

# Maintaining reliable supply to Broken Hill

**RIT-T – Project Assessment Draft Report [REVISED]**

Region: South Western New South Wales

Date of issue: 6 October 2021



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# Summary

TransGrid is applying the Regulatory Investment Test for Transmission (RIT-T) to long-term options for maintaining reliable supply to Broken Hill. Publication of this Project Assessment Draft Report (PADR) represents the second step in the RIT-T process and follows the Project Specification Consultation Report (PSCR) released in November 2019.

## **This PADR has been updated based on new AER guidance on the treatment of non-network option costs**

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An initial Project Assessment Draft Report (PADR) was released for this RIT-T on 11 August 2020 (referred to throughout this document as the 'initial PADR'). TransGrid highlighted in the initial PADR that the regulatory treatment of non-network costs is a key driver of the preferred option under the RIT-T.

In late August 2020, the Australian Energy Regulator (AER) provided additional guidance regarding the treatment of non-network options in the RIT-T cost benefit assessment. TransGrid has confirmed with the AER that this guidance should be applied to this RIT-T. This revised PADR therefore updates the approach to assessing non-network options and presents the revised outcomes of the RIT-T assessment.

Consistent with the AER's guidance, where an option involves the use of the existing diesel-fired<sup>1</sup> turbines at Broken Hill, TransGrid considered how these assets would operate in the base case as well as in each option case, and have assessed the difference.

TransGrid has also taken the opportunity to update the RIT-T assessment to reflect the feedback received from stakeholders on the initial PADR.

## **Benefits from the options considered in this PADR**

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Broken Hill is located in the far west of New South Wales and is part of TransGrid's south-western transmission network. It is currently supplied by a single 220 kV transmission line, 'Line X2', from Buronga which spans approximately 260 km.

When Line X2 is out of service due to planned or unplanned outage, electricity supply to Broken Hill is supported by two diesel-fired turbines, which are owned by Essential Energy, to avoid involuntary load shedding. TransGrid relies on these turbines to meet the NSW Electricity Transmission Reliability and Performance Standards 2017 (the 'reliability standards') set by the NSW Energy Minister and regulated by the NSW Independent Pricing and Regulatory Tribunal (IPART).

Essential Energy has notified TransGrid of its decision to divest the turbines located at Broken Hill and is currently in the process of enacting that divestment. If no action is taken by TransGrid, this would result in the required reliability of supply to Broken Hill not being maintained, and involuntary load shedding when Line X2 is on planned or unplanned outage.

TransGrid considers this a 'reliability corrective action' under the RIT-T, as the identified need is to ensure that the externally-imposed reliability standards for Broken Hill continue to be met. All of the credible options assessed in this PADR provide back-up and reliable supply to Broken Hill for the future that is consistent with the NSW Electricity Transmission Reliability and Performance Standards.

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<sup>1</sup> While the initial PADR referred to these turbines as 'gas turbines', they are actually operated using diesel and so we have updated their description throughout this document accordingly.

Some of the credible options assessed will also affect the wholesale electricity market. In particular:

- > some options involve grid-connected storage that introduce new entities trading in the wholesale market, eg, dispatching into the National Electricity Market (NEM) outside of the allocation of storage needed to meet its Broken Hill network support commitments; and
- > the impact on network capacity under some of the options facilitates greater uptake of renewables in surrounding Renewable Energy Zone (REZ) areas.

Both the benefits from the provision of reliable supply to Broken Hill and wider wholesale market benefits have been estimated as part of this PADR.

## **The updated PADR analysis has benefited from further stakeholder feedback**

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The initial PADR for this RIT-T was published on 11 August 2020.

TransGrid received nine submissions, including from proponents of non-network options (including a number of new non-network solutions since the initial PADR was released). The submissions can be summarised as:

- > four from existing proponents from the Expression of Interest (EOI)/PSCR;
- > three from new proponents, with various levels of solutions;
- > one who endorsed another proponent's solution (Option 1D); and
- > one from PIAC that raised concerns about trialling emerging technologies.

