Introduction   **14158- F1903 TIPS - CHERRY GARDENS 275kV Line Insulator Refurbishment**

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Project description

Condition assessment reports identified issues with the selected assets. Significant consequences of failure to personel and network exist in the event of insulator failure, if it were not replaced. Primarily the consequences relate to network availability and safety, but also include: reputation, environment and financial. This project is required to refurbish insulator systems on selected lines to achieve a life extension of the overall asset. The project is to be completed in the 2018-23 regulatory period. The feeder identified for insulator replacement is F1903 TIPS - CHERRY GARDENS 275kV Line Insulator Refurbishment.

Project options

Base case   Business as usual with no capital expenditure.

Option 1   Replacement in 2018-2023

Option 2   Replacement in 2023-2028

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	Estimated capital costs in the estimate from project centre
Useful life	Length of time capital investments are expected to provide service	Useful life estimated from original economic justification on project centre
Routine maintenance	Annual amount of estimated routine maintenance in real terms	See Detailed Opex Assessment
Corrective maintenance	Annual amount of estimated corrective maintenance in real terms	See Detailed Opex Assessment
Risk Cost Reduction	Annual cost of risk if the unit is not replaced	See Detailed Risk Assessment

I0 Inputs
User provided parameters and inputs to the model

Inputs

General parameter inputs

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

Sensitivities		
Low	Medium	High
1.50%	2.00%	3.00%
4.50%	6.00%	8.50%

Capital cost

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

Capital cost inputs

Option	Asset	Amount	Start year	End year	Commission year	Asset life
Option 1	Line Insulator	6,221,786	2018	2020	2021	27
Option 2	Line Insulator	6,221,786	2023	2025	2026	27

Costs inputs

Cost type	Cash/Non-cash	Low	Medium (Percentage)	High	Comment
Routine Maintenance	Cash	70%	100%	130%	Standard sensitivities used

Financial year / Routine Maintenance	Units	2018 $	2019 $	2020 $	2021 $	2022 $	2023 $	2024 $	2025 $	2026 $	2027 $	2028 $	2029 $	2030 $	2031 $	2032 $	2033 $	2034 $	2035 $	2036 $	2037 $
Base case	2018 $	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467
Option 1	2018 $	417,467	417,467	417,467	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096
Option 2	2018 $	417,467	417,467	417,467	417,467	417,467	417,467	417,467	417,467	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096	3,096

Benefit inputs

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

Financial year / Risk Cost Reduction	Units	2018 $	2019 $	2020 $	2021 $	2022 $	2023 $	2024 $	2025 $	2026 $	2027 $	2028 $	2029 $	2030 $	2031 $	2032 $	2033 $	2034 $	2035 $	2036 $	2037 $
Base case	2018 $	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Option 1	2018 $	0	0	0	14,044,929	14,492,883	14,968,702	15,469,015	15,991,302	16,533,592	17,094,295	17,672,100	18,265,898	18,874,743	19,497,815	20,134,391	20,783,836	21,445,579	22,119,110	22,803,965	23,499,724
Option 2	2018 $	0	0	0	0	0	0	0	0	16,533,592	17,094,295	17,672,100	18,265,898	18,874,743	19,497,815	20,134,391	20,783,836	21,445,579	22,119,110	22,803,965	23,499,724

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				Routine Maintenance

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

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 $	93,744,194	130,342,258	128,739,375	117,608,609
Option 2	2018 $	64,203,427	85,856,555	79,181,738	76,413,907

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