AusNet

Transmission Revenue Reset 2027 to 2032 (TRR 2027-32)

Planning Report: Loy Yang Power Station 500 kV Circuit Breaker Replacement Project

Date: September 2026

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1. Executive summary

The Loy Yang Power Station 500 kV switching station (LYPS) is part of the main Victorian transmission network backbone. It connects Loy Yang A and B power stations, and Bassslink to the major 500 kV flow path between the Latrobe Valley and the load centre in metropolitan Melbourne and is therefore critical to the secure and reliable supply of electricity in Victoria.

The condition of some of the switchgear at LYPS is poor and it is expected that the risk of asset failure will increase over time. An asset failure will impact customers due to increased market cost and presents increased safety and environment risk.

Known inherent fleet issues affecting the deteriorated 500 kV assets at LYPS have persisted despite refurbishment, repair and maintenance efforts. Without remedial action beyond ongoing business-as-usual maintenance their condition is expected to deteriorate rapidly, materially increasing the likelihood of asset failure as has been observed with failures at LYPS in 2017, 2021 and 2024. Given the known fleet issues, AusNet has a risk based long-term replacement plan to phase out these legacy obsolete equipment types. The legacy circuit breakers, current transformers and isolators at LYPS are among the few remaining in AusNet's transmission network, and their replacement forms the second stage of the replacement project targeting these assets, following Stage 1, which commenced in late 2017. Failure of these assets at LYPS could cause significant system security risks as it could constrain one of the Loy Yang B generation units or result in unplanned outages of the critical 500 kV transmission lines connecting LYPS and Hazelwood Terminal Station (HWTS). Targeted replacement of these assets is an economic investment to manage the risk of asset failure and is consistent with AusNet's safety obligations and community expectations.

Since our Initial Proposal, AusNet has separated the LYPS and HWTS works into two standalone projects, with replacement works now proposed at each station individually. While the projects were originally combined due to their proximity, similar functional role, and the opportunity to deliver customer cost savings through a joint project, further assessment has identified materially different asset risk profiles and replacement drivers at each site.

In particular, the poorer asset condition at LYPS, its more aggressive polluted environment, and the potential safety consequences of current transformer (CT) failure, supports prioritising replacement works at LYPS. These findings are documented in the asset condition report and form the basis for including the LYPS replacement project in the Revised Proposal.

By contrast, an updated assessment of the economic timing of replacement at HWTS, incorporating new information including the latest 2026 demand forecasts, found it prudent to defer the HWTS project beyond the upcoming regulatory period. Asset risks at HWTS will continue to be prudently managed through targeted refurbishment and the strategic use of like-for-like spare assets and components salvaged from common asset types being replaced at LYPS and KTS.

Separating the projects also responds to feedback in the AER's Draft Decision regarding the need to more clearly justify the timing of the proposed investments. The updated assessment found that replacement at LYPS is economic by 2029. However, AusNet is targeting commissioning in 2032, with project expenditure occurring within the 2027-32 regulatory control period.

2. Background

LYPS has long played, and will continue to play a critical role in maintaining the safe, secure and reliable supply of electricity in Victoria. It is part of the main 500 kV Victorian transmission network backbone as it connects Latrobe Valley generation (Loy Yang A and B, and Loy Yang Gas power stations) and Basslink to the load in metropolitan Melbourne via the Northen and Southern 500 kV Latrobe Valley to Melbourne flow paths. Hazelwood Terminal Station (HWTS), Rowville Terminal Station (ROTS), Cranbourne Terminal Station (CBTS) and South Morang Terminal Station (SMTS) are key terminal stations along this flow path. Loy Yang coal fired power stations currently supplies approximately 50%[3] of Victoria's electricity. See Figure 1 for an overview of LYPS location within the Victorian transmission network.

