

OPTIONS EVALUATION REPORT (OER)



Tamworth 330kV Secondary System Renewal

OER 00000001243 revision 3.0

Ellipse project no.: P0005239

TRIM file: [TRIM No]

Project reason: Capability - Asset Replacement for end of life condition

Project category: Prescribed - Replacement

Approvals

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Date submitted for approval	24 November 2016	

Change history

Revision	Date	Amendment
0	23 June 2016	Initial issue
1	27 October 2016	Update to 2016/17 dollars and SFAIRP/ALARP data
2	16 November 2016	Update to format
3	24 November 2016	Added OSR reference

1. Need/opportunity

Tamworth 330/132kV Substation forms a part of the 330kV backbone of the NSW network and the Queensland/New South Wales Interconnector (QNI). The site comprises of 4x330kV feeders, 3x330/132kV transformers, 2x330kV Reactors and 4x132kV feeders. The site was established in 1968, and the secondary systems assets have install dates between 1968 and 2014.

Secondary Systems assets have been identified as reaching end of life and require addressing at the site.

2. Related Needs/opportunities

The assets proposed to be replaced under this Secondary System Replacement were identified in the following Needs:

- > Need ID 615 – Replacement of Optimho LFZP1112 Protection Relays
- > Need ID 1380 – Protection – Schweitzer SELxxx Condition
- > Need ID 1382 – Protection – GE Relay Condition
- > Need ID 629 – Replacement of RTUs

3. Options

The options scoped for this need were identified as per the Options Screening Report – Secondary System Renewal.

All dollar values in this document are expressed in un-escalated 2016/17 dollars.

Base Case

The Base Case for this Need is to continue with TransGrid's operation and management (O&M) for the site. This approach does not address the technological obsolescence, spares unavailability, and component deterioration of the secondary systems or the risk cost associated with the Need. The risk cost associated with all secondary system at Tamworth 330/132kV Substation of \$3.28m per annum will increase due to:

- > the probability of failure increasing as the assets move further past their expected life; and
- > TransGrid's means of mitigating and repairing these failures being almost exhausted.

Key drivers for this risk cost are:

- > The majority of relays protecting the 330kV assets are non self-checking and provide no feedback as to the health of the asset, therefore increasing the likelihood of a hazardous event occurring.
- > The site forms part of the 330kV backbone of the network, is part of the QNI interconnector and carries a risk of a system black event. Consequence assumes black start for assets protecting primary plant at 330kV and above with "N-1" redundancy. The restoration time has been set as 8 hours with an assumed 1,296MW of load interrupted to mixed customers (residential, commercial, and agricultural) to model a number of potential network scenarios based on this consequence.

Increasing maintenance on the equipment cannot reduce the probability of failure in order to reduce the risk cost.

Option A — Strategic Asset Replacement [[OFR 1243A](#), [OFS 1243A](#)]

Option A is to carry out the replacement of individual secondary system assets at Tamworth 330/132kV Substation that are in need of renewal during the 2019-2023 regulatory period. This option involves replacing the old assets

“like for like” with a modern equivalent asset by utilising the existing building, tunnel boards and where practicable, the cabling. This option excludes additional system modification or delivery of additional functionality.

The expected capital cost for this option total \$1.30m. This costing is estimated using TransGrid’s ‘Success’ estimating system. A further \$1.16m of capital expenditure would be required over the 15 year life cycle of this option through to 2038.

Operating costs have been estimated at \$5k per annum for this option based on current maintenance schedules.

Due to the “like for like” nature of this option, no benefit has been calculated in accordance with TransGrid’s Renewal and Maintenance Strategy for Secondary Systems Site Installations¹.

The residual risk associated with this option upon completion of the project amounts to \$2.47m per annum (base case risk cost = \$3.28m). The risk reduction is realised through the reduction in the probability of failure for all assets and reduction in likelihood of a hazardous event due to the installation of self-checking relays.

Option B — In-Situ Replacement including Transformer [[OFR 1243B](#), [OFS 1243B](#)]

Option B is to carry out the complete upgrade and renewal of the 330kV secondary systems at Tamworth 330/132kV Substation, including those for transformers, by reusing the existing building, tunnel boards and where practicable, the cabling. This option will modernise the automation philosophy to current design standards and practices and will provide additional operational benefits.

