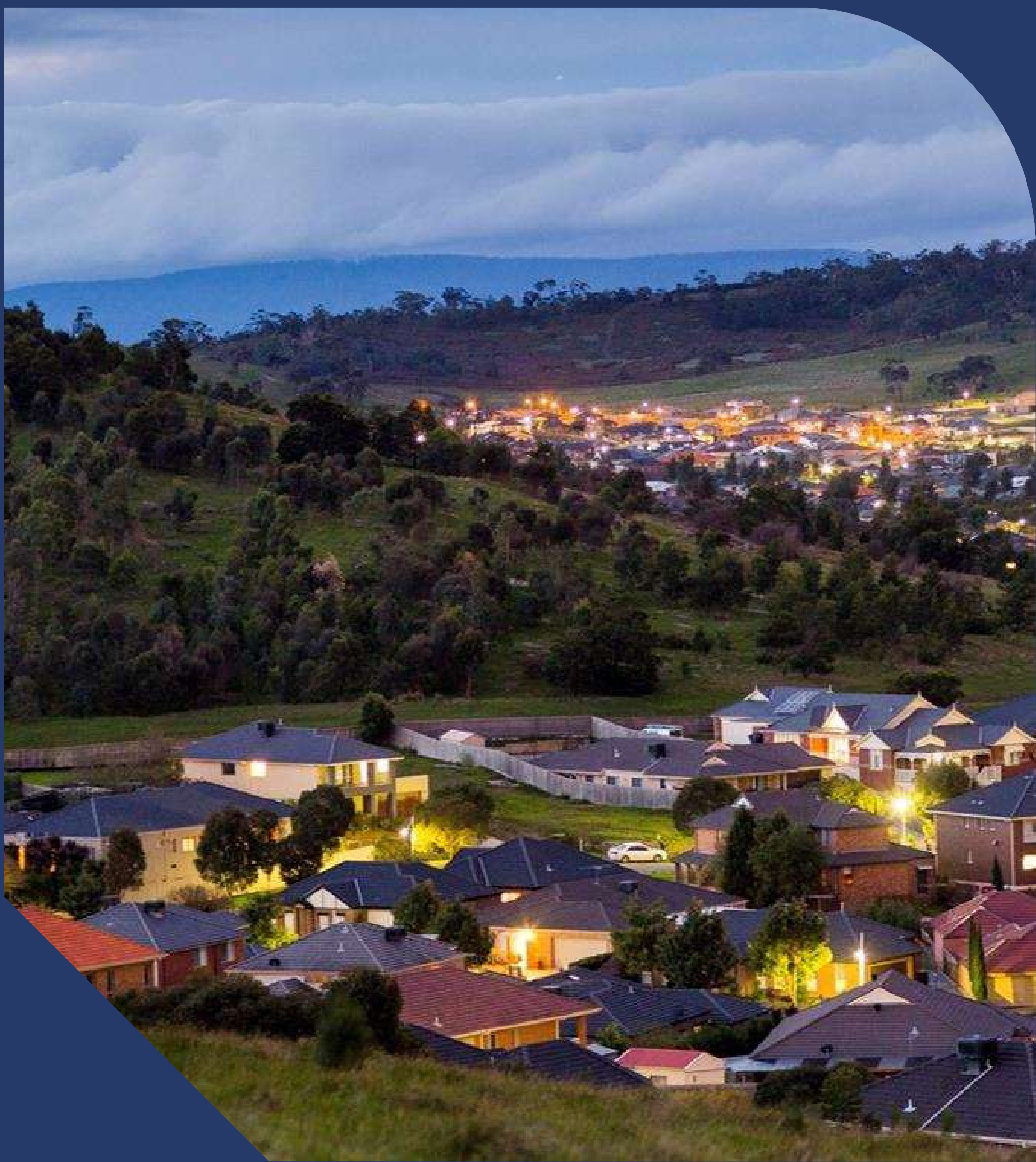
Tower replacement on the Heywood to Alcoa Portland 500kV line

Regulatory Investment Test for Transmission

Project Specification Consultation Report

Tuesday, 27 February 2024



AusNet

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1. Introduction

1.1. Overview

AusNet owns and operates the electricity transmission network in Victoria, which transports electricity from large coal, gas and renewable generators across Victoria and interstate, to terminal stations that supply large customers and the distribution networks.

