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$534.8	$0.0
1	Replace with hot spare transformer (preferred)	$146.6	$145.1	$389.7
2	Replace with cold spare phase	$106.9	$165.8	$369.0
3	Deferred replacement	$106.9	$183.8	$350.9

Source: 5.5.74 - AusNet Services - Project Economic Model - SMTS H T Replacement - 31 Oct 2025 - CONF

New information drove an increase in scope and cost for the GIS replacement

321. We reviewed the documentation provided by AusNet regarding the 500kV GIS replacement project, which indicated to us that the project scope and cost had increased significantly over the project life. For example, the RP for the current RCP had a relatively small expenditure allowance for part GIS replacement. Based on our discussions onsite, we understand this was based on an initial plan for staged replacement of the GIS based on advice of AusNet's technical consultant, and with expenditure across multiple RCPs.

322. AusNet has since determined that a staged replacement of the GIS is not technically feasible, and that a full replacement with AIS was required which increased the cost and timing of the project. We show the configuration of the yard in Figure 4.6.

[118] In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

[119] In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

Figure 4.6: Location and condition of SMTS 500kV GIS

Source: AusNet onsite presentation

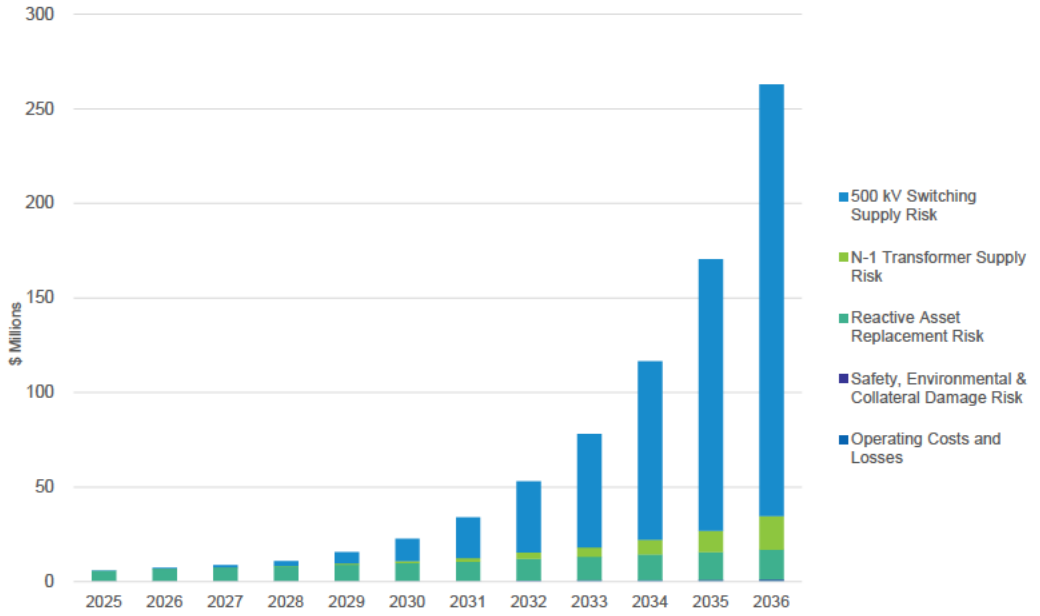
323. We also observe that the initial cost included in the PSCR (June 2024) was $180 million for GIS replacement only, with an updated cost of $300 million included in the PADR (September 2025), which included the F2 transformer. AusNet did not nominate a dollar basis for these estimates; however they appear to be indicative 'rounded' estimates. We understand the increase resulted from additional planning that identified the location for the new AIS solution, including replacement and relocation of the F2 transformer and associated switchgear.

324. Whilst the planning process described to us was reasonable, the evolution of this project and change of input assumptions, which together have resulted in the proposed projects being significantly larger than AusNet originally envisaged, was not clearly evident in the information that we were provided.

Supply risk of the GIS switchgear is the primary driver of the economic timing for its replacement

325. On review of the economic model, the benefits (and therefore economic timing) for replacement of the 500kV GIS switchgear and F2 transformer is driven by 500kV switchgear supply risk as shown in Figure 4.7

Figure 4.7: Benefit stack for SMTS 500kV GIS switchgear and F2 transformer replacement



Source: EMCa derived from 5.5.66 – AusNet Services – Project Economic Model – SMTS 500kV GIS and F2 T R – 31 Oct 2025 - CONFIDENTIAL

326. From our discussion during the onsite meeting, we understand that the 500kV switchgear supply risk is the result of a combination of: (i) high PoF; (ii) increase in demand; and (iii) limited segregation capability of gas zones associated with the older technology GIS, which collectively increase energy at-risk. We were satisfied with AusNet's explanation of the supply risk.

327. We also queried whether AusNet had considered staged replacement of the transformer and switchgear. AusNet states that the F2 transformer, in addition to being considered in a poor condition and previously identified for replacement, is located in an area that would be difficult to access once the 500kV is augmented:[120]

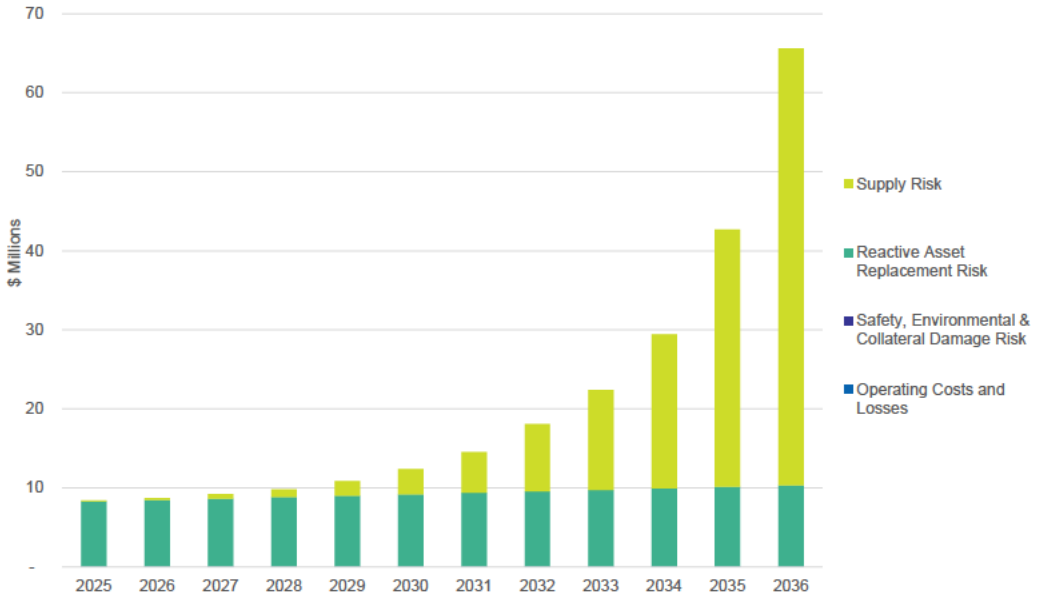
> *'Enabling works would be required to make way for AIS that will be eventually installed to the West of the existing GIS. An all-new protection/comms building will be constructed and pre-commissioned, ready for the new switchgear. The F2 transformer also needs to be replaced early in a new location to the West, since there would not be space to remove the old F2 once AIS bays to the West are constructed.'*

Reactive replacement cost is the primary driver of the economic timing for replacement of the 330/22kV transformer

328. The project is driven by a combination of reactive replacement cost and increasing supply risk-cost, based on an elevated PoF as shown in Figure 4.8.

120 SMTS GIS and F2 replacement asset condition report.

Figure 4.8: Benefit stack for SMTS 330/220kV transformer replacement



Source: Source: EMCa derived from 5.5.74 – AusNet Services – Project Economic Model – SMTS H T Replacement – 31 Oct 2025 - CONFIDENTIAL

329. In the early years of the assessment period, the largest component of risk-cost is the reactive replacement risk-cost, with an increasing supply risk. The reactive replacement cost is the primary driver of the economic timing. In the case of the supply risk, the N-1 transformer risk dominates due to the assumptions of increasing demand forecast in the later years.

330. The reactive replacement cost uses a value of asset replacement for a single phase transformer bank (H Transformer - Single Phase) of $50 million ($2025). This is materially higher than the value used in the cost estimate of $30.6 million ($2025) for replacement of the transformer.[121] However, once adjusted to include related design, construction and disposal costs, it is likely to be similar in magnitude. A reduction to the assumed replacement cost would result in a decrease to the benefits, and slight deferral of the economic timing, however we expect the project would remain economic to undertake in the next RCP.

AusNet has made changes to its modelling which update the economic timing, but retained the delivery timing

331. As shown in Table 4.18, AusNet has provided updated economic timing for the replacement projects at SMTS. AusNet has retained the original project timing, being later than the economic timing.

Table 4.18: Updated economic timing

Project	Initial Economic Timing	Updated Economic Timing (IR001)	Updated Economic Timing (IR007)	Project Delivery Timing
SMTS 500kV GIS and F2 Transformer Replacement	2032	2030	2030	2032-33
SMTS 330/220kV Transformer Replacement	2028/29	2028/29	2030	2028-29

Source: AusNet response to information requests IR001 table 2 and IR007

[121] Supply and install one new 700 MVA Transformer bank (three 233.3MVA single phase units) in place of H2.

Summary of findings

332. The need to undertake a project to address the condition of the 500kV GIS and F2 transformer, and 330kV transformer assets at SMTS in the next RCP is prudent and the scope reasonable.

333. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

4.3.3 Rowville Terminal Station (ROTS) 500 kV GIL Replacement

Project overview

Project and scope details

334. AusNet has two 300m long gas insulated transmission lines (GIL) at ROTS – Rowville to Thomastown 220 kV and Rowville to South Morang 500 kV. The Rowville to Thomastown GIL is insulated for 500 kV operation but is only used at 220 kV presently. Rowville to South Morang 500 kV is insulated for, and operated at, 500 kV.

335. The main function of the 300m long GILs are to comply with AEMO planning requirements to mitigate against security risk associated with overhead line crossings within the terminal station.

336. The preferred replacement option is to replace the GIL circuit to TTS with a 220 kV underground cable, and the ROTS-SMTS GIL circuit with an above ground 500 kV cable. AusNet has included $60.9 million in the next RCP.

Current RCP capex allowance and proposed expenditure in the next RCP

337. We were not able to find reference to the ROTS GIL replacement in the initial RP for the current RCP and infer that AusNet had not previously identified this project for commencement in the current RCP. However, we note that the expenditure that AusNet has proposed for the current RCP is less than $1 million.

Assessment of proposed expenditure

Asset condition supports consideration of replacement of these assets

338. Both GILs are 40 years old, based on an obsolete technology, with limited support, no spare parts, and in poor condition. The GILs have experienced an increase in mechanical issues, SF6 gas leaks and failures.

339. Since 2023, AusNet has undertaken work to install welded jackets around the vessels to assist with gas containment and lubricate seals. AusNet estimates that at the current completion rate, due to limitations of network outages, it could take up to five years to complete all repairs.

340. Based on our review of the information provided by AusNet and discussions during our onsite meeting, we consider that AusNet has reasonably exhausted available life extension options. This has included detailed review by a structural expert that indicates that the structural integrity of the GIL had been significantly impaired, and that the current program of repairs would provide limited further life extension.

Selection of preferred option is reasonable

341. Due to the design of the switchyard, the options to replace the existing GIL are limited. AusNet has assessed a range of options, as shown in Table 4.19, with its preferred option to replace the GIL with cable. Specifically to:

- replace the Rowville to Thomastown GIL with 220 kV underground cable, and
- replace the Rowville to South Morang GIL with above ground 500 kV cable.