The expected capital costs for this option total \$4.5m. This costing is estimated using TransGrid’s ‘Success’ estimating system. A further \$1.15m of capital expenditure would be required over the 15 year life cycle of this option through to 2038, associated with replacement of the busbar and 132 kV line protections which are not part of Option B scope.

Operating costs have been estimated at \$5k per annum for this option based on current maintenance schedule.

A benefit figure of \$33k per annum has been calculated for this option in accordance with TransGrid’s Renewal and Maintenance Strategy for Secondary Systems Site Installations.

The residual risk associated with this option upon completion of the project amounts to \$0.60m per annum (base case risk cost = \$3.28m). The risk reduction is realised through the reduction in the probability of failure for all assets, the reduction in likelihood of a hazardous event due to the installation of self-checking relays and remediation of the risk posed by the 415V AC distribution.

Option C — In-Situ Replacement excluding Transformer [[OFR 1243C](#), [OFS 1243C](#)]

Option C is to carry out the complete upgrade and renewal of the 330kV secondary systems at Tamworth 330/132kV Substation, excluding those for transformers, by reusing the existing building, tunnel boards and where practicable, the cabling. This option will modernise the automation philosophy to current design standards and practices and will provide additional operational benefits.

The expected capital costs for this option total \$3.2m. This costing is estimated using TransGrid’s ‘Success’ estimating system. A further \$1.96m capital expenditure (Real 2016/17 dollar term) would be required over the 15 year life cycle of this option through to 2038 to replace the transformer protections as they age past their nominal asset life, in addition to the replacement of the busbar and 132kV line protections which are not part of the Option C scope.

Operating costs have been estimated at \$5k per annum for this option based on current maintenance schedule.

A benefit figure of \$20k per annum has been calculated for this option in accordance with TransGrid’s Renewal and Maintenance Strategy for Secondary Systems Site Installations.

¹ Refer SSA Strategy - Renewal and Maintenance - Secondary Systems Site Installations

The residual risk associated with this option upon completion of the project amounts to \$0.92m per annum (base case risk cost = \$3.28m). The risk reduction is realised through the reduction in the probability of failure for all assets, the reduction in likelihood of a hazardous event due to the installation of self-checking relays and remediation of the risk posed by the 415V AC distribution.

Option D — SSB Replacement [OFR 1243D, OFS 1243D]

Option D is to carry out the complete upgrade and renewal of secondary systems at the Tamworth 330kV Substation by using modular Secondary Systems Building (SSBs) and installing new cable throughout. This option will modernise the automation philosophy to current design standards and practices and will provide additional operational benefits.

This option assumes that the new secondary systems will be designed to be accommodated within a similar panel arrangement as the existing installation. Redundant panels and tunnel boards in the ASB relay room will need to be progressively decommissioned and removed as the new secondary systems are cut-over and commissioned.

The expected capital costs for this option total \$9.1m. This costing is estimated using TransGrid's 'Success' estimating system. A further \$1.15m of capital expenditure would be required over the 15 year life cycle of this option through to 2038, associated with replacement of the busbar and 132kV line protections which are not part of Option D scope.

Operating costs have been estimated at \$5k per annum for this option based on current maintenance schedule.

A benefit figure of \$33k per annum has been calculated for this option in accordance with TransGrid's Renewal and Maintenance Strategy for Secondary Systems Site Installations.

The residual risk associated with this option upon completion of the project amounts to \$0.51m per annum (base case risk cost = \$3.28m). The risk reduction is realised through the reduction in the probability of failure for all assets and the reduction in likelihood of a hazardous event due to the installation of self-checking relays.

Option E — IEC-61850 Deployment [OFR 1243E, OFS 1243E]

Option E is to replace all secondary systems assets at the Tamworth 330kV Substation with an IEC-61850 solution. This option also includes the replacement of DC supplies to account for increase in power requirements and remediates the 415V AC distribution in the building and segregates the LV AC cables from DC cables

The expected capital costs for the option total \$7.6m. This costing is estimated using TransGrid's "Success" estimating system. A further \$1.15m of capital expenditure would be required over the 15 year life cycle of this option through to 2038, associated with replacement of the busbar and 132 kV line protections which are not part of Option E scope.

