Powerlink Queensland

Summary
Project Assessment Conclusions Report

22 January 2021

Managing voltage control in Central Queensland

Summary

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. With reactive plant at capacity, obtaining outages for maintenance work on the plant is also becoming increasingly problematic.

The Project Assessment Conclusions Report (PACR) represents the final step in the RIT-T process prescribed under the Rules undertaken by Powerlink to address the emerging voltage control risks in Central Queensland. 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 present value of net economic benefit, or minimises the net cost, is recommended as the preferred option.

Proposed network options to address the identified need

Powerlink 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. The major difference between the credible options relates to the location of the reactors.

By addressing the voltage control risks, all three options allow Powerlink to meet the identified need and continue to meet the reliability and service standards specified within Powerlink's Transmission Authority and Schedule 5.1 of the Rules,.

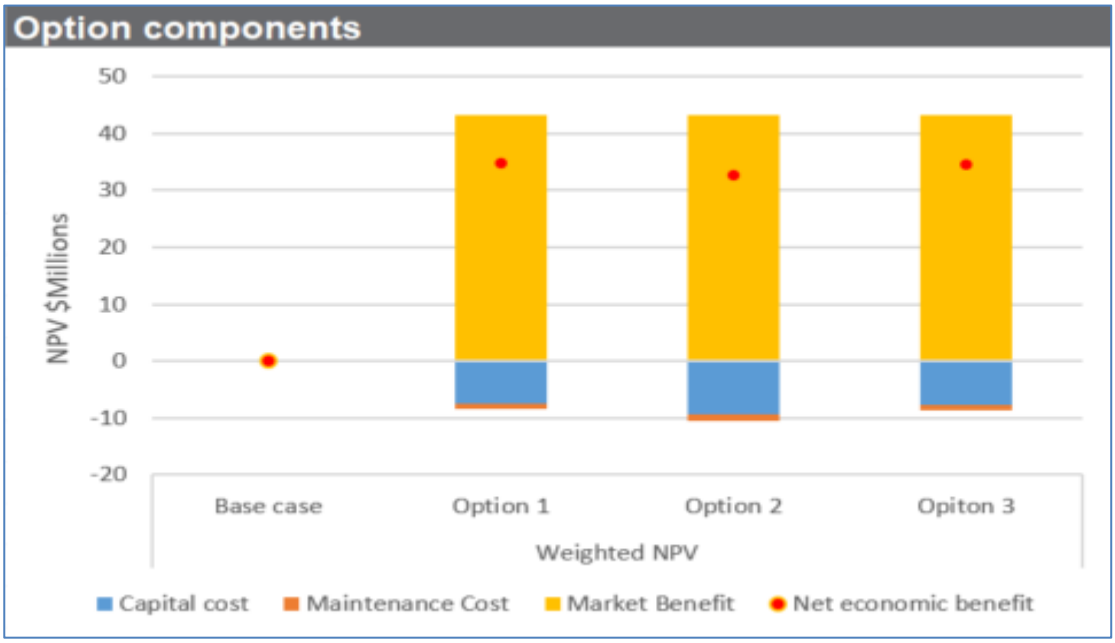
Powerlink published a Project Specification Consultation Report (PSCR) in October 2020 to address the risks of over-voltage events in Central Queensland. No formal submissions were received in response to the PSCR that closed on 8 January 2021. As a result, no additional credible options have been identified as a part of this RIT-T consultation.

The three credible network options, along with their NPVs relative to the Base Case are summarised in Table 1. Of the three credible network options, Option 1 has the greatest benefit in NPV terms.

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 line reactors at H020 Broadsound (1x 25MVar 300kV and 1x 35MVAr 330kV) 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



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 1 provides the greatest net economic benefit in NPV terms 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 1, which involves the installation of a bus reactor at Broadsound Substation by June 2023. The indicative capital cost of this option is $9.63 million in 2020/21 prices. Under Option 1, initial design work will commence in early 2021, with all work completed by June 2023. Powerlink is the proponent of the proposed network project.

As the outcomes of the economic analysis contained in the PACR remain unchanged from those published in the PSCR, the draft recommendation has been adopted without change as the final recommendation for implementation.

Dispute Resolution

In accordance with the provisions of clause 5.16B.(a) of the NER, Registered Participants, the AEMC, Connection Applicants, Intending Participants, AEMO and interested parties may, by notice to the AER, dispute conclusions in the PACR in relation to:

- the application of the RIT-T,
- the basis upon which the preferred option was classified as a reliability corrective action or
- the assessment of whether the preferred option has a *material inter-regional impact* or not

Notice of a dispute must be given to the AER within 30 days of the publication date of the PACR. Any parties raising a dispute are also required to simultaneously provide a copy of the dispute notice to the RIT-T proponent.

Contact us

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