Powerlink Queensland

Summary
Project Specification Consultation Report

31 March 2021

Maintaining reliability of supply in the Cairns region Stage 1

Addressing the condition risk of the transmission towers between Davies Creek and Bayview Heights

Summary

Overview

The bulk supply of electricity to the Cairns region in Far North Queensland is provided by generators in Central and Northern Queensland, via a 132kV coastal network and a 275kV inland network, as well as a 'run of the river' hydro power station north of Cairns at Barron Gorge, which is connected to the 132kV network.

The majority of supply to the Cairns region is delivered through the inland 275kV network to Ross, near Townsville. From Ross it is transferred via a 275kV transmission line to Chalumbin, continuing via a second 275kV transmission line from Chalumbin to the Woree Substation on the outskirts of Cairns. These 275kV transmission lines also provide connections to the Mt Emerald Wind Farm and Kareeya Power Station.

The 275kV transmission line between Ross and Chalumbin substations was constructed in 1989, is 244km in length and for the majority of its route, lies to the west of the Great Dividing Range.

The Chalumbin to Woree section of the transmission line was constructed in 1998 and is approximately 140km in length. While the condition of the majority of this line is consistent with its age, it is not the case for the final 16km into Cairns, which is in a deteriorated condition. This section of the transmission line, which traverses the environmentally sensitive World Heritage Wet Tropics area terminating near Trinity Inlet Marine Park, has required a comprehensive ongoing maintenance program due to its heightened exposure to highly corrosive coastal winds.

Powerlink has identified an opportunity to consider a staged approach

Given the non-homogenous condition of the approximately 384km of 275kV transmission lines supplying the Cairns region, and subject to the submissions received and cost-benefit analysis undertaken as part of this RIT-T consultation, there is an opportunity to optimise potential reinvestments by applying a prudent and staged approach to address higher risk components in the nearer term based on deteriorating condition.

In particular, the deteriorating condition of 16km of the 275kV Chalumbin to Woree transmission line, from Davies Creek to Bayview Heights, in the government gazetted Wet Tropics World Heritage Area, poses a risk to the ongoing safe and reliable supply of electricity to the Cairns region. The existing 37steel lattice towers require priority action to address their more complex and advanced condition risks and have been proposed under Stage 1 of this RIT-T (Addressing the condition risks of the transmission towers between Davies Creek and Bayview Heights).

The increasing likelihood of faults and outages arising from the condition of these structures remaining in service without corrective action exposes customers to the risks and consequences of an unreliable electricity supply. The increasing susceptibility of the line to conductor drop and tower failure during major weather events also exposes the Wet Tropics World Heritage Area to unacceptable environmental risks.

The section of the transmission line between Ross and Chalumbin is deteriorating at a slightly slower rate due to its location on the western side of the Great Dividing Range. Powerlink is proposing that as the potential reinvestment for this section is not anticipated until around 2026-27, it will be assessed under a subsequent Stage 2 RIT-T (Maintaining reliability of supply in the Cairns region).

Identified need

Emerging condition risks due to structural corrosion on the 275kV transmission lines between Ross, Chalumbin and Woree substations require action to maintain reliability of supply in the Cairns region by December 2026.

Stage 1: *Addressing the condition risks of the transmission towers between Davies Creek and Bayview Heights* by 2023

The deteriorating condition of the steel lattice towers between Davies Creek and Bayview Heights puts at risk Powerlink's ongoing compliance with the reliability and service standards set out in the National Electricity Rules (the Rules), Powerlink's Transmission Authority and applicable regulatory instruments[1].
Powerlink must therefore take action to maintain existing electricity services, ensuring an ongoing reliable, safe and cost effective supply to customers in the area.

Powerlink is required to apply the RIT-T to this investment

The proposed investment is to meet reliability and service standards specified within applicable regulatory instruments and Schedule 5.1 of the Rules and it is classified as a "reliability corrective action"[2].

As the identified need is not discussed in the most recent Integrated System Plan (ISP), it is subject to the application and consultation process for RIT-T projects not defined as *actionable ISP projects*[3].

The most expensive credible network option identified in this PSCR meets the capital expenditure cost threshold of $6 million, initiating public consultation under the Rules. Powerlink has adopted the expedited process for this RIT-T[4], as the preferred option is below $43 million and is unlikely to result in any material market benefits, other than those arising from a reduction in involuntary load shedding. The reduction in involuntary load shedding under the credible network options is catered for in the risk cost modelling and consequentially represented in the economic analysis of the options.

A non-credible Base Case has been developed against which to compare credible options

Consistent with the Australian Energy Regulator's (AER's) RIT-T Application Guidelines[5], the assessment undertaken in this PSCR compares and ranks the net present value (NPV) of credible network options designed to address the emerging risks, relative to a Base Case.
The Base Case is modelled as a non-credible option where the existing condition issues associated with an asset are managed via operational maintenance only, resulting in an increase in risk levels due to deterioration of asset condition and rectification of failures taking longer due to obsolescence issues. These increasing risk levels are assigned a monetary value and added to the ongoing maintenance costs to form the Base Case.

Two credible network options have been developed to address the identified need

Table 1 details the two credible network options and their net present values (NPVs) relative to the non-credible Base Case[6]. Overall Option 2 is ranked first in NPV terms.