Operating costs have been estimated at \$10k per annum based on current maintenance plan settings.

A benefit figure of \$33k per annum has been calculated for this option in accordance with TransGrid's Renewal and Maintenance Strategy for Secondary Systems Site Installations. Additional benefit of \$400k in the 1st year, \$200k in the 2nd year and \$100k in the 3rd year is also included to account for gain due to standard development. The savings in the second year and third year is a high level assumption and considers the benefits diminishing due to potential spend in IEC61850 solution to allow for improvements.

The residual risk associated with this option upon completion of the project amounts to 4.28m per annum (base case risk cost = \$3.28m).

Options A, B, C, D and E have all been assessed as technically feasible.

4. Evaluation

Evaluation of the proposed options has been completed using both commercial considerations and the ALARP (as low as reasonably practical) regulatory requirements. The results of these evaluations are outlined below.

4.1 Commercial evaluation

The result of commercial evaluation for each of the options is summarised in Table 1.

Table 1 – Commercial evaluation (\$ million)

Option	Description	Total capex	Annual opex	Annual post project risk cost	Economic NPV @10%	Financial NPV @10%	Rank
Base case	'Run-to-fail' (O&M continues)	-	-	3.28	-	-	6
A	Strategic Asset Replacement	1.30	0.005	2.47	2.26	(0.90)	4
B	In-Situ Replacement incl. transformers	4.50	0.005	0.60	10.52	(0.23)	1
C	In-Situ Replacement excl. transformers	3.20	0.005	0.92	9.18	(0.33)	2
D	SSB Replacement	9.10	0.005	0.51	8.25	(3.58)	3
E	IEC-61850 Deployment	7.60	0.010	4.28	(11.49)	(3.60)	5

The commercial evaluation is based on:

- > Economic life of assets is assumed 15 years. Therefore the Net Present Value (NPV) assessment period is also 15 years.
- > Write-offs have been evaluated from the fixed asset register at \$12.5k for Option B, D, E; at \$7.4k for Option C as these options involve retiring assets before their end of their financial lives.
- > Capex excludes interest during construction.

Sensitivities on economic NPV for all three options with changing discount rates are shown in Table 2.

Table 2 – Discount rate sensitivities (\$ million)

Option	Description	Economic NPV @13%	Economic NPV @6.75%
A	Strategic Asset Replacement	1.43	3.65
B	In-Situ Replacement incl. transformers	7.52	15.32
C	In-Situ Replacement excl. transformers	6.60	13.32
D	SSB Replacement	5.26	12.96

Option	Description	Economic NPV @13%	Economic NPV @6.75%
E	IEC-61850 Deployment	(9.99)	(13.66)

4.2 SFAIRP/ALARP evaluation

Options to reduce the network safety risk as per the risk treatment hierarchy have been considered in other lifecycle stages of the asset, and it has been determined that no reasonably practicable options exist to reduce the risk further than those capital investment options listed below.

Evaluation of the proposed options has been completed against the SFAIRP (So Far As Is Reasonably Practicable)/ALARP (As Low As Reasonably Practical) obligation, as required by the Electricity Supply (Safety and Network Management) Regulation 2014 and the Work Health and Safety Act 2011. The Key Hazardous Events and the disproportionality multipliers considered in the evaluation are as follows:

- > Catastrophic failure of asset/uncontrolled discharge or contact with electricity/ unauthorised access to site - 3 times the safety risk and 10% of the reliability risk (applicable to safety)

The results of this evaluation are summarised in the tables below.

Table 3 – Feasible options (\$ thousand)

Option	Description	CAPEX	Expected Life	Annualised CAPEX
Base	Do nothing	N/A	N/A	N/A
A	Strategic Asset Replacement	1,300	15 years	90
B	In-Situ Replacement incl. transformers	4,500	15 years	300
C	In-Situ Replacement excl. transformers	3,200	15 years	210
D	SSB Replacement	9,100	15 years	610
E	IEC-61850 Deployment	7,600	15 years	510

Table 4 – Annual risk calculations (\$ thousand)

Option	Annual Residual Risk			Annual Risk Savings		
	Safety Risk	Reliability Risk	Bushfire Risk	Safety Risk	Reliability Risk	Bushfire Risk
Base	10	2,675	2	N/A	N/A	N/A
A	9	1,964	1	1	711	1
B	2	490	1	8	2,186	1
C	3	741	2	7	1,935	0
D	0	490	0	10	2,186	2
E	10	4,010	0	0	(1,334)	2

Table 5 – Reasonably practicable test (\$ thousand)

Option	Network Safety Risk Reduction ²	Annualised CAPEX	Reasonably practicable ³ ?
A	80	90	No
B	250	300	No
C	216	210	Yes
D	262	610	No
E	0	510	No

Option C is reasonably practicable.

