HOUSTONKEMP Economists

Memo

To	Stephanie McDougall - Transgrid
From	Ann Whitfield and Tony Chen
Subject	SW NSW analysis update
Date	2 November 2022

Transgrid has requested HoustonKemp undertake an update of the NPV analysis for the Improving Stability in South West New South Wales (SW NSW) project, to include two additional options not considered in the SW NSW RIT-T project assessment conclusion report (PACR).[1] These additional options are variants of options that were included in the RIT-T, which both include network support from a committed battery energy storage system (BESS) for longer than the three year period considered in the RIT-T.

This updated analysis draws on new market modelling inputs from EY (for the new Option 4A) but otherwise adopts the same assumptions as in the PACR. This memorandum sets out the results from this updated analysis.

1. Updated options for SW NSW

Two new options have been included in the SW NSW analysis update. These new options are variants of options that were included in the PACR:

- **Option 4A**: this new option is based on Option 4 in the PACR, which has a network support component that utilises a committed BESS and new network assets. Option 4A differs from Option 4 in that the network support component is assumed to be in place for six years, instead of three years for Option 4.
- **Option 5A**: this new option is based on Option 5 in the PACR, which involved a BESS solution to meet the identified need over the long term. Instead of a Transgrid owned battery (which would be a new investment), Option 5A assumes that an already committed BESS would provide this support.

We understand that Transgrid has held discussions with the proponent of the non-network option but that both the technical feasibility of the option and the cost at which the proponent may be willing to enter into an extended period of network support remain to be confirmed.

The updated set of options are set out in Table 1 below, with the two new options (Option 4A and Option 5A) in **bold**.

[1] https://www.transgrid.com.au/media/tinisujc/transgrid-pacr_improving-stability-in-sw-nsw.pdf. The BESS is being developed by Edify.

Table 1 Updated set of options for the SW NSW project

Option	PACR/New	Option description	Inputs for the analysis update	Commission timing
Option 1A	PACR	New 330 kV transmission line between Darlington Point and the new Dinawan substation being constructed for Project EnergyConnect	Same as the PACR	Battery: N/A Network: 2025/26 onward
Option 1B	PACR	Rebuild of the 330 kV transmission line between Darlington Point and the new Dinawan substation	Same as the PACR	Battery: N/A Network: 2025/26 onward
Option 2	PACR	New 330 kV transmission line between Darlington Point and the Wagga Wagga substation	Same as the PACR	Battery: N/A Network: 2026/27 onward
Option 3	PACR	Static synchronous compensator (STATCOM) solution at the Darlington Point substation	Same as the PACR	Battery: N/A Network: 2025/26 onward
Option 4	PACR	Interim 3-year battery solution (already committed) ahead of Option 1A	Same as the PACR	Battery: 2023/24 to 2025/26 Network: 2025/26 onward
Option 4A	**New**	**6-year battery solution (already committed) ahead of a deferred Option 1A**	**EY wholesale market modelling for benefits** **PACR Option 4 for costs**	**Battery: 2023/24 to 2025/26** **Network: 2028/29 onward**
Option 5	PACR	Standalone long-term battery solution (150MW/225MWh) using new Transgrid owned battery asset	Same as the PACR	Battery: 2024/25 onward Network: N/A

Option	PACR/New	Option description	Inputs for the analysis update	Commission timing
Option 5A	New	Standalone long-term battery solution (150MW/225MWh) using an already committed battery asset	PACR Option 5 for benefits and zero costs (as the battery is a committed asset)	Battery: 2024/25 onward Network: N/A

2. Updated analysis outcomes

2.1 Weighted outcomes

Results from the updated analysis set out in Figure 1 show that Option 5A is the highest ranked option (noting that Option 4 was identified as the preferred option in the PACR). The higher ranking for Option 5A is entirely due to the assumption that it utilises network support services from a committed BESS, and therefore any capex and opex related to that BESS forms part of the base case rather than the option itself. In contrast, Option 5 introduces the BESS as a new investment that forms part of the option and therefore capex and opex relating to the BESS is incremental to the base case and included as a cost in the NPV assessment.

Option 5A will incur higher network support payments than any other option, as network support services are required for a longer period of time. However, NNO payments are treated as transfers in the RIT-T analysis and therefore net off to zero with the amount received by the NNO provider.