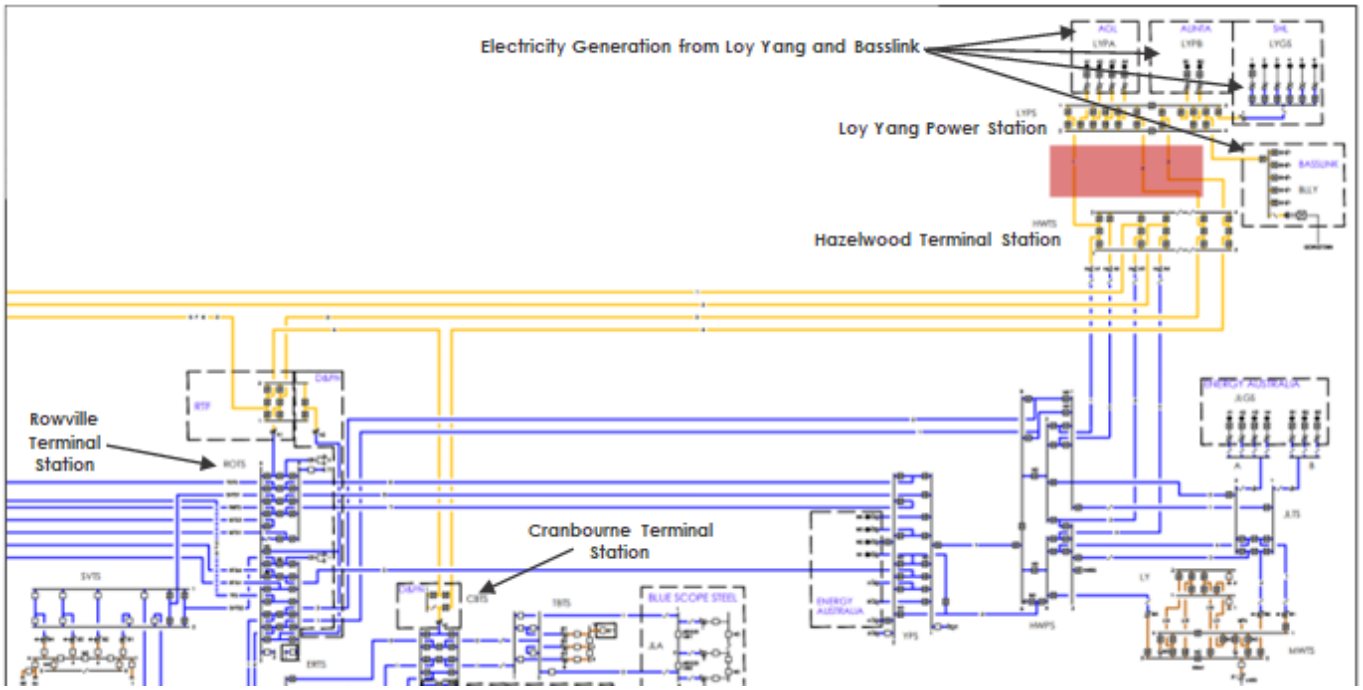

Figure 1: Overview of LYPS location within the Victorian transmission network

Asset Condition

The 500 kV assets at LYPS present an increasing risk of failure given their poor condition. The deterioration is driven by a combination of known fleet issues and exposure to corrosive environmental conditions. As a result, there is a clear need for investment given the material and growing system security, safety and environmental risks due to the following:

- asset condition has degraded to poor and very poor
- the consequence of failure is severe due to network criticality, and
- known persistent inherent fleet issues of legacy equipment at LYPS that could not be fully resolved by refurbishment, repair nor maintenance activities.

The deteriorated 500kV assets at LYPS are shown in red boxes in Figure 2 and includes :

- Six live tank circuit breakers (CBs)
- Six associated disconnector and earth switches
- 15 single phase current transformers (CTs).