Options A, B, D and E are not reasonably practicable.

4.3 Preferred option

The option to address the condition of the identified assets, Option B - In-Situ Replacement including Transformers is the preferred option to address this Need.

This option has been selected due to its technical viability, reduction in reliability risk and reduction in safety risk beyond as low as reasonably practicable. This option provides significant technical benefits and provides the greatest positive NPV.

Capital and operating expenditure

There is negligible difference in predicted ongoing operational expenditure between the option and base case. Implementing Option B will reduce callouts to address defects and this benefit has been captured in the economic evaluation. These have been captured as benefits for delivering the project.

Regulatory Investment Test

A Regulatory Investment Test for Transmission (RIT-T) is not required as this is an asset replacement project with no augmentation component.

5. Recommendation

It is the recommendation that Option B - In-Situ Replacement including Transformers be scoped in detail.

² The Network Safety Risk Reduction is calculated as 6 x Bushfire Risk Reduction + 3 x Safety Risk Reduction + 0.1 x Reliability Risk Reduction

³ Reasonably practicable is defined as whether the annualised CAPEX is less than the Network Safety Risk Reduction

Attachment 1 – Commercial evaluation report

Option A NPV calculation

Project_Option Name		Tamworth 330kV Secondary System Renewal - Option A			
1. Financial Evaluation (excludes VCR benefits)					
NPV @ standard discount rate	10.00%	-\$0.90m	<i>NPV / Capital (Ratio)</i>	-0.70	
NPV @ upper bound rate	13.00%	-\$0.92m	<i>Pay Back Period (Yrs)</i>	0.00 Yrs	
NPV @ lower bound rate (WACC)	6.75%	-\$0.83m	<i>IRR%</i>	-0.48%	
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%	\$2.26m	<i>NPV / Capital (Ratio)</i>	1.75	
NPV @ upper bound rate	13.00%	\$1.43m	<i>Pay Back Period (Yrs)</i>	2.35 Yrs	
NPV @ lower bound rate (WACC)	6.75%	\$3.65m	<i>IRR%</i>	26.29%	
Benefits					
Risk cost	As Is	To Be	Benefit	<i>VCR Benefit</i>	\$0.68m
<i>Systems (reliability)</i>	\$2.67m	\$1.96m	\$0.71m	<i>ENS Penalty</i>	\$0.01m
<i>Financial</i>	\$0.58m	\$0.49m	\$0.09m	<i>All other risk benefits</i>	\$0.12m
<i>Operational/compliance</i>	\$0.00m	\$0.00m	\$0.00m	Total Risk benefits	\$0.81m
<i>People (safety)</i>	\$0.01m	\$0.01m	\$0.00m	 Benefits in the financial NPV*	\$0.13m
<i>Environment</i>	\$0.00m	\$0.00m	\$0.00m	<i>*excludes VCR benefits</i>	
<i>Reputation</i>	\$0.02m	\$0.01m	\$0.01m	 Benefits in the economic NPV**	\$0.80m
Total Risk benefits	\$3.28m	\$2.47m	\$0.81m	<i>**excludes ENS penalty</i>	
Cost savings and other benefits			\$0.00m		
Total Benefits			\$0.81m		
Other Financial Drivers					
Incremental opex cost pa (no depreciation)			-\$0.00m	<i>Write-off cost</i>	\$0.00m
Capital - initial \$m			-\$1.30m	<i>Major Asset Life (Yrs)</i>	15.00 Yrs
Residual Value - initial investment			\$0.09m	<i>Re-investment capital</i>	-\$1.16m
Capitalisation period			5.00 Yrs	<i>Start of the re-investment period</i>	2021-22