Figure 1 Option 5A is the highest ranked option on a weighted basis

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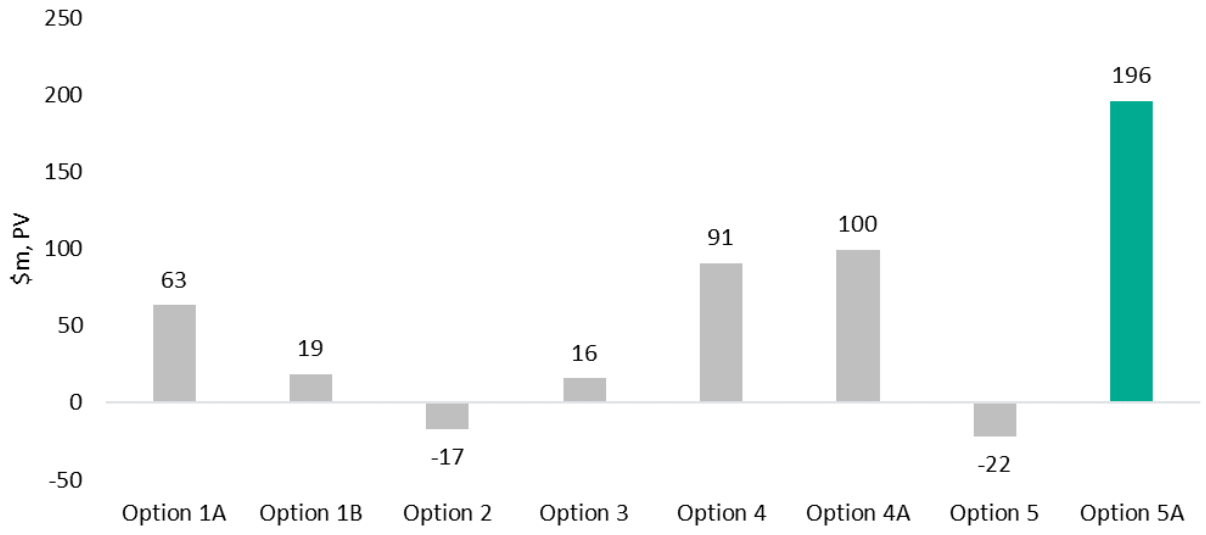


The second ranked option is Option 4A. Option 4A has a higher net benefit than Option 4, by approximately $9 million (or 10 per cent) in present value terms. Wholesale market benefits are estimated to be lower for Option 4A compared to Option 4, in present value terms. However, the extended six year period for network support under Option 4A (compared to three years under Option 4) allows for the start of network investment to be deferred until 2024/25, resulting in capex and opex for this option being lower in present value terms.

Table 2 provides a comparison of the costs and benefits between Option 4 and Option 4A in present value terms.

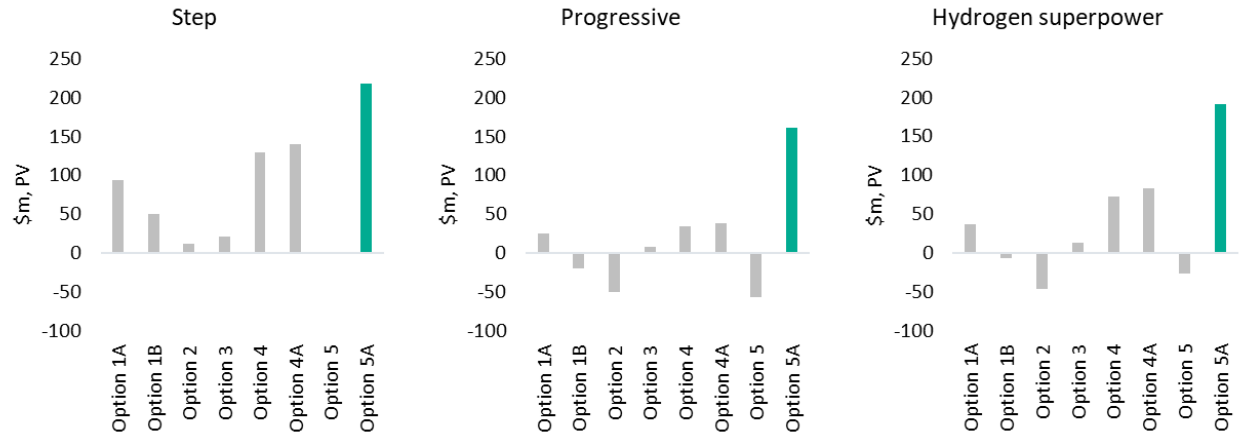
Table 2 Comparison between Option 4 and Option 4A[2]

