OPTIONS EVALUATION REPORT (OER)

Misc DNSP Secondary Systems Works

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Approvals

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Change history

Revision	Date	Amendment
0	3/11/2016	Initial issue
1	8/12/2016	Amended risks to align with NER compliance requirements

1. Need/opportunity

Analysis of minor secondary systems projects investment during the 2014/15 to 2018/19 Regulatory Control Period (from July 2014 to November 2016, approximately 2.5 years) is $1.2 million.[1]. These investments were for remote end works for Ausgrid, Endeavour Energy and Essential Energy. No investment was completed for ActewAGL. This expenditure equates to approximately $0.16 million per year for the three DNSPs. It is anticipated that expenditure will remain constant for the remainder of the current Regulatory Control Period for each DNSP.

Endeavour Energy has advised TransGrid in a letter dated 19 August 2016 that in the 2018/19 to 2022/23 reset period, a number of sites in their network will require minor secondary systems (protection, communications, and commissioning works) investment. The exact locations for these works are not known at this stage, however, individual work requests will be sent to TransGrid, as per current process, as the projects arise. Endeavour Energy has estimated that approximately $0.1 million per annum will be required by TransGrid to fund these minor works ($0.5 million over the 2018/19 to 2022/23 period). These types of works are not included in any other proposed 2018/19 to 2022/23 projects. This estimate is also similar to the level of current minor secondary systems project investment within the current Regulatory Control Period.

It is assumed the estimated expenditure for Ausgrid and Essential Energy will be similar to that of Endeavour Energy. That is for Ausgrid $0.1 million per annum ($0.5 million over the 2018/19 to 2022/23 period) and for Essential Energy $0.1 million per annum ($0.5 million over the 2018/19 to 2022/23 period).

With the relative size of the ActewAGL network, and historical investments completed, no funds have been allocated within this need.

Hence the total estimate expenditure is $1.5 million over the 2018/19 to 2022/23 period.

2. Related needs/opportunities

Nil

3. Options

Base case

The primary risk of TransGrid not addressing this need is that it will not comply with the NER Clause 4.6.5(b), which states:

> *"If there is an outage of both protection systems on a transmission line and AEMO determines this to be an unacceptable risk to power system security, AEMO must take the transmission element out of service as soon as possible and advise the appropriate Network Service Provider immediately this action is undertaken."* (NER v.85).

Furthermore, the NER states that "this clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations clause 6(1) and Schedule 1". According to the National Electricity Law (1996) clause 2AA(1)(c), the penalty to TransGrid would be $100,000 and up to $10,000 per day for every day during which the protection systems are non-compliant. Therefore, the risk cost of this option is assessed to be:

[1] Following a review of project expenditure by the TransGrid Portfolio Management group.

Financial Risk Cost

$$Risk\ cost = civil\ penalty$$

$$= \$100{,}000 + \$10{,}000\ (per\ day) * 365\ (days\ per\ year) * 5\ (no. of\ years)^{2}$$

$$= \$18.35\ million\ /\ 5\ years$$

$$= \$\mathbf{3.67}\ \boldsymbol{million\ per\ annum}$$

There are no other risk types applicable to this Need.

The Total Risk cost is $3.67 million, refer Attachment 2.

Option A — Miscellaneous secondary systems works for DNSP connection points

TransGrid completes the minor secondary systems projects initiated by the DNSPs during the 2018/19 to 2022/23 Regulatory Control Period.

The risk cost of this option is assessed to be zero, as with the correct protection schemes installed, TransGrid will be meeting its compliance obligations under the NER.

Non-network solutions

There are no non-network solutions able to address this Need, as it is driven by secondary systems assets which are required in service as long as the primary systems they are controlling/protecting remain in service.

4. Evaluation

4.1 Technical evaluation

These will be evaluated as work requests come through from the DNSPs.

4.2 Commercial evaluation

The commercial evaluation of the technically feasible options is set out in Table 2. Details appear in Attachment 1.

Table 2 — Commercial evaluation ($ million)

Option	Description	Total capex ($m)	Annual opex ($m)	Annual post project risk cost ($m)	Economic NPV @ 10% ($m)	Financial NPV @10% ($m)	Rank
Base case	'Do nothing'	0	0	3.67	0	0	-
A	Miscellaneous secondary systems works for DNSP connection points	1.5	0.39	0	15.67	15.67	1

[2] Assuming that the violation persists over the entire 2018/19 to 2022/23 regulatory control period.

