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Project description

The present layout of Robertstown Substation poses a number of operational issues; the main issue is that when maintenance is scheduled for any of the centre breakers (or their associated disconnectors, CTs etc.), in addition to line exit disconnectors, a line fault on one of the Davenport to Robertstown to Para to Tungkillo lines will split the 275 kV buses. This results in power flows travelling from the 275 kV yard to the 132 kV yard through one transformer and then from the 132 kV yard back to the 275 kV yard through the other transformer via the 132kV bus. Therefore during any of these scheduled maintenance times the Murraylink interconnection must be significantly constrained or forced to import and generation north of Robertstown may need to be constrained to manage the post contingent flows.

Project options

Base case	Business as usual with no capital expenditure where the current substation arrangements, and maintenance practices are retained.
Option 1	Install an additional 275 kV diameter at Robertstown Substation, a single 275 kV CB and associated equipment (i.e. isolators, CT and protection) between the 275 kV busses at Robertstown, expanding the site.
Option 2	Installation of the CB within the existing site without expansion

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 center
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
Constraints on Wind for Outages	Estimated Constraint on SA Wind for outages north of Robertstown for planned and unplanned outages	Detailed Benefits Assesment tab
Reduced labour costs in outage planning	Reduction in outage planning required for annual planned outage at Robertstown	ElectraNet estimate
Deferred Expenditure	Deferred expense of environmental costs associated with the Robertstown Site	ElectraNet estimate
Benefit of site expansion	Associated value of the circuit breaker being placed in the more desirable	ElectraNet estimate

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R0 CBA Results

Sensitivities, results and rankings

Input Summary

Parameter selection for sensitivity analysis

Capital cost

Scenario parameters		Capital cost scenario		
	Units	Low	Medium	High
Assumed scenario weighting	% weighting	33%	33%	33%
Discount rate	% real, pre-tax	6.00%	6.00%	6.00%
Capital cost	% of estimate	70%	100%	130%

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

Benefit of site expansion

Scenario benefit inputs		Benefit of site expansion scenario		
	Units	Low	Medium	High
Reduced constraints on wind farms	% of estimate	80.0%	80.0%	80.0%
Reduced labour costs in outage plann	% of estimate	80.0%	80.0%	80.0%
Deferred Expenditure	% of estimate	100.0%	100.0%	100.0%
Benefit of site expansion	% of estimate	70.0%	100.0%	130.0%

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 \$	5,694,415	3,796,256	1,898,097	3,796,256
Option 2	2018 \$	5,032,016	3,209,809	1,387,601	3,209,809

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