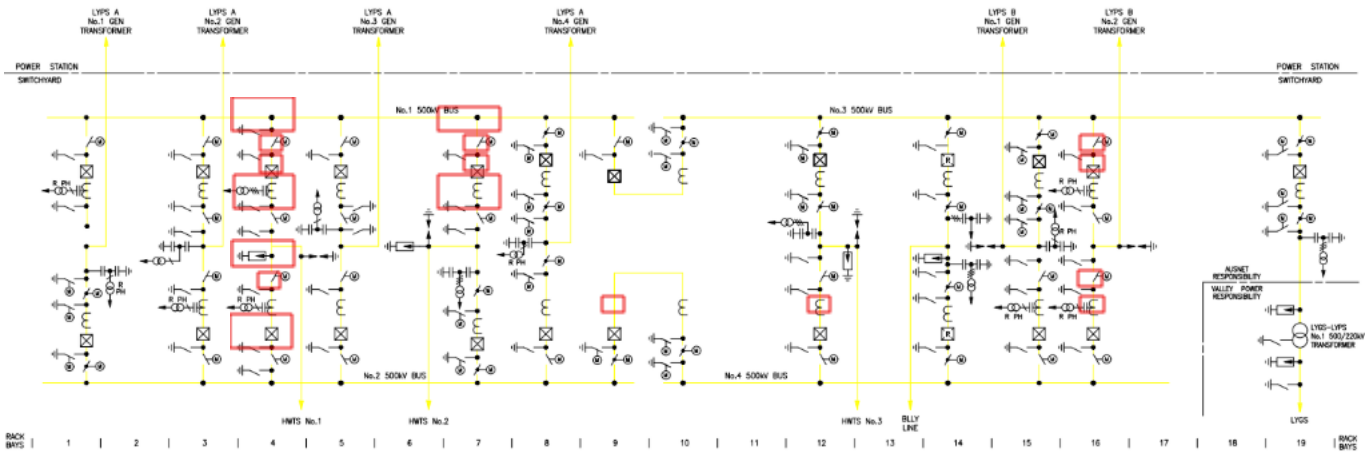

Figure 2: Deteriorated 500kV assets at LYPS

3. Identified need

The deteriorated 500kV assets at LYPS present an increasing risk of failure and there is a clear need for investment to manage the growing system security, safety and environmental risks as shown in Figure 3 where the baseline risk presents the increasing asset failure risk over time:

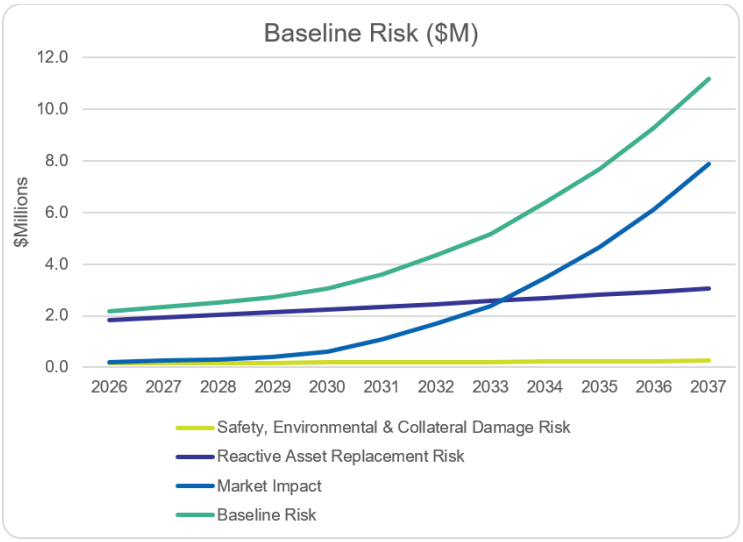

Figure 3: Baseline risk where no remedial action is taken to address asset failure risk at LYPS

3.1. Key inputs and assumptions

The identified need is underpinned by several assumptions, including the risk of asset failure (determined by the condition of the assets), the likelihood of the relevant consequences, and several assumptions adopted from the latest Inputs Assumptions and Scenarios Report (IASR). These assumptions are outlined below.

Market impact (wholesale market and involuntary load shedding) risk costs

A comprehensive network and market modelling study has been undertaken to assess the market impact of an outage at LYPS arising from an asset failure. The study applies the latest market modelling assumptions adopted by AEMO which includes NEM operational demand forecasts, generation cost forecasts, generation retirement schedules, and forecast transmission developments. It consists of increased generation cost and involuntary load shedding.

AusNet calculated the involuntary load shedding supply risk cost, which is the expected unserved energy resulting from an asset failure, based on the Value of Customer Reliability (VCR) at LYPS. This is consistent with the AER's estimate of VCR.

Safety risk costs

The Electricity Safety Act 1998 requires AusNet to design, construct, operate, maintain, and decommission the network to minimise hazards and risks to the safety of any person as far as practicable or until the costs become disproportionate to the benefits from managing those risks. This requires AusNet to minimise the safety risks posed by deteriorated 500kV assets at LYPS to as far as practicable.

By implementing this principle for assessing safety risks from an asset failure, AusNet uses:

- a value of statistical life to estimate the benefits of reducing the risk of a fatality;
- a value of lost time injury; and
- a disproportionality factor.

AusNet notes that this approach, including the use of a disproportionality factor, is consistent with the RIT-T asset replacement planning industry practice notes[9] developed by the AER.