The Regulatory Investment Test for transmission (**RIT-T**) is an economic cost-benefit test used to assess and rank potential investments capable of meeting an 'identified need'. The purpose of the RIT-T is to identify the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the National Electricity Market (**the preferred option**).

The publication of this Project Specification Consultation Report (**PSCR**) represents the first step in the RIT-T process. It relates to AusNet's plans to replace towers on the Heywood Terminal Station to Alcoa Portland 500 kV Nos. 1 and 2 lines (**HYTS- APD**), which are at risk of asset failure if no remediation actions are performed. As explained in this PSCR, there are no non-network options that could address the identified need.

In accordance with clause 5.16 of the National Electricity Rules (**NER**) and section 4.2 of the AER's RIT-T Application Guidelines[1], this PSCR sets out:

- the identified need that AusNet Services is seeking to address, together with the assumptions used in identifying this need;
- a description of the credible network options that may address the identified need, including our reasons why there are no credible non-network options;
- the technical characteristics of each credible option;
- the classes of market benefits that AusNet Services considers are unlikely to be material, together with our reasoning;
- the estimated construction timetable and commissioning date; and
- the total indicative capital and maintenance costs for each option.

1.2. Consultation

In accordance with clause 4.2 of the AER's Application Guidelines, we are seeking submissions on the matters set out in this PSCR. Notification of our request for submissions will be provided to Registered Participants, AEMO, non-network providers, interested parties and persons on our demand side engagement register as required by the NER. We will also publish this report on our website. The closing date for submissions is 31 May 2024.

Any questions regarding this report should be directed to: rittconsultations@ausnetservices.com.au or please contact to Francis Lirios on (03) 9695 6000.

[1] Australian Energy Regulator, Application Guidelines, Regulatory Investment Test for transmission, August 2020.

2. Background

Heywood Terminal Station (**HYTS**) is located in south western Victoria and is the main terminal station interconnecting the Victorian 500 kV transmission back bone with the South Australian transmission network via a double circuit 275 kV line. HYTS also supplies the Portland aluminium smelter via a double circuit 500 kV line as shown in Figure 1.

