6 MAY 2026

Maintaining Reliability of Supply at Townsville South

Project Assessment Conclusions Report

Preface

Powerlink Queensland is a Transmission Network Service Provider (TNSP) that owns, develops, operates and maintains Queensland's high-voltage electricity transmission network. The network transfers bulk power from Queensland generators to electricity distributors Energex and Ergon Energy (part of the Energy Queensland Group), and to a range of directly connected large industrial customers.

This Project Assessment Conclusions Report has been prepared in accordance with version 244 of the National Electricity Rules (NER), the Regulatory Investment Test for Transmission (RIT-T) Instrument (November 2024) and RIT-T Application Guidelines (November 2024). The RIT-T Instrument and Application Guidelines are made and administered by the Australian Energy Regulator.

The NER requires Powerlink to carry out forward planning to identify future reliability of supply requirements, which may include replacement of network assets or augmentation of the transmission network. Powerlink must then identify, evaluate and compare network and non-network options (including, but not limited to, generation and demand side management) to identify the preferred option which can address future network requirements at the lowest net cost to electricity customers.

Powerlink also has obligations under the NER to address power system security requirements identified by the Australian Energy Market Operator in its annual System Security Reports.

This document provides details of the identified risks and need associated with this project. It also provides information on credible options, categories of market benefits likely to impact the ranking of credible options and recommends the preferred option for implementation.

More information on how Powerlink applies the RIT-T process is available on Powerlink's website.

A copy of this report will be made available to any person within three business days of a request being made. Requests should be directed to the Manager Network and Alternate Assessments, by phone ((07) 3860 2111) or email (networkassessments@powerlink.com.au).

Disclaimer

Powerlink acknowledges the Traditional Owners and their custodianship of the lands and waters of Queensland and in particular, the lands on which we operate. We pay our respect to their Ancestors, Elders and knowledge holders and recognise their deep history and ongoing connection to Country.

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Executive Summary

Primary plant condition at Townsville South Substation requires Powerlink to act

The Townsville South Substation is located 11 kilometres south-east of the Townsville central business district and is a major injection point into the Ergon Energy distribution network for southern and eastern Townsville. The substation is also a transfer point for enabling the flow of electricity between Clare to the south and Townsville to the north. Planning studies confirm there is an enduring need for Townsville South Substation to maintain electricity supply and meet regulatory requirements.

The primary plant at Townsville South Substation – the equipment through which the electrical power passes – has been identified as being at risk of premature failure or is at the end of its technical service life with identified defects and obsolescence issues.

Powerlink must therefore take action to avoid the increasing likelihood of loss of power supply arising from failure of the primary plant at the substation and to ensure customers are provided with a safe and reliable supply of electricity.

Powerlink is reapplying the Regulatory Investment Test for Transmission to maintain reliability of supply at Townsville South

In 2018/19, Powerlink undertook a Regulatory Investment Test for Transmission (RIT-T) to address the condition risks arising from ageing primary plant at Townsville South Substation. The preferred option in the Project Assessment Conclusions Report (PACR) was staged replacement of selected primary plant using live tank circuit breakers. The PACR indicated completion was planned by December 2022 at an estimated capital cost of $4.94 million in 2018/19 prices.

Following completion of the RIT-T, constrained availability of field resources during the COVID-19 pandemic delayed project delivery. During this time, the condition of the primary plant further deteriorated, resulting in Powerlink implementing a number of Restricted Access Zones (RAZs) to maintain safety at the substation. Powerlink also encountered early failures in equipment at the substation, including particular current transformer and voltage transformer models. Powerlink has mitigated highest increased asset risks through priority replacement works allowing rectification of RAZs as well as interim operational measures, including additional inspections and maintenance.

The original scope of the project has been expanded to address ongoing reliability risks identified since the initial RIT-T. Initially, the project scope involved replacing seven circuit breakers with live tank models, while retaining the existing current transformers in those bays. However, it has since been identified that these current transformers are prone to premature failure and now require replacement. As a result, the preferred option has shifted to installing dead tank circuit breakers, which integrate current transformers within the unit. Additionally, the scope has been expanded to include the replacement of further voltage transformers that have also demonstrated premature failure.

Powerlink considers the change in preferred option to be a material change of circumstances under the RIT-T framework set out in the National Electricity Rules (NER) and is reapplying the RIT-T to maintain reliability of supply to Townsville South.

Powerlink commenced this RIT-T with the publication of a Project Specification Consultation Report (PSCR) in December 2025. No submissions were received in response to the PSCR by the due date of 10 April 2026. As a result, no additional credible options have been identified as a part of this RIT-T consultation.

This PACR is the final step in the RIT-T process to address the primary plant risks at Townsville South Substation. The PACR contains the results of the planning investigation and the cost-benefit analysis of credible options. The cost-benefit analysis uses a non-credible base case where the asset condition issues are managed via operational or maintenance measures. In this situation, risk levels increase over time due to deterioration of asset condition and increasing failure rectification timeframes due to obsolescence issues. Credible options are compared to the base case allowing ranking of credible options.

Powerlink has developed one credible network option to address the identified need

The table below details the credible network option and shows that this option has a positive Net Present Value (NPV) relative to the base case. Further credible options were initially considered in Powerlink's first RIT-T, however due to identification of additional equipment reliability risks, only one credible option remains.

Summary of Credible Option

Option	Description	Total Costs ($m, 2025)	NPV relative to base case ($m)	Ranking
1	Single stage replacement utilising dead tank circuit breakers by December 2027.	20.23	27.28	1

Note: Total costs exclude risk and contingency.

Evaluation and conclusion

The RIT-T requires that the preferred option maximise the present value of economic benefits. If the identified need is for a reliability corrective action, the preferred option may have a net economic cost.

The cost-benefit analysis for this RIT-T demonstrates that Option 1, single stage replacement utilising dead tank circuit breakers, reduces the monetised risk and results in a positive NPV outcome relative to the base case. The indicative capital cost of Option 1 is $20.23 million in 2024/25 prices. Installation and commissioning of the new primary plant is to be completed by December 2027.

Dispute Resolution

In accordance with clause 5.16B(a) of the NER, energy industry participants, the Australian Energy Market Commission, electricity consumers (including their representatives) may, by notice to the Australian Energy Regulator (AER), dispute conclusions made by Powerlink in this PACR in relation to:

- the application of the RIT-T;
- the basis on which Powerlink has classified the preferred option as a reliability corrective action; or
- Powerlink's assessment of whether the preferred option will have a material inter-network impact.

Notice of a dispute must be given to the AER within 30 days of the publication date of this report. Any parties raising a dispute are also required to simultaneously provide a copy of the dispute notice to Powerlink. Powerlink requests a copy of any dispute notice be sent by email (NetworkAssessments@powerlink.com.au) and marked for the attention of the Head of Legal Services.

1. Introduction

1.1. Powerlink asset management and obligations

Powerlink's approach to asset management delivers value to customers and stakeholders by optimising whole of life cycle costs, benefits and risks, while ensuring compliance with relevant legislation, regulations and standards. This is underpinned by Powerlink's corporate risk management framework, risk assessment guidelines and methodologies.