Option B NPV calculation

Project_Option Name

Tamworth 330kV Secondary System Renewal - Option B

1. Financial Evaluation (excludes VCR benefits)

NPV @ standard discount rate	10.00%	-\$0.23m	NPV / Capital (Ratio)	-0.05
NPV @ upper bound rate	13.00%	-\$0.68m	Pay Back Period (Yrs)	0.09 Yrs
NPV @ lower bound rate (WACC)	6.75%	\$0.57m	IRR%	8.88%

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%	\$10.52m	NPV / Capital (Ratio)	2.34
NPV @ upper bound rate	13.00%	\$7.52m	Pay Back Period (Yrs)	1.68 Yrs
NPV @ lower bound rate (WACC)	6.75%	\$15.32m	IRR%	43.86%

Benefits

Risk cost	As Is	To Be	Benefit		
<i>Systems (reliability)</i>	\$2.67m	\$0.49m	\$2.18m	VCR Benefit	\$2.10m
<i>Financial</i>	\$0.58m	\$0.10m	\$0.48m	ENS Penalty	\$0.03m
<i>Operational/compliance</i>	\$0.00m	\$0.00m	\$0.00m	All other risk benefits	\$0.55m
<i>People (safety)</i>	\$0.01m	\$0.00m	\$0.01m	Total Risk benefits	\$2.68m
<i>Environment</i>	\$0.00m	\$0.00m	\$0.00m	Benefits in the financial NPV*	\$0.61m
<i>Reputation</i>	\$0.02m	\$0.01m	\$0.01m	*excludes VCR benefits	
Total Risk benefits	\$3.28m	\$0.60m	\$2.68m	Benefits in the economic NPV**	\$2.68m
Cost savings and other benefits			\$0.03m	**excludes ENS penalty	
Total Benefits			\$2.71m		

Other Financial Drivers

Incremental opex cost pa (no depreciation)	-\$0.00m	Write-off cost	-\$0.01m
Capital - initial \$m	-\$4.50m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment	\$0.00m	Re-investment capital	-\$1.15m
Capitalisation period	4.00 Yrs	Start of the re-investment period	2033-34

Option C NPV calculation

Project_Option Name

Tamworth 330kV Secondary System Renewal - Option C

1. Financial Evaluation (excludes VCR benefits)

NPV @ standard discount rate	10.00%	-\$0.33m	NPV / Capital (Ratio)	-0.10
NPV @ upper bound rate	13.00%	-\$0.66m	Pay Back Period (Yrs)	0.08 Yrs
NPV @ lower bound rate (WACC)	6.75%	\$0.28m	IRR%	8.03%

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%	\$9.18m	NPV / Capital (Ratio)	2.83
NPV @ upper bound rate	13.00%	\$6.60m	Pay Back Period (Yrs)	1.39 Yrs
NPV @ lower bound rate (WACC)	6.75%	\$13.32m	IRR%	48.19%

Benefits

Risk cost	As Is	To Be	Benefit		
<i>Systems (reliability)</i>	\$2.67m	\$0.74m	\$1.93m	VCR Benefit	\$1.86m
<i>Financial</i>	\$0.58m	\$0.17m	\$0.41m	ENS Penalty	\$0.03m
<i>Operational/compliance</i>	\$0.00m	\$0.00m	\$0.00m	All other risk benefits	\$0.46m
<i>People (safety)</i>	\$0.01m	\$0.00m	\$0.01m	Total Risk benefits	\$2.35m
<i>Environment</i>	\$0.00m	\$0.00m	\$0.00m	Benefits in the financial NPV*	\$0.51m
<i>Reputation</i>	\$0.02m	\$0.01m	\$0.01m	*excludes VCR benefits	
Total Risk benefits	\$3.28m	\$0.92m	\$2.35m	Benefits in the economic NPV**	\$2.34m
Cost savings and other benefits			\$0.02m	**excludes ENS penalty	
Total Benefits			\$2.37m		

Other Financial Drivers

Incremental opex cost pa (no depreciation)	-\$0.00m	Write-off cost	-\$0.01m
Capital - initial \$m	-\$3.24m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment	\$0.22m	Re-investment capital	-\$1.96m
Capitalisation period	4.00 Yrs	Start of the re-investment period	2023-24