The submissions from proponents of non-network options raised a range of issues relating to the specific assumptions made in evaluating their options (including cost and technical capabilities). These submitters each requested confidentiality. However, in general, TransGrid revised the assessment of each of the options in light of the submissions, and adopted the assumptions proposed as far as possible.

In March 2021, TransGrid sent a request for clarification to those proponents who proposed a solution in response to the EOI that accompanied the initial PADR, in order to source the required inputs to enable TransGrid to assess their options in-line with the new AER guidance. This consultation allowed proponents to reconsider and revise their offers in light of the new guidance, as well as to raise any further points with TransGrid as part of the RIT-T consultative process.

## **Five types of credible options have been developed and assessed in this PADR**

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Stakeholder consultation on the PSCR and initial PADR has assisted greatly with developing and refining the credible options considered in this RIT-T. Specifically, consultation with third parties has enabled this revised PADR to assess the following five types of credible options:

- > Option 1: nine different non-network opex solutions fully provided by third parties (Options 1A(1)– (5) (being five different sized options from one proponent), Option 1C, Option 1D, Option 1E and Option 1F);
- > Option 2: a revised version, and cost for, acquiring the existing diesel-fired turbines from Essential Energy;
- > Option 3: establishing new diesel-fired turbines at Broken Hill;
- > Option 4: building a second single circuit 220 kV transmission line from Buronga to Broken Hill; and
- > Option 5: nine variants of the first group of solutions involving either shared ownership or ownership by TransGrid (Option 5A(1) - (5) (being five different sized options from one proponent), Option 5B, Option 5C, Option 5E and Option 5G).

The updated AER guidance now means that options with the same scope in terms of the underlying technical solution will have the same net benefits, regardless of ownership. For example, Option 1A(1) that is a non-network solution will have the same resource costs and net benefits as Option 5A(1), where the solution is

owned by TransGrid. For clarity, ownership of the solution, whether by a non-network proponent or TransGrid, now results in the same level of net benefits for that solution under the RIT-T.

All options reduce expected unserved energy (EUE) at Broken Hill to the amount required under the IPART reliability standard. Option 4 provides an additional level of reliability due to the second transmission line and is assessed to reduce EUE to effectively zero.

TransGrid notes that the existing turbines at Broken Hill form a component of several options. However, they are only ultimately able to be offered either by the party who purchases the turbines, or by a party that contracts with the purchaser. Depending on when the divestment process concludes, there may therefore be a reassessment of credible options between the PADR and the PACR. It is also possible that Essential Energy may sell the turbines to a third party who does not wish to be part of a network support arrangement, prior to the finalisation of this RIT-T process. In this circumstance, Option 2 would no longer be a credible option for this RIT-T, and non-network options that rely on the Essential Energy turbines would also be affected.

The nine non-network opex solutions fully provided by third parties and the nine variants of these solutions involving either shared ownership or ownership by TransGrid have been assessed using information (including costs) provided by parties in response to our March 2021 requests for clarification, where available, and in subsequent engagement with TransGrid. In order to maintain confidentiality of commercial-in-confidence information in submissions, these costs, and cost structures, have not been presented in this PADR.

## **The RIT-T assessment has considered different future scenarios and different base cases for the outcome of the divestment process for the existing turbines at Broken Hill**

Uncertainty is captured under the RIT-T framework through the use of scenarios, which reflect different assumptions that are expected to affect the key drivers of the estimated net market benefits.

The credible options have been assessed under three scenarios as part of this PADR assessment, which are characterised as follows:

- > a 'low net economic benefits' scenario, involving a number of assumptions that gives a lower bound and conservative estimate of net present value of net economic benefits;
- > a 'central' scenario which consists of assumptions that reflect TransGrid's central set of variable estimates that provides the most likely scenario; and
- > a 'high net economic benefits' scenario that reflects a set of assumptions which have been selected to investigate an upper bound of net economic benefits.

The table below summarises the specific key variables that influence the net benefits of the options under each of the scenarios considered.