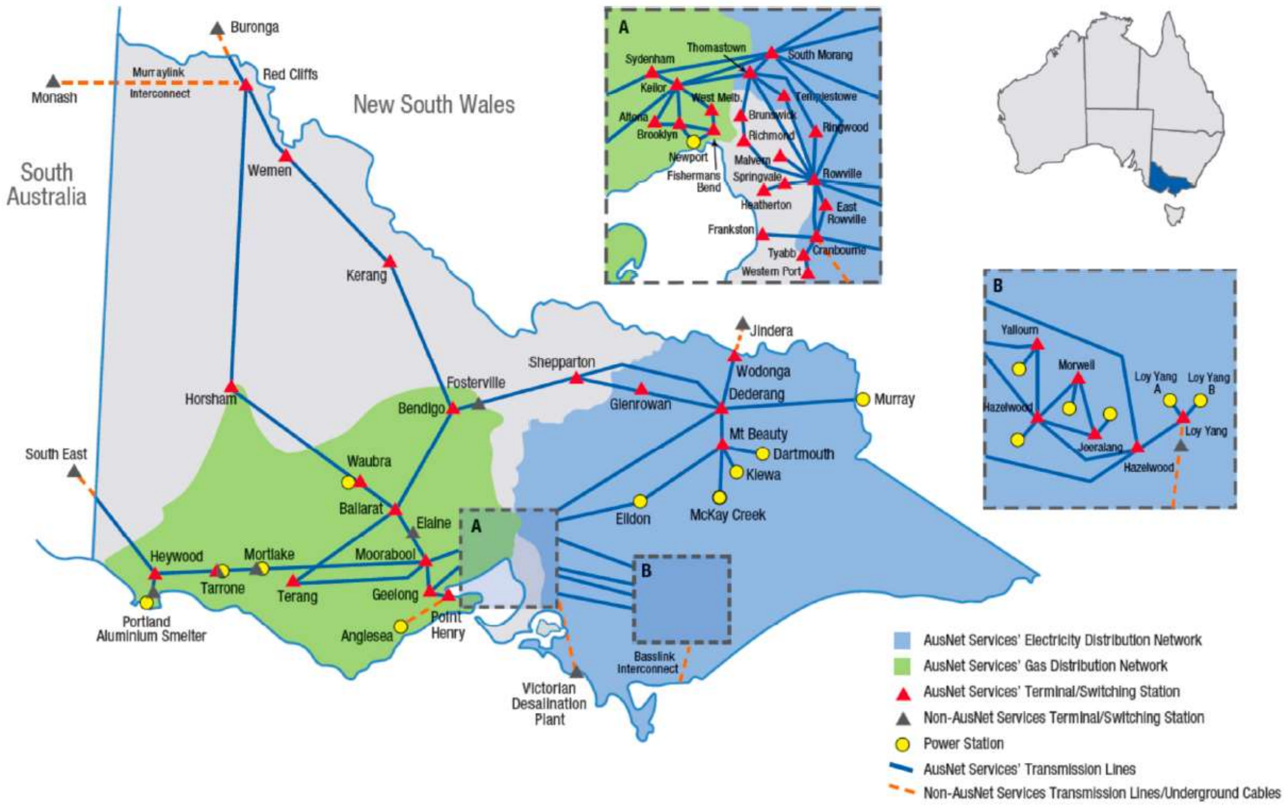

Figure 1: AusNet's transmission network, including the Heywood to Portland Aluminium Smelter

The main load supplied from HYTS is the Portland Aluminium smelter. A reliable and secure supply to the Portland Aluminium smelter is of high importance as significant cost impacts could result if the supply is interrupted.

Twenty-five towers (i.e., T605 to T628B) along the Heywood Terminal Station to Alcoa Portland 500 kV Nos. 1 and 2 lines (**HYTS- APD**) have been identified for corrosion management including member and bolt replacement works. The coating systems on these structures have deteriorated to a point where section loss has occurred due to the severe corrosivity of the environment.

AusNet must ensure that it complies with its regulatory obligations, which include the Electricity Safety Act 1998. This Act requires AusNet to minimise hazards and risks to the safety of any person as far as reasonably practicable.

AusNet has developed risk-based models to assist with the application of formal risk assessments as required by the Electrical Safety (Management) Regulations 2019. Implementation of this selective replacement strategy, addressing both failure frequency and consequences, is necessary to maintain public safety and assist in meeting the safety objectives set out in AusNet's MissionZero strategy.

3. Identified need

3.1. Description

Twenty-five towers on the HYTS-APD line are currently experiencing an increased risk of failure as a result of corrosion from the coastal environment where the line operates. A failure of these towers could potentially lead to a catastrophic safety incident and almost certainly would impact the ability of the Portland aluminium smelter to operate.

A staged replacement program is envisaged as the best way to mitigate this increasing risk. The program will start at the end of the circuit (i.e., closest to the coast), and then progressively move in-land.

First phase of the program will replace nine towers - starting with six structures from T628B until T624, including three towers (T609, T618, and T621) from a recent condition assessment survey which have been assessed as needing ‘urgent replacement’. After completion of the first phase, the second phase of the replacement program will commence, starting from T623 until T605.

In 2001 and 2002, towers on the HYTS-APD line were painted to reduce the effects of corrosion and have since been maintained through member and bolt replacements on an as-needed basis. From an asset management perspective, it is no longer practical to repaint or replace corroded members and bolts. The location and function of corroded members and bolts means that replacement has a high probability of scope creep and cost blow-outs, as the interconnected members are also likely to require replacement.

