



Expanding NSW-QLD transmission transfer capacity

Project Assessment Draft Report
Summary

30 September 2019

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TransGrid and Powerlink are investigating network and non-network options for expanding transfer capacity between New South Wales and Queensland necessary to support the long-term interests of consumers for safe, secure, reliable electricity, at the least cost, across a range of plausible futures. This analysis builds on the assessment in the 2018 Integrated System Plan (ISP) prepared by the Australian Energy Market Operator (AEMO).

The 2019 AEMO Electricity Statement of Opportunities (ESOO) has reconfirmed the importance of completing an incremental upgrade to QNI (as well as VNI¹) ahead of the forecast closure of Liddell Power Station, which it states will improve the supply-demand balance in New South Wales and reduce the likelihood of unserved energy.²

We are applying the Regulatory Investment Test for Transmission (RIT-T)³ to this identified need based on net market benefits, rather than reliability corrective action. Reliability of supply has been considered as one class of market benefits in the overall benefits assessment. This report summarises the Project Assessment Draft Report (PADR), which has been prepared as the second formal step in the 'expanding NSW-QLD transmission transfer capacity' RIT-T process and follows the Project Specification Consultation Report (PSCR) released in November 2018.

The PADR focusses on options for increasing transfer capacity between New South Wales and Queensland in the near-term, consistent with the assessment of the 'Group 1' QNI expansion in the 2018 ISP, as well as guidance from the Australian Energy Regulator (AER) provided since the PSCR.⁴ This revised focus is to ensure that the consideration of medium-term options (i.e., 'Group 2' QNI expansion in the 2018 ISP) does not delay the consideration of near-term options required to ensure the greatest net benefits to NEM participants, particularly in light of the forecast closure of Liddell Power Station over 2022 and 2023.

The medium-term options included in the PSCR will be assessed as part of a separate RIT-T in the future, the timing of which is expected to be informed by the 2020 ISP recommendations.

Overview

The PADR confirms the 2018 ISP recommendation that there are significant net benefits associated with expanding transfer capacity between New South Wales and Queensland.

It finds that upgrading the Liddell to Tamworth lines and installing new dynamic reactive support at Tamworth and Dumaresq and shunt capacitor banks delivers the greatest expected net benefits of all options considered and is the 'preferred option' at this draft stage of the RIT-T.⁵

The analysis shows that the preferred option is expected to:

- deliver net benefits of approximately \$200 million over the assessment period to 2044/45 (in present value terms);
- reduce the need for new generation and large-scale storage in New South Wales to meet demand following Liddell Power Station's forecast retirement over 2022 and 2023;
- lower the aggregate generator fuel costs required to meet demand in the National Electricity Market (NEM) going forward;
- avoid capital costs associated with enabling greater integration of renewables in the NEM; and
- generate sufficient benefits to recover the project capital costs two years after the option is commissioned.

¹ 'VNI' is the proposed increase in transmission transfer capacity between Victoria and New South Wales.

² AEMO, *2019 Electricity Statement of Opportunities*, August 2019, pp.4 & 93.

³ The Regulatory Investment Test for Transmission (RIT-T) is the economic cost benefit test that is overseen by the AER and applies to all major network investments in the NEM.

⁴ AER, *Queensland-NSW Interconnector RIT-T guidance notice and engagement process*, available at: <https://www.aer.gov.au/communication/queensland-nsw-interconnector-rit-t-guidance-notice-and-engagement-process>

⁵ The preferred option is defined as the option that maximises net market benefits under the RIT-T framework.

Benefits from expanding transmission transfer capacity between NSW and Queensland

The driver for the investment options considered in the PADR is to create a net benefit to consumers and producers of electricity and to support energy market transition through:

- allowing for more efficient sharing of generation across the NEM, thereby avoiding the use of higher cost generators and deferring, or avoiding, the construction of new, more expensive generation and/or storage capacity;
- continuing to provide reliable supply at the lowest cost by deferring the need to build new generation and storage capacity in New South Wales ahead of the forecast retirement of Liddell Power Station; and
- facilitating the transition to a lower carbon emissions future and the adoption of new technologies through improving access to high quality renewable resources across regions, which further avoids the use of high-cost generators and defers, or avoids, the need to build new generation.

