

Powerlink Queensland



Summary
Project Assessment Conclusions Report
28 November 2019
Maintaining reliability of supply between
Clare South and Townsville South

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Summary

The 132kV network between Collinsville and Townsville was developed in the 1960s and 1970s to supply mining, commercial and residential loads. A parallel 275kV network was developed more than a decade later to reinforce supply into Townsville and far north Queensland.

The main function of the current 132kV infrastructure between Clare South and Townsville South is to provide connections to Invicta Mill and Clare South substations, and to support power transfers in the area, including from renewable generation. This infrastructure consists of two, 132kV single circuit transmission lines between Clare South Substation and Townsville South Substation, each traversing separate routes. The coastal line was established in 1967, and has a tee connection to Invicta Mill Substation. The inland line, established in 1963, carries critical telecommunications traffic for the transmission network via an optical ground wire. Due to their deteriorating condition, these 132kV transmission lines are now reaching the end of their technical service life.

There is a requirement for Powerlink to address the emerging condition risks on the 132kV Clare South to Townsville South Transmission lines. As the identified need for the proposed investment is to maintain compliance with the reliability and service standards set out in the National Electricity Rules (the Rules), Powerlink's Transmission Authority and applicable regulatory instruments¹, the proposed investment is classified as a 'reliability corrective action'².

This Project Assessment Conclusions Report (PACR) represents the final step of the RIT-T process prescribed under the Rules undertaken by Powerlink to address the condition risks arising from the ageing transmission lines between Clare South and Townsville South. It contains the results of the planning investigation and cost benefit analysis of credible options. In accordance with the RIT-T, the credible option that minimises the net present value of costs is recommended for implementation.

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

Consistent with the December 2018 RIT-T Application Guidelines, the assessment undertaken compares and ranks the net present value of credible options to address the emerging risks 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 as the condition of the asset deteriorates over time. These increasing risk levels are quantified with a monetary value and added to the ongoing maintenance costs to form the Base Case. The Base Case is then used as a benchmark against which to compare and rank the credible options scoped to offset or mitigate the risks, and to ensure ongoing compliance with applicable regulatory and jurisdictional obligations.

Options considered

Powerlink published a Project Specification Consultation Report (PSCR) in November 2018, and a Project Assessment Draft Report (PADR) in August 2019 with respect to maintaining reliability of supply between Clare South and Townsville South. These documents invited submissions of credible non-network options to replicate the support, in full or in part, that the Clare South to Townsville South transmission lines provide Powerlink in meeting the Rule's and Powerlink's Transmission Authority's reliability obligations on an enduring basis.

Powerlink hosted a webinar for interested stakeholders in March 2019 to share key information contained in the PSCR, later than originally planned due to the unprecedented floods experienced by the Townsville community. The original closing date for PSCR submissions was also extended by one month until 18 April 2019.

Powerlink proposed four credible network options in the PSCR and PADR to address the identified condition driven need on the Clare South to Townsville South transmission lines. Option 1a and Option 1 involve retaining the existing 132kV lines between Clare South and Townsville South substations, utilising two alternative life extension strategies. Options 2 and 3 involve two life extension strategies of the coastal line along with decommissioning of the inland line, as well as the installation of an additional 375MVA transformer at Strathmore.

¹ Electricity Act 1994, Electrical Safety Act 2002 and Electricity Safety Regulation 2013

² The Rules clause 5.10.2, Definitions, reliability corrective action

Submissions from Origin Energy and Wilmar Sugar proposing potential non-network solutions were received in response to the publication of the PSCR. Following discussions with the proponents, and detailed analysis of their proposals, it was concluded that the solutions offered were not technically feasible due to their inability to meet the network's fault level and voltage control requirements for the area. As a result, they could not be considered as credible options in the PADR to meet the identified need under this RIT-T (refer Section 4 of this report for further detail).