In its most recent annual audit, Energy Safe Victoria (**ESV**) conducted a review of the maintenance associated with the towers on the HYTS-APD line. As a result of this review, AusNet is required to progress a project to address the identified tower condition issues.

In addition to the need for remedial action to mitigate the risks and consequences of tower failure on the HYTS-APD line, AusNet must also ensure that it complies with its regulatory obligations, which include the Electricity Safety Act 1998. This Act requires AusNet to minimise hazards and risks to the safety of any person as far as reasonably practicable. In relation to the towers on the HYTS-APD line, compliance with this Act (and other regulations) contribute to the identified need.

3.2. Assumptions

In assessing the identified need, AusNet must consider the risk of asset failure and the likelihood of potential adverse consequences eventuating. In addition to undertaking this analysis, AusNet has adopted the following further assumptions to quantify the potential costs of tower failure.

3.2.1. Supply risk costs

In the event of a tower failure on the HYTS-APD line, customers will experience a loss of supply event. The supply risk costs are the probability of an event occurring multiplied by the unserved energy that would result from that event. The cost of unserved energy is determined by the Value of Customer Reliability (**VCR**), which is estimated by the AER and depends on the customers supplied by the HYTS-APD line, which notably includes the Portland aluminium smelter. AusNet notes that the AER’s RIT-T application guideline requires a RIT–T proponent to use the VCR estimates that the AER publishes and updates annually. In conducting sensitivity analysis , AusNet may also have regard to ‘boundary values’ for the VCR. AusNet notes that the Portland aluminium smelter may be significantly impacted commercially if there is a sustained outage.

3.2.2. Health and safety risks

The Electricity Safety Act 1998 requires AusNet to design, construct, operate, maintain, and decommission its network to minimise hazards and risks to the safety of any person as far as reasonably practicable or until the costs become disproportionate to the benefits from managing those risks. By implementing this principle for assessing safety risks from asset failures, AusNet uses:

- a value of statistical life to estimate the benefits of reducing the risk of death;[2]

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[2] Department of the Prime Minister and Cabinet, Australian Government, “Best Practice Regulation Guidance Note: Value of statistical life,” available at https://www.pmc.gov.au/resource-centre/regulation/best-practice-regulation-guidance-note-value-statistical-life.

- a value of lost time injury;[3] and
- a disproportionality factor.[4]

AusNet's approach to assessing the risk and consequence of asset failure, including the use of a disproportionality factor, is consistent with the guidance provided by the AER.[5]

3.2.3. Financial risk costs

In the event of a tower failure, costs will be incurred in replacing the failed assets (and any consequential damage to other assets). The risk of this financial impact may vary for different credible options and, therefore, should be factored into the cost-benefit assessment.

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3 Safe Work Australia, "The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2012-13," available at https://www.safeworkaustralia.gov.au/system/files/documents/1702/cost-of-work-related-injury-and-disease-2012-13.docx.pdf.

4 Health and Safety Executive's submission to the1987 Sizewell B Inquiry suggesting that a factor of up to 3 (i.e. costs three times larger than benefits) would apply for risks to workers; for low risks to members of the public a factor of 2, for high risks a factor of 10. The Sizewell B Inquiry was a public inquiry conducted between January 1983 and March 1985 into a proposal to construct a nuclear power station in the UK.

5 Australian Energy Regulator, "Industry practice application note for asset replacement planning," available at https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/industry-practice-application-note-for-asset-replacement-planning.

4. Potential Credible Options

This section describes the credible options that have been considered to address the identified need, including:

- the technical characteristics of each option;
- the estimated construction timetable and commissioning date; and
- the total indicative capital and operating and maintenance costs.

The purpose of the RIT-T is to identify the credible option for addressing an identified need that maximises the net market benefit. An important aspect of this task is to consider non-network and network options on an equal footing, so that the optimal solution can be identified.

As the identified need in this case arises from the condition of towers on the HYTS-APD line, there are no credible non-network options that could address the identified need. The HYTS-APD line is critical in providing supply to the Portland Smelter. In addition, the HYTS-APD line is an important component of the transmission network that may be required to support offshore wind projects. For these reasons, it is essential to maintain the existing service capability provided by the HYTS-APD line.