342. We consider that the cable options and operating voltages nominated by AusNet are reasonable. We understand that these options are supported by AEMO.

Table 4.19: ROTS 500kV GIL replacement – modelling outputs ($m real 2025)[122]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$327.8	$0.0
1	Like-for-like GIL Replacement	$83.8	$74.5	$253.3
2	Replace with cable (preferred)	$62.2	$59.0	$268.7
3	Deferred GIL Replacement	$62.2	$78.4	$249.4
4	Replace with two 500 kV cables	$90.0	$78.8	$248.9

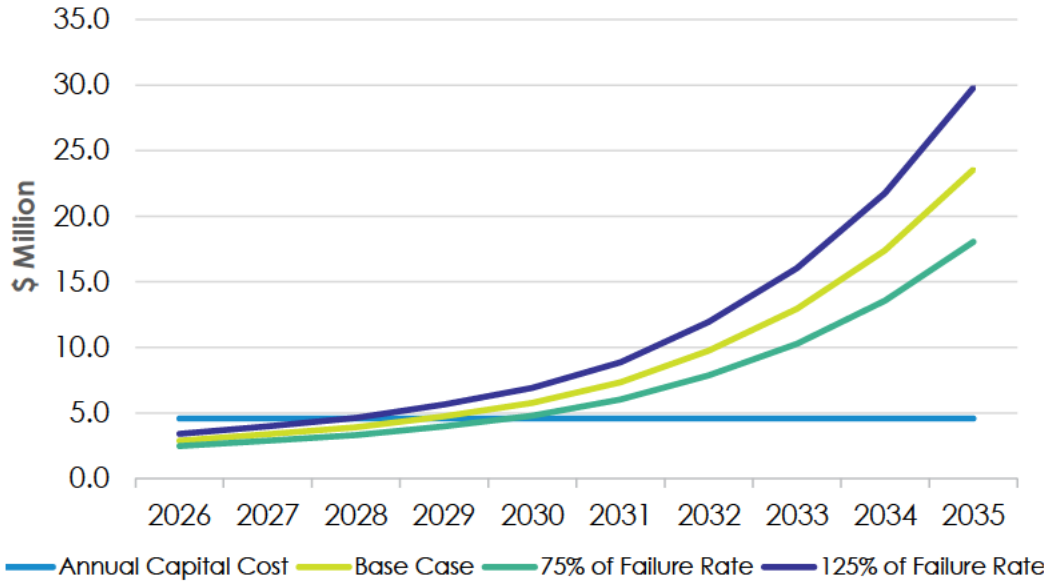
Source: 5.5.52 - AusNet Services - Project Economic Model - ROTS GIL R- 31 Oct 2025 - CONF

Proposed project timing based on AusNet's assumptions for risk is reasonable

343. The primary driver of risk-cost is the reactive replacement of these assets given the condition of the existing GIL. We therefore considered how sensitive the economic analysis was to changes in the PoF that AusNet has assumed.

344. Further to AusNet's sensitivity analysis which is shown in Figure 4.9, we changed the value to 25% for the low case (representing a 75% reduction in the assumed PoF) and the project remained economic to proceed within the next RCP.

Figure 4.9: Sensitivity analysis of ROTS GIL replacement - failure rate



Source: 5.5.52 – AusNet Services – Project Economic Model – ROTS GIL R – 31 Oct 25 - CONFIDENTIAL

345. The sensitivity analysis undertaken by AusNet indicates that the project is economic to be included in the next RCP under all scenarios, with project delivery nominated as 2030-31, being later than the economic timing of 2028-29, and not overly sensitive to changes in the PoF assumption.

122 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

Whilst we could not verify the basis for the assumed PoF from AusNet's information, we consider that the assumptions are reasonable

346. Due to limited history of these installations, AusNet states that it has developed a failure model which is used to estimate that there will be a 50% probability of significant failure by mid-2029, and which it considers supports intervention.

347. During our onsite meeting with AusNet, we asked for an explanation of how the PoF was derived for ROTS GIL, as applied in its economic analysis to determine the economic timing. AusNet stated that it projected forward the historical SF6 leaks as a proxy for equipment failure and derived a relationship to determine a failure rate. In absence of better information and given the relationship between loss of SF6 and equipment failure (potentially catastrophic) we consider this was a reasonable method of approximation.

348. We asked AusNet to provide the models/ spreadsheets (or other information) that demonstrate how the PoF values were calculated that are relied upon in the economic models of the proposed major stations repex. In its response, we were provided an Excel model and explanatory notes. However, the values did not align with those included in the economic model.[123]

349. We observed reference to the following assumptions:

- Use of RTF-SMTS[124] 500kV likelihood of consequence for both circuits (as a simplifying worst case), corresponding with the performance of the 500kV GIL
- [redacted] chance of failure in three years based on a consultant report, which aligns with 2029 at which point the GIL will be 43 years old
- Assumption of a Beta value of 4.0 (based on the top-end of the range assumed for mechanical fatigue) and an Eta value of 36.

350. Whilst these values are typical of assets experiencing advanced deterioration, and on their own are reasonable assumptions, we were not able to reproduce the PoF data series that AusNet had applied in its model. Nonetheless, given the condition of the GIL assets, and reasonableness of the assumptions that AusNet has applied, we consider that the PoF series is likely to be a reasonable approximation. We consider that this view is supported by the sensitivity analysis that AusNet has undertaken, and which shows that the project is not sensitive to changes in failure rate.

Summary of findings

351. The need to undertake a project to address the condition of GIS assets at ROTS in the next RCP is prudent and the scope reasonable.

352. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

4.3.4 Thomastown Terminal Station (TTS) CB Replacement

Project Overview

Project and scope details

353. TTS is in central Victoria and is an important switching station, forming part of the 220KV transmission network in Victoria's metropolitan region.

123 AusNet's response to information request, Response to IR#007.

124 We assume that AusNet's reference to RTF relates to Rowville Transmission Facility, and for the purpose of our assessment we have assumed that this is the ROTS-SMTS 500kV line

354. AusNet proposes replacing twelve CBs, twenty-three disconnectors, six current transformers, and six voltage transformers at TTS because their deteriorated condition presents a significant supply risk and other operational risks.[125]

355. AusNet has included $30.8 million ($2027, direct costs only) in the next RCP and plans to complete the scope of work in 2028, which aligns with AusNet's identified project economic timing.

Current RCP capex allowance and proposed expenditure in the next RCP

356. The TTS 66kV CB Replacement project proposed cost was reduced from $13.9 million to $11.4 million ($real 2021-22) in AusNet's RRP for the current RCP,[126] which was accepted by the AER. The project completion was deferred until 2028-29 following review of the economic timing, in response to an increase in project cost.[127]

357. Table 4.20 compares the current RCP and whole of project costs, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. From the information provided, it is not clear what the $9.4 million expected to be incurred in the current RCP has been directed to, however we expect that replacement work would be prioritised to address the assets that present the highest risk.

358. We observe in Table 4.20 the estimated increase in costs relative to AusNet's whole of project cost estimate at the time that it prepared its 2022-27 TRR, which AusNet attributes as being due to labour and material cost escalation,[128] and which reasonably aligns with the sum of AusNet's actual capex for the current RCP and its forecast for the next RCP.

Table 4.20: TTS CB replacement project – project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 actual capex	2022-27 TRR estimate	Latest project cost estimate	2027-32 forecast[129]	Actual capex + forecast
14.0	9.4	**23.5**	**43.7**	31.8	**41.2**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

Assessment of proposed expenditure

The condition of the identified assets requires remedial action

359. AusNet expects that transmission services from TTS will continue to be required:[130]

> *'…given the transmission network developments that are foreshadowed in AEMO's Integrated System Plan (ISP, Victorian Annual Planning Report (VAPR) and VicGrid's Victorian Transmission Plan (VTP).'*

360. We are satisfied that TTS is required for the foreseeable future and it is therefore prudent for AusNet to consider the PoF and the impact on supply and other operational risks of the TTS assets. AusNet has identified 220kV and 66kV switchgear as being in poor condition and transformer B4 is also classified as being in poor condition. The treatment of B4 is considered in Section 4.4.6, primarily because of the different economic timing. AusNet

125 The list in the PPR (Table 1) and PCR (Table 1) differ in total count 42 vs 47 - assets in poor condition at TTS.

126 AusNet Services TRR 2023-27 RRP – 1 September 2021. Table 3-3.

127 AusNet Services TRR 2023-27 RRP – 1 September 2021. Page 166.

128 AusNet's response to information request, IR#001 – Attachment to Question 3 – 20251203 – PUBLIC.

129 Total escalated costs including overheads sourced from the capex model.

130 Project Planning Report – TTS CB Replacement – 31 Oct 2025 – PUBLIC(30883593.1). Page 7.

advises that *'[t]his split is consistent with the Victorian Annual Planning Report 10 year renewal plan.'*[131]

361. AusNet has provided an ACR which explains the condition of the 46 assets earmarked for replacement. The asset condition is rated as poor and '*at or near end of life*' due to one or more of condition, technical obsolescence, and operational constraints (due to fault rating and safety risk). Whilst some of the switchgear types have what we would consider to be average ages lower than typical end-of-life for well-maintained units, we accept that a combination of factors has led to them being in this condition, including inherent design flaws.

362. In summary, we consider it is appropriate for AusNet to consider remedial action.

AusNet identified two options in addition to BAU

363. From AusNet's condition and operational assessment of the relevant switchgear, we are satisfied that repair and refurbishment will become increasingly difficult, with continuing reliance on cannibalised parts from decommissioned units and which requires a progressive replacement program to extend the operating life of remaining units in service.

364. AusNet reasonably considers two replacement options with the BAU case[132] as the counterfactual to maintain reliable transmission network services at TTS and to mitigate other operational risks from asset failures:

- Option 1: Replace CB and switchgear by 2028 (preferred), and
- Option 2: Defer replacement by five years (until 2033).

365. The avoided risk-costs delivered by the replacement options are primarily from avoided probabilistic reactive replacement cost and supply interruption (involuntary load shedding), with avoided safety, environmental, and collateral damage as second-level benefits.

366. AusNet calculates the NPV for its preferred Option 1 of $4.7 million ($2025) as shown in Table 4.21, indicating to us that there is a marginal economic benefit of proceeding with this project.

Table 4.21: TTS CB replacement – modelling outputs ($m real 2025)[133]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$40.2	$0.0
1	Replace CBs and switchgear (preferred)	$41.4	$35.4	$4.7
2	Deferred replacement	$48.6	$37.3	$2.9

Source: 5.5.93 - AusNet Services - Project Economic Model - TTS Circuit Breaker Replacement - 31 Oct 2025 - CON

367. We therefore looked at the risk that the project was seeking to address, and how that risk was determined. AusNet rates the 66kV CBs' condition as 5, the highest rating. The aggregate 66kV CB failure rate modelled by AusNet for the 11 x 66kV CBs is 139% in 2025, and 100% for the five VTs. However, the aggregate PoF does not accord with recent failure experience. For example:[134]

- There have been 15 notifications over the last 4.5 years for the 9 x TTS [redacted] type CBs, an average of 0.25 notifications per breaker per annum

131 TRR 2027-32 Revenue Proposal – 31 Oct 2025 – PUBLIC. Page 92.

132 Ongoing maintenance and refurbishment.

133 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

134 Project Asset Condition Report – TTS CB Replacement – 31 Oct 2025 – CONF(30883721.1). Table 3.

- No major failures of the [redacted] CBs at TTS have been recorded, and
- There have been four major failures across AusNet's [redacted] CB fleet between 2000 and mid-2025.