While the summary of these three broad sources of expected benefit have changed in a minor way since the PSCR to reflect the market modelling now undertaken (and presented in the PADR), the 'identified need' for this RIT-T remains unchanged, i.e., 'to increase overall net market benefits in the NEM through relieving existing and forecast congestion on the transmission network between New South Wales and Queensland'.

The 2018 ISP concluded that market benefits associated with an expansion of transfer capacity in the near-term can be realised as soon as this can be provided due to a reduced need for new gas-fired generation in New South Wales to meet demand once Liddell Power Station retires, as well as benefits from allowing more efficient generation sharing between New South Wales and Queensland. The 2018 ISP conclusions have been reinforced by the assessment in the PADR.

The PADR finds that the net benefit gained by expanding transfer capacity between New South Wales and Queensland allows for a lower cost 'filling of the gap' in electricity supply following Liddell Power Station's forecast closure, compared to what might otherwise occur.

The PADR analysis has benefited from extensive stakeholder consultation

Following publication of the PSCR, and an accompanying inputs and methodology consultation paper and assumptions workbook, we held a webinar in early February 2019 to help explain the assessment to stakeholders and to seek stakeholders' views. In December 2018, Powerlink provided its Customer Panel with an overview of the RIT-T and held a focused engagement workshop to receive their input and feedback on the options presented in the PSCR.

Formal submissions from a number of parties were subsequently received, seven of which have been published on our websites⁶ (the remainder have requested their submissions be kept confidential).

Prior to, as well as after, receiving submissions, we held a number of bilateral meetings with interested parties in order for them to clarify their submission, provide additional information and understand the RIT-T assessment further. These discussions focussed on the potential for non-network solutions to assist in meeting the identified need and have been pivotal in us being able to define and include two new credible options for assessment in the PADR and outlined below.

We have taken all feedback raised in submissions into account in undertaking our PADR analysis, as explained throughout this document (together with an appendix providing a comprehensive list of key points raised through stakeholder engagement and responses to each).

In July 2019, the AER released a public guidance note⁷ outlining the refined focus for the PADR on near-term options for QNI expansion. In addition, TransGrid and Powerlink briefed their respective Customer Panels on

⁶ <https://www.transgrid.com.au/what-we-do/projects/current-projects/ExpandingNSWQLDTransmissionTransferCapacity> & <https://www.powerlink.com.au/expanding-nsw-qld-transmission-transfer-capacity>

⁷ AER, *QNI Regulatory Investment Test*, Guidance Note, July 2019, available at: <https://www.aer.gov.au/networks-pipelines/compliance-reporting/guidance-note-queensland-to-new-south-wales-interconnector-regulatory-investment-test>

this refined focus and presented it to a broad range of stakeholders as part of their Transmission Network and Annual Planning Forums in September 2019.

Six credible options have been developed and assessed in the PADR

Stakeholder consultation on the PSCR has enabled two new credible options to be defined and assessed as part of the PADR, i.e., in addition to the four incremental credible options to increase transfer capacity identified in the PSCR.

These new options reflect:

- a ‘modest’ 2 x 40MW/20MWh battery energy storage system (BESS); and
- a refinement of the delivery, costs and capabilities of the original, larger, BESS option proposed in the PSCR (which is now assumed to be a 2 x 200MW/100MWh system).

The table below updates and summarises the six credible options assessed.⁸ All credible options are expected to be delivered and inter-network testing completed by June 2022.