1.2. Overview of the Regulatory Investment Test for Transmission

The purpose of a Regulatory Investment Test for Transmission (RIT-T) is to identify the preferred investment option that meets the identified network need. The preferred option maximises the present value of economic benefit. If the identified need is for a reliability corrective action, the preferred option may have a net economic cost.[1]

Powerlink applies the RIT-T to potential prescribed (regulated) investments in the transmission network where the estimated capital cost of the most expensive option exceeds $8 million.[2]

Powerlink commenced this RIT-T with publication of a Project Specification Consultation Report (PSCR) on 23 December 2025. The PSCR identified Option 1, single stage replacement utilising dead tank circuit breakers, as the preferred option to address the risks at Townsville South Substation. The PSCR stated that the indicative capital cost of Option 1 was $20.23 million in 2024/25 prices, and that installation and commissioning of the new primary plant would be completed by December 2027.

The PSCR indicated that Powerlink would adopt the expedited process for this RIT-T, as allowed under the National Electricity Rules (NER) for RIT-T projects without material market benefits and where other conditions are met.[3] Submissions on the PSCR were due to Powerlink by 10 April 2026; as no submissions were received, no additional credible options that could deliver a material market benefit have been identified via the RIT-T consultation process. Powerlink has therefore satisfied the conditions to expedite this RIT-T process and not issued a Project Assessment Draft Report (PADR).

This Project Assessment Conclusions Report (PACR) is the final step in the RIT-T process to address risks at Townsville South Substation. The PACR includes:

- a description of each credible option assessed;
- a quantification of the costs, including a breakdown of operating and capital expenditure, and classes of material market benefit for each credible option;
- reasons why Powerlink has determined that a class or classes of market benefit are not material;
- the results of Net Present Value (NPV) analysis for each credible option assessed, together with accompanying explanatory statements; and

[1] National Electricity Rules (NER), clause 5.15A.1(c) and chapter 10, glossary ('net economic benefit').
[2] NER, clauses 5.15.3(a) and (b)(2) set the threshold at $5 million. The Australian Energy Regulator's (AER) latest cost threshold review increased the value to $8 million for three years from 1 January 2025.
[3] NER, clause 5.16.4(z1).

- the identification of the proposed preferred option, including details of the technical characteristics and the estimated construction timetable and commissioning date.[4]

More information on the RIT-T process is provided in Appendix 1.

1.3. Consumer and Non-network Engagement

Powerlink undertakes a considered and consistent approach to ensure an appropriate level of stakeholder engagement is undertaken for each individual RIT-T consultation. The scope of engagement activities is dependent upon various considerations, such as the characteristics and complexity of the identified need and potential credible options.

For all RIT-Ts, members of Powerlink's Non-network Engagement Stakeholder Register receive email notifications of publication of RIT-T reports. For projects where Powerlink identifies material or significant market benefits, additional activities such as webinars or dedicated engagement forums may be appropriate. For more information, see Powerlink's RIT-T stakeholder engagement matrix.

Additionally, Powerlink takes a proactive approach to engagement generally. This includes:

- The Transmission Network Forum – Powerlink's annual customer engagement event.
- Collaboratively working with Powerlink's customers, including regular consultation on RIT-Ts with our Customer Panel (Powerlink Customer Panel | Powerlink)
- Transparency on future network requirements, such as our Transmission Annual Planning Report (TAPR)

Appendix 2 provides more detail on Powerlink's engagement approach.

[4] NER, clause 5.16.4(v).

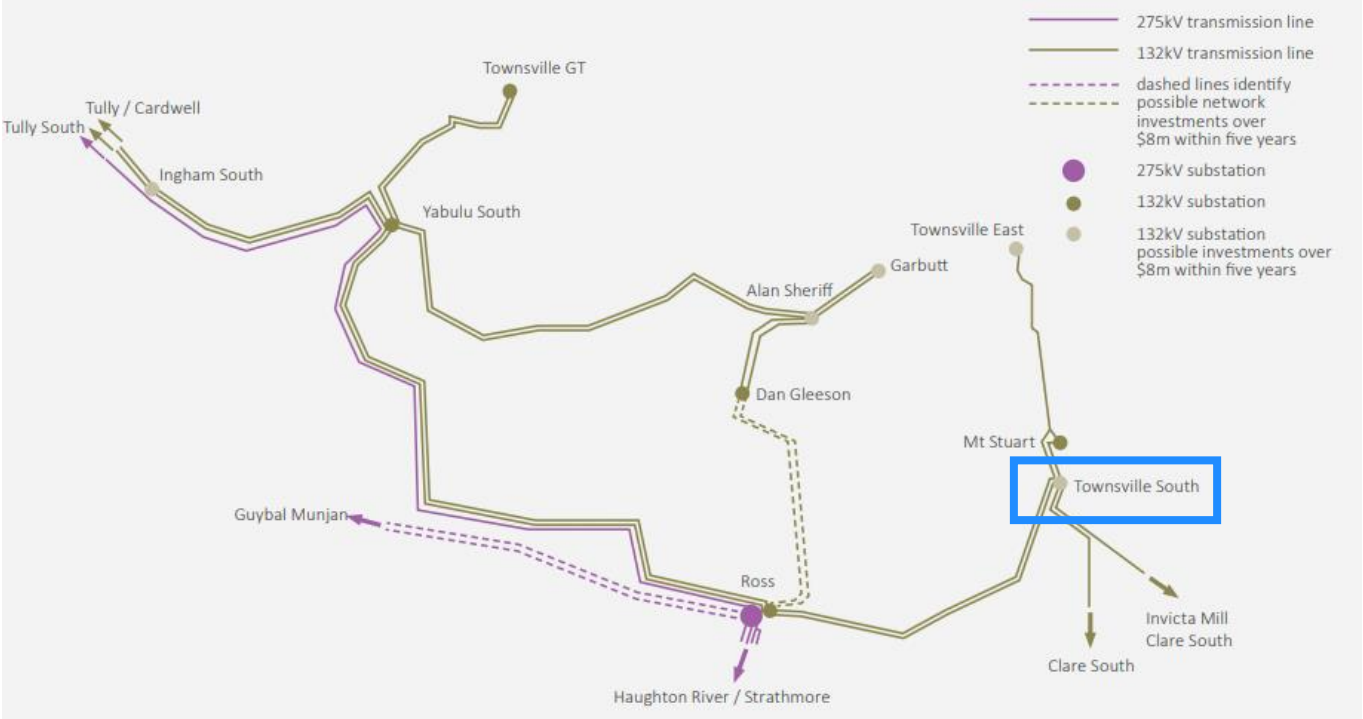
2. Identified Need

The primary driver for reinvestment at Townsville South Substation is plant reliability leading to loss of power supply to the Townsville area or reduction in reliability of the 132kV network supplying North Queensland.