Financial risk costs

There is an ongoing need for the transmission services provided at LYPS and emergency asset replacement would be required to continue the service should an asset fail. In the event of an asset failure at LYPS, AusNet has conservatively assumed only the failed asset will require emergency replacement, and other assets would not require

repair nor replacement. AusNet has also conservatively assumed the emergency asset replacement cost is the same as planned replacement cost even though unplanned replacement costs could be higher than planned replacement costs. The failure rate weighted unplanned asset replacement risk cost has been included in the assessment.

Environmental risk costs

The environmental risk cost of oil leakage has been calculated based on the probability of asset failure, the likelihood that an environmental incident will occur and the clean up cost.

AusNet has assessed its direct contribution to changes in Australia's greenhouse gas emissions from sources other than generation based on variations in the annual leakage of Sulphur Hexafluoride (SF_6), which is an insulation gas used in the 500 kV CBs at LYPS. A Global Warming Potential (GWP) factor of 23,500 relative to carbon dioxide (CO_2), has been applied to the SF_6 leakages to quantify its equivalent CO_2 emissions (CO_2-e).

The equivalent CO_2 emissions have been monetised using the value of emissions reduction (VER) in accordance with the guidance published by the AER.

4. Options assessed

This section sets out the credible options that have been considered to meet the identified need, including:

- the technical characteristics of each option;
- the estimated construction time and commissioning date;
- the total indicative capital and operating and maintenance costs
- whether the credible option is likely to have a material inter-regional impact.

AusNet identified the following two credible options that can be implemented in time to meet the identified need. These options have been considered with reference to the BAU base case.

- Option 1 – replace deteriorated assets as a single integrated project by 2030
- Option 2 – defer replacement of deteriorated assets by five years to 2035

The switchgear replacement at HWTS that has been proposed in AusNet's initial TRR proposal has been deferred to the 2032 to 2037 regulatory control period based on the AER feedback received in the draft determination. The scope proposed now targets the most critical assets.

For all options, AusNet expects that the operating and maintenance costs will not materially change from the base case.

Social licence requirements are expected to be effectively managed through established land access and stakeholder engagement processes. Given the limited scope of works within an existing terminal station and the minimal residual social licence risk, no additional social licence costs have been included across these options.

4.1. Option 1: Replace deteriorated assets at LYPS as a single integrated project by 2030

Option 1 entails replacing the deteriorated 500kV CBs, associated disconnectors and earth switches and CTs at LYPS with AusNet's current modern standard equivalent equipment by 2030 as a single integrated project. The project will commence in 2027.

The estimated capital cost of this option is $31.9 million.

4.2. Option 2: Defer replacement of deteriorated assets at LYPS by five years to 2035

This option involves deferring the replacement of the deteriorated 500kV CBs, associated disconnectors and earth switches and CTs at LYPS by five years to 2035. The project will commencement in 2032.

Delaying the replacement of the deteriorated equipment by five years will increase the risk of asset failure and thus, increase system security, safety and environmental risks.

The estimated capital cost of this option is $31.9 million.

4.3. Material inter-regional network impact

The proposed asset replacements at LYPS will not change the transmission network configuration and none of the network options considered are likely to have a material inter-network impact. A 'material inter-network impact' is defined in the NER as:

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

5. Assessment approach

Consistent with the RIT-T requirements and practice notes on risk-cost assessment methodology, AusNet Services undertook a cost-benefit analysis to evaluate and rank the net economic benefits of the credible options over a 45-year period.

All options considered have been assessed against a business-as-usual case (counter factual) where no proactive capital investment to reduce the increasing baseline risks is made.

Optimal timing of an investment option is the year when the annual benefits from implementing the option become greater than the annualised investment cost.

5.1. Proposed scenarios and input assumptions

The robustness of the investment decision is tested using the range of input assumptions and scenarios described in the table below. This analysis involves variation of assumptions around the most likely values as per the IASR, VicGrid's connection point forecast, latest VCR rates, and AusNet Service's best estimate of project cost and forecast asset failure rates.

