

Powerlink Queensland



Summary of Project Assessment Conclusions Report

21 October 2019

Addressing the secondary systems condition risks at Mudgeeraba

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Summary

Located approximately 10km north of the Queensland-NSW border, Mudgeeraba Substation was established in 1970 as a 110kV switchyard. It was expanded in the late 1990s with the addition of a 275kV switchyard and now serves as the major injection point for the distribution networks supplying the southern Gold Coast in Queensland and north-eastern New South Wales (NSW), supporting a diverse range of customer needs in these areas.

Planning studies have confirmed there is an enduring need to continue to supply the existing electricity services provided by Mudgeeraba substation.

The 275kV secondary systems at Mudgeeraba Substation broadly perform the functions of transmission element protection, data collection, remote (and local) control, and monitoring. Commissioned approximately 20 years ago, these secondary systems are reaching the end of their technical service lives, and are increasingly no longer supported by their manufacturer, with limited spares available. Increasing failure rates, along with the increased time to rectify the faults due to the obsolescence of the equipment significantly affects the availability and reliability of these systems and their ability to continue to meet the requirements of the National Electricity Rules (the Rules).

Powerlink must therefore address the emerging risks arising from the condition of the secondary systems at Mudgeeraba Substation. As the identified need of the proposed investment is to meet reliability and service standards specified within Powerlink's Transmission Authority and guidelines and standards published by the Australian Energy Market Operator (AEMO), and to ensure Powerlink's ongoing compliance with Schedule 5.1 of the Rules, it is classified as a 'reliability corrective action'¹.

This Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process prescribed under the Rules undertaken by Powerlink to address the condition risks arising from the 275kV secondary systems at Mudgeeraba Substation. It contains the results of the planning investigation and the cost-benefit analysis of credible options compared to a non-credible Base Case where the emerging risks are left to increase over time. In accordance with the RIT-T, the credible option that minimises the net present value (NPV) of costs is recommended as the preferred option.

Credible options considered

Powerlink has developed two credible network options to maintain the existing electricity services, ensuring an ongoing reliable, safe and cost effective supply to customers in the area. The major difference between the credible options relates to whether the secondary systems are replaced in-situ in the existing building, or utilise a new prefabricated building.

By addressing the condition risks, both options allow Powerlink to meet the identified need and continue to meet the reliability and service standards specified within Powerlink's Transmission Authority, Schedule 5.1 or the Rules, AEMO guidelines and standards and applicable regulatory instruments.

Powerlink published a Project Specification Consultation Report (PSCR) in June 2019 to address the risks and obsolescence issues arising from the condition of the 275kV secondary systems at Mudgeeraba Substation. No submissions were received in response to the PSCR that closed on 27 September 2019. As a result, no additional credible options have been identified as a part of this RIT-T consultation.

The two credible network options, along with their NPVs relative to the Base Case are summarised in Table 1. Both options have a negative NPV relative to the non-credible Base Case, as allowed for under the Rules for 'reliability corrective actions'. Of the two credible network options, Option 2 has the lowest cost in NPV terms.

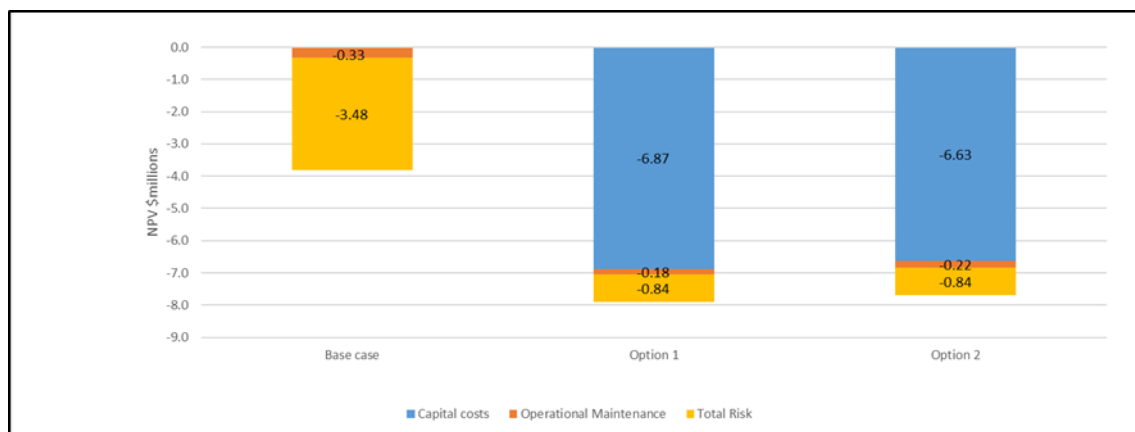
¹ The Rules clause 5.10.2, Definitions, reliability corrective action.

Table 1: Summary of credible network options

Option	Description	Total costs (\$m) 2018/19	NPV relative to base case (\$m) 2018/19	Ranking
Option 1 Replacement in existing building	In-situ replacement of the 275kV secondary systems in the existing building by December 2021	8.60	-4.09	2
Option 2 Replacement in new building	Replacement of the 275kV secondary systems into a new building by December 2021	8.30	-3.88	1

The absolute NPVs of the Base Case and the credible options are negative, shown graphically in Figure 1, with Option 2 being the least negative of the credible options. Both options significantly reduce the total risks arising from the condition of the ageing and obsolete secondary systems at Mudgeeraba remaining in service and enable Powerlink to continue to meet reliability and service standards specified within Powerlink's Transmission Authority and guidelines and standards published by the Australian Energy Market Operator (AEMO), and to ensure Powerlink's ongoing compliance with Schedule 5.1 of the Rules.

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



Evaluation and Conclusion

The RIT-T requires that the proposed preferred option maximises the present value of net economic benefit, or minimises the net cost, to all those who produce, consume and transport electricity. The economic analysis demonstrates that Option 2 provides the lowest cost solution and is therefore the preferred option.

In accordance with the expedited process for the RIT-T, the PSCR made a draft recommendation to implement Option 2, which involves the replacement of the 275kV secondary systems at Mudgeeraba in a new building by December 2021. The indicative capital cost of this option is \$8.3 million in 2018/19 prices. Under Option 2, design work will commence in 2019, followed by fabrication and installation of the new 275kV secondary systems in 2020 and 2021, with all works completed by December 2021. Powerlink is the proponent of the proposed network project.

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



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