2.1. Geographical and network need

Townsville South Substation was established in 1977 to replace the 132 kilovolt (kV) equipment at Stuart Substation. Townsville South Substation serves multiple functions, including as a bulk supply point for Ergon Energy load in the southern and eastern suburbs of Townsville.

Figure 2.1: Northern Ross Zone Transmission Network



2.2. Description of identified need

Powerlink's Transmission Authority requires it to plan and develop the transmission network in accordance with good electricity industry practice, having regard to the value that end users of electricity place on the quality and reliability of electricity services. It allows load to be interrupted during a critical single network contingency, provided the maximum load and energy will not exceed 50 megawatts (MW) at any one time, or will not be more than 600 megawatt hours (MWh) in aggregate.[5] The Transmission Authority is also subject to a broader obligation under the *Electricity Act 1994* (Qld) (the Electricity Act) that Powerlink operate, maintain (including repair and replace if necessary) and protect its transmission grid to ensure the adequate, economic, reliable and safe transmission of electricity.[6]

[5] Transmission Authority No. T01/98, section 6.2(c).
[6] *Electricity Act 1994* (Qld), section 34(1)(a).

Planning studies confirm that to continue to meet the reliability standard in Powerlink's Transmission Authority, the services currently provided by Townsville South Substation are required into the foreseeable future to meet ongoing customer requirements.

The primary plant at Townsville South Substation – the equipment through which the electrical power passes – has been identified as being at risk of premature failure or is at the end of its technical service life with identified defects and obsolescence issues.

Powerlink must therefore take action to avoid the increasing likelihood of loss of power supply arising from failure of the primary plant at the substation and to ensure customers are provided with a safe and reliable supply of electricity.

As a result, the proposed investment is for meeting reliability and service standards. These standards are set through Powerlink's Transmission Authority requirements and Schedule 5.1 of the NER. Because of this it is classed as a reliability corrective action under the NER.[7] A reliability corrective action differs from that of an increase in producer and consumer surplus (market benefit) driven need in that the preferred option may have a negative net economic outcome. The NER includes reliability corrective actions to allow for meeting an externally imposed obligation on the network business.[8]

2.3. Description of asset condition and risks

Powerlink has undertaken a comprehensive condition assessment of the primary plant at Townsville South Substation. This assessment has identified that a significant amount of primary plant is exhibiting age-related deterioration issues and reaching the end of its technical service life, with an increasing risk of failure.

In addition, Powerlink has experienced premature failures in certain equipment models installed throughout Powerlink's network, including particular current transformer and voltage transformer models installed at Townsville South.

At-risk Townsville South Substation primary plant comprises circuit breakers, current and voltage transformers, isolators, earth switches, surge arrestors and capacitor banks.

2.4. Consequences of failure of primary plant

Poor asset condition increases the risk and frequency of faults, while obsolescence increases the time needed for Powerlink to undertake any necessary repairs, prolonging the return to service time.

The potential in-service failure of ageing primary plant at Townsville South presents Powerlink with a range of safety, network and financial risks, and the inability to meet legislative obligations and customer service standards. The condition and consequences of failure of the main at-risk items of primary plant is summarised in the table below.

[7] NER, clause 5.10.2 (definition of 'reliability corrective action').
[8] NER, clause 5.15A.1(c).

Table 2.1: Summary of primary plant condition issues and potential consequences of failure

Equipment	Condition / Issue	Potential Consequences of Failure
Circuit Breakers	• Loss of pneumatic pressure • Limited availability of spares	• Failure to operate to clear a fault, resulting in slower clearance times and additional plant being taken out of service to clear the fault, increasing supply risk. • Extended time to restore supply to customers due to a limited availability of spares • Environmental impacts from Sulfur Hexaflouride (SF_6) gas release • Increased maintenance resulting in less reliable and more costly supply to customers
Voltage Transformers	• Degraded oil and paper insulation inside porcelain housings • Oil leaks and overheating	• Significant financial, environmental and loss of supply risks • Loss of protection signals resulting in disconnection of supply • Breach of metering requirements[9]
Current Transformers	• Degraded oil and paper insulation inside porcelain housings • Oil leaks	• Significant safety, financial, environmental and loss of supply risks • Potential for failure modes leading to damage of other equipment and extended loss of supply
Isolators and Earth Switches	• Corrosion of operating arms and associated structures • High resistance of contacts	• Failure to operate leading to network outages to rectify before maintenance and project work can be conducted • Heating from the high resistance causing potential fire and relevant safety risks
Surge Arrestors	• Moisture ingress • Corrosion • Dielectric breakdown	• Unable to protect equipment from overvoltage surges resulting in failure of downstream equipment
Capacitor Banks	• Corrosion of capacitor cans • Failure of capacitors within capacitor cans	• Load/generation shedding when power factor correction or voltage stability is required in the network • Safety risks associated with catastrophic failure of capacitor cans

[9] Chapter 7, Part D, Metering Installation and Schedule 7.2 Metering Provider, AER

3. Potential Credible Network Options to Address the Identified Need

3.1. Credible Network Option

Powerlink has developed one credible network option to maintain reliability of supply and to address condition risks at Townsville South Substation. Further credible options were initially considered in Powerlink's first RIT-T, however due to identification of additional equipment reliability risks with other primary plant, only one credible option remains.

Option 1 seeks to address the risks associated with the primary plant at Townsville South by undertaking a single stage replacement utilising dead tank circuit breakers. Under Option 1, it is planned to complete commissioning works by December 2027.

A summary of this option is shown in the table below.

Table 3.1: Summary of credible option

Option	Description	Total costs ($m, 2025)	Indicative annual O&M costs ($m, 2025)
1	Single stage replacement utilising dead tank circuit breakers by December 2027.	20.23	0.04

Note: O&M denotes operations and maintenance.

The credible option addresses the risks resulting from the ageing primary plant at Townsville South Substation to allow Powerlink to meet its reliability of supply and safety obligations under its Transmission Authority, the Electricity Act and Schedule 5.1 of the NER, by the replacement of the deteriorated equipment.

3.2. Options considered but not progressed

In 2018/19, Powerlink undertook a RIT-T to address the condition risks arising from ageing primary plant at Townsville South Substation and two additional options were developed as follows:

- Staged replacement utilising live tank circuit breakers completed by 2045
- Staged replacement utilising dead tank circuit breakers completed by 2045.[10]

The preferred option in the PACR was staged replacement of selected primary plant using live tank circuit breakers. Live tank circuit breakers contain the interrupter (the part which opens and closes the circuit) inside an insulated tank that is at high voltage, whereas, for dead tank circuit breakers, the interrupter is inside a tank that is solidly earthed. Dead tank circuit breakers also contain current transformers within the one unit.

