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Project description

A project to replace 101 isolators that have reached the end of their technical and economic lives. The isolators identified for replacement are listed in the Isolators tab. This project considers several options including, running existing units to failure (in practice this means increasing corrective maintenance cost and decreasing reliability) or planned replacements.

Project options

Base case	Business as usual with no capital expenditure.
Option 1	101 isolators have been identified for replacement, aged between 46 and 62 years. The works assumed for this project includes the replacement of these isolators where no other Capital Projects are scheduled to undertake replacement of the identified isolators in the 2019-2023 regulatory period. This replacement is to be completed in accordance with the Substation Design Manual and relevant standards.
Option 2	Replace isolators in the 2024-2028 regulatory period. However, 50 Isolators have already been replaced by emergency replacement therefore only 51 are required to be replaced.

Key modelling assumptions

Financial year runs from 1 July to 30 June.

Real 2018 \$ are used for all monetary values unless otherwise stated.

Inputs to the model

Parameter/Input	Description	Source
Discount rate	Real pre-tax discount rate	ElectraNet estimate
Current financial year	Year to start analysis	When the capital investment is due to occur for the project
Time horizon	Length of time under consideration	Total project life including useful life and if the project occurred in the next regulatory period
Capital costs	Amount of capital investment in real terms for each project option	Latest estimate v9 20/9/2016, Total Cost \$10,415,360
Useful life	Length of time capital investments are expected to provide service	Useful life estimated from orginal economic justification on project center
Routine maintenance	Annual amount of estimated routine maintenance in real terms	Assume 1% of Capital Cost
Corrective maintenance	Amount of estimated corrective maintenance in real terms	Detailed Opex Assessment
Emergency replacement cost	Cost to replacement units as the units fail	Detailed Opex Assessment
Risk cost reduction	Value of risk associated with each of the different options.	See detailed risk models

### User provided parameters and inputs to the model

### General parameter inputs

Parameter	Unit	Value	Source	Sensitivities		
				Low	Medium	High
Inflation rate	Percentage	2.00%	RBA	1.50%	2.00%	3.00%
Discount rate (real, pre-tax): estimate	Percentage	6.00%	ElectraNet estimate	4.50%	6.00%	8.50%
Discount rate (real, pre-tax): lower bound	Percentage	4.50%	ElectraNet estimate			
First year of analysis	Year	2019	Current financial year			
Base financial year for analysis	Year	2018	Base year			
Time horizon	Years	20	ElectraNet			

Sensitivities			Comment
Low	Medium	High	
70%	100%	130%	Standard sensitivities used

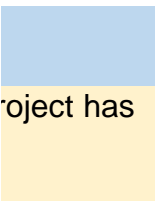
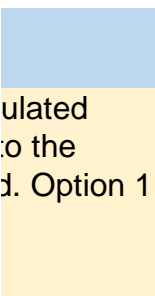
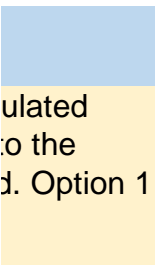
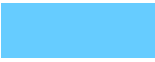
Capital cost inputs					Commission	
Option	Asset	Amount	Start year	End year	Year	Asset life
Option 1	Isolators 2019	2,207,368	2019	2019	2020	20
Option 1	Isolators 2020	2,207,368	2020	2020	2021	20
Option 1	Isolators 2021	2,207,368	2021	2021	2022	20
Option 1	Isolators 2022	2,207,368	2022	2022	2023	20
Option 1	Isolators 2023	2,207,368	2023	2023	2024	20
Option 2	Isolators 2024	1,114,611	2024	2024	2025	20
Option 2	Isolators 2025	1,114,611	2025	2025	2026	20
Option 2	Isolators 2026	1,114,611	2026	2026	2027	20
Option 2	Isolators 2027	1,114,611	2027	2027	2028	20
Option 2	Isolators 2028	1,114,611	2028	2028	2029	20

Cost type	Cash/Non-cash	Percentage			Comment
		Low	Medium	High	
Corrective Maintenance	Cash	70%	100%	130%	Standard sensitivities used
Routine Maintenance	Cash	70%	100%	130%	Lower sensitivities used
Emergency replacement	Cash	70%	100%	130%	

[illegible]

Benefit type	Cash/Non-cash	Percentage			Comment
		Low	Medium	High	
Risk Cost Reduction	Cash	50%	80%	100%	Lower sensitivities applied

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R0 CBA Results

Sensitivities, results and rankings

Input Summary

Parameter selection for sensitivity analysis

Discount rate

Scenario parameters		Discount rate scenario		
	Units	Low	Medium	High
Assumed scenario weighting	% weighting	33%	33%	33%
Discount rate	% real, pre-tax	4.50%	6.00%	8.50%
Capital cost	% of estimate	100%	100%	100%

Cost selection for sensitivity analysis

Corrective Maintenance

Scenario cost inputs		Corrective Maintenance scenario		
	Units	Low	Medium	High
Corrective Maintenance	% of estimate	70.0%	100.0%	130.0%
Routine Maintenance	% of estimate	100.0%	100.0%	100.0%
Emergency replacement	% of estimate	100.0%	100.0%	100.0%

Benefit selection for sensitivity analysis

Risk Cost Reduction

Scenario benefit inputs		Risk Cost Reduction scenario		
	Units	Low	Medium	High
Risk Cost Reduction	% of estimate	50.0%	80.0%	100.0%

Cost Benefit Analysis Results (Quantitative)

Output summary    Net present value of benefits

NPV results		Scenario			Weighted
Option	Units	Low	Medium	High	NPV
Option 1	2018 \$	2,295,498	2,527,038	2,328,412	2,383,649
Option 2	2018 \$	1,975,717	1,924,187	1,608,033	1,835,979

Output summary    Ranking of options

Ranking of options		Scenario			Weighted
Option	Units	Low	Medium	High	ranking
Option 1	2018 \$	1	1	1	1
Option 2	2018 \$	2	2	2	2

Other Considerations (Qualitative)

As these assets are at the end of their technical life, there is increased risk of failure which could lead to increased safety and reliability issues.

It is likely that if these assets are not replaced that a number will fail during the regulatory period or the next period resulting in corrective operational expenditure cost and the unplanned unavailability of parts of the network.

This project is required to replace individual substation isolators that have been assessed to be at the end of their technical and/or economic lives, at locations where the asset won't be replaced as part of an augmentation or substation rebuild during the 2019-23 regulatory control period.