368. Notwithstanding that replacement should occur prior to a major failure occurring, based on assessed condition and cognisant that AusNet has been undertaking a program of replacement for its 66kV CB fleet, we remain concerned that the failure rates that AusNet has assumed in its modelling for these units may be higher than is indicated by their condition, as discussed in Section 3.

369. Furthermore, the majority of the Option 1 benefits accrue after 2036 and given the uncertainty about benefits over 45 years as discussed in Section 3, we considered a shorter study period of 20 years to help assess the robustness of the result, all other factors unchanged. Based on AusNet's economic model, the NPV option net benefit relative to the BAU case is negative, at -$7.7 million ($2025). Notwithstanding the overarching strategy to progressively remove this plant from the system, and initial inclusion in the current RCP (despite being deferred to the next RCP) these results indicate that the full replacement project is not economic to proceed in the next RCP.

The economic timing is 2034 from its economic modelling and not 2028

370. AusNet identifies the economic timing as 2028 based on its assessment of when the benefits first exceed the annualised capital cost. However, AusNet has referenced the annualised capital cost of $1.7 million ($2025) using its low case discount rate of 3.0%,[135] and not the base case discount rate of 7.0% (as it has applied for other projects).

371. This is the only major stations repex project for which AusNet has applied a 3% discount rate and the consequently much lower hurdle for the investment economic timing. In the PPR for this project, AusNet states its reasons as: [136]

'The economic timing of 2028 for a discount rate of 3% (AusNet WACC rate) supports that network users and customers supplied from TTS are not subjected to greater supply risks than their perceived value of network reliability, as this level of reliability is supported by investment made by a regulated network business. The investment cost can thus be annualised at 3% to determine the economic year as this is consistent with the rate used to assess the impact on network tariffs (utility cost) for investments when finding the optimum supply reliability.'

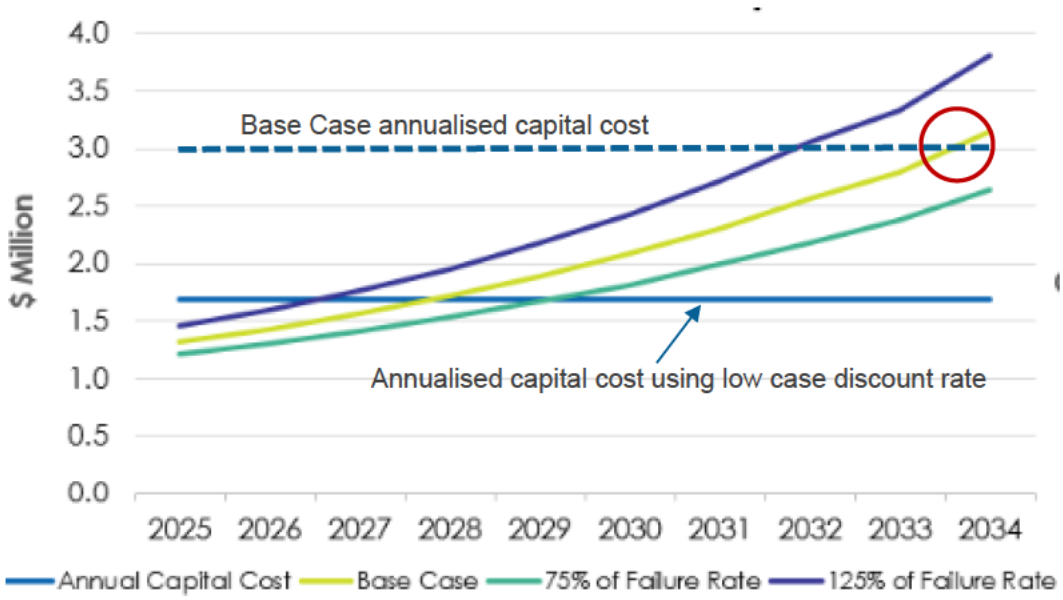
372. AusNet's logic is somewhat circular, and we do not consider that AusNet has provided sufficient justification for changing the discount rate assumption for a single project, as it has done, thereby reducing the annualised cost applied for this assessment and artificially bringing the project forward. As discussed in Section 3, for the purpose of our assessment, we have adopted the base case discount rate determined by AusNet, for our analysis. Applying the base case discount rate of 7.0% results in an annualised capital cost of $3.0 million ($2025). The economic timing, determined by AusNet's economic model using the higher annualised cost is 2034, as shown in Figure 4.10.

373. Figure 4.10 also shows the sensitivity of the economic timing to the asset failure rate, which illustrates that the economic timing would be even later (2035 or 2036) with a 25% reduction in the failure rate and using the base case annualised capital cost. The relatively high assumed aggregate PoFs for the 66kV switchgear (in particular) as discussed above indicates to us that the assumed PoF may overstate the benefits, and adjustment to those benefits will result in deferral of the project economic timing.

135 Project Economic Model – TTS Circuit Breaker Replacement – 31 Oct 2025 – CONF(30883722.1), Sensitivity worksheet. Row 8.

136 Project Planning Report – TTS CB Replacement – 31 Oct 2025 – PUBLIC(30883593.1). Page 13.

Figure 4.10: Sensitivity analysis of TTS CB replacement project – failure rate, showing base case and low case annualised capital costs



Source: Project Economic Model – TTS Circuit Breaker Replacement – 31 Oct 2025 – CON(30883722.1) with modification by EMCa to include the Base Case annualised capital cost

374. The economic timing is not as sensitive to variances in demand growth as it is to the failure rate, however as expected, with the base case annualised cost of $3.0 million, the economic timing is 2034.

375. Based on the combination of deferred economic timing, negative NPV to a reduced study period, and sensitivity to failure rate, we consider that this project is a candidate to be deferred until after the end of the next RCP.

Summary of findings

376. The need to undertake a project to address the condition of the 66kV CB assets at TTS in the next RCP has not been adequately justified.

377. We consider that the economic timing is likely to be in 2034 at the earliest and is a candidate for completion of the proposed work to be deferred beyond the end of the next RCP as indicated by our review of AusNet's economic modelling. We note that AusNet has also estimated expenditure in the last two years of the current RCP for this project, and which is not within the scope of our review.

4.3.5 Loy Yang Power Station (LYPS) and Hazelwood Terminal Station (HWTS) 500kV CB Replacement Stage 2

Project overview

Project and scope details

378. Both LYPS and HWTS are part of the backbone of Victoria's 500kV transmission network. AusNet has identified several assets located in the terminal stations of LYPS and HWTS that are in poor condition, including 500kV CBs, associated disconnectors, earth switches and current transformers.

379. AusNet proposes to continue stage 2 of its 500kV CB replacement program at a cost of $65.6 million (direct costs) in the next RCP.

Current RCP capex allowance and proposed expenditure in the next RCP

380. AusNet had not included this project in its Initial RP for the current RCP.

381. As a part of its considerations for the RRP for the current period, in light of the early closure of Yallourn Power Station (YPS) planned for 2028 which was not known at the time of the Initial RP, AusNet had identified four projects including the 500kV CB replacement as requiring detailed reassessment. At that time the project cost was indicated as $99 million ($real 2021-22).

382. Following its internal review, AusNet proposed $16 million ($real 2021-22) of expenditure in its RRP for an asset replacement project at HWTS/LYPS that, due to the expected closure of YPS in 2028, was to be incurred in the current RCP as stage 1 of what we understand was the first of two stages.

383. Table 4.22 compares the current RCP and whole of project costs, which include OHs and CFCs and therefore are not directly comparable to the direct costs we refer to elsewhere for the next RCP. These figures follow a similar trend to that described above and, although AusNet incurred almost none of its forecast requirement in the current period, the revised total project cost reasonably aligns with the sum of the actual capex for the current RCP and forecast for the next RCP. The total project cost comprises stage 1 and stage 2 of the project, reflecting increases to labour and material costs and revised project timing.

Table 4.22: LYPS and HWTS CB replacement – project costs including OHs and CFCs ($m real March 2027)

Current RCP project cost		'Whole of project' total cost		Calculated total cost	
2022-27 allowance	2022-27 actual capex	2022-27 TRR estimate	Latest project cost estimate	2027-32 forecast[137]	Actual capex + forecast
20.1	0.8	**71.3**	**70.4**	68.2	**69.0**

Source: IR#001 – Attachment to Question 3 – 20251203 – PUBLIC, AusNet Services - TRR 2027-32 Capital Expenditure Model - 31 Oct 2025

Assessment of proposed expenditure

The condition of the identified assets requires remedial action

384. AusNet has identified a number of 500kV CB, disconnector and CT assets at the LYPS and HWTS sites as being in poor condition and recommends replacement in the next RCP. At LYPS, proximity to coal-fired generation has accelerated corrosion due to environmental pollution.

385. Although mid-life refurbishments of the 500kV CBs were completed at LYPS and HWTS, based on a recent failure at LYPS AusNet considers that the replacement hydraulic seals may lack longevity and be unsuitable. Ongoing SF6 leaks, technical obsolescence and lack of spares add additional risks for this fleet of assets.

386. AusNet states that the disconnector assets are experiencing increasing failures, with refurbishment no longer an option.

387. For the CT assets, AusNet has a number of oil-filled CT designs present at these sites with internal deterioration present, including increased risk of explosive failure.

388. Based on the representation by AusNet, the identified assets are at increased risk of failure and require remediation. AusNet states that the replacement of these units represents the 'final phase' of replacement for these units across its network.

AusNet has indicated project timing as being prior to the economic timing from its economic model

389. In its PPR, AusNet states that:[138]

137 Total escalated costs including overheads sourced from the capex model.

138 AusNet Services - Project Planning Report - LYPS HWTS 500kV CB Replacement Stage 2 - 31 Oct 2025.

'The risk of failure of these assets is forecast to increase, and an investment of $66.8 million to replace them is economically justified by 2033. AusNet is targeting project completion in 2032 to mitigate identified risks, including potential constraints on Loy Yang B generation and extended outages of critical 500kV transmission lines.'

390. In other parts of its PPR, AusNet states that the earlier proposed project timing is to allow for potential delays in project delivery:[139]

'Project delivery may be impacted by the availability of planned generator and transmission line outages to allow assets to be replaced, and it is hence considered prudent to target a completion date that is one year earlier than the economic investment timing should the project take longer than planned.'

391. AusNet does not explain the extent of the risks, including potential constraints on Loy Yang B in its submission, or other bases for its statement that the project timing should be earlier than indicated in the economic timing due to system risks:[140] *'Accelerating the timeline is considered a prudent approach to maintaining system reliability and avoiding prolonged network disruptions.'*

392. However, AusNet has included market-based impacts in its economic model, and therefore we reviewed the economic model as the basis for its assessment of the prudent timing.

AusNet has considered two replacement options in addition to BAU

393. AusNet reasonably considers two replacement options with the BAU case as shown in Table 4.24, with its recommended Option 1 to complete the work in the next RCP. This provides only marginally higher benefit than deferral of the project.

Table 4.23: LYPS and HWTS 500kV CB replacement Stage 2– modelling outputs ($m real 2025)[141]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$65.8	$0.0
1	Replace CBs and switchgear (preferred)	$66.8	$58.5	$7.3
2	Deferred replacement (to 2036)	$66.8	$59.6	$6.2

Source: 5.5.22 - AusNet Services - Project Economic Model - LYPS HWTS 500kV CB Replacement Stage 2 - 31 Oct 20

AusNet has assumed a higher replacement cost in its economic model than we found in other 500kV projects, as the basis for its risk-costs

394. Based on AusNet's analysis, the key risk driving the economic timing is the forecast of reactive asset replacement risk-cost. The former is the product of the assumed PoF and the cost to replace the asset upon failure.