**Table 1: Summary of scenarios**

<b>Variable</b>	<b>Central</b>	<b>Low net economic benefits</b>	<b>High net economic benefits</b>
Network capital costs	Base estimate	Base estimate + 25%	Base estimate - 25%
Broken Hill demand	Based on POE50 demand forecast	Based on POE90 demand forecast	Based on POE10 demand forecast
Wholesale market benefits estimated	EY estimated based on central ISP scenario (as outlined in section 6 below)	30 per cent lower than what EY has estimated	30 per cent higher than what EY has estimated

Variable	Central	Low net economic benefits	High net economic benefits
VCR	\$36.43/kWh	\$25.50/kWh	\$47.36/kWh
Discount rate	5.90%	9.57%	2.23%

The underlying demand forecasts have been updated slightly since the original PADR to align with our 2021 Transmission Annual Planning Report.

TransGrid modelled two alternate base cases as part of the revised PADR assessment. For this RIT-T, an important feature of the base case is the assumption regarding the future of the existing turbines at Broken Hill in the absence of an option, reflecting the Essential Energy divestment process underway. All credible options were modelled against the following two base cases:

- > Base case I – the existing turbines are sold to a party outside of the NEM, e.g., a mine situated outside of the NEM; and
- > Base case II – the existing turbines are not sold and Essential Energy mothballs them in the future.

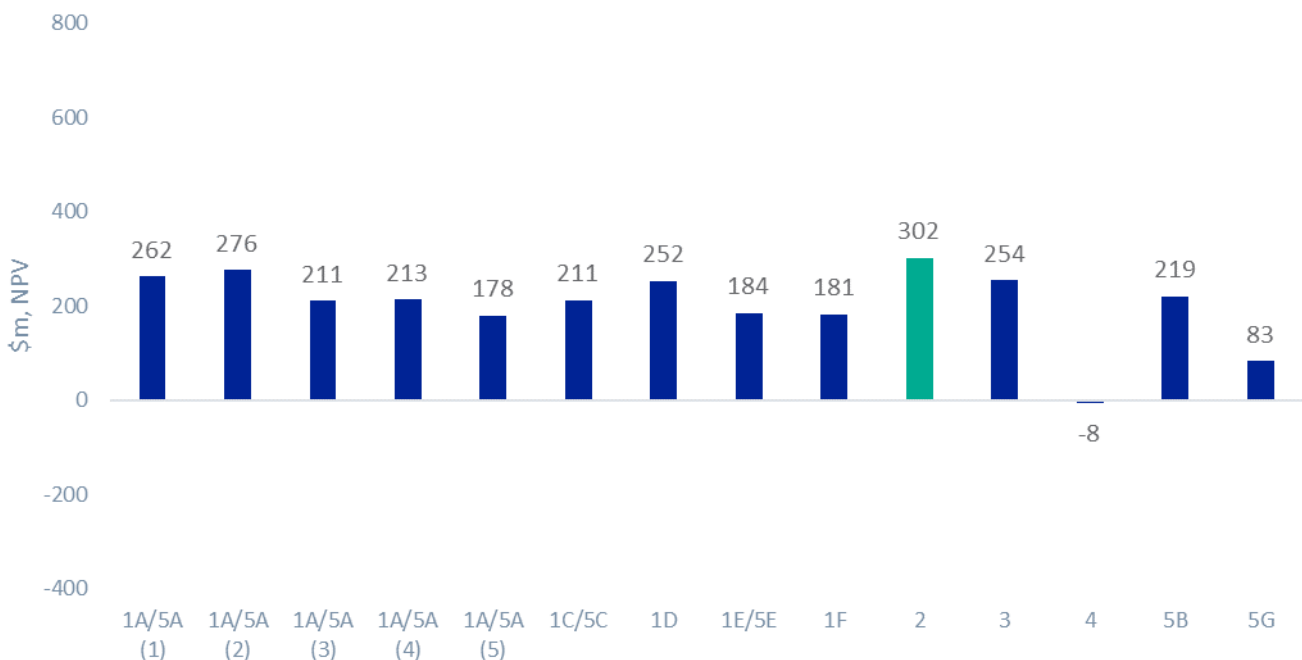
The different base cases affect the costs and benefits included in the RIT-T assessment.

**The top-ranked options deliver positive net benefits across all scenarios and on a weighted basis, with the ranking of those options having the highest net benefit being consistent across both base cases**

The results of the PADR assessment find that Option 2 delivers the greatest net benefit of all credible options considered for continuing to provide reliable supply to Broken Hill. Under Option 2, TransGrid would purchase the existing turbines and undertake required refurbishment activities.