Figure 2 provides an aerial view of the proposed project.

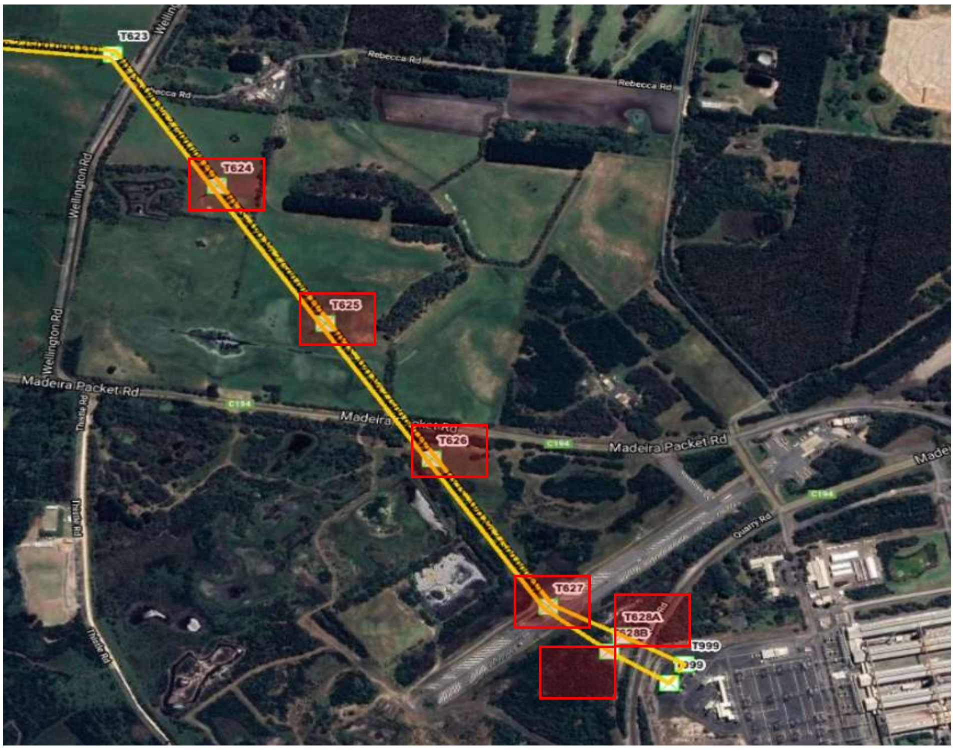

Figure 2: Aerial view of project sites

The credible options are:

- Option 1: Replace the corroded towers with new steel lattice towers, including all line components in a staged manner.
- Option 2: Replace towers with steel transmission poles.

Neither credible option is expected to have an inter-regional impact. Each credible option is discussed in further detail below.

4.1. Option 0: Do Nothing/BAU

The Do Nothing/BAU option assumes that AusNet would not undertake any investment, outside of the normal operational and maintenance processes. The Do Nothing/BAU option establishes the base level of risk and provides a basis for comparing other credible options. Whilst the direct capital cost of this option is zero, the continued exposure to residual risks means that this option has significant risk costs associated with it. In relation to this project, 'do nothing' or 'BAU' is not a credible option.

4.2. Option 1: Replace the corroded towers with new steel lattice towers

This option would replace the transmission towers with painted steel lattice towers that comply with current design standard AS/NZS 7000. This option will undertake the replacement in a staged approach, starting with the most corroded structures in the circuit, which involves the replacement of nine towers.

The key benefit associated with this option is that it removes all risks associated with the failure of degraded assets, as well as reduces the risks associated with a failure from a High Intensity Wind event.

By eliminating the risk of a tower and line failure due to corrosion, AusNet also reduces the risk of a public health and safety incident occurring, noting that there are two road crossings along this section of the line. At this stage, the direct capital costs for this option is approximately $40.2 million in present value terms. The operating expenditure arising from this option is not expected to be materially different to the BAU option.