395. On closer review of the reactive replacement cost assumed by AusNet for this project, we observe a materially higher cost for the 500kV CB and 500kV CT replacement than AusNet has assumed for other projects in the respective economic models as shown in Table 4.23.

139 AusNet Services - Project Planning Report - LYPS HWTS 500kV CB Replacement Stage 2 - 31 Oct 2025.

140 AusNet Services - Project Planning Report - LYPS HWTS 500kV CB Replacement Stage 2 - 31 Oct 2025.

141 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

Table 4.24: Comparison of asset replacement cost ($m real 2025)

Project	500kV CB	500kV current transformer
LYPS and HWTS 500kV CB replacement project economic model	1.63	0.85
MLTS 500kV CB replacement economic model	1.07	0.21
Ratio	*1.5x*	*4.0x*

Source: 5.5.22 - AusNet Services - Project Economic Model - LYPS HWTS 500kV CB Replacement Stage 2 - 31 Oct 20

396. We also observe that the cost assumed in the economic model is materially higher than the equipment costs that AusNet has included in the cost estimate for this project, after accounting for additional costs associated with the design, construction and on-costs.

397. The impact of a higher input assumption for the asset replacement cost in the economic model is that the associated benefit of reactive asset replacement is higher than would otherwise be the case, with a lower benefit resulting in later economic timing of the project. We reviewed how sensitive the project was to this assumption by reducing the values of 500kV CB and CT replacement. We found that even with a small reduction of the cost of 10%, the economic timing was deferred by two years to 2035. For a 25% reduction, and which still remains a higher cost than the other project we reviewed, the project was deferred beyond the end of the assessment period of 2036.

398. Absent a clear explanation by AusNet of the reason that the replacement cost was materially higher than it has assumed for other projects, our review of the economic model alone suggests potential to consider deferring this project.

Based on the condition assessment, further deferral of the project is not prudent

399. Whilst a reduction to the assumed reactive replacement cost may indicate a deferral, the condition of the assets at this site nevertheless indicates to us that it is prudent to commence replacement within the next RCP.

400. In the detailed cost estimate, AusNet states:[142]

> *'Loy Yang Power Station (LYPS) and Hazelwood Terminal Station (HWTS) are centres for the despatch of base load generation in Victoria and are critical for supply reliability. The [redacted] circuit breakers installed in the 1980s were assessed to be in C5 condition four years ago and those in single switched bays were urgently replaced under TD- 0006190. It is now necessary to replace the remaining [redacted] circuit breakers at LYPS and HWTS. An [redacted] CB in C4 condition is also to be replaced.'*

401. Due to the complexity of this site, we note that AusNet has proposed a multi-year project that spans all years of the next RCP with completion by 2032. This represents a further deferral from the condition assessment of C5, that AusNet states as being undertaken '*four years ago*' and which would typically trigger a project to be undertaken within a five-year period, and which has not yet occurred.

Option analysis is simplistic, and doesn't address proposed scope options

402. We acknowledge that these sites are critical nodes for the Victorian power system. We note that the highest priority replacements have been completed by AusNet under previous projects, and the focus is now on the replacement of:[143]

- 13 500kV live-tank [redacted] CBs
- 22 500kV [redacted] isolators
- 24 individual 500kV [redacted] hairpin CTs

142 AusNet Services - Project Detailed Cost Summary - LYPS HWTS 500kV CB Repl Stage 2 - 31 Oct 2025.

143 AusNet Services - Project Asset Condition Report - LYPS HWTS 500kV CB Repl Stage 2 - 31 Oct 2025.

- 6 [redacted] CTs, rated at 500kV.

403. On review of the cost estimate, there are additional scope items associated with upgrade of the switchyard, transformer refurbishment, control building upgrades and surface reinstatement amongst others. Whilst we consider that undertaking priority work on other assets in the switchyard whilst a workforce is mobilised at the site, and making use of common outage schedules is likely to be efficient, AusNet does not provide adequate supporting information for these additional scope items and therefore higher project cost.

404. The options analysis undertaken by AusNet is simplistic, comparing only two options being: (i) replacement of the recommended scope within the next RCP; and (ii) deferral of the replacement. For example, this does not include a further staged / partial replacement option of the additional scope, or to consider the project scope in the context of an optimised replacement plan for this site over time, which includes the current, next and subsequent RCPs. However, on balance we consider that as a proposed stage 2 project, AusNet has already commenced a partial replacement option under stage 1 for the highest priority asset replacement projects at this site, albeit this does not help explain the included scope items for the next RCP.

405. Further, should AusNet reduce the scope of this project, this may advance the economic timing of the remaining scope due to the lower cost.

Summary of findings

406. The need to undertake a project to address the condition of CB assets at LYPS and HWTS in the next RCP is prudent and, on balance, we consider that the scope is reasonable.

407. We consider that the advancement of project timing relative to the economic timing has not been adequately justified. Our review of the economic model indicates that reasonable reactive replacement costs would be lower than AusNet has assumed in its modelling, based on the assumptions that AusNet has applied to other projects, and this would result in further deferral of the project timing. This is supported by comparatively similar benefits arising from the economic modelling between the two options that AusNet has considered.

408. We also found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 led to an overestimate of the cost relative to the efficient cost of the project.

4.4 Our assessment of proposed projects (proposed to commence in the next RCP)

409. In this section we assess the proposed $271.3 million on the 6 projects that AusNet has categorised as ‘proposed’ projects being those that obtained business case approval in 2025 or have not yet obtained business case approval and are proposed to commence in the next RCP.

4.4.1 Newport Power Station D (NPSD) 220kV GIS replacement

Project overview

Project and scope details

410. Newport Power Station is a peaking power station. AusNet states that the GIS at the associated 220kV switching station NPSD requires replacement due to technical obsolescence and deteriorating condition.

411. AusNet plans to build a new indoor GIS generator connection station near the current location, with the project commencing in 2027-28 with forecast expenditure of $152.0 million planned to be incurred in the next RCP.

Assessment of proposed expenditure

Asset condition assessment supports the need to consider remedial action

412. The 510MW gas-fired Newport Power Station located in south-west Melbourne supports demand within the western metropolitan 220kV ring and provides ancillary services, including voltage support and system strength. AusNet owns the 220 kV NPSD connection station with GIS located inside the power station building.

413. AusNet states that:[144]

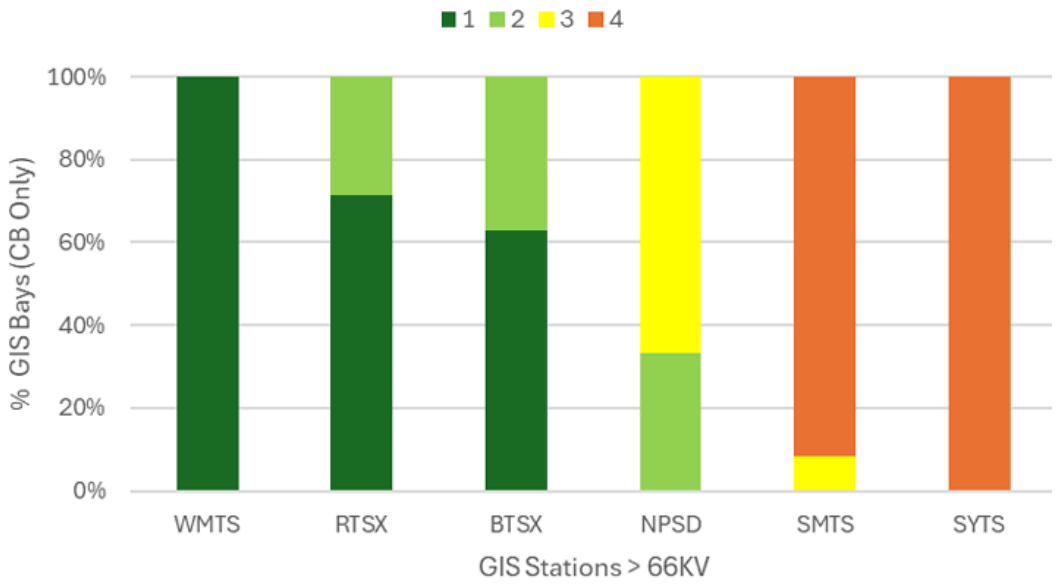
> *'The role of Newport Power Station may become more significant given the planned early closure of Yallourn Power Station in 2028 and it is considered that the site will remain an important part of the transmission network in the foreseeable future.'*

414. The proposed project is required to maintain reliable transmission network services at NPSD and to mitigate risks from 220 kV switchgear failures. AusNet reports that the 220 kV GIS, installed in 1979, is nearing end-of-life with increasing failures, technical obsolescence, and no manufacturer support available beyond generic advice:[145]

> *'The aging GIS presents significant reliability, safety and environmental risks exhibiting in SF6 leaks, worn circuit breaker mechanisms and flange corrosion.'*

415. AusNet has provided an ACR which supports these statements. Figure 4.11 shows that approximately 65% of the GIS assets are in poor condition, noting that this ACR applies a different condition classification scale to AusNet's standard approach.[146] In this figure, a rating of 3 corresponds to 'poor' condition, which indicates that the assets should be replaced within 2 to 10 years.[147]

Figure 4.11: GIS asset health as of June 2025[148]



Source: Project Asset Condition Report – NPSD 220kV GIS – 31 Oct 2025 -PUBLIC(30883560.1), Figure 7

144 Project Planning Report – NPSD 220kV GIS – 31 Oct 2025 – PUBLIC(30883563.1). Page 2.

145 Project Planning Report – NPSD 220kV GIS – 31 Oct 2025 – PUBLIC(30883563.1). Page 2.

146 AusNet usually applies a 1-5 scale with 4 representing poor condition and 5 representing very poor condition.

147 Based on AusNet's typical qualitative guidance for an asset in poor condition.

148 Scale: 1 (very good health) to 4 (very poor health).

416. We are also satisfied that the practical options for repair/refurbishment and opportunities for minimally invasive material life extensions have been practically exhausted.[149]

417. Given the enduring requirement for NPSD, the condition of the GIS assets, and the challenges with refurbishment mean that it is reasonable for AusNet to consider the scope and economic timing for replacement of the NSPD 220kV GIS.

Options analysis supports AusNet's selection

418. AusNet's PPR (and its economic model) considers the relative merits of two options in addition to the BAU option:

- Option 1 – new 220kV GIS connection station (preferred), and
- Option 2 – deferred replacement of the existing GIS connection station.

419. The project ACR considers and dismisses as practically and economically unviable, four further options:[150]

- Renovation of the GIS – the reasons why this is not a preferred option include extended exposure to N-1 failure during the renovation work and outage constraints
- Part-asset replacement – the aged, obsolete GIS assets of the type at NSPD are no longer available for part-replacement, consequently AusNet determined that for the NPSD GIS the financial and technical risks were deemed to be too high relative to the preferred option
- Replacement with outdoor AIS - there is typically a 3-fold cost advantage for AIS, however AusNet determined that neither an indoor nor outdoor AIS switchyard is viable due to space restrictions
- Replacement like-for-like GIS in-situ - bay by bay replacement in the same location was deemed impractical by AusNet, primarily because it would require long circuit outages for bay dismantlement and re-build.

420. We consider that AusNet has reasonable grounds for dismissing these 'further' options.

421. AusNet selected Option 1, which can be implemented in the available space with modern GIS equipment which is more compact than the existing switchgear.[151] As shown in Table 4.25, this choice is supported by having the highest NPV and is the reasonable option to select.