The commercial evaluation is based on:

- a 10% discount rate
- a life of the investment of 15 years and a corresponding residual/terminal value
- Discount rate sensitivities based on TransGrid's current AER-determined pre-tax real regulatory WACC of 6.75 percent and 13% appear in Table 3 for the preferred option, A:

Table 3 — Discount rate sensitivities ($ million)

Option	Description	Economic NPV @ 13%	Economic NPV @ 6.75%
A	Miscellaneous secondary systems works for DNSP connection points	11.44	22.49

4.3 ALARP evaluation

An ALARP assessment is triggered by the following hazard and the disproportionate factor:

- Unplanned outage of HV equipment → 3 times the safety risk reduction and taking 10% of the reliability risk reduction as being applicable to safety.

However, as this will only produce 30% of the benefit derived in the economic evaluation, a full ALARP evaluation will not produce an alternative preferred solution.

4.4 Compliance with National Electricity Rules

Addressing this Need will enable TransGrid to avoid the non-compliance penalties associated with the NER Clause 4.6.5(b), as outlined in section 3.

4.5 Preferred option

Option A is the preferred option as it is the only feasible option which enables TransGrid to meet its compliance obligations under the National Electricity Rules.

Capital and operating expenditure

The yearly incremental operating expenditure of Option A is estimated to be 2% of the upfront capital cost of the each secondary systems project, which equates to $0.39 million over the life of the assets, escalated at a rate of 2.9% per annum.

Regulatory Investment Test

The total cost of these secondary systems projects would be less than the $6 million threshold and they are therefore not subject to the RIT-T.

5. Recommendation

Based on the economic evaluation above, Option A is the preferred option to address the Need as it:

- enables TransGrid to meet its compliance obligations under the National Electricity Rules (NER).
- reduces TransGrid's risk exposure and reduces the risk from $3.67 million per year to zero.

It is therefore recommended that individual projects be raised for each DNSP secondary systems work request submitted during the 2018/19 to 2022/23 Regulatory Control Period.

Attachment 1 – Commercial evaluation report

Project_Option Name	Miscellaneous DNSP Secondary Systems Works - Option A

1. Financial Evaluation (excludes VCR benefits)

NPV @ standard discount rate	10.00%	$15.67m	*NPV / Capital (Ratio)*	*10.44*
NPV @ upper bound rate	13.00%	$11.44m	*Pay Back Period (Yrs)*	*Not measurable*
NPV @ lower bound rate (WACC)	6.75%	$22.49m	*IRR%*	*67.03%*

2. Economic Evaluation (includes VCR benefits but excludes tax benefits from non-cash transactions, ENS penalty and overall tax cost)

NPV @ standard discount rate	10.00%	$15.67m	*NPV / Capital (Ratio)*	*10.44*
NPV @ upper bound rate	13.00%	$11.44m	*Pay Back Period (Yrs)*	*Not measurable*
NPV @ lower bound rate (WACC)	6.75%	$22.49m	*IRR%*	*67.03%*

Benefits

Risk cost	As Is	To Be	Benefit
Systems (reliability)	*$0.00m*	*$0.00m*	*$0.00m*
Financial	*$0.00m*	*$0.00m*	*$0.00m*
Operational/compliance	*$3.67m*	*$0.00m*	*$3.67m*
People (safety)	*$0.00m*	*$0.00m*	*$0.00m*
Environment	*$0.00m*	*$0.00m*	*$0.00m*
Reputation	*$0.00m*	*$0.00m*	*$0.00m*
Total Risk benefits	$3.67m	$0.00m	$3.67m
Cost savings and other benefits			$0.00m
Total Benefits			$3.67m

VCR Benefit	*$0.00m*
ENS Penalty	*$0.00m*
All other risk benefits	*$3.67m*
Total Risk benefits	$3.67m
Benefits in the financial NPV* **excludes VCR benefits*	$3.67m
Benefits in the economic NPV** ***excludes ENS penalty*	$3.67m

Other Financial Drivers

Incremental opex cost pa (no depreciation)	-$0.03m	Write-off cost	$0.00m
Capital - initial $m	-$1.50m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment	$0.10m	Re-investment capital	$0.00m
Capitalisation period	5.00 Yrs	Start of the re-investment period	0.00 Yrs