Project works commenced following completion of the RIT-T, constrained availability of field resources during the COVID-19 pandemic delayed project delivery. During this time, the condition of the primary plant further deteriorated, resulting in Powerlink implementing a number of Restricted Access Zones (RAZs) to maintain safety at the substation. Powerlink also encountered early failures in equipment at the substation, including particular current transformer and voltage transformer models. Powerlink has mitigated highest asset risks through priority

[10] Detail on the two options is available in Table 5.2 of the PSCR for this RIT-T.

replacement works allowing rectification of RAZs as well as interim operational measures, including additional inspections and maintenance.

However, the increased risk of early failure of current transformer and voltage transformer models presents Powerlink with a range of ongoing reliability of supply, safety and compliance risks which put at risk Powerlink's ongoing compliance with the reliability and service standards set out in the NER, Powerlink's Transmission Authority and applicable regulatory instruments.

For this reason, replacement of these models is required to be brought forward, and the staged replacement options are no longer considered to be technically feasible. The preferred option has also changed from utilising live tank circuit breakers to dead tank circuit breakers due to the need to replace the current transformers in the same bays as the circuit breakers (dead tank circuit breakers include current transformers as part of their design).

3.3. Material Change in Circumstances

Powerlink considers the change in preferred option since the RIT-T completed in 2018/19 to be a material change of circumstances under the RIT-T framework set out in the NER and is reapplying the RIT-T to maintain reliability of supply to Townsville South.[11]

[11] NER, clause 5.16.4(z3). See Appendix 5 for more detail regarding requirements for reapplication of the RIT-T.

4. Economic Analysis of the Base Case

Powerlink has developed a risk modelling framework consistent with the RIT-T Application Guidelines. An overview of the framework is available on Powerlink's website and the principles of the framework have been used to quantify the monetised risk, termed risk costs, in the National Electricity Market (NEM) context for the Townsville South base case. The framework includes the modelling methodology and general assumptions underpinning the analysis.

4.1. Modelling a base case under the RIT-T

The base case is the situation in which the RIT-T proponent does not implement a credible option to meet the identified need and continues with business-as-usual (BAU) activities.[12]

The assessment undertaken in this RIT-T compares the costs and benefits of credible options to address the risks arising from an identified need with a base case. As characterised in the RIT-T Application Guidelines, the base case reflects a situation in which the condition and obsolescence issues arising from the ageing assets are only addressed through standard operational activities, with resultant safety, financial, environmental and network risks.[13]

To develop the base case, the existing condition and obsolescence issues are managed by undertaking operational maintenance or operational measures only. This results in higher overall risk levels as the condition and availability of the asset deteriorates over time. These risk levels are assigned a monetary value that is used to evaluate the credible options designed to offset or mitigate these risk costs.

The base case therefore includes the costs of work associated with operational maintenance and the risk costs associated with the failure of the assets. The costs associated with equipment failures are modelled in the risk cost analysis and are not included in the operational maintenance costs.

The base case acts as a benchmark and provides a reference point in the cost-benefit analysis to compare and rank the credible options against each other over the same timeframe.

4.2. Quantifiable Risk Costs for the Base Case

The NER requires RIT-T proponents to quantify a number of classes of market benefits for each credible option, unless the proponent can demonstrate that a specific category(ies) is/are unlikely to materially affect the outcome of the assessment of credible options.[14] In line with Powerlink's framework, three key risk costs have been quantified in the cost benefit analysis in response to the identified need:

- **Network risk cost** – this is the cost of loss of supply that results from an in-service failure of the identified equipment and is typically known as unserved energy. This generally accrues under concurrent failure events, and consideration has been given to potential feeder trip events within the wider area at the same time as the failure of an element of the identified equipment. Townsville South Substation supplies a mixture of residential, industrial and agricultural load types. Historical load data has been analysed to approximate the

[12] AER, *Regulatory Investment Test for Transmission*, November 2024, glossary ('base case').
[13] AER, *Application Guidelines, Regulatory Investment Test for Transmission*, November 2024, page 21. See AER, *Regulatory Investment Test for Transmission*, November 2024, paragraph 24 and AER, *Application Guidelines, Regulatory Investment Test for Transmission*, November 2024, pages 32-35 for a definition and discussion of states of the world in a RIT-T.
[14] NER, clauses 5.15A.2(b)(4), (5) and (6). See also AER, *Regulatory Investment Test for Transmission*, November 2024, paragraphs 10 to 13.

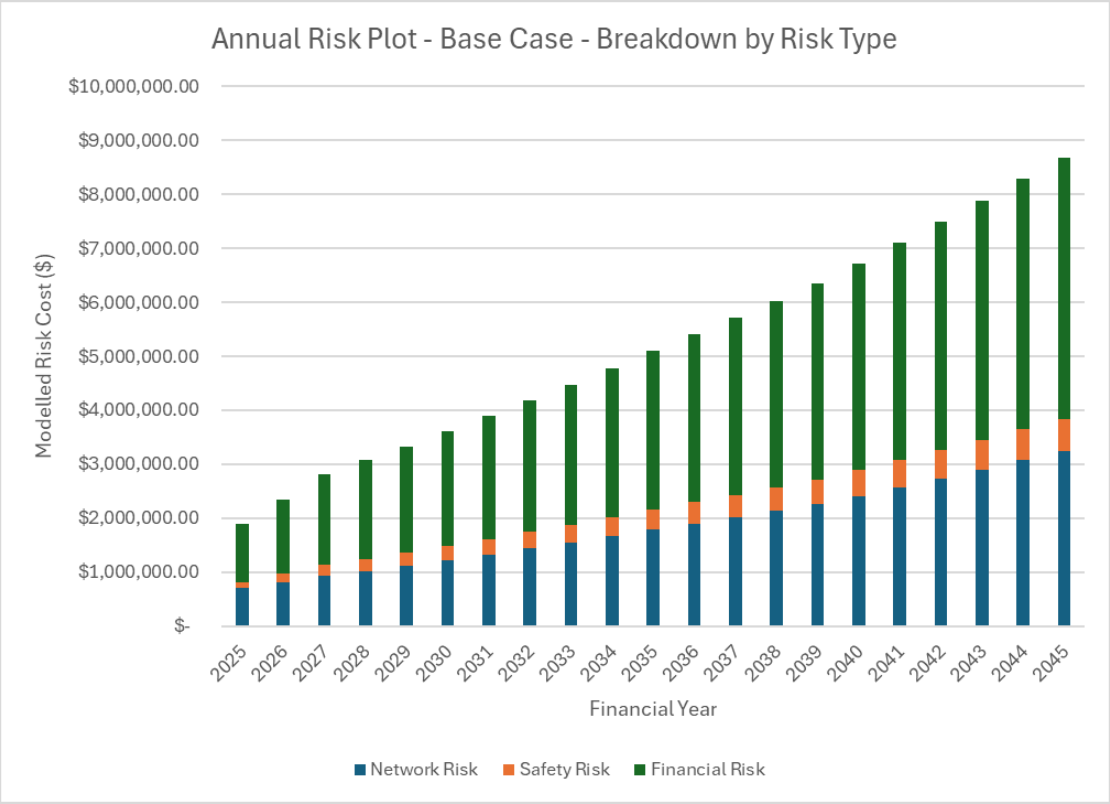
ratio of the load types, resulting in a Value of Customer Reliability (VCR) of $36,090/MWh, published within the 'Value of customer reliability – Final report on VCR values' by the AER (updated in December 2024).

