Powerlink Queensland

Summary
Project Specification Consultation Report
8 October 2020
Managing voltage control in Central Queensland

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Summary

Changing electricity generation and consumption patterns in Central and Northern Queensland require Powerlink to take action

Minimum transmission flows between Central and Northern Queensland have been decreasing over the past 5 years, with this trend forecast to continue into the future.

The main driver of this change has been the progressive displacement of traditional generation in Central Queensland with increasing amounts of large scale variable renewable energy (VRE) generation in the North, coupled with a reduction in minimum daytime demand due to the uptake of small scale rooftop PV systems. This has led to an increase in the reactive charging of 275kV lines in the Central Queensland area, resulting in a growing potential for sustained over-voltage events.

Over-voltage events can result in equipment damage, loss of supply and safety issues.

The Rules specify allowable over-voltage limits and require Powerlink to take action to ensure these limits are not exceeded in order to maintain the power system in a secure state.

Current reactive plant is at capacity and Powerlink is increasingly having to manage these limits via the switching out of feeders. This operational solution is now at its technical limit and is not considered an effective sustainable strategy. Switching out of feeders on an on-going regular basis impacts system strength and reliability of supply, while increasing transmission losses and accelerating the ageing of primary plant.

Insufficient reactive capacity in the Central Queensland section of the grid is also making it increasingly difficult to obtain outages for maintenance purposes, increasing the likelihood of Powerlink breaching its responsibilities as a Transmission Network Service Provider (TNSP) under the Rules, as well as its Transmission Authority reliability and service standards.

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

The identified need to manage voltages within allowable limits requires Powerlink to apply the RIT-T.

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 Rules, and is classified as a 'reliability corrective action'[1].

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*[2].

Powerlink has presented three credible network options in this Project Specification Consultation Report (PSCR) to maintain the existing electricity services, ensuring an ongoing reliable, safe and cost effective supply to customers in the area.

All options presented are below $43 million, with the only material market benefit being changes in fuel costs, which are identical for each option. As there are no market benefits that change the ranking of the options, Powerlink has adopted the expedited process for non-ISP projects for this RIT-T[3]. The changes in fuel costs have been included in the economic analysis of the options.

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

Consistent with the Australian Energy Regulator's (AER's) RIT-T Application Guidelines for non-ISP projects, the assessment undertaken in this PSCR compares the net present value (NPV) of the credible network options identified to address the emerging risk-costs of a "do-nothing" Base Case.

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

[2] Refer to Clause 5.16.2 of the NER.

[3] In accordance with clause 5.16.4(z1) of the Rules and S4.1 AER Regulatory investment test for transition application guidelines, August 2020

The Base Case is modelled as a **non-credible** option where the emerging issue of non-compliant over voltage events is managed via the despatching of off-line generators to provide voltage support to the network. The additional fuel costs of despatching these generators forms the market costs of the "do nothing" Base Case.

Proposed network options to address the identified need

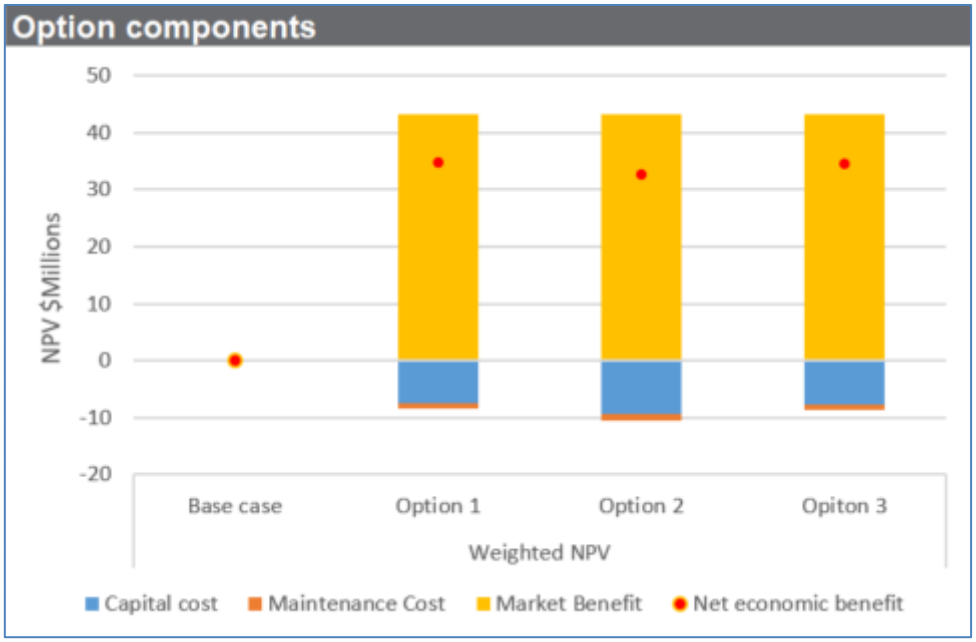
The credible network options, along with their NPVs relative to the Base Case are summarised in Table 1. The absolute NPVs of the Base Case and the credible network options are shown in Figure 1.

Table 1 illustrates that the three credible network options have a net economic benefit relative to the non-credible Base Case.

Table 1: Summary of the credible network options

Option	Description	Total costs ($m) 2020/21	Net Economic Benefit ($m)
1	Establish 1x 150MVAr 300kV bus reactor at H020 Broadsound by June 2023	9.63	34.80
2	Establish 2x 300kV line reactors at H020 Broadsound by June 2023	12.04	32.61
3	Establish 1x 150MVAr 300kV 2bus reactor at H011 Nebo by June 2023	9.89	34.48

Figure 1: NPV of Base Case and Credible Network Options



The Base Case is not a credible option, in that it does not allow Powerlink to continue to maintain compliance with the requirements of relevant regulatory instruments and the Rules. As the investment is classified as a 'reliability corrective action' under the Rules, the purpose of the RIT-T is to identify the credible option that minimises the total cost to customers.

Taking into account capital, operational maintenance and market benefits, Option 1 delivers the greatest net economic benefit, providing a $34.80 million net economic benefit in NPV terms when compared to the Base Case over the 20-year analysis period.

Option 1 has been identified as the preferred network option

The preferred network option involves establishment of a 275kV bus connected shunt reactor at the Broadsound Substation by June 2023. Powerlink is the proponent of this network option.

Under this option, installation and commissioning of the reactor will be completed by June 2023.

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

Powerlink welcomes submissions, from proponents who consider they could offer a potential non-network solution by January 2021.

A non-network option that avoids the proposed installation of the new shunt reactor would need to replicate, in part or full, the support that the reactor delivers to the network in the Central Queensland area, on a cost effective and ongoing basis.

Lodging a submission with Powerlink

Powerlink is seeking written submissions on this Project Specification Consultation Report on or before Friday, 8 January 2021, particularly on the credible option presented[4].

Please address submissions to:

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[4] 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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