Present value	Option 4	Option 4A	Difference
Capex	($115m)	($93m)	$23m
Opex	($15m)	($12m)	$3m
Market benefits	$221m	$204	($17m)
Net benefit	**$91m**	**$100m**	**$9m**

2.2 Outcomes by scenario

Results under each scenario (ie step change scenario, progressive change scenario, and hydrogen superpower scenario) reflect the weighted outcome, where Option 5A is ranked highest, Option 4A is ranked second, and Option 4 is ranked third. Option 1A is also ranked fourth in all scenarios.

Figure 2 Option 5A is ranked 1st in all scenarios, while Option 4A and 4 are 2nd and 3rd respectively



This indicates that relative option rankings for the top four options are insensitive to scenarios, and therefore the results under weighted outcomes will be robust to different scenario weightings.

[2] Numbers in Table 2 may not add due to rounding.

3. Escalation of costs and benefits are not material to the outcomes

Since the RIT-T analysis was undertaken, Transgrid has revised some of its input cost estimates and also updated the profile of expenditure expected for network investment under Option 1A.

We have assessed these changes on the above analysis and found that they do not affect the outcome in terms of relative option rankings compared to the those presented above in section 2.

Figure 3 Escalated and unescalated weighted outcomes produce the same option rankings

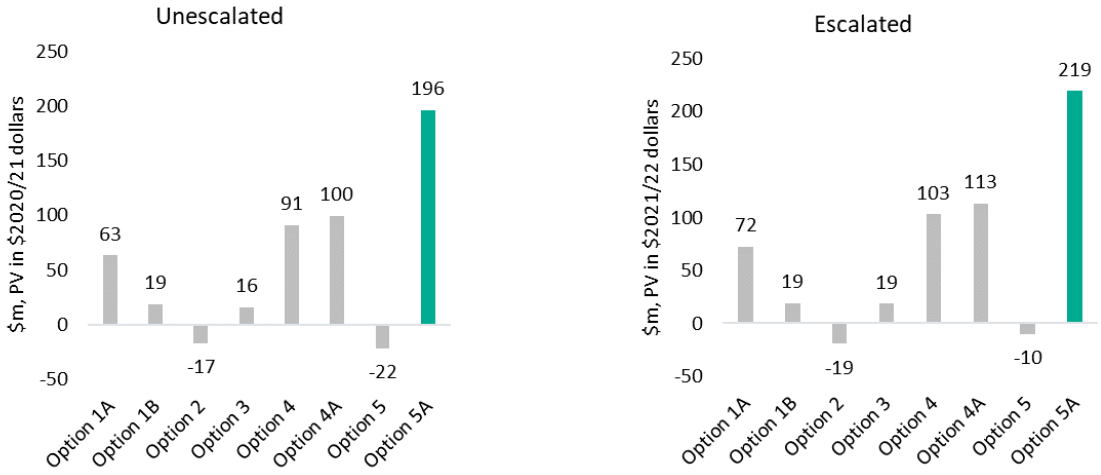


Figure 3 above shows the escalation of costs and benefits[3] increases the scale of net benefits (or net costs) but does not change the relative rankings between the top four options. Option 5A is still ranked first with the highest net benefit out of all options included in the updated analysis, while Option 4A, Option 4 and Option 1A are ranked second, third and fourth respectively, which is consistent with unescalated outcome rankings.

[3] Differences between the escalated and unescalated weighted outcomes relate to three areas: 1) escalation of real costs reflecting higher input prices for network infrastructure components, measured in 2021/22 dollars; 2) modification of capex profiles; and 3) escalation of 2020/21 dollar inputs to 2021/22 dollar inputs for benefits to align with 2021/22 dollar inputs for costs.