Parameter	Lower Bound	Most likely (central) assumption or scenario	Upper Bound
VCR	75% of central assumption	Published VCR	125% of central assumption
Asset failure rate	75% of central assumption	Assessed failure rate	125% of central assumption
Demand Growth	85% of central assumption	2026 Connection Point Forecast	115% of central assumption
Discount rate1	WACC rate of a network business (3.0%)	Latest commercial discount rate from IASR (7%)	Upper Bound (10%)
Project Capital Cost	85% of estimated cost	Estimated cost	115% of estimated cost

Table 1 - Summary of input assumptions for range of scenarios and sensitivity studies

5.2. Material classes of market benefits

NER clause 5.16.1(c)(4) formally sets out the classes of market benefits that must be considered in a RIT-T. AusNet Services estimates that the classes of market benefits that are likely to be material include changes in involuntary load shedding.

5.3. Other classes of benefits

Although not formally classified as classes of market benefits under the NER, AusNet Services anticipates a material reduction in: safety risks from potential explosive failure of deteriorated assets, collateral damage risks to adjacent

plant, and the risk of increased costs resulting from the need for emergency asset replacements and reactive repairs by implementing anyone of the options described in Section 4. These additional benefits were included in the project justification.

5.4. Classes of market benefits that are not material

AusNet Services considers that the following classes of market benefits are unlikely to be material for any of the options considered:

- Changes in costs for parties, other than the RIT-T proponent – there is no other known investment, either generation or transmission, that will be affected by any option considered.
- Changes in ancillary services costs – the options are not expected to impact on the demand for and supply of ancillary services.
- Competition benefits – there is no competing generation affected by the limitations and risks being addressed by the options considered.

Option value – as the need for and timing of the investment options are driven by asset failure risk, there is no need to incorporate flexibility in response to uncertainty around any other factor.

6. Options assessment

This section presents the results of the economic cost benefit analysis that has been conducted to determine the preferred option and its economic timing.

All the options considered will deliver a reduction in market impact risk (including supply risk), safety risk, environmental risk, collateral risk and risk cost of emergency replacement in the event of asset failure. Presented in Figure 4, the present value (PV) cost of Option 1 (Replace CBs and switchgear) is lower than Option 2 (Deferred replacement) for all of the sensitivities where input variables are varied one at a time.

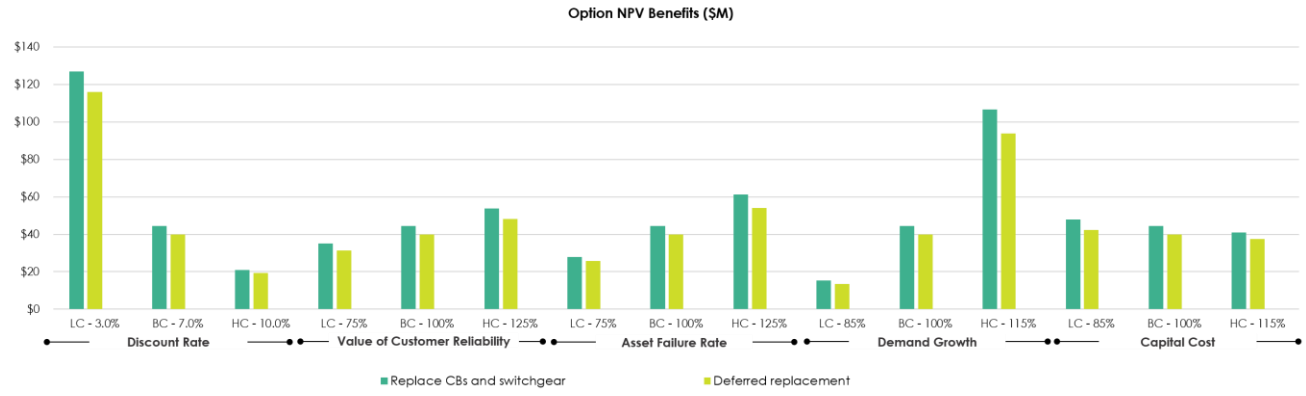

Figure 4: Option selection, scenario and sensitivity study

6.1. Preferred Option

Option 1 is the preferred option as it maximises the net economic benefit for all scenarios and sensitivity studies.

It requires approximately $31.9 million of capital investment with no material change to operating and maintenance costs.

The scope of work entails replacing the following deteriorated 500kV assets at LYPS by 2030 as a single integrated project with a commencement date of 2027:

- Six live tank CBs
- Six associated disconnector and earth switches
- 15 single phase CTs

6.2. Optimal timing of the preferred option

This section describes the optimal investment timing of the preferred option for different assumptions of key variables.