Table 4.25: NPSD GIS replacement – modelling outputs ($m real 2025)[152]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$246.7	$0.0
1	Integrated Replacement with GIS (preferred)	$152.6	$96.0	$150.7
2	Deferred Integrated Replacement with GIS	$152.6	$100.7	$146.0

Source: 5.5.43 - AusNet Services - Project Economic Model - NPSD 220kV GIS - 31 Oct 2025 - CONF

149 Project Asset Condition Report – NPSD 220kV GIS -31 Oct 25 – CONF(30883681.1).

150 Project Asset Condition Report – NPSD 220kV GIS – 31 Oct 2025 -PUBLIC(30883560.1). Pages 8-10.

151 Project Asset Condition Report – NPSD 220kV GIS – 31 Oct 2025 -PUBLIC(30883560.1). Page 10.

152 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

Avoided market risk impact risk is the major source of benefit, and leads to a high NPV

422. The major sources of benefit are associated with avoided market impact risk (avoided generation constraints that would result in increased wholesale market cost and involuntary load shedding) due to prolonged outages of the transmission lines and transformers switched at NPSD.

423. The NPV of the preferred Option 1 of $150.7 million ($2025) is slightly lower than the deferral option by $4.7 million and can be considered materially similar. For the analysis, the full project expenditure is modelled in year 2032 for Option 1 and 2036 for Option 2, being a four-year deferral.

424. To study the impacts of a shorter study period, that is, to increase the degree of certainty to the ascribed market benefits, we derived the NPV for a 20-year study period using AusNet's economic model. Reducing the study period to 20 years still results in a strongly positive NPV for both options, all other things being equal.

The economically optimum timing is likely to be 2034

425. In its PPR, AusNet refers to the economic timing being 2033:[153]

> *'Figure 5 shows that the optimal timing of the preferred option (Option 1) is starting from 2033 with the project completion by the end of 2032 and that investment is needed within the 2027 to 2032 regulatory control period.'*

426. From AusNet's economic model, the economic timing is 2034 (as this is when the annual project benefits exceed the annual project cost).[154]

427. The economic timing is most sensitive to demand growth assumptions, as shown in Figure 4.12, with a 15% reduction in peak demand deferring the economic timing well beyond 2034. Conversely, a 15% increase in demand would bring forward the economic timing to 2030.

428. We also considered the impact of removing the summer and winter PV factors (i.e. setting both to 1.0) and although the annual benefit is materially reduced, the economic timing remains as 2034.[155]

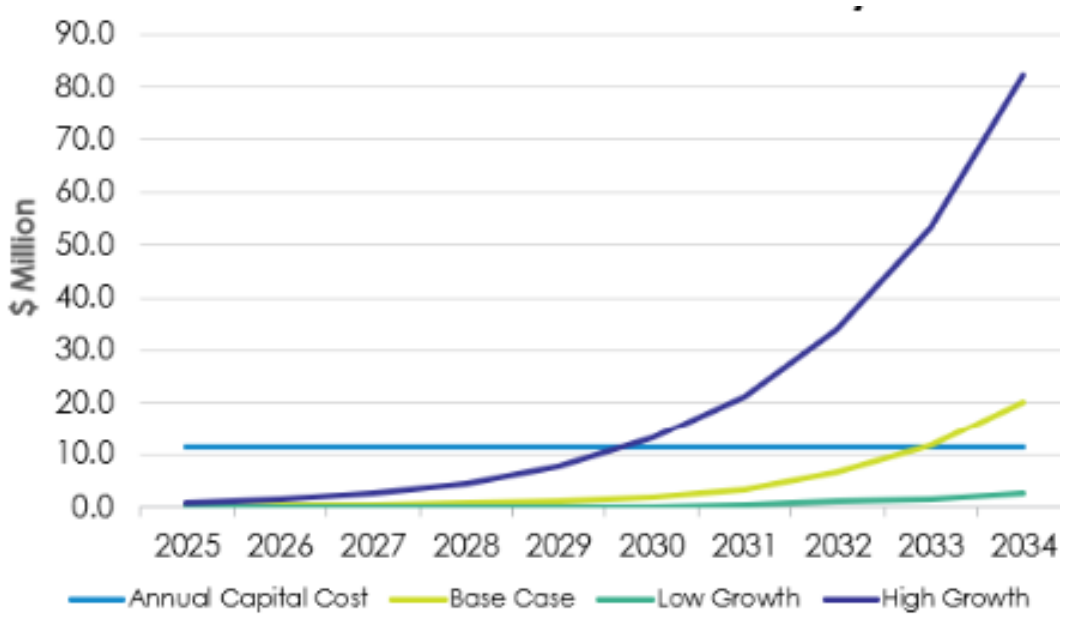
429. We conclude that the economic timing for completion of the work is likely to be no earlier than 2034, and which is consistent with the condition assessment of the GIS at NPSD. Therefore, we conclude that a reasonable basis for regulatory purposes is to assume that this project is deferred by two years, from 2032 to 2034.

153 AusNet Services - Project Planning Report - NPSD 220kV GIS - 31 Oct 2025 - PUBLIC(30883563.1). Figure 5.

154 Project Economic Model – PSD 220kV GIS – 31 Oct 2025 – CONF(30883682.1), Result tab, cell M166 and cell M165.

155 The annual benefit is 1% higher than the annual cost in 2034.

Figure 4.12: Sensitivity analysis for NSPD GIS 220kvV replacement - demand growth[156]



Source: Project Economic Model – PSD 220kV GIS – 31 Oct 2025 – CONF(30883682.1)

Summary of findings

430. The need to undertake a project to address the condition of the GIS assets at NPSD in the next RCP is prudent and the scope reasonable.

431. However, based on our review of AusNet's economic modelling, we consider that the economic timing is likely to be in 2034 at the earliest, and therefore that this project is a candidate to be deferred by up to 2 years relative to the timing of 2032 that AusNet proposes.

4.4.2 Wodonga Terminal Station (WOTS) Spare 330/66/22kV Transformer Procurement

Project overview

Project and scope details

432. WOTS consists of two 330/66/22 kV three-winding 75 MVA transformers with a new 75 MVA cold spare transformer available on site. AusNet has proposed to replace the cold spare at a cost of $12.1 million in the next RCP.

Assessment of proposed expenditure

Cold spare established in the current RCP

433. AusNet included a similar project at WOTS in its initial RP for the current RCP. AusNet's RRP for the current period indicated a decrease in cost of this project from $3.8 million ($real 2021-22) to $1.3 million ($real 2021-22),[157] however no additional information was provided in that document.

434. We have assumed the project scope was to establish a cold spare to mitigate the identified risk of transformer failure, and which we understand is now in place.[158]

156 The base case result shown in this sensitivity graph is higher than the base case capex in the 'Result' tab.

157 AusNet Services TRR 2023-27 RRP – 1 September 2021. Table 3-3.

158 The project planning report does not provide a year in which the cold spare was procured or installed.

Project is in direct response to a proposed distribution project

435. The documentation provided by AusNet describing the project drivers is confusing. In the PPR, the driver is described as load at-risk due to loss of both X1 and X2 transformers (N-2) and is supported by the modelling included in the provided economic model. Both of these sources appear to assume that the cold spare is not present.

436. We assume this is due to a proposed project by AusNet Distribution, to commission the spare transformer for the 'Connection Enablement: Wodonga–Barnawartha in North-Eastern Victoria RIT-T' and which does not include procurement to replace the spare transformer and therefore will present the original transformer failure risk.

437. We confirmed our understanding of the project driver with AusNet at our onsite meeting.

Proposed cost is materially higher than a previous project to establish a spare transformer

438. The proposed option is the procurement of a cold spare to be stored at WOTS at a cost of $12.1 million and which is much higher, even after adjustment for inflation, than the cost estimate included for the current RCP.

439. We observe that the cost estimate provided by AusNet in support of this project includes several assumptions, with the highest cost component being for the transformer at $5.8 million ($2025), being an assumed doubling of the purchase order from Siemens dated 2021. Civil works and risk allowance are the next highest components of the cost estimate, presumably based on the new location for the transformer.

440. Similarly, AusNet has not explained why the proposed cost of $12.1 million (for project TD-0016808) is materially higher than the $7.5 million[159] included for what appears to be a similar project for the purchase of a spare transformer for WOTS (project TD-0007975).

441. We consider that whilst the costs will be higher than historical costs, due to recent market driven increases, the proposed cost estimate has not been sufficiently justified.

Distribution project remains uncertain, and AusNet have deferred the economic timing

442. During our onsite discussion, we asked AusNet if this project was required in light of the proposed connection enablement project not included in the AER's draft decision for AusNet Distribution and subsequently withdrawn by AusNet Distribution in its RRP. AusNet confirmed that the project was included based on assumptions of the distribution project proceeding.

443. In its draft decision for AusNet Distribution, the AER states:[160]

> *'the $180.4 million proposed for connection enablement was not consistent with the current embedded generation connection framework in the NER and the economic timing of the projects was highly uncertain based on AusNet's modelling. We have not included this expenditure in our alternative estimate for augmentation'*

444. Based on our reading of AusNet Distribution's RRP, the previous Wodonga Terminal Station (WOTS) - Barnawartha (BWA) 66kV augmentation has been included as a contingent project, due to '*developments since the submission of the Initial Proposal*.'[161]

445. Following the onsite, and as a part of its response to defer the economic timing to 2033, AusNet states: [162]

> *'The preferred option for this project has changed from the procurement of a cold spare to the deferred procurement of a cold spare, and the updated economic timing is later than the planned delivery timing. However, as mentioned in our discussion with EMCa*

159 Project cost includes OHs and CFCs, per IR#001 – Attachment to Question 3 – 20251203 – PUBLIC.

160 Attachment 2 – Capital expenditure | Draft decision – AusNet Services distribution determination 2026-31. AER. Page 11.

161 AusNet – EDPR Revised Proposal 2027-31. Page 15.

162 AusNet's response to information request, IR#007 - AusNet Responses on EMCa follow up - 20251215 - PUBLIC – PARTIAL. Question 1.

on Friday 8 December, this project will need to be reassessed in full due to decisions that have been made by the distribution network. Therefore, we propose to change the delivery timing to 2032-33 prior to the AER's draft decision but conduct a further reassessment in our revised proposal.'

446. Based on the submission by AusNet, and absent compelling justification given the changed circumstances, we consider it reasonable to defer the delivery timing to beyond the end of the next RCP.

Summary of findings

447. The need to undertake a project to address the condition of the spare transformer at WOTS in the next RCP has not been adequately justified.

4.4.3 Moorabool Terminal Station (MLTS) Reactor Replacement

Project overview

Project and scope details

448. AusNet proposes replacing one of two reactors at MLTS that have been assessed as being in an advanced state of deterioration. The proposed cost of replacing the No.1 220kV shunt reactor is $18.5 million within the next RCP, and with a project completion date of 2031.

Assessment of proposed expenditure

The condition of the 220kV MLTS shunt reactor indicates that it is approaching end-of-life

449. The No.1 220 kV Shunt Reactor was commissioned in 1983. The ACR states:[163]

'Long term condition analysis results for this reactor consistently show elevated levels of phenolic compounds within the insulating oil, which are typically linked to degradation in resin bonded/impregnated insulating structures. This type of degradation leads to shrinkage in the winding insulated support materials…This deterioration is currently the most significant factor contributing to the reactor's poor condition. The 245 kV bushings are also in an advanced deteriorated physical state, demonstrating high risk oil seal leaks leading to bushing's internal insulation system deterioration.

While the bushings, oil, reactor tank and cooling system are considered recoverable, the internal windings are not. The internal support structures for the windings show advanced deterioration, posing a significant risk of winding failure and potential catastrophic failure of the reactor. Therefore, full replacement of the reactor is recommended rather than refurbishment.'