- **Financial risk cost** – this is the cost associated with rectifying an in-service failure of the identified equipment.
- **Safety risk cost** – this is the assessed safety impact that may result from the unlikely event of a catastrophic in-service failure of the identified equipment. Powerlink utilises guidance from the Department of Prime Minister and Cabinet to assess and quantify this risk.

Appendix 3 outlines the market benefits that Powerlink has assessed as not having a material impact on the options analysis.

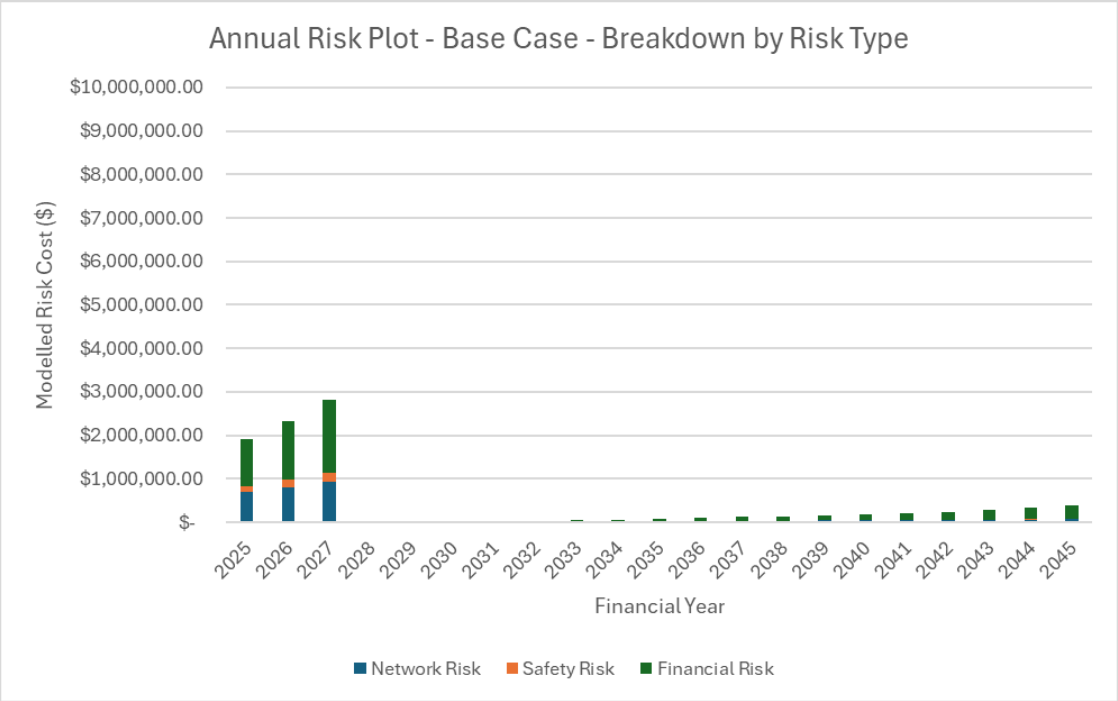
The 20-year forecast of risk costs for the base case and option 1 is shown in Figure 4.1 and Figure 4.2.

Figure 4.1: Monetised risk for the base case



As shown in Figure 4.1, around 50% of the risk cost is financial risk, based on having to replace the existing equipment in emergency situations through continued operation of the existing equipment. Based upon the assessed condition of the ageing primary plant at Townsville South, the total risk costs are projected to increase from around $1.90 million in 2025 to $8.68 million in 2045, with Option 1 significantly reducing this risk through replacing these assets as shown in Figure 4.2.

Figure 4.2 Monetised risk for Option 1



5. Cost-benefit Analysis and Identification of Preferred Option

5.1. Cost estimation

Basis of Estimation

The basis for the estimation for the credible option presented in this PACR is outlined in the methodologies and processes used to derive cost estimates as described in Powerlink's Cost Estimation Methodology. The estimates are informed by the level of specific project information available at the time of PACR preparation. Powerlink's Cost Estimation Methodology also provides context to the classes of estimate discussed in this section.[15]

Key inputs and assumptions

Option 1: Single stage replacement utilising dead tank circuit breakers by December 2027

A Class 2 Estimate has been produced for Option 1 (see Table 5.1) with an accuracy range of -15% to +20%.

Powerlink has made the following scope assumptions in producing this estimate:

- All existing equipment is in good condition and working order, the site is accessible and there are no RAZs;
- All resources will be available including necessary resources to complete construction, testing and commissioning activities;
- Availability of site access for works as required;
- Existing ground conditions are suitable for the construction of standard foundations;

[15] The methodology is available on the RIT-T Consultations page of Powerlink's website.

- Laydown area is located within the substation yard;
- Outages will be available, based on appropriate contingency arrangements being put in place to ensure Return to Service requirements are met.

Main components of capital cost estimate of credible option

The capital costs for this project are shown in Table 5.1.

Table 5.1: Summary of capital costs of credible option

Cost Estimate Components	Option 1 ($m, 2025)
Design	1.85
Materials	2.53
Construction	4.68
Commissioning	9.00
Other[16]	2.17
Total	**20.23**

Contingency allowance

For proposed transmission investments subject to the RIT-T, known and unknown delivery risk costs are excluded from the cost of the option. This approach aligns with that of the RIT-T Instrument which requires that the cost of the options considered include only direct costs, apart from any other costs the AER has agreed to in writing.[17]

5.2. Modelling assumptions

Each option is scoped to manage the major risks arising in the base case and to maintain compliance with all statutory requirements, the NER and AEMO standards. The residual risk is calculated for each option based upon the individual implementation strategy of the option. This is included with the capital and operational maintenance cost of each option to develop the NPV inputs.

Powerlink has undertaken the RIT-T analysis over a 30-year period, from 2025 to 2055. A 30-year period takes into account the size and complexity of the primary plant replacement options. There will be remaining asset life by 2055, at which point a terminal value is calculated to account for capital costs under each credible option.

[16] Generally, comprises project management, design and commissioning coordination, project governance, administrative support, cost estimation and RIT-T consultation costs.
[17] AER, *Regulatory Investment Test for Transmission*, November 2024, paragraph 5.

In this RIT-T Powerlink has adopted a real, pre-tax commercial discount rate of 7% as the central assumption for the NPV analysis.[18] Powerlink has tested the sensitivity of the results to changes in this discount rate assumption, and specifically to the adoption of a lower bound discount rate of 3% and an upper bound discount rate of 10%.[19]

5.3. Sensitivity Analysis

Powerlink has chosen to present a single reasonable scenario for comparison purposes. Capital cost, discount rate and risk cost sensitivities have been considered individually and in combination and found that none of the parameters have an impact on the ranking of the results. Table 5.2 outlines the sensitivities that have been assessed.