Table E.1 Summary of credible options assessed as part of the PADR

Option description	Indicative total transfer capacity (MW) ⁹		Estimated capex (\$m)
	Northward	Southward	
<i>Incremental upgrades to the existing network to increase transfer capacity</i>			
Option 1A – Uprate Liddell to Tamworth lines and install new dynamic reactive support at Tamworth and Dumaresq and shunt capacitor banks	690	1,120	175
Option 1B – Uprate Liddell to Tamworth lines only	570	1,070	34
Option 1C – Install new dynamic reactive support at Tamworth and Dumaresq and shunt capacitor banks	480	1,120	142
Option 1D – Sapphire substation cut into line 8C and a mid-point switching station between Dumaresq and Bulli Creek	480	1,110	45
<i>A ‘virtual transmission line’ comprised of grid-connected battery systems</i>			
Option 5A – Small BESS (2 x 40MW/20MWh)	520	1,110	110*
Option 5B – Large BESS (2 x 200MW/100MWh)	680	1,270	461*

* These are the assumed upfront capital and reinvestment costs for these two options.

Option 1A is the 2018 ISP recommended ‘Group 1’ investment. The other network options have been developed based on additional studies and consultation undertaken since the 2018 ISP, including on this RIT-T’s PSCR. These options reflect alternate, lower cost, options targeting different transfer limits that would provide different market benefits.

The BESS options have been assessed using information (including costs) provided by parties in response to the PSCR and in subsequent engagement with TransGrid and Powerlink. However, in order to maintain confidentiality of commercial-in-confidence information in submissions, the analysis presented in the PADR (including Table E.1) has used public generic storage costs. The use of generic costs does not alter the outcomes of the assessment in terms of which option is preferred overall.

⁸ The same option naming/numbering convention has been applied as in the PSCR, i.e., ‘Option 1’ for the incremental upgrades to the existing network to increase transfer capacity and ‘Option 5’ for the grid-connected battery systems.

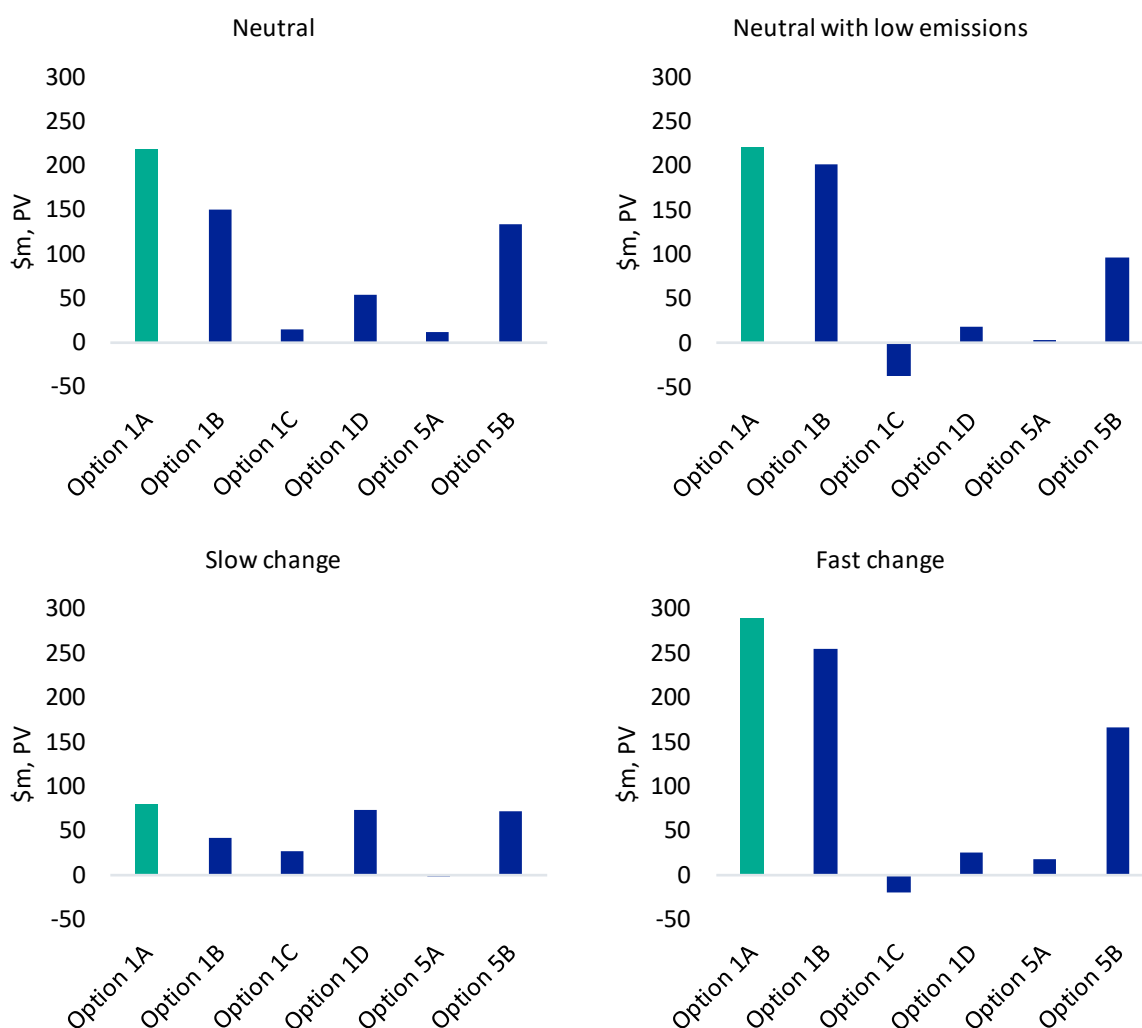
⁹ The transfer capacities shown in this table are indicative for one operating state only (daytime, medium demand) and serve to summarise the notional differences between options. Appendix D provides additional detail on the modelled transfer capacities of the options, across a range of operating states. As outlined in the Inputs and Methodology Consultation Paper in December 2018, System Technical Analysis undertaken since the PSCR was released has resulted in refining the definition of the QNI transfer capacity.