450. The overall condition of the No. 1 220kV shunt reactor is rated as 'poor' (C4). Based on the information provided in the ACR, this is a reasonable conclusion. We are also satisfied that because of the deteriorated core and windings, refurbishment is unlikely to be economically feasible.

451. We consider that a prudent operator would investigate options and the economic timing for replacement of the reactor.

Options analysis is adequate and the selected option is the prudent choice

452. The options shown in Table 4.26 were assessed to identify the preferred solution:

- Do nothing: No mitigating action beyond existing measures to address the identified risk
- Option 1: Replace No.1 220kV shunt reactor (preferred), and

[163] Project Asset Condition Report – MLTS Reactor Replacement – 31 October 2025 – CONF. Page 2.

- Option 2: Defer the No 1 220kV shunt reactor replacement by five years.

Table 4.26: MLTS Reactor replacement modelling outputs ($m real 2025)[164]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$21.4	$0.0
1	Replace the 220kV No.1 shunt reactor (preferred)	$19.0	$16.8	$4.6
2	Deferred replacement	$19.0	$17.9	$3.6

Source: 5.5.33 - AusNet Services - Project Economic Model - MLTS Reactor Replacement - 31 Oct 2025 - CONF

453. The economic benefits[165] of the proposed replacement program derive mainly from: (i) the incremental cost of running out of merit generation following failure of the reactor; and (ii) the reactive reactor replacement cost.[166] AusNet models the supply risk (consequences) associated with failure of the reactor, describing the market impact cost as follows:[167]

> *'Failure of these assets will limit the network's reactive power support required to manage the over-voltage condition, which will have a negative impact on the transmission network's stability and may cause damage to the connected electrical apparatus.'*

454. AusNet has used the 'Do nothing' total underlying costs (expressed as $M for each year) for managing over-voltage (Pillar 2) as determined by AEMO,[168] by pro-rating AEMO's assumed underlying cost to the 100MVAr No. 1 shunt reactor.[169] The AEMO study period is 10 years (2025-2034), however AusNet has extended the benefits through to 2070 (45 years), applying a fixed benefit of $6.0 million ($2025) p.a. from 2035 onward. The undiscounted benefits up to and including 2035 are in aggregate $33 million, with the undiscounted benefits from 2026-2070 totalling $211 million. The derivation of the annual benefit used beyond 2034 is not apparent from the information provided to us, although it is approximately equal to the 2033 benefit derived from the AEMO forecast.

455. Option 1 has the highest NPV under the Base Case and under all but two sensitivity studies (high discount rate and low asset failure rate). The NPV of $4.6 million ($2025)[170] for Option 1 is relatively low. We consider the results of the sensitivity of the economic timing of Option 1 below. As discussed above, the majority of the benefits accrue after 2035.

456. A further option, deferring the project by two or three years, was not considered by AusNet, however AusNet's economic model allowed us to defer the timing of the project by two and three years, which only slightly reduced the NPV compared with the preferred Option 1. This analysis suggests that with the base case assumptions, the timing for completion of the work could be beyond the end of the next RCP without material reduction in the NPV.

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164 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

165 Project Economic Model – MLTS Reactor Replacement – 31 Oct 2025 – CONF; which among other things assumes a capital cost for the preferred option of $19.00m (real 2027).

166 RIT-T PACR, Maintain Reliable Transmission network Services at Moorabool Terminal Station. Page 10.

167 AusNet Workshop – Major Station Projects vSend. Slide 110.

168 AEMO, Me bourne Metropolitan Voltage Management – Project Assessment Conclusions Report, 2024. Table 12 (Pillar 2).

169 This is done by calculating a Reactor Value stream expressed as $/MVAr based on 300MVAr of reactive support, then pro-rating the value stream to the proposed 100MVAr reactor. The underlying assumption is that AEMO's study assumed that the 220kV MLTS shunt reactor would be available and so we conclude that pro-rating the value stream identified by AEMO is a reasonable approach.

170 Which corresponds with the economic model.

457. In our view, AusNet has not provided sufficient information to justify the assumed market benefits from mitigating the voltage support costs for an N-1 failure of the shunt reactor continuing at an elevated level until 2070.

A shorter study period results in significantly lower benefits

458. To study the impacts of a shorter study period, that is, to increase the degree of certainty to the ascribed market benefits, we derived the NPV for a 20-year study period using AusNet's economic model as discussed in Section 3. With all other assumptions unchanged, this reduces the NPV from $4.9 million to -$3.6 million ($2025). The Option 2 NPV similarly reduces for a shorter study period and is similarly negative for replacement deferred to 2035, all other things being equal.

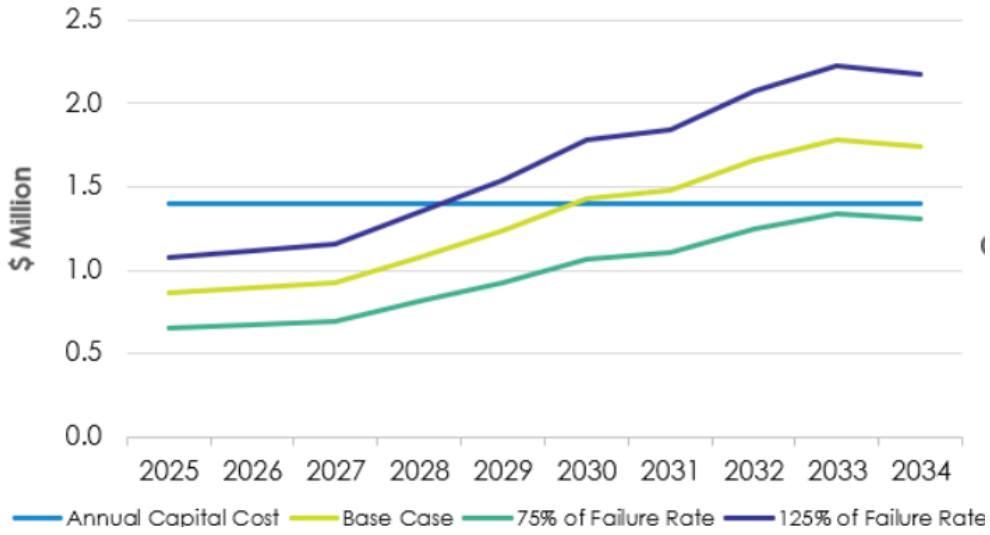
459. We consider that replacing the reactor within the next 10 years[171] (i.e. by 2035) is likely to be prudent given its reported condition, but the economic analysis provided by AusNet does not support inclusion in the next RCP.

Economic timing is sensitive to the failure rate

460. The base case assumptions applied to Option 1 lead to an economic timing of 2030, with AusNet advising it is planning to finish the replacement in 2031 due to deliverability constraints.

461. However as shown in Figure 4.13, the economic timing is deferred beyond 2034 for the low case PoF (-25%) with a 45-year study period. Given the 10-year horizon, changes to the modelling period to account for uncertainty in market benefits does not impact the economic timing, that is, when the benefits exceed the annuitised cost.

Figure 4.13: Sensitivity analysis of MLTS shunt reactor replacement – Asset failure



Source: Project Economic Model – MLTS Reactor Replacement – 31 Oct 2025 – CONF(30883675.1)

The cost estimate is high when compared with the AEMO cost estimate

462. AusNet's proposed capex of $18.5 million, is based on its cost estimate from a preliminary design.[172] This cost is significantly higher than AEMO has used in the analysis that AusNet has referenced for the underlying system costs (reactor value stream), which is $9.0 million ($real 2024)[173] for a 220 kV 100 MVAr shunt reactor. However, we note that AusNet's cost

171 Based on the guidance from AusNet that a C4 condition classification indicates the asset should be replaced/refurbished within 2-10 years (MLTS Shunt Reactor Replacement – Asset Condition Report, Appendix A).

172 Project Detailed Cost Summary – MLTS Reactor Replacement – 31 Oct 2025 – CONF.

173 Melbourne Metropolitan Voltage Management – Project Assessment Conclusion Report. AEMO. Table 18 which in turn is based on Class 5A (+/- 30%) cost estimates for individual equipment and using the AEMO 2023 Transmission Cost Database (TCD), the 2024 ISP Inputs and Assumptions Workbook (escalated to real 2024 dollars).

estimate includes the following scope which indicates to us that the AEMO cost estimate is not directly comparable:

- Considerable civil works and control building renovation
- AC system upgrades, and
- Considerable secondary system upgrades.

463. The AEMO cost estimate, escalated to $2026-27, would not fully account for the site specific costs and aspects such as traffic management and regulatory approval costs at MLTS. We consider AusNet's direct cost to be on the high end of a reasonable range.

Summary of findings

464. The condition of the MLTS reactor indicates that it should be considered for replacement. AusNet's economic analysis, with benefits assumed to continue beyond 2070, is claimed to support replacement within the next RCP. However, we consider the benefits over such a long time to be very uncertain given that they were derived from extrapolation of a 10-year AEMO forecast. A more conservative 20-year study period leads to negative NPV for the preferred option. On this basis we consider project completion can prudently be deferred until early in the following RCP.

465. We also found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

4.4.4 Ballarat Terminal station (BATS) B2 Transformer Replacement

Project overview

Project and scope details

466. BATS is a part of the 220kV regional network in Victoria and serves as a supply point for the large regional city of Ballarat.

467. AusNet has proposed the replacement of one of the two 150MVA 220/66kV power transformers due to poor condition by 2028. The B2 transformer has a high likelihood of failure due to a close-in fault, due to a design issue affecting the structural strength of tits 66kV winding.

Assessment of proposed expenditure

The condition of the B2 transformer indicates that it is approaching end-of-life

468. AusNet has provided a condition report which states that the B2 transformer is now 56 years old and is considered to be in very poor condition.

469. Forensic analysis of similar 150 MVA 220/66 kV transformer failures at BATS and RWTS (with the same manufacturer, design, construction and specification) indicated a fleet based latent 'end of life' defect in the winding structural support system.

470. Condition monitoring data for the BATS B2 transformer shows significant deterioration of the winding insulated support structures, as indicated by sustained high levels of phenolic and furan compounds in the insulating oil. The dominant condition risk is the associated with the B2 winding failure – an internal winding failure that is not recoverable / repairable.

Option analysis is simplistic, and doesn't fully address the proposed scope options

471. AusNet considers the replacement of the B2 transformer with a new transformer in 2031 or sooner as Option 1, and deferral of the replacement to 2036 as Option 2 as shown in Table 4.27.

Table 4.27: BATS transformer replacement modelling outputs ($m real 2025)[174]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$117.2	$0.0
1	Replace B2 Transformer (preferred)	$45.5	$57.5	$59.6
2	Deferred Replacement	$45.5	$71.8	$45.4

Source: 5.5.4 - AusNet Services - Project Economic Model - BATS B2 Transformer Replacement - 31 Oct 2025 - CONF

472. The PPR provided by AusNet is high-level and does not accurately represent the extent of the scope of the project. On review of the detailed cost summary provided, the project includes extension of the switchyard to install a new B3 transformer prior to de-commissioning B2, replacement of associated secondary systems, a new control room and switchyard upgrades:[175]

> *'The scope is to design, procure, install, and commission all necessary primary, civil/structural, transmission lines and secondary equipment for Ballarat terminal station (BATS) to replace the B2 transformer, extend the new control room, update a tranche of protection panels and demolish the old control room.'*

473. To replace a terminal station transformer, a spare or new bay is required to install the new transformer before the original transformer can be decommissioned, removed and disposed of. The scope of works will be site dependent, subject to the site and switchyard configuration and condition of related assets.

