Powerlink Queensland

Summary
Project Assessment Conclusions Report
10 October 2019

Maintaining reliability of supply in the Blackwater Area

Summary

Blackwater Substation, established in 1969 and located approximately 68km east of Emerald, plays a critical role in the provision of electricity to customers in Queensland's Central West area, providing supply to residential, mining and rail traction loads. Planning studies have confirmed there is a long-term requirement to continue to supply the existing electricity services provided by Blackwater Substation supporting the diverse range of customer needs in the area.

The substation's 132kV switchyard includes three 132/66/11kV transformers (2 x 80MVA and 1 x 160MVA) which provide connections to the Ergon Energy (part of the Energy Queensland Group) distribution network. The two 80MVA transformers were installed in 1978, and at over 40 years of age have significant condition and performance issues indicating that they are reaching the end of their technical service lives. The third transformer, rated at 160MVA, was installed in 2006 and is in good working condition.

The increasing likelihood of faults arising from the condition of the ageing 80MVA transformers at Blackwater remaining in service beyond June 2022, exposes customers to the risks and consequences of an increasingly unreliable electricity supply. There is a need for Powerlink to address these emerging risks. As the identified need for the proposed investment is to meet reliability and service standards specified within Powerlink's Transmission Authority and to ensure Powerlink's ongoing compliance with Schedule 5.1 of the National Electricity Rules (the Rules) and relevant jurisdictional obligations[1], it is classified as a 'reliability corrective action'[2].

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 two 80MVA transformers at Blackwater 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 maximises the net present value (NPV) of economic benefit, or minimises the costs, is recommended as the preferred option.

Credible options considered

Powerlink published a Project Specification Consultation Report (PSCR) to Registered Participants, the Australian Energy Market Operator (AEMO) and interested parties in May 2019 to address the risks arising from the condition of the ageing 80MVA transformers at Blackwater.

No submissions were received in response to the PSCR that closed on 27 August 2019. As a result, no additional credible options have been identified as a part of this RIT-T consultation.

Powerlink has developed three credible network options to maintain the existing electricity services, ensuring an ongoing reliable, safe and cost effective supply to customers in the area. Option 1 and 2 result in a changed substation configuration, with the final configuration consisting of two 132/66/11kV transformers (i.e. 2 x 160MVA transformers; one new and one existing transformer). Option 3 maintains the existing configuration consisting of three 132/66/11kV transformers (i.e. 2 x 100MVA new transformers and 1 x 160MVA existing transformer).

By addressing the condition risks, all options presented 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 of the Rules and applicable regulatory instruments.

The Base Case is a non-credible option that reflects a state of the world in which the condition of the ageing asset is only addressed through standard operational maintenance activities, with escalating safety, financial, environmental and network risks.

The three credible network options, along with their net present values (NPVs) relative to the Base Case are summarised in Table 1. Option 2 is ranked first of the three credible options, with the highest NPV relative to the Base Case.

[1] Electricity Act 1994, Electrical Safety Act 2002 and Electricity Safety Regulation 2013
[2] The Rules clause 5.10.2, Definitions, reliability corrective action.

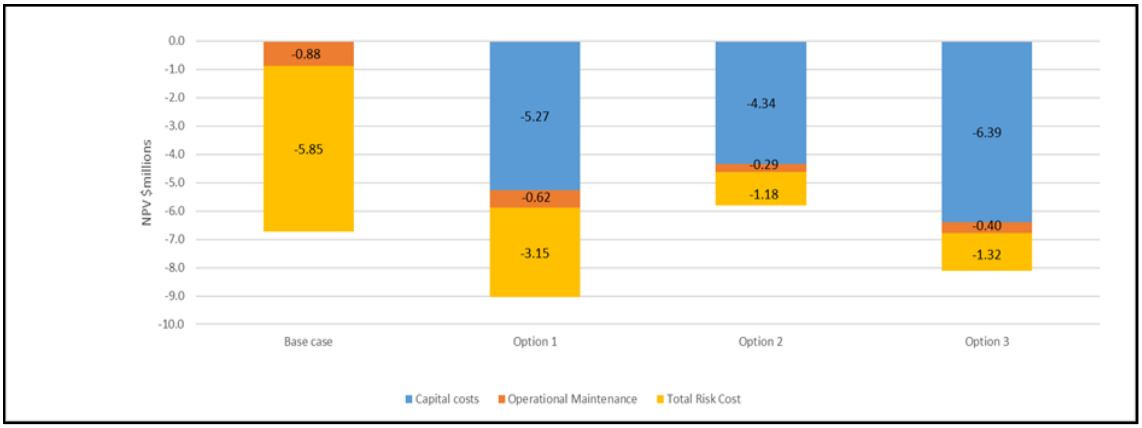
Table 1: Summary of credible network options

Option	Description	Total Cost ($m) 2018/19	NPV relative to Base Case ($m) 2018/19	Ranking
1	Repair oil leaks and replace selected components on the two at-risk 80MVA transformers to address corrosion and emerging reliability issues by June 2022 Replace both at-risk 80MVA 132/66/11kV transformers with a single 160MVA 132/66/11kV transformer by June 2027	3.50* 6.16†	-2.31	3
2	Replace both at-risk 80MVA 132/66/11kV transformers with a single 160MVA 132/66/11kV transformer by June 2022	6.16*	+0.91	1
3	Replace both at-risk 80MVA 132/66/11kV transformers with two 100MVA 132/66/11kV transformers by June 2022	9.09*	-1.39	2

*RIT-T Project
†Future modelled project

The absolute NPVs of the Base Case and the credible options are negative, shown graphically in Figure 1. All options reduce the total risk and maintenance costs arising from the ageing and obsolete assets at Blackwater remaining in service, with Option 2 having the largest reduction and reflecting a net economic benefit of $0.91 million compared to the Base Case.

Figure 1: NPV of the 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 in the market.

In accordance with the expedited process for this RIT-T, the PSCR made a draft recommendation to implement Option 2. The RIT-T project for Option 2 involves replacing the two 132/66/11kV 80MVA transformers with one 132/66/11 kV 160MVA transformer by June 2022, at an estimated capital cost of $6.16 million in 2018/2019 prices. Under Option 2, design work will commence in late 2019, with installation of the new transformer completed by June 2022. Powerlink is the proponent of this network solution.

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.

Contact us

Registered office	33 Harold St Virginia Queensland 4014 Australia
Postal address:	GPO Box 1193 Virginia Queensland 4014 Australia
Contact:	Roger Smith Manager Network and Alternate Solutions
Telephone	(+617) 3860 2328 (during business hours)
Email	networkassessments@powerlink.com.au
Internet	www.powerlink.com.au