Figure 5 shows that the optimal timing of the preferred option (Option 1) is 2029 and that investment is needed within the 2027 to 2032 regulatory control period. It is worth noting that the demand growth sensitivity also shows that the economic timing is delayed by only one year, to 2030, under a scenario where the demand forecast is 15% lower. This remains earlier than the current project delivery timing of 2032.

Figure 5: Optimal investment timing sensitivity study

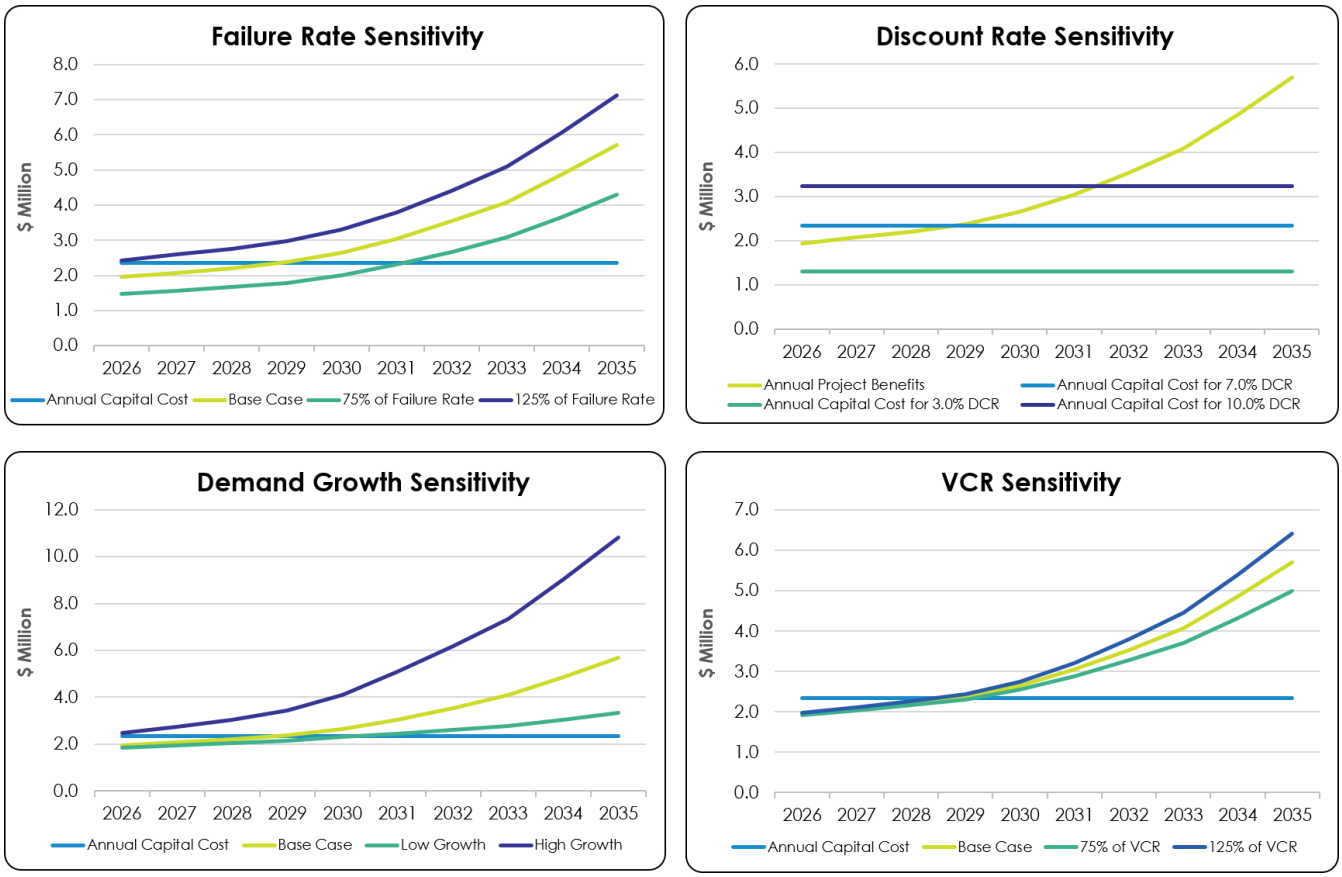

Figure 6 shows that the investment economic timing is only one year later for a 15% increase in investment cost.