474. Whilst we did not find this detail in the PPR, we did find a high-level reference in the asset condition report to additional scope to replace the control room building, which states:[176]

> *'As part of BATS B2 Transformer replacement project, AusNet is proposing to demolish the old control room building which in very poor condition and to extend the existing new control room building.'*

475. Whilst we consider that it is efficient to undertake priority work on adjacent assets in the switchyard whilst a workforce is mobilised at the site, and making use of common outage schedules, AusNet has not made this clear in its project justification.

The economic timing for replacement is earlier than the proposed timing by 2031

476. The included sensitivity analysis shows that the economic timing of the preferred option (Option 1) is 2025 or earlier, with the timing not sensitive to the different assumptions. AusNet has proposed the replacement of the B2 transformer at BATS by 2031, being later than the economic timing.

Summary of findings

477. The need to undertake a project to address the condition of the transformer at BATS in the next RCP is prudent and, on the balance of probability, the scope reasonable.

478. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

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174 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

175 5.5.5 - AusNet Services - Project Planning Report - BATS B2 Transformer Replacement - 31 Oct 2025 – PUBLIC.

176 5.5.3 - AusNet Services - Project Asset Condition Report - BATS B2 Transformer Replacement - 31 Oct 2025.

4.4.5 Morwell Terminal Station (MWTS) 66kV CB Replacement

Project overview

Project and scope details

479. AusNet proposes replacing nine CBs, 24 underslung disconnectors, 15 oil-filled 66kV current transformers, five oil-filled 66kV voltage transformers, and 12 surge arresters at MWTS due to increasing risk of asset failure as a result of deteriorating asset condition.

480. AusNet has included $21.9 million in the next RCP with the project completion planned for 2031, commencing in 2029.

Assessment of proposed expenditure

The condition of 66kV switchgear poses increasing risk to maintaining supply

481. AusNet expects the supply services from MWTS will remain essential for the foreseeable future, in line with future transmission network developments outlined in AEMO's ISP and the 2024 VAPR.

482. AusNet states that:[177]

> *'Failure of 66kV feeder circuit breakers may lead to outages within the '66kV Loop' out of MWTS, adversely affecting customer reliability… and [c]ircuit breaker failures associated with LY3 and LY4 feeders would directly compromise the auxiliary supply to Loy Yang Power Station (LYPS), impacting Victoria's current system black start pathways.'*

483. The nine MWTS minimum oil type [redacted] 66kV CBs identified for replacement by AusNet have an average age of 41 years. They were refurbished in 2013 to extend their service life by 15 years. Combined with the reported frame and interrupter component issues and the reported technical obsolescence,[178] we conclude that the CBs are approaching the end of their technical life.

484. Similarly, the information regarding the condition of the CTs, VTs, disconnectors, and surge arresters in the project ACR is sufficient to support AusNet's conclusions that: (i) these assets are also approaching end-of-life; and (ii) refurbishment is not a viable medium-to-long term solution.

485. In addition to reliability concerns, there are heightened safety risks due to potential catastrophic failures, environmental risks, collateral damage to adjacent infrastructure, and increased costs associated with emergency replacements and reactive repairs.

486. We are satisfied that a prudent operator would look at the best approach to replacing the deteriorating equipment and the economic timing for doing so.

AusNet considered two options in addition to the BAU approach and has selected the prudent approach

487. AusNet's economic model considers two options in addition to the counterfactual BAU case as shown in Table 4.28:

- Option 1: CB and switchgear replacement in 2031 (preferred), and
- Option 2: deferred CB and switchgear replacement to 2036.

177 Project Planning Report – MWTS 66kV CB Replacement – 31 Oct 2025 – PUBLIC. Page 6.

178 Project Asset Condition Report – MWTS 66kV CB Replacement – 31 Oct 2025 – CONF. Page 5.

Table 4.28: MWTS 66kV CB replacement modelling outputs ($m real 2025)[179]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$32.3	$0.0
1	CB and switchgear replacement in 2031 (preferred)	$28.9	$27.4	$4.9
2	Deferred Replacement	$28.9	$28.6	$3.7

Source: 5.5.38 - AusNet Services - Project Economic Model - MWTS 66kV CB Replacement - 31 Oct 2025 - CONF

488. The Option 1 NPV for the study period of 45 years is a relatively low at $4.9 million ($2025), which is higher than for Option 2. AusNet's modelled sensitivity analysis shows that Option 1 is superior to Option 2 for all but the asset failure rate (Low case scenario) and discount rate (high case scenario).

489. As the majority of benefits accrue after 2036, we considered a reduced study period of 20 years as discussed in Section 3, which reduces the NPV from $4.9 million to -$3.6 million ($2025). Despite this result, we consider that replacement planning is prudent given its reported condition.

The economic timing for replacement of all the switchgear is likely to be later than AusNet has assumed, however project delivery is unchanged

490. AusNet has determined the economic timing to replace the MWTS CBs as 2031.

491. AusNet's economic model includes the results of sensitivity analysis based on high and low case variations of five key parameters. This shows that the economic timing would be 2035 if the asset failure rate was 25% lower than the base case, and between 2033 and 2034 for demand growth (85% of base case), capital cost (115% of base case), and VCR (125% of base case). Unfavourable variances around the base case would bring the economic timing forward to between 2026 and 2028, depending on the parameter. All of which indicate commencement of this project within the next RCP is justified.

492. We also considered how sensitive the economic timing was to AusNet's PV factor based on the concerns we raised in Section 3. We did this by adjusting the value to 1.0 (from 1.33 and 1.13 for summer and winter, respectively). This change deferred the economic timing by three years, to 2034.

493. We consider that this project is sensitive to the demand assumptions that are applied, however it is reasonable to commence the project in the next RCP to target replacement of the identified switchgear and instrument transformers. Given the sensitivity to input assumptions as noted above, we consider that the economic timing is more likely deferred from 2031, by two to three years (i.e. to 2033 or 2034).

494. AusNet has proposed delivery of this project by 2033, and which includes expenditure beyond the end of the next RCP. Whilst our analysis indicates that the economic timing is likely to be in 2033 at the earliest, we consider that on balance, the project delivery timing that AusNet has proposed is likely to be a more reasonable indication of the prudent timing.

Summary of findings

495. The need to undertake a project to address the condition of the 66kV CB assets at MWTS in the next RCP is prudent and the scope is reasonable.

496. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

[179] In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as option 0.

4.4.6 Thomastown Terminal Station (TTS) B4 transformer replacement

Project overview

Project and scope details

497. TTS has five 150 MVA 220/66 kV transformers (B1 to B5), with the 58 year old B4 assessed by AusNet to be in a *critically deteriorated state* due to irreversible degradation of its winding cellulose insulation.[180]

498. AusNet proposes replacing transformer B4 transformer and associated secondary protection relays by 2031, commencing in 2028, at a cost of $21.8 million in the next RCP.

Assessment of proposed expenditure

AusNet's assessment of transformer B4 condition supports the need for remedial action

499. TTS needs in-service transformers to maintain reliable transmission network services and to mitigate risks associated with asset failures. AusNet's condition assessment report provides compelling evidence that:

- The overall condition of B4 is very poor (classification C5) – for example, AusNet summarises the state of the transformer inspection results (provided in detail in the project ACR) as follows: [181]

  'Findings from the inspection include severe thermal degradation of the 220 kV and 66 kV windings with high winding temperature gradients and inefficient OFAF cooling performance. Moreover, the Degree of Polymerisation (DPv) is below 200, confirming the end-of-life condition of the transformer.'

- Refurbishment is not a practical remedy for life extension.

500. We therefore consider it reasonable for AusNet to examine closely the risk posed by failure of B4 and the timing of replacement.

AusNet considered two replacement options

501. AusNet considered two replacement options with the BAU case as the counterfactual:[182]

- Option 1: replace transformer B4 by 2031 (preferred), and
- Option 2: defer replacement of transformer B4 by five years.[183]

502. AusNet has assessed that in-situ replacement of B4 is viable until 2031, but for Option 2, the transformer will need to be replaced in another location due to outage constraints given the forecast increased demand at TTS 66kV. This results in a $6.7 million price premium for Option 2 over Option 1[184] as shown in Table 4.29. We consider this to be a reasonable assumption given the demand forecast, N-2 capacity of TTS, the extent of load at-risk, and the extra civil and primary and secondary electrical work required.

180 Project Asset Condition Report – TTS B4 T Replacement – 31 Oct 2025 – CONF. Page 2.

181 Project Asset Condition Report – TTS B4 T Replacement – 31 Oct 2025 – CONF. Page 4.

182 Project Planning Report – TTS B4 T replacement – 31 Oct 25 – PUBLIC. Pages 4, 5.

183 Although in the economic model provided, the work is deferred to 2035 not 2036.

184 Project Planning Report – TTS B4 T replacement – 31 Oct 25 – PUBLIC. Page 5.

Table 4.29: TTS transformer replacement – modelling outputs ($m real 2025)[185]

Option	Option description	Total modelled cost	PV of costs	NPV option benefit (relative to BAU)
0	Business as Usual	$0.0	$87.8	$0.0
1	Replace B4 transformer (preferred)	$23.2	$49.5	$38.3
2	Deferred replacement	$29.9	$55.2	$32.7

Source: 5.5.88 - AusNet Services -Project Economic Model - TTS B4 T Replacement - 31 Oct 2025 -CONF

503. The present value of the baseline risk-costs associated with the B4 transformer is estimated to be $87.8 million ($2025) over the study period, largely reflecting supply interruption risk and reactive asset replacement risk.

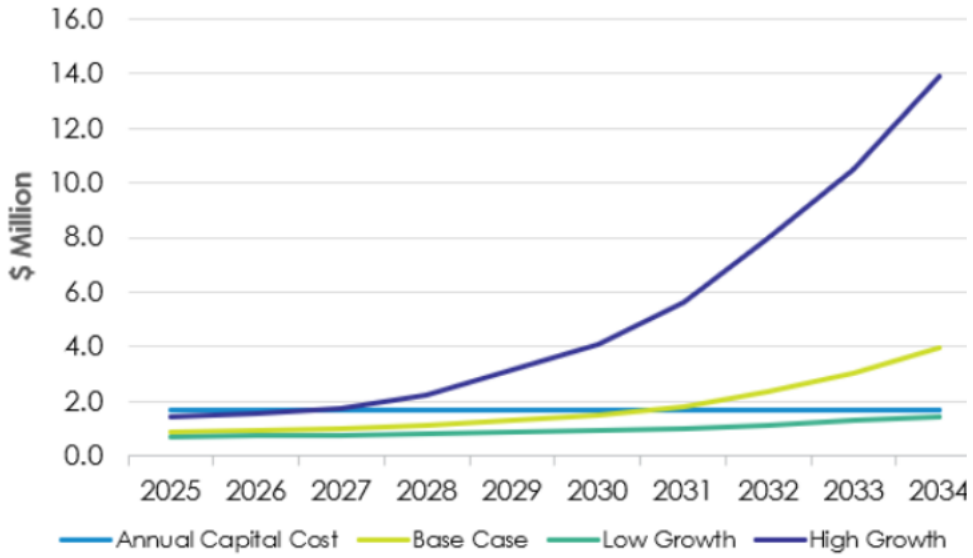
504. The NPV of Option 1 is $38.3 million ($2025), with the BAU case as the counterfactual. The sensitivity studies show that Option 1 NPV is positive for all sensitivity scenarios and has a higher NPV than Option 2 under all scenarios. Therefore Option 1 is the prudent choice between the two options considered.

The economic timing is 2031 but this is very sensitive to demand growth

505. As shown in Figure 4.14, the economic timing derived from AusNet's economic model is 2031. The figure also shows that the economic timing of the project is most sensitive to demand growth:

- If demand growth is 15% higher than AusNet's forecast, the economic timing for the transformer replacement project is brought forward to 2027
- Conversely, if demand growth is slower than forecast, the economic timing is 2035, a four-year delay, all other things being equal.