Table 5.2: Reasonable sensitivity parameters

Key parameter	Central Scenario
Capital cost	100% of base capital cost estimate
Maintenance cost	100% of base maintenance cost estimate
Discount rate	7.0%
Risk cost	100% of base risk cost forecast

5.4. NPV analysis

Table 5.3 outlines the NPV for the credible option relative to the base case.

Table 5.3: NPV of credible option relative to the base case

Option	Description	NPV relative to base case ($m)	Ranking
1	Single stage replacement utilising dead tank circuit breakers by December 2027.	27.28	1

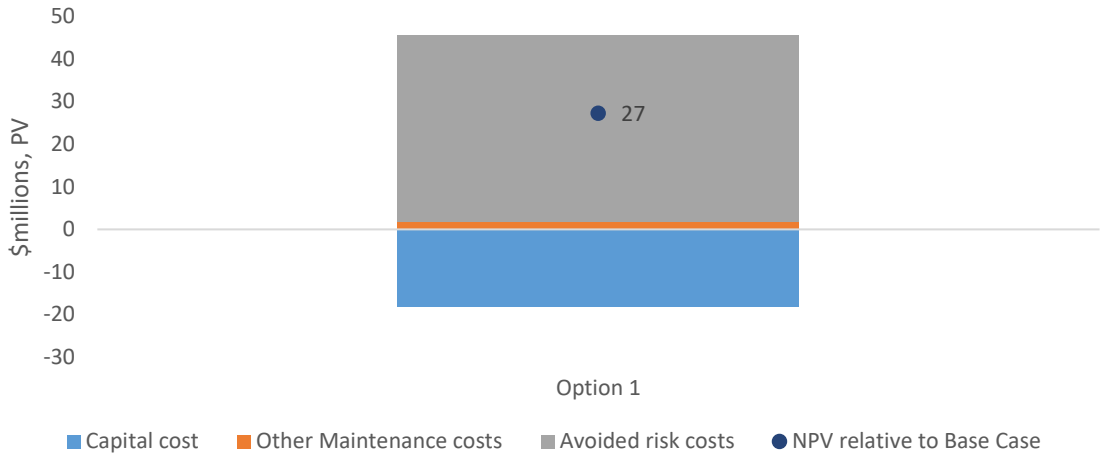
Option 1 will address the identified need on an enduring basis.

Figure 5.1 sets out the breakdown of capital cost, operational maintenance cost and risk cost for option 1 in NPV terms under the central scenario. Note that the non-credible base case consists of operational maintenance and total risk costs and does not include any capital expenditure.

Figure 5.1 illustrates that Option 1 will reduce the risk cost compared to the base case and results in a positive NPV outcome relative to the base case. Sensitivity analysis also concluded that the NPV outcome relative to the base case will remain positive for varying levels of discount rate, capital expenditure, operation maintenance expenditure and risk cost.

[18] This indicative commercial discount rate of 7% is based on AEMO, *2025 Inputs, Assumptions and Scenarios Report,* August 2025, page 158.
[19] A discount rate of 3% real pre-tax Weighted Average Cost of Capital is based on AEMO, *2025 Inputs, Assumptions and Scenarios Report,* August 2025, page 158.

Figure 5.1: NPV component of option under central scenario (NPV $m)



5.5. Conclusion

The result of the cost-benefit analysis indicates that Option 1, the only credible option, provides a positive net economic benefit over the 30-year analysis period. Sensitivity testing shows the analysis is robust to variations in the capital cost, risk cost and discount rate assumptions. Powerlink therefore considers that Option 1 satisfies the requirements of the RIT-T and is the proposed preferred option.

6. Final Recommendation

Based on the conclusions drawn from the NPV analysis and regulatory requirements relating to the proposed replacement of transmission network assets, Powerlink's final recommendation is that Option 1 be implemented to address the risks associated with the deteriorated condition of the aged and obsolete primary plant at Townsville South Substation. Implementing this option will also ensure ongoing compliance with relevant standards, applicable regulatory instruments and the NER. Powerlink considers that Option 1 satisfies the RIT-T.

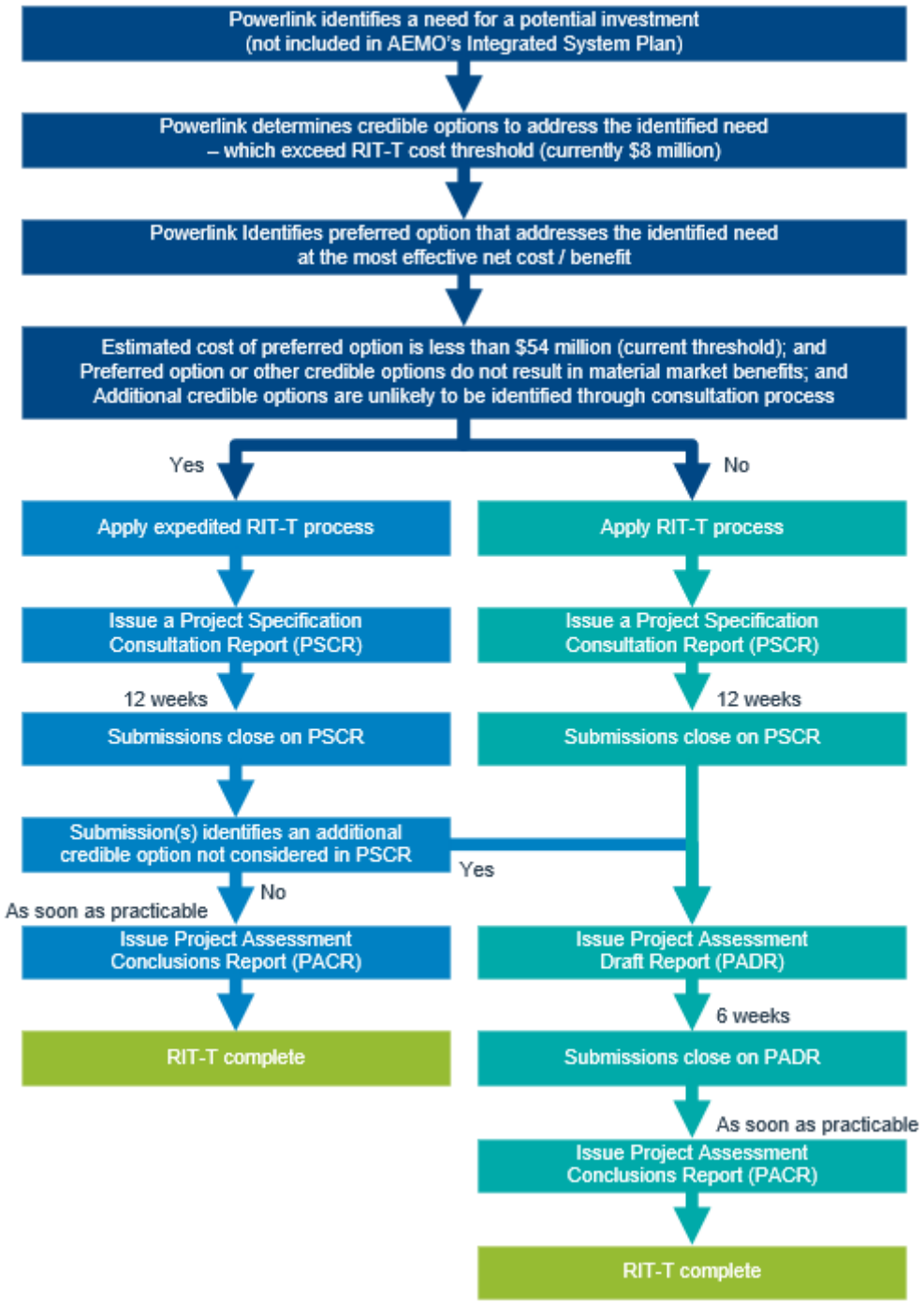
Option 1 involves the single stage replacement of primary plant at Townsville South Substation utilising dead tank circuit breakers by 2027. The indicative capital cost of this option is $20.23 million in 2024/25 prices.