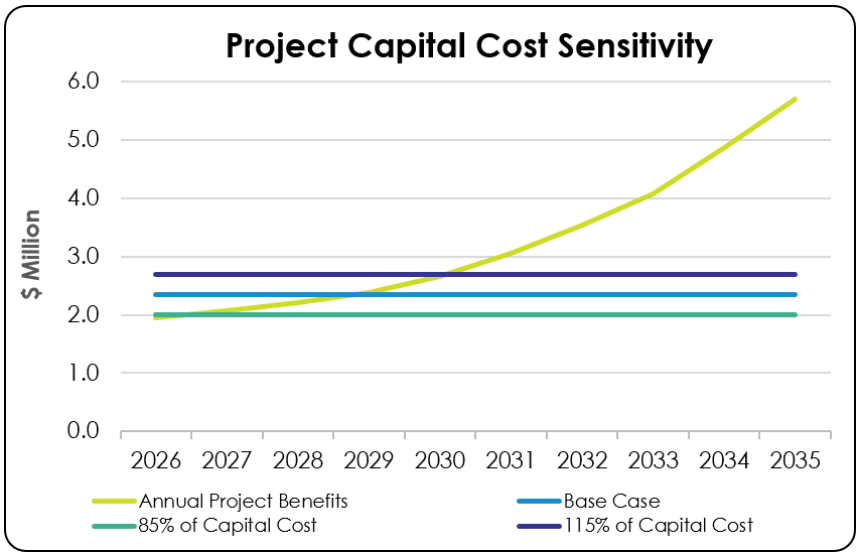

Figure 6: Optimal investment timing sensitivity study – Capex

7. Conclusion

From all the options considered, Option 1 is the most economical option to maintain reliable transmission network services at LYPS and managing safety, environmental, collateral and emergency replacement risks.

The estimated capital cost of this option is $31.9 million with no material change in operating and maintenance costs. The project is economic by 2029, but AusNet Services is targeting a commissioning date of 2032, with the costs of the project expenditure falling within the 2027 to 2032 regulatory control period.

8. Appendix 1: Cost Estimate

Option 1

	PROJECT EXPENDITURE FORECASTS	TOTAL	2026	2027	2028	2029	2030	2031
1	DESIGN & STUDIES/ASSESSMENTS	$ 2,225,662.70	$ -	$ 1,338,306.98	$ 887,355.72	$ -	$ -	$ -
2	INTERNAL LABOUR	$ 3,084,586.21	$ 181,102.60	$ 710,779.02	$ 712,726.36	$ 710,779.02	$ 710,779.02	$ 58,420.19
3	MATERIALS (AusNet Free Issue Materials)	$ 6,802,471.30	$ -	$ -	$ -	$ 3,694,650.78	$ 3,107,820.52	$ -
4	PLANT & EQUIPMENT	$ -	$ -	$ -	$ -	$ -	$ -	$ -
5	CONTRACTS (incl insurance)	$ 13,742,718.36	$ -	$ -	$ -	$ 7,486,704.78	$ 6,256,013.58	$ -
6	OTHER - RISK P(50)	$ 3,451,841.66	$ 19,015.77	$ 233,967.38	$ 193,997.42	$ 1,580,115.98	$ 1,416,531.00	$ 8,214.11
7	PROJECT DIRECT EXPENDITURE P(50)	$ 29,307,280.24	$ 200,118.37	$ 2,283,053.38	$ 1,794,079.50	$ 13,472,250.56	$ 11,491,144.12	$ 66,634.31
8	OVERHEADS	$ 1,350,946.66	$ 9,462.61	$ 107,064.74	$ 83,604.29	$ 621,364.03	$ 526,398.53	$ 3,052.46
9	FINANCE CHARGES (IDC)	$ 1,269,268.14	$ 1,315.81	$ 41,201.96	$ 181,272.78	$ 186,608.71	$ 776,752.52	$ 82,116.35
10	PROJECT DIRECT EXPENDITURE (SAP)	$ 31,927,495.04	$ 210,896.80	$ 2,431,320.08	$ 2,058,956.57	$ 14,280,223.30	$ 12,794,295.18	$ 151,803.11
11	MANAGEMENT RESERVE [P(90)-P(50)]	$ 1,990,868.77						
12	ESCALATION	$ -						
12	TOTAL EXPENDITURE FOR APPROVAL	$ 33,918,363.81	$ 210,896.80	$ 2,431,320.08	$ 2,058,956.57	$ 14,280,223.30	$ 12,794,295.18	$ 151,803.11

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