An additional non-network submission was received from Vena Energy in response to the PADR, which closed on 27 September 2019. While there are some unresolved parameters with the proposed solution, the proposal is assumed to be technically feasible and has been assessed by Powerlink to the extent that it could provide a partial solution to the identified need. This non-network solution has been included as part of the new combined network / non-network options 4 and 5, and the cost benefit analysis in the PACR has been updated to reflect this change (refer Table 1).

All options extend the life of the 132kV network between Clare South and Townsville South through to 2040, at which time the area's 275kV lines are likely to have reached the end of their technical service life, thereby providing an opportunity to review the configuration of the complete network in the area. The six credible options, along with their net present values (NPVs) relative to the Base Case are summarised in Table 1. The absolute NPVs of the Base Case and the options are shown graphically in Figure 1.

Table 1: Summary of credible options

Option	Description	Total cost (\$m) 2018/19	NPV relative to Base Case (\$m) 2018/19	Ranking
Maintain existing network topology theme				
Option 1a: 10 year life extension strategy of coastal and inland lines ³	Repair or replace selected components on the coastal line by December 2021* and inland line by December 2022*	40.83*		
	Repair or replace selected components on the inland line by December 2025 [†]	9.10 [†]	6.76	3
	Repair or replace selected components on the coastal line by December 2031 [†] and inland line by December 2035 [†]	17.04 [†]		
Option 1: 20 year life extension strategy of coastal and inland lines	Repair or replace at risk components and paint all structures on the coastal line by December 2021, as well as repair/replace selected components on the inland line by December 2022*	54.81*	-6.52	4
	Repair or replace selected components and paint all towers on the inland line by December 2025 [†]	24.87 [†]		

³ The Base Option contained in the Project Specification Consultation Report was relabelled Option 1a in the Project Assessment Draft Report subsequent to the release of the AER, Application guidelines, Regulatory investment test for transmission, December 2018

Option	Description	Total cost (\$m) 2018/19	NPV relative to Base Case (\$m) 2018/19	Ranking
Reconfigure network topology theme				
Option 2: 10 year life extension strategy of coastal line with network reconfiguration	Repair or replace selected components on the coastal line, and install a new transformer at Strathmore by December 2021*	28.34*	14.49	1
	Decommission the inland line by December 2022 [∞]	8.22 [∞]		
	Repair or replace selected components on the coastal line by December 2031 [†]	8.43 [†]		
Option 3: 20 year life extension strategy of coastal line with network reconfiguration	Repair or replace at risk components and paint all structures on the coastal line and install a new transformer at Strathmore by December 2021*	42.32*	8.46	2
	Decommission the inland line by December 2022 [∞]	8.22 [∞]		
Option 4 10 year life extension strategy of coastal line with network reconfiguration and non-network solution	Repair or replace selected components on the coastal line by December 2021*, and operate a non-network "Grid Firming Facility" at Collinsville from December 2021 to December 2026	Confidential~	-10.21	5
	Decommission the inland line by December 2022 [∞]	8.22 [∞]		
	Install a new transformer at Strathmore by December 2026*	14.53 [†]		
	Repair or replace selected components on the coastal line by December 2031 [†]	8.43 [†]		
Option 5 20 year life extension strategy of coastal line with network reconfiguration and non-network solution	Repair or replace at risk components and paint all towers on the coastal line by December 2021* and operate a non-network "Grid Firming Facility" at Collinsville from December 2021 to December 2026	Confidential~	-16.25	6
	Decommission the inland line by December 2022 [∞]	8.22 [∞]		
	Install a new transformer at Strathmore by December 2026*	14.53 [†]		