4.3. Option 2: Replace towers with steel transmission poles

Option 2 would replace of the transmission towers with painted steel transmission poles. The existing towers would be retired and replaced with AS/NZS7000-2016 compliant steel poles. The key benefit of this option is that it would eliminate the risk of a tower collapse event due to corrosion. However, it would not eliminate the risk of in-service failure of the other line elements, i.e., insulator, conductor, groundwire.

This option has the following disadvantages compared to option 1:

- This option would require redesign and construction of new footings, causing increased disruption to community and landowners, without additional benefits.
- Additional planning permits would be required to build this option, potentially introducing delays into the project.
- This option does not include the replacement of conductor or other line hardware, so would require revisiting towers T624 to T628B to replace these at some point in the next 15 years, also leading to increased disruption.

While the direct capital costs of this option are approximately $19.1 million in present value terms, the additional indirect costs described above are expected to result in total costs that exceed those for Option 1. As noted in relation to option 1, the operating expenditure arising from this option is not expected to be materially different to the BAU option.

4.4. Preferred option scope, costs and timeframes

For the reasons set out in the previous section, at this stage Option 1 is expected to be the preferred option. The scope of work to deliver this option is summarised below:

- Desktop investigation for the tower drawings including manufacturing drawings.
- Perform site inspection to validate data, verify site conditions including geotechnical investigation to confirm foundation performance.
- Existing foundation assessment to confirm their suitability in accordance with current standards.

- Undertake site inspection to establish traffic management requirements, site access requirements for plant machinery and suitability of the use of Emergency Restoration System (**ERS**) masts for both North and South side of the existing line.
- Replacement of six steel lattice towers T624 to T628B, including the phase conductors, earth wires, insulator assemblies and fittings, fall arrest system, anti-climbing system, and signage from tower 623 until the gantries at Alcoa Smelter including the landing spans.
- Replacement of a further three steel lattice towers – T609, T618 and T621.
- Tower strengthening works to ensure the integrity of the towers in the short term until the full design and full tower replacements can occur.

Construction would commence in July/August 2024 with project completion expected within approximately 2 years.

5. Economic assessment of the credible options

5.1. Market benefits and assessment approach

Clause 5.16.4 (b)(6)(iii) of the NER requires the RIT-T proponent to consider whether each credible option provides the classes of market benefits described in clause 5.15A.2(b)(4). To address this requirement, the table below discusses our approach to each of the market benefits listed in that clause for both credible options.

Table 1: Analysis of Market Benefits

Class of Market Benefit	Analysis
(i) changes in fuel consumption arising through different patterns of generation dispatch;	The credible options will not have any impact on fuel consumption.
(ii) changes in voluntary load curtailment;	The credible options are not expected to lead to changes in voluntary load curtailment.
(iii) changes in involuntary load shedding with the market benefit to be considered using a reasonable forecast of the value of electricity to consumers;	The credible options are expected to have an impact on involuntary load shedding, by affecting the risk of asset failure. The cost benefit analysis will therefore consider the impact of each option on load shedding. AusNet applies probabilistic planning techniques to assess the expected cost of unserved energy for each option.
(iv) changes in costs for parties, other than the RIT-T proponent, due to differences in: *(A) the timing of new plant;* *(B) capital costs; and* *(C) the operating and maintenance costs;*	There is not expected to be any difference between the credible options.
(v) differences in the timing of expenditure;	There is not expected to be any difference between the credible options.
(vi) changes in network losses;	The credible options will not result in changes to electrical energy losses.
(vii) changes in ancillary services costs	The credible options will not have any impact on ancillary service costs.
(viii) competition benefits	The credible options will not provide any competition benefits.
(ix) any additional option value (where this value has not already been included in the other classes of market benefits) gained or foregone from implementing the credible option with respect to the likely future investment needs of the National Electricity Market;	There will be no impact on the option value in respect of the likely future investment needs of the NEM.
(x) any other class of market benefit determined to be relevant by the AER.	There are no other classes of market benefit that are relevant to the credible options.