Option D NPV calculation

Project_Option Name

Tamworth 330kV Secondary System Renewal - Option B

1. Financial Evaluation (excludes VCR benefits)

NPV @ standard discount rate	10.00%	-\$3.58m	NPV / Capital (Ratio)	-0.39
NPV @ upper bound rate	13.00%	-\$4.01m	Pay Back Period (Yrs)	0.01 Yrs
NPV @ lower bound rate (WACC)	6.75%	-\$2.78m	IRR%	1.31%

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%	\$8.25m	NPV / Capital (Ratio)	0.91
NPV @ upper bound rate	13.00%	\$5.26m	Pay Back Period (Yrs)	3.29 Yrs
NPV @ lower bound rate (WACC)	6.75%	\$12.96m	IRR%	23.83%

Benefits

Risk cost	As Is	To Be	Benefit		
<i>Systems (reliability)</i>	\$2.67m	\$0.49m	\$2.18m	VCR Benefit	\$2.10m
<i>Financial</i>	\$0.58m	\$0.01m	\$0.57m	ENS Penalty	\$0.03m
<i>Operational/compliance</i>	\$0.00m	\$0.00m	\$0.00m	All other risk benefits	\$0.64m
<i>People (safety)</i>	\$0.01m	\$0.00m	\$0.01m	Total Risk benefits	\$2.77m
<i>Environment</i>	\$0.00m	\$0.00m	\$0.00m	Benefits in the financial NPV*	\$0.70m
<i>Reputation</i>	\$0.02m	\$0.01m	\$0.01m	*excludes VCR benefits	
Total Risk benefits	\$3.28m	\$0.51m	\$2.77m	Benefits in the economic NPV**	\$2.77m
Cost savings and other benefits			\$0.03m	**excludes ENS penalty	
Total Benefits			\$2.80m		

Other Financial Drivers

Incremental opex cost pa (no depreciation)	-\$0.00m	Write-off cost	-\$0.01m
Capital - initial \$m	-\$9.10m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment	\$0.00m	Re-investment capital	-\$1.15m
Capitalisation period	3.00 Yrs	Start of the re-investment period	2033-34

Option E NPV calculation

Project_ Option Name

Tamworth 330kV Secondary System Renewal - Option E

1. Financial Evaluation (excludes VCR benefits)

NPV @ standard discount rate	10.00%	-\$3.60m	NPV / Capital (Ratio)	-0.47
NPV @ upper bound rate	13.00%	-\$3.81m	Pay Back Period (Yrs)	-0.01 Yrs
NPV @ lower bound rate (WACC)	6.75%	-\$3.17m	IRR%	-1.17%

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%	-\$11.49m	NPV / Capital (Ratio)	-1.51
NPV @ upper bound rate	13.00%	-\$9.99m	Pay Back Period (Yrs)	Not measurable
NPV @ lower bound rate (WACC)	6.75%	-\$13.66m	IRR%	Not measurable

Benefits

Risk cost	As Is	To Be	Benefit		
<i>Systems (reliability)</i>	\$2.67m	\$4.01m	-\$1.34m	VCR Benefit	-\$1.37m
<i>Financial</i>	\$0.58m	\$0.23m	\$0.35m	ENS Penalty	\$0.01m
<i>Operational/compliance</i>	\$0.00m	\$0.00m	\$0.00m	All other risk benefits	\$0.36m
<i>People (safety)</i>	\$0.01m	\$0.01m	\$0.00m	Total Risk benefits	-\$1.00m
<i>Environment</i>	\$0.00m	\$0.00m	\$0.00m	Benefits in the financial NPV*	\$0.80m
<i>Reputation</i>	\$0.02m	\$0.03m	-\$0.01m	*excludes VCR benefits	
Total Risk benefits	\$3.28m	\$4.28m	-\$1.00m	Benefits in the economic NPV**	-\$0.58m
Cost savings and other benefits			\$0.43m	**excludes ENS penalty	
Total Benefits			-\$0.57m		

Other Financial Drivers

Incremental opex cost pa (no depreciation)	-\$0.01m	Write-off cost	-\$0.01m
Capital - initial \$m	-\$7.60m	Major Asset Life (Yrs)	15.00 Yrs
Residual Value - initial investment	\$0.51m	Re-investment capital	-\$1.15m
Capitalisation period	3.00 Yrs	Start of the re-investment period	2033-34