* Proposed RIT-T project

† Modelled capital project

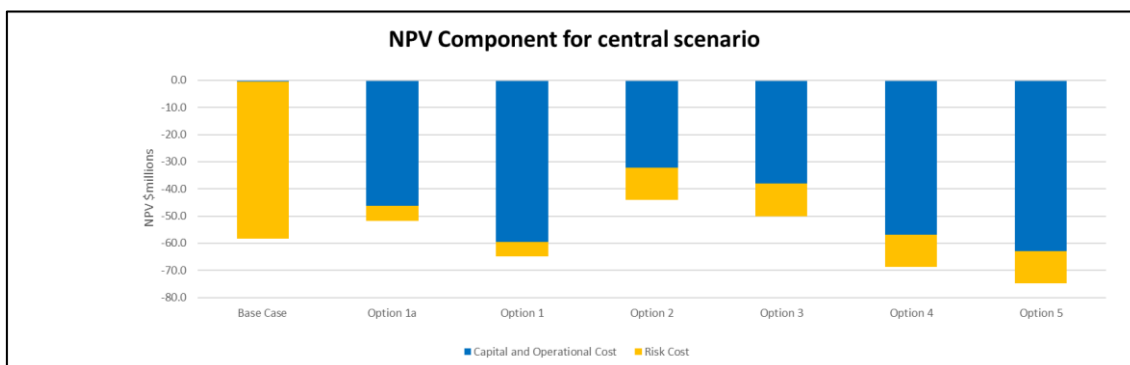
[∞] Operational project

~ Includes commercially sensitive costs, the details of which have been excluded to maintain confidentiality at the request of the non-network proponent

It should be noted that the options described in Table 1 result in different network configurations by December 2022. Options 1a and 1 maintain the existing network topology, while Options 2, 3, 4 and 5 result in the existing inland line being decommissioned.

All options and their resulting network configurations, continue to meet system standards and provide the required services, to the Townsville South, Clare and Proserpine areas.

Figure 1: NPV of Base Case and Options (\$m, 2018/19)



Note: Capital and operational costs have been combined to maintain confidentiality with the non-network proponent

Figure 1 shows the breakdown of the absolute NPV of the Base Case and the six credible options calculated over a 20 year analysis period. The Base Case and options all have a negative NPV. All options reduce the risk costs arising from the ageing and obsolete assets remaining in service (as occurs in the Base Case) with Options 1a, 2 and 3 resulting in a net economic benefit when compared to the Base Case. The remaining options, Option 1 and the combined network / non-network Options 4 and 5, were found to be less cost effective than the preferred network option, Option 2.

Taking into account capital, operational maintenance and risk costs, Option 2 delivers the greatest net economic benefit, providing a \$14.49 million reduction in the overall costs in NPV terms when compared to the Base Case over the 20 year analysis period.

Evaluation and conclusion

The RIT-T requires that the proposed preferred option maximises the present value of net economic benefit, or for a reliability corrective action minimises the cost, to all those who produce, consume and transport electricity in the market. In accordance with the RIT-T process, the PADR published in August 2019 made a draft recommendation to implement Option 2 as it:

- satisfies the RIT-T based on the cost benefit analysis (i.e. lowest cost in NPV terms with consideration for estimating accuracy)
- reduces the risk to supply and public safety arising from the inland line remaining in service beyond December 2022
- optimises the life of the coastal line while maintaining system strength and stability
- allows Powerlink to maintain compliance with the Rules, Powerlink's Transmission Authority and applicable regulatory instruments, ensuring reliability of supply and service standards are maintained for customers.

Option 2 involves the repair or replacement of selected components on the coastal 132kV line from Clare South to Townsville South, and the installation of a new 375MVA 132/275kV transformer at Strathmore by December 2021, with a separate operational project to decommission the inland line by December 2022.

The indicative capital cost of the RIT-T project for the preferred option is \$28.34 million in 2018/19 prices and it delivers a \$14.49 million net economic benefit in NPV terms relative to the Base Case. Under this option, design will commence in late 2019 and construction in early 2020. Installation of the new transformer at Strathmore and the life extension of the coastal transmission line will be completed by December 2021.

As the outcomes of the economic analysis contained in this PACR remain unchanged from those published in the PADR, the draft recommendation has been adopted without change as the final recommendation, and will now be implemented.



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