As explained in the above table, the only market benefit that is relevant to the identified need is the change in involuntary load shedding, which is calculated as follows:

- **Energy at risk**: This is the estimated amount of energy that would not be supplied as a result of a tower failure. This statistic provides an indication of the magnitude of energy that would not be supplied in the unlikely event of a tower failure.
- **Expected unserved energy**: This is the energy at risk weighted by the probability of a tower failure. This statistic provides an indication of the amount of energy, on average, that will not be supplied in a year considering the low probability that a tower failure occurs.

For the purpose of this RIT-T, our probabilistic planning approach provides a reasonable level of scenario analysis by considering the risk of asset failures and the expected cost of unserved energy under different demand conditions. The impact of different inputs is tested through sensitivity analysis. The assumptions regarding reductions in supply risk were discussed in section 3.2.1of this PSCR.

In addition to market benefit of reducing involuntary load shedding, the costs associated with safety risks and financial risks (as discussed in sections 3.2.2 and 3.2.3) must also be factored in the cost-benefit assessment. In effect, each credible option (including the BAU option) will have different costs associated with safety risks and financial risks that will play a role in determining the preferred option.

5.2. Identifying the preferred option

As explained in section 4.4, at this stage it is expected that Option 1, which is to replace the corroded towers with new steel lattice towers, is the preferred option. In the next phase of the RIT-T process, AusNet will set out the detailed cost-benefit analysis to determine the preferred option in accordance with the requirement of the RIT-T. This analysis will employ the methodology described in the previous section.

6. Next steps

AusNet intends to publish a Project Assessment Draft Report (PADR) in relation to this project. However, AusNet notes that a Project Assessment Draft Report may not be required if this project benefits from the exemption provided by clause 5.16.4(z1), which requires that:

- the preferred option, Option 1, has a capital cost of less than $46 million which would be below the threshold amount determined by the AER;
- the PSCR identifies the preferred option and explains our reasons for selecting it; and
- all credible options will not have a material class of market benefits except for those specified in clause 5.15A(b)(4)(ii).

Accordingly, and subject to reviewing the submissions on this PSCR, AusNet may instead publish a Project Assessment Conclusions Report (**PACR**), rather than a PADR. In any event, AusNet expects to publish either the PADR or PACR in June 2024.

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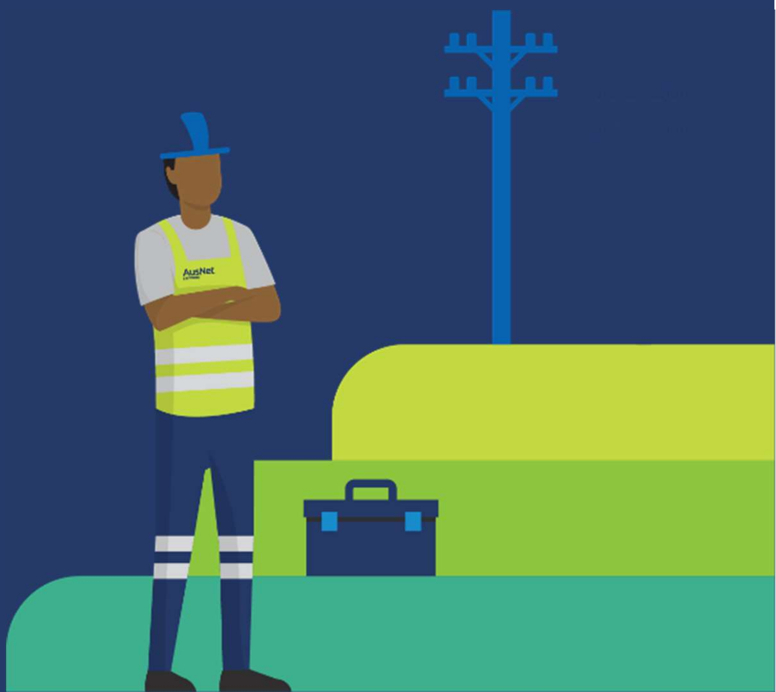

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