The preferred option delivers positive net benefits and is the top-ranked option across all reasonable future scenarios

Uncertainty is captured under the RIT-T framework through the use of scenarios, which reflect different assumptions about future market development, and other factors that are expected to affect the relative market benefits of the options being considered.

Four scenarios have been considered as part of the PADR, which are intended to cover a wide range of possible futures and are generally aligned with the AEMO proposed 2020 ISP ‘slow change’, ‘neutral’ and ‘fast change’ scenarios. The four scenarios differ in relation to key variables expected to affect the market benefits of the options considered, including demand outlook, assumed generator fuel prices, assumed emissions targets, retirement profiles for coal-fired power stations, and generator and storage capital costs.

Figure E.1 – Estimated net benefits for each scenario



The results of the PADR assessment find that Option 1A is expected to deliver the greatest net benefits of all options, across all four scenarios considered. Estimated net benefits for this option range from approximately \$80 million to \$290 million depending on the scenario and, on a weighted basis, it is expected to deliver around 25 per cent more net benefits than the second-ranked option (Option 1B).

The market benefits of all options are primarily derived from the avoided, or deferred, costs associated with generation and storage in New South Wales, compared to the base case. This benefit arises since the expanded transfer capacity between New South Wales and Queensland under each option allows Queensland generation to export to New South Wales, reducing the need for new investment in generation in New South Wales.

While Option 5B is the top-ranked BESS option, and has the greatest estimated gross benefit of all options, it is only expected to deliver around 60 per cent of the expected net benefits of Option 1A (on a weighted-basis). This is driven by the relatively high costs associated with Option 5B, which include high upfront costs and as the need to reinvest during the assessment period due to the comparatively shorter life of the energy storage components.

We have also tested the robustness of the assessment to a range of sensitivities, including the deferred assumed retirement of three of Liddell Power Station’s units (as recently announced by AGL), the impact of assuming Wood Mackenzie’s ‘fast’ coal price scenario (as part of the latest AEMO ISP assumptions), the effect of including outages during line uprating works, the capital costs of the credible options, and alternate commercial discount rate assumptions. All tests confirm the conclusion that Option 1A is the optimal investment and is a ‘no regrets’ decision to implement as soon as practicable.