[1] Electricity Act 1994, Electrical Safety Act 2002 and Electricity Safety Regulation 2013 (See Appendix 2 for further detail)
[2] The Rules clause 5.10.2, Definitions, reliability corrective action.
[3] Refer to Clause 5.16.2 of the NER.
[4] In accordance with clause 5.16.4(z1) of the Rules
[5] AER, Application guidelines, Regulatory investment test for transmission, August 2020
[6] Both options are modelled with an annual Operating and Maintenance budget of $4,500 for the 37 towers.

Table 1: Summary of credible network options

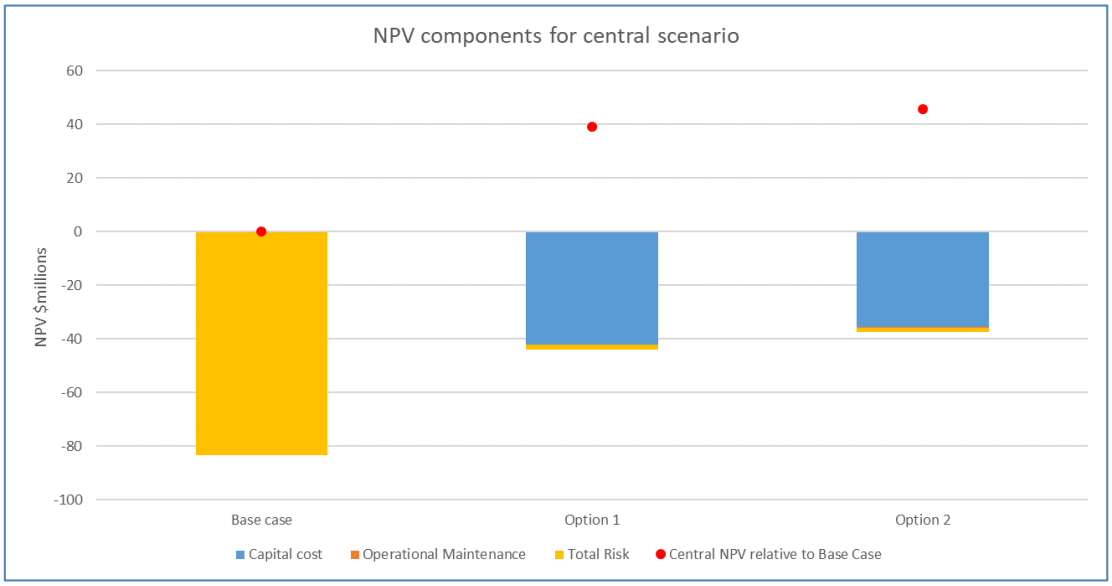
Option	Description	Total Cost ($m 2020/21)	Central NPV relative to Base Case ($m)	Ranking
Option 1 Staged Line refit without painting	Replace critical components and members displaying advanced and early onset of corrosion by October 2023*	**20.23***	39.29	**2**
	Replace critical components and members displaying early onset of corrosion by 2033*	29.73†		
	Replace critical components and members displaying early onset of corrosion by 2038†	23.25†		
	Replace critical components and members displaying early onset of corrosion by 2043†	9.25†		
	Total Capital Cost	82.46		
Option 2 Line refit with painting	Replace all critical components displaying advanced corrosion and repaint towers by October 2023*	**38.37***	45.74	**1**
	Repaint of selected structural components and minor works by 2039†	5.38†		
	Total Capital Cost	43.75		

*RIT-T Project
†Modelled network projects including future RIT-T consultations

As a minimum, both options achieve a further 25 years asset life and reduce the risk costs compared to the Base Case.

Figure 1 illustrates that by reducing the risk costs arising from the condition of the 37 towers between Davies Creek and Bayview Heights, both credible options have a positive NPV relative to the Base case, with Option 2 providing the greatest reduction in risk costs.

Figure 1: NPV of Base Case and Credible Network Options



Option 2 has been identified as the preferred option

The Base Case is not a credible option, in that it does not allow Powerlink to continue to maintain compliance with relevant standards, applicable regulatory instruments and the Rules.

The economic analysis demonstrates that Option 2 provides the highest net economic return relative to the Base Case of the two credible options and is therefore the preferred option.

Option 2 involves the refurbishment of the 37 towers through the selective replacement of corroded members and components, along with the painting of all 37 towers by October 2023. The indicative capital cost of the RIT-T project for the preferred option is $38.37 million in 2020/21 prices.

Under Option 2, consultation and joint planning with Wet Tropics' stakeholders will commence in late-2021, with contractors deployed to site in mid-2022 and work completed by October 2023.

Powerlink welcomes the potential for non-network options to form part or all of the solution

Powerlink welcomes submissions from proponents who consider that they could offer a credible non-network option that is both economically and technically feasible by October 2023, on an ongoing basis. A non-network option that avoids reinvestment in ageing structures would need to replicate, in part or full, the support that the Chalumbin to Woree transmission line provides to customers in the Cairns region, on a cost effective basis.

Lodging a submission with Powerlink

Powerlink is seeking written submissions on this *Project Specification Consultation Report* by Thursday, 8 July 2021, particularly on the credible options presented[7].

Please address submissions to:

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[7] Powerlink's website has detailed information on the types of engagement activities, which may be undertaken during the consultation process. These activities focus on enhancing the value and outcomes of the RIT-T engagement process for customers and non-network providers.

Contact us

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