Figure 4.14: TTS B4 transformer replacement – economic timing demand growth sensitivity



Source: Project Economic Model – TTS B4 T Replacement – 31 Oct 2025 -CONF(30883718.1)

506. We also considered how sensitive the economic timing was to AusNet's PV factor based on the concerns we raised in Section 3. We did this by adjusting the value to 1.0 (from 1.33 and 1.13 for summer and winter, respectively). This change deferred the economic timing by one year to 2032, which is within the next RCP.

185 In the economic model, the BAU option was Option 1. However, to align the option numbering with other documentation we have denoted Option 1 in this table as Option 0.

507. AusNet has separately advised that its updated PoF calculation methodology has resulted in a delayed economic timing of 2032, and that it proposes to delay its planned delivery schedule to 2032 as a consequence.[186] We consider that the delayed timing is prudent.

The cost estimate includes a large allowance for addition civil and structural works

508. AusNet has provided a detailed cost estimate based[187] on the preliminary design. The major cost is associated with the primary works (transformer, neutral earthing reactor, instrument transformers, etc) as we would expect. A large additional sum for civil and structural work is included for new bunding, a new firewall, and an allowance for removal of contaminated soil. We infer that the bunding and firewall are to comply with contemporary standards.

Summary of findings

509. The need to undertake a project to address the condition of the B4 transformer at TTS in the next RCP is prudent and the scope reasonable. We consider that AusNet's proposed delay to the planned delivery schedule to 2032 as a consequence of its updated analysis is prudent.

510. However, we found evidence of unsupported allowances and assumptions in the cost estimate, which for the reasons we have discussed in section 3.5.5 lead to an overestimate of the cost relative to the efficient cost of the project.

511. The economic timing is very sensitive to the demand growth forecast and we consider it prudent for AusNet to revisit the implications of the 2025 demand forecast as soon as practicable to assess the impact on the scope and timing of the work.

4.5 Summary of findings and implications for proposed major stations repex forecast

4.5.1 Summary of findings

Additional scope for some in-flight projects has not been sufficiently justified

512. For the four projects that AusNet has identified as in-flight, we consider that the projects are reasonable candidate projects to be completed in the next RCP, all of which had commenced in the current RCP. However, for two projects - SHTS Transformer and CB Replacement, and RCTS Transformer & Switchgear Replacement, AusNet has proposed further increases to the cost and scope of the projects that we do not consider have been adequately justified.

513. AusNet presented to us a PCR process, that if applied correctly should ensure that any requested scope and cost changes are robust prior to making commitments to proceed. For these projects, evidence of the PCR process or similar has not been provided, rather a summary of the changes and indicative costs was provided. Notwithstanding that AusNet has demonstrated that it has incurred upward pressure on pricing, we do not consider that the summary level of detail provided is sufficient to meet the needs of the NER and guidance materials, given the quantum of proposed increases.

We consider that some projects are likely to be deferred relative to the timing proposed by AusNet

514. We have tested the projects for sensitivity to changes in input assumptions using the sensitivity analysis that AusNet has applied. In most cases the projects have relatively

186 AusNet's response to information request, IR#007 – AusNet Responses on EMCa follow-up questions – 20251216 – PUBLIC.

187 Project Detailed Cost Summary – TTS B4 T Replacement – 31 Oct 2025 – CONF.

strong NPVs and this is not likely to change the preferred option or defer the economic timing materially. However, in projects with relatively low NPV results, we looked further into the drivers of the risks and assumptions, and sensitivity to the assumptions that AusNet has applied. We found that the economic timing indicated by the modelling was more likely than not later than indicated by AusNet:

- For the NPSD 220kV GIS replacement this would lead to deferral of the project by up to two years.
- For the WOTS Spare 330/66/22kV Transformer Procurement we consider that there is insufficient certainty surrounding whether this project will proceed in the next RCP, despite the proposed deferral of this project in response to our review, or that a replacement of the existing spare transformer will be required in the next RCP. On that basis, we do not consider that the need or timing of this project to be undertaken in the next RCP has been sufficiently justified.
- In the case of the TTS 66kV CB replacement, we found an issue with the modelling and once corrected and adjusted above, was a candidate for deferral beyond the end of the next RCP.
- Similarly, for the LYPS and HWTS 500kV CB replacement, the assumptions pointed to later economic timing from its modelling, with earlier project timing not evident in the economic modelling or adequately justified in other materials that AusNet has provided to us.
- Using a more appropriate 20-year study period for the MLTS reactor replacement project to recognise the uncertainty in ongoing benefits, leads to a negative NPV and we consider it to be prudent to defer the project timing by two years to 2033.
- For the TTS B4 transformer replacement project, AusNet's updated analysis results in deferral of the project delivery timing by one year to 2032.

Elements of cost estimate have not been sufficiently justified as reflective of an efficient cost, and lead to an overestimate of the efficient project cost

515. For the most part, AusNet's estimated costs reflect the outcome of a reasonable cost estimation process. However, across the portfolio of projects that we reviewed, we consider that there is a systemic overstatement of project cost estimates and which in aggregate lead to an overestimate relative to the efficient cost allowance that is required for regulatory purposes.

516. As identified in Section 3, specifically in section 3.5.5, we found the cost estimates to be over-stated due to a combination of the following factors:

- Application of additional costs to cover payment of contractor incentives has not been adequately justified
- We found examples of allowances that are higher than we would typically expect, based on our experience, and which collectively result in cost estimates above an efficient level, and
- There is duplication in some elements of provisions made for uncertainty and risk.

517. When considered in aggregate, we estimate that AusNet has overestimated its forecast costs by approximately 10%. An adjustment of the proposed capex by a similar amount for the projects included in the next RCP is likely to be a more reasonable estimate of the required capex.

Some of the proposed projects are sensitive to demand growth assumptions

518. Furthermore, project timing for some projects is sensitive to specific the demand growth assumptions that AusNet has applied. This is primarily due to the estimate of expected unserved energy (EUE) that AusNet has calculated, and which is directly linked to its demand assumptions.

519. Whilst we have tested the sensitivity, it is beyond our scope to review the demand forecast. If the demand forecast does not eventuate as AusNet has assumed, this may lead to re-prioritisation of some proposed repex against other works, consistent with what AusNet states it has undertaken in the current RCP, particularly in cases where deliverability issues may emerge. If it does not, this may lead to deferral of some projects.

520. This is particularly the case for KTS, for which AusNet has states it will revisit the latest demand growth assumptions to test the timing of the project. We observe that the timing for the TTS B4 transformer replacement and MWTS CB replacement projects are also sensitive to the demand growth assumptions.

4.5.2 Implications for forecast major stations repex

521. Whilst the majority of AusNet's forecast major stations repex appears reasonable, the issues we have identified lead us to the view that its forecast major stations repex for the next RCP represents an overestimate of its prudent and efficient requirement.

522. We propose adjustments for the issues that we have identified, and which lead us to a central estimate of the required capex for major stations repex as approximately 26% lower than AusNet has proposed as shown in Table 4.30 and Figure 4.15.

523. Whilst we have 'built up' our alternative estimate from the components of the program as AusNet has proposed, we consider that an appropriate interpretation of this alternative estimate is that in aggregate, an alternative capex allowance that is 20% to 30% less than AusNet has proposed, is a reasonable estimate of capex that would enable AusNet to address the issues that it has identified.

Table 4.30: EMCa adjustments to proposed major stations repex by project for next RCP – central estimate ($m, real March 2027)

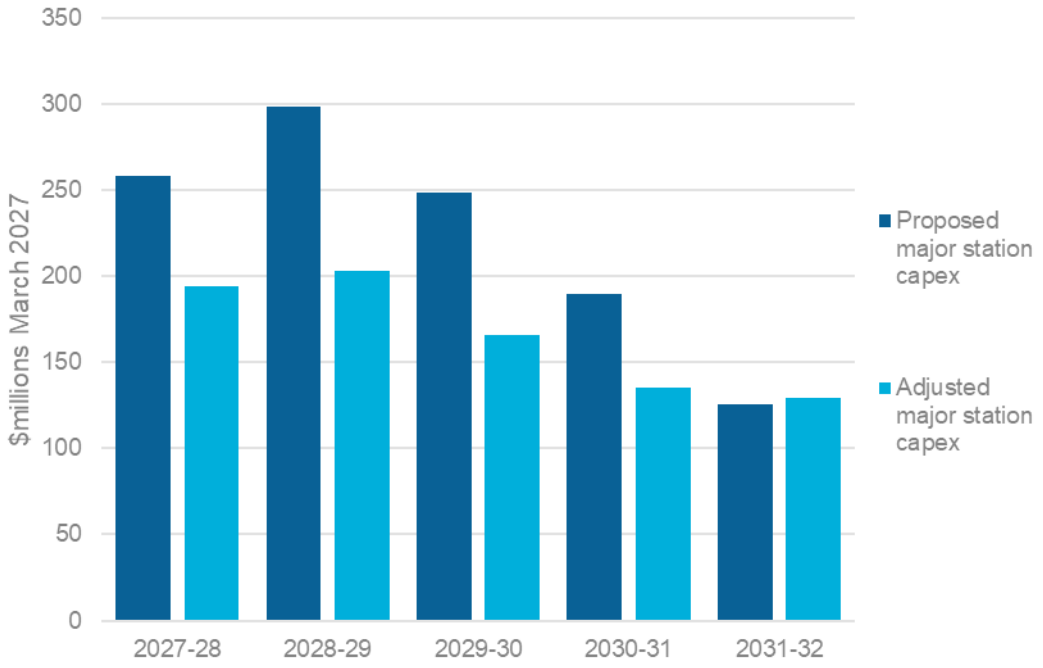
	2027-28	2028-29	2029-30	2030-31	2031-32	RCP Total
Proposed major stations repex	258.2	298.8	248.9	189.9	125.4	**1,121.2**
EMCa adjustments						
Additional scope/cost for SHTS TX and CB project not justified[188]	-11.5	-6.9				-18.4
Additional scope/cost for RCTS TX and Switchgear project not justified[189]		-10.3				-10.3
Deferral of TTS CB replacement project beyond next RCP	-19.6	-11.2				-30.8
Deferral of LYPS and HWTS CB replacement project by two years	-4.4	-8.7	-7.1	-14.6	-6.1	-40.9
Deferral of NPSD GIS replacement project by two years	-3.0	-18.5	-44.2	-29.0	11.3	-83.3
Deferral of WOTS spare transformer project beyond next RCP	-2.1	-6.8	-3.3			-12.1
Deferral of MLTS reactor replacement by two years	-0.1	-4.0	-9.0	-1.5	9.1	-5.4
Deferral of TTS B4 transformer by one year	-1.4	-6.2	-1.3	5.2	3.8	0.0
Adjust net amount for over-estimation by 10%	-21.6	-22.6	-18.4	-15.0	-14.3	-92.0
Adjusted major stations repex	**194.6**	**203.5**	**165.6**	**135.1**	**129.1**	**827.9**
Indicative adjustment (percent)						**-26%**

Source: EMCa analysis

188 This was determined as being the difference between the estimated project cost of $64.6 million ($2027) per IR001 Q3 and the last known total project cost of $46.1 million ($2027) per IR001 Q3, and which accounted for the last two years of expenditure.

189 This was determined as being the difference between the estimated project cost of $77.4 million ($2027) per IR001 Q3 and the approved value of $56.3 million ($2023) which when escalated to $2027 is approximately $67.1 million.

Figure 4.15: Comparison of proposed and EMCa adjusted major stations repex (central estimate) for next RCP ($m, real March 2027)



Source: EMCa analysis