Option 2 is the option with the highest net benefit across the low and central scenarios (with Option 1A(4)/5A(4) becoming top-ranked in the high scenario), and is also the highest ranked on a weighted basis. Option 2 is also the highest ranked option under a majority of the sensitivities investigated. These results are consistent across both base cases considered.

**Figure 1: Summary of the estimated net benefits under the weighted scenario, base case I**



**Figure 2: Summary of the estimated net benefits under the weighted scenario, base case II**



Notwithstanding that the continued use of the diesel-fired turbines under Option 2 exhibits the highest net benefit and therefore is identified as the ‘preferred option’ (according to the specific definition in the RIT-T), we have concerns that prolonging the use of fossil fuel technologies is inconsistent with the Sustainability Strategy of Broken Hill City Council<sup>2</sup> or the general transition of the electricity sector to low emission technologies.

The highest ranked non-fossil fuel option under this RIT-T assessment is a non-network option, Option 1A/5A(2). Option 1A/5A(2) does not have an enduring reliance on fossil fuel technologies as part of the long term solution to meet reliability standards at Broken Hill. Instead, Option 1A/5A(2) is a compressed-air energy storage solution that will create a mini-grid at Broken Hill that will normally operate connected to the grid, and can meet the identified need over the long term.

Option 1A/5A(2) is of a sufficient size to trade in the wholesale market and is expected to provide wholesale market benefits in addition to the required level of reliability at Broken Hill. When Line X2 is in service, the storage will be able to store renewable generation from southern NSW that would otherwise be spilt, and make it available at other times. When Line X2 is out of service, the storage will enable Broken Hill to run as a ‘mini-grid’, using the wind and solar generation at Broken Hill based on the assessment in this PADR.

Broader market benefits are also expected to accrue under Option 1A/5A(2) and are primarily derived from avoided or deferred costs associated with generation and storage elsewhere in the NEM. Option 1A/5A(2) is estimated to deliver net benefits of around \$276 million to \$278 million over the assessment period to 2044/45 (in present value terms).

Option 1A/5A(2) is found to be the second-ranked option under the central scenario and on a weighted basis. Specifically, the net benefit of Option 1A/5A(2) is found to be within 9 and 12 per cent of the net benefit of Option 2, on a weighted basis, across base case I and base case II, respectively.

The technology utilised by Option 1A/5A(2) also offers a degree of flexibility to be scaled into a larger solution should the need arise, including if potential mining spot loads in the Broken Hill area eventuate.

<sup>2</sup> Broken Hill City Council, *Sustainability Strategy 2018-2023*.

TransGrid understands that the proponent of Option 1A/5A(2) is exploring external out-of-market funding. Any such external funding would reduce the costs of Option 1A/5A(2) that are included in the RIT-T NPV assessment and could potentially close the gap between Option 2 and Option 1A/5A(2) such that this option becomes the 'preferred option' (according to the specific definition in the RIT-T).

TransGrid notes that it is intended that the analysis in the PACR will be updated to reflect any external funding, as well as any other recent relevant market developments not captured in these assumptions.

## Next steps

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TransGrid welcomes written submissions on this PADR. Submissions are due on 17 November 2021.

Submissions should be emailed to TransGrid's Regulation team via [regulatory.consultation@transgrid.com.au](mailto:regulatory.consultation@transgrid.com.au).<sup>3</sup> In the subject field, please reference 'PADR Broken Hill reliability project.'

At the conclusion of the consultation process, all submissions received will be published on the TransGrid's website. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement.

The next formal stage of this RIT-T is the publication of a PACR. The PACR is expected to be published in March 2022.

To read the full Project Assessment Draft Report visit [TransGrid's website](#).

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<sup>3</sup> TransGrid is bound by the Privacy Act 1988 (Cth). In making submissions in response to this consultation process, TransGrid will collect and hold your personal information such as your name, email address, employer and phone number for the purpose of receiving and following up on your submissions. If you do not wish for your submission to be made public, please clearly specify this at the time of lodgement.