Next steps and the wider investment approval process

TransGrid and Powerlink welcome written submissions on the PADR. Submissions are due on or before 15 November 2019.

Submissions should be emailed to regulatory.consultation@transgrid.com.au

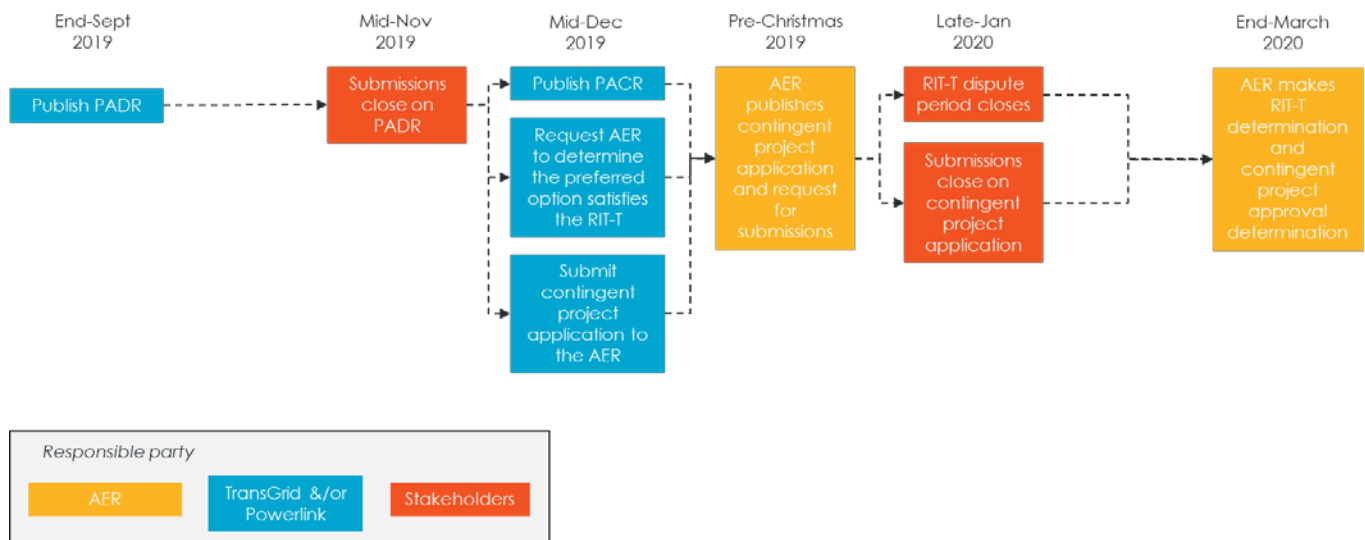
Submissions will be published on the TransGrid and Powerlink websites. If you do not wish for your submission to be made publicly available, please clearly specify this at the time of lodgement.

The next formal stage of this RIT-T is the Project Assessment Conclusions Report (PACR). The PACR will address PADR consultation responses and determine the final preferred option and is expected to be published in December 2019.

Subject to the PACR, TransGrid and/or Powerlink will submit contingent project applications to the AER as part of the wider regulatory investment approval process.

The AER has proposed to adopt an expedited process for considering these contingent project applications. Figure E.2 below summarises this expedited approval process and the expected timeframes.

Figure E.2 – Expedited investment approval process for this RIT-T



Source: Indicative timetable for the Queensland-NSW Interconnector RIT-T, available at: <https://www.aer.gov.au/communication/queensland-nsw-interconnector-rit-t-guidance-notice-and-engagement-process>

In addition, on 12 November 2018, the New South Wales Government released the NSW Transmission Infrastructure Strategy stating it will support early development of the preferred near-term option (i.e. consistent with the 2018 ISP ‘Group 1’ timings) by bringing forward early planning and feasibility work. TransGrid is working with the New South Wales Government on this initiative.