Under Option 1, it is planned to complete commissioning of the new primary plant by December 2027.

Powerlink will now proceed with the necessary processes to implement the preferred option.

Appendix 1: RIT-T Process

The flow chart below illustrates the RIT-T process where the need is not identified as an actionable project in AEMO's ISP.



Appendix 2: Powerlink's Approach to Engagement

More than five million Queenslanders and 241,000 Queensland businesses depend on Powerlink's performance. Powerlink recognises the importance of engaging with a diverse range of customers and stakeholders who have the potential to affect, or be affected by, Powerlink activities and/or investments.

Together with our industry counterparts from across the electricity and gas supply chain, Powerlink has committed to the Energy Charter. The charter is a national CEO-led collaboration that supports the energy sector towards a customer-centric future. Powerlink joins other signatories in committing to progress the culture and solutions needed to deliver more affordable, reliable and sustainable energy systems. Powerlink's Energy Charter Disclosure Statement for 2023/24 shows Powerlink's achievements against the principles of the Energy Charter.

Powerlink takes a proactive approach to engagement

Powerlink regularly hosts a range of activities to provide timely and transparent information to customers and stakeholders within the broader community.

Powerlink's annual Transmission Network Forum (TNF) is a primary vehicle used to engage with the community, understand broader customer and industry views and obtain feedback on key topics. It also provides Powerlink with an opportunity to further inform its business network and non-network planning objectives. TNF participants include customers, landholders, environmental groups, Traditional Owners, government agencies, and industry bodies.

Engagement activities such as the TNF help inform the future development of the transmission network and assist Powerlink in providing services that align with the long-term interests of customers. Powerlink also incorporates feedback from these activities into a number of publicly available reports.

Working collaboratively with Powerlink's Customer Panel

Powerlink's Customer Panel provides a face-to-face opportunity for customers and consumer representatives to give their input and feedback about Powerlink's decision-making, processes and methodologies. The panel also provides Powerlink with a valuable avenue to keep customers and stakeholders better informed, and to receive feedback about topics of relevance, including RIT-Ts.

The Customer Panel is regularly advised on the publication of Powerlink's RIT-T documents and is briefed quarterly on the status of current RIT-T consultations as well as upcoming RIT-Ts. This provides an ongoing opportunity for the Customer Panel to ask questions and provide feedback to further inform RIT-Ts, and for Powerlink to better understand the views of customers when undertaking the RIT-T consultation process.

Powerlink will continue to provide updates to and request input from the Customer Panel throughout the RIT-T consultation process.

Transparency on future network requirements

Powerlink's annual planning review findings are published in the Transmission Annual Planning Report (TAPR) and TAPR templates (available via the TAPR portal). It provides early information and technical data to customers and stakeholders on potential transmission network needs over a 10-year outlook period. The TAPR plays an important part in planning Queensland's transmission network and helping to ensure it continues to meet the needs of Queensland electricity customers and participants in the NEM.

Community engagement

Powerlink recognises the importance of engaging with stakeholders who may reasonably be expected to be affected by the works required to meet the identified need described in this PACR.

The engagement frameworks and strategies that underpin Powerlink's engagement approach include:

- The International Association for Public Participation (IAP2) spectrum[20], noting each stakeholder group has unique needs and requires an individual assessment on the spectrum;
- Powerlink's Community Engagement Approach and Reflect Reconciliation Action Plan; and
- the Energy Charter Landholder and Community Better Practice Engagement Guide; and Better Practice Social Licence Guideline.

Powerlink assesses the requirement for community engagement based on the identified need

Powerlink undertakes an assessment of the potential for social and environmental impacts of anticipated replacement or augmentation projects well in advance of the identified need timing. Understanding if and when community engagement may be required, as well as the appropriate engagement approach, is an integral component of the early planning analysis needed to inform option identification, consideration of statutory processes (e.g. Ministerial Infrastructure Designation if required) and subsequent project development strategy and engagement plans.

Powerlink's engagement approach is tailored to maximise the accessibility of the proposed project's information to the stakeholder groups and/or communities affected by the project once the need to undertake community engagement is identified. Key stakeholders may include, but are not limited to, directly impacted and adjacent landholders, Traditional Owner groups, local residents, businesses and other organisations such as schools, community organisations and environmental groups, local government authorities and elected representatives within local and state governments.

Assessment and basis of assessment on the need for community engagement

Powerlink has assessed that minimal community engagement is required given the scope of works under consideration for any proposed network options to meet the identified need. This is due to all network options including replacement of equipment within the existing Townsville South substation. Powerlink will provide notifications to nearby residents to ensure all affected parties are appropriately informed of project activities.

[20] Refer to IAP2's website.

Appendix 3: Market benefits that are not material for this RIT-T assessment

A discussion of each market benefit under the RIT-T that Powerlink considers not to be material is presented below.

- **Changes in patterns of generation dispatch**: replacement of ageing assets under the credible options by itself does not affect transmission network constraints or affect transmission flows that would change patterns of generation dispatch. It follows that changes through different patterns of generation dispatch are not material to the outcome of the RIT-T assessment.
- **Changes in voluntary load curtailment**: replacement of ageing assets under the credible options by itself does not affect prices in the wholesale electricity market. It follows that changes in voluntary load curtailment will not be material for the purposes of this RIT-T.
- **Changes in costs for other parties**: the effect of replacement of ageing assets under the credible options considered are localised to the substation they are located at and do not affect the capacity of transmission network assets and therefore are unlikely to change generation investment patterns (which are captured under the RIT-T category of 'costs for other parties')
- **Differences in the timing of expenditure**: credible options for asset replacement do not affect the capacity of transmission network assets, the way they operate, or transmission flows. Accordingly, differences in the timing of expenditure of unrelated transmission investments are unlikely to be affected.
- **Changes in network losses**: credible options are not expected to provide any changes in network losses as replacing secondary systems does not affect the characteristics of primary transmission assets.
- **Changes in ancillary services cost**: there is no expected change to the costs of Frequency Control Ancillary Services (FCAS), Network Control Ancillary Services (NCAS), or System Restart Ancillary Services (SRAS) due to credible options under consideration. These costs are therefore not material to the outcome of the RIT-T assessment.
- **Changes in Australia's greenhouse gas emissions**: Powerlink does not consider that any of the credible options will materially affect Australia's greenhouse gas emissions, and the cost of quantifying any greenhouse gas emission benefits would involve a disproportionate level of effort compared to the additional insight it would provide.
- **Competition benefits:** Powerlink does not consider that any of the credible options will materially affect competition between generators, and generators' bidding behaviour and, consequently, considers that the techniques required to capture any changes in such behaviour would involve a disproportionate level of effort compared to the additional insight it would provide.
- **Option value**: Powerlink does not consider that the identified need for the options considered in this RIT-T is affected by uncertain factors about which there may be more clarity in future. As a consequence, option value is not a relevant consideration for this RIT-T.
- **Costs associated with social licence activities:** Powerlink does not consider that the cost of social licence activities is materially different between the credible options under consideration in this RIT-T. These costs are therefore not material to the outcome of the RIT-T assessment.

Appendix 4: Sensitivity Analysis

Powerlink has investigated the following sensitivities on key assumptions:

- a range from 3% to 10% discount rate;
- a range from 75% to 125% of base capital expenditure estimates; and
- a range from 75% to 125% of base risk cost estimates.

As illustrated in Figures A2.1 – A2.3 of the PSCR, sensitivity analysis for the NPV relative to the base case shows that varying the discount rate, capital expenditure and total risk costs has no impact on the sign of the Option 1 NPV relative to the Base Case. Option 1 has a positive NPV relative to the Base Case under all scenarios tested.

Powerlink also performed a Monte Carlo simulation with multiple input parameters (including capital cost, discount rate and total risk cost) generated for the calculation of the NPV for each option. This process was repeated over 5,000 iterations, each time using a different set of random variables from the probability function. The sensitivity analysis output is presented as a distribution of possible NPVs for each option, as illustrated in Figure A2.5 of the PSCR.

The Monte Carlo simulation also confirmed that Option 1 is robust over a range of input parameters in combination.

Appendix 5: Compliance Checklists

NER Requirements for RIT-T

Clause 5.16.4(v) of the NER states that a PACR must include the matters detailed in the PSCR/PADR (as required under clause 5.16.4(k)) and summarise and comment on submissions received on the PSCR/PADR. This appendix outlines Powerlink's compliance with PADR/PACR content requirements in each sub-paragraph of clause 5.16.4(k).

Table A5.1: NER Compliance Checklist

Sub-para	Requirement	Section of PACR
(1)	Description of each credible option	0
(2)	Summary of and commentary on submissions to the PSCR/PADR	N/A
(3)	Quantification of costs, including breakdown of operating and capital expenditure Classes of material market benefit for each credible option	4, 5.1, 5.4
(4)	Description of methodologies used to quantify each class of material market benefit and cost	4.2
(5)	Reasons why a class/classes of market benefit are not material	Appendix 3
(6)	Identification and quantification of any class of market benefit estimated to arise outside Queensland	N/A
(7)	Results of NPV analysis for each credible option, and explanation of results	5.4
(8)	Identification of preferred option	5.5, 0
(9)	For the preferred option: (i) details of the technical characteristics (ii) the estimated construction timetable and commissioning date (iii) an augmentation technical report from AEMO (if required) (iv) a statement that the preferred option satisfies the RIT-T	 0 0, 6 N/A 0
(10)	RIT reopening triggers	N/A

N/A denotes not applicable.

Powerlink assessment regarding reapplication of the RIT-T to maintain reliability of supply at Townsville South

The process in clause 5.16.4(z3) of the NER for a RIT-T proponent to reapply the RIT-T project in response to a material change in circumstances was expanded in version 203 of the NER, which took effect on 9 October 2023. Prior to 9 October 2023, if a material change in circumstances occurred, the RIT-T proponent had to reapply the RIT-T unless otherwise determined by the AER.

The expanded process does not apply to a RIT-T project if, prior to 9 October 2023, the RIT-T proponent had prepared a PADR for the project (clause 11.154.2(b) of the NER). Powerlink issued a PSCR to maintain reliability at Townsville South Substation in October 2018 and applied the exemption to publishing a PADR (clause 5.16.4(z1) of the NER). As Powerlink issued the PACR in March 2019, Powerlink is reapplying the RIT-T as per clause 5.16.4(z3) of the NER in force before October 2023.

RIT-T Application Guidelines Compliance Checklist

The table below outlines Powerlink's compliance with binding requirements included in the RIT-T Application Guidelines.

Table A5.2: RIT-T Application Guidelines Compliance Checklist

Section of Guidelines	Topic	Requirements	Section of PACR
3.2.5	Social licence principles	Consider social licence issues in the identification of credible options and include information about when and how social licence considerations have affected the identification and selection of credible options.	Appendix 3
3.4.3	Value of emissions reduction	The VER, reported in dollars per tonne of emissions (CO2 equivalent), is used to value emissions. A RIT-T proponent is required to use the then prevailing VER under relevant legislation or, otherwise, in any administrative guidance.	N/A
3.5	Valuing costs	Costs are the present value of the following direct costs: • Constructing or providing the credible option; • Operating and maintenance costs; • Costs of complying with relevant laws, regulations and administrative requirements; and Costs of removing and disposing of existing assets (particularly for asset replacement programs).	0, 4, 5.1
3.5.3	Social licence costs	Provide the basis for any social licence costs, including any reference to best practice	N/A
3.5A.1	Cost estimation accuracy	Outline cost estimation process (as applicable to stage of the RIT-T)	5.1
3.5A.2	Cost estimation information	Details of inputs, assumptions and methodologies for each credible option (as applicable to the stage of the RIT-T)[21]	5.1
3.6	Market benefit classes	Apply market benefit classes consistently across all credible options	4.2
3.7.3	Market benefits	Calculation of changes in Australia's greenhouse gases	N/A
3.8.2	Sensitivities	Sensitivity analysis on all credible options	Appendix 4

[21] Although the provisions in section 3.5A.2 of the RIT-T Application Guidelines are not included in the table of binding requirements at Appendix C of the Guidelines, Powerlink has added them to the compliance checklist as the provisions are expressed as being binding in section 3.5A.2 of the Guidelines.

3.9.4	Contingency allowance	Details of any contingency allowance included in a cost estimate for a credible option	N/A
3.11.2	Concessional finance	Provide sufficient detail about a concessional finance agreement	N/A
4.1	Community engagement	Description of assessment of requirement for community engagement and, as applicable, how engagement has been undertaken and any relevant concerns sought to be addressed, and how the proponent plans to engage with stakeholder groups.	1.3, Appendix 2

Notes:

N/A denotes not applicable.

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