OPTIONS EVALUATION REPORT (OER)

Various Locations CT Renewal Program

OER 000000001338 revision 1.0

Ellipse project no.: P0007880
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	10 November 2016	

Change history

Revision	Date	Amendment
0	22 June 2016	Initial issue
1	18 October 2016	Update to 2016/17 dollars and SFAIRP/ALARP data
2	2 November 2016	Update to format
3	10 November 2016	Updated assets requiring replacement and associated Capex and evaluation figures.

1. Need/opportunity

TransGrid has a population of oil filled current transformers (CT) installed over a range of voltages and designs and with a range of ages. The individual impact of each individual failure varies with its location in the network. Consideration should be given to reduce the risk cost associated with these assets.

2. Related Needs/opportunities

Circuit breaker (CB) Need 1337 has been developed to address the risk associated with aging CBs. An analysis of the savings in Capex associated with replacing a standalone CB with dead tank CB (DTCB), which also incorporates the adjacent CTs, has been completed. The resulting DTCB replacements are included in the Capex and Net Present Value (NPV) analysis under the CB Need, and have therefore been removed from this CT OER.

Programs for other substation assets are being developed and should be considered when packaging work for delivery.

3. Options

The options screening report outlines the options which were not considered to address this Need. The option which was not considered feasible is refurbishment since it would not successfully reduce the risk associated with this Need. The remaining option is included in this evaluation.

Base Case

The Base Case is the do nothing option whereby the CTs will be run to failure, without replacement due to increasing risk. This option has an ongoing risk cost of $4.8m associated with it. This excludes the risk cost associated with the CTs which will be addressed by the installation of DTCBs under Need 1337 (combined CB and CT) as it is included in that Need.

Even after the run to failure strategy has been implemented the nominated CTs will still then be required, since the network must be restored to normal operation. However, the impact of this may be greater than the risk above, due to increased costs associated with urgent and unplanned replacement works.

Option A — Replacement of CTs [OFR 1338A, OFS 1338A]

This option involves the replacement of CTs with similar standalone CTs (i.e. not combining CTs and CBs into a DTCB solution) in order to reduce the probability of failure and the associated risk cost. The CTs which have the potential to be replaced along with the CB into a DTCB are included in the CB Need 1337 including the evaluation of available replacement options. The Capex value in the OFS has been adjusted to suit the number of individual assets which are recommended to be replaced based on the following evaluations.

There is a reduction in Opex associated with defect work resulting from the replacement of the CTs with new units. This has been estimated using the historic defect costs for the assets with available data and then increasing to account for missing historical data and assumed increasing defect rate in the future.

4. Evaluation

4.1 Commercial evaluation

The economic evaluation of the technically feasible options is set out in Table 1 below.

Table 1 – Commercial evaluation ($ million)

Option	Description	Total capex	Annual post project risk cost	Post project risk cost	Economic NPV @ 10%	Rank
Base Case	Do nothing and run to failure	-	-	4.77	-	2
A	Replacement of CTs	19.61	(0.05)	0.11	77.21	1

There are 305 CTs which pass the economic NPV evaluation and should be replaced under Option A (which excludes the CTs to be replaced with DTCBs under Need 1337). The result for each individual asset is provided in Attachment 1.

The Opex savings associated with the replacement of CTs represents the savings in reduced number of defects. A small amount of savings in Opex is also expected if some of the existing oil CTs are replaced with gas insulated CTs, however this has not been included in the economic analysis because it is not certain which type will be selected if the project proceeds to the delivery stage.

The NPV analysis (discounted to June 2019) assumes that each asset replacement listed in Attachment 1 occurs during the 5 year regulatory period. The timing of the replacements should generally occur with the highest NPV replacements first. The NPV summary above represents the combined NPV of all CTs recommended for replacement. The asset life of the new CTs is 45 years and the NPV analysis has been completed over a 30 year timeframe (including the 5 year investment period) and the residual values of the CTs have been included in the final year cash flow. The risk savings associated with the investment have utilised the oil CT probability of failure modelling for the NPV period. The increase in risk saving over time is calculated by determining the difference in probabilities of failure between the existing unit and a new unit as they both age.

The economic evaluation is based on a discount rate of 10%. Table 2 below provides a sensitivity analysis based on TransGrid's current AER-determined pre-tax real regulatory WACC of 6.75% and an upper bound of 13%. The sensitivity analysis demonstrates a strongly positive NPV for the range of discount rates considered, however the number of individual asset replacements which are NPV positive reduces with the higher discount rate and increases with the lower discount rate.

Table 2 – Discount rate sensitivities ($ million)

Option	Description	Economic NPV @ 13% (18/19)	Economic NPV @ 6.75% (18/19)
A	Replacement of CTs	44.01	144.51

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 in Table 1.

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)
- Unplanned outage of HV equipment - 10% of the reliability risk (applicable to safety)

The results of this evaluation are summarised in the tables below which includes only those assets which are considered reasonably practicable (refer to Attachment 1 for the result on each asset).

Table 3 – Annual risk calculations ($ thousand)

Option	Annual Residual Risk			Annual Risk Savings		
	Safety Risk	Reliability Risk	Bushfire Risk	Safety Risk	Reliability Risk	Bushfire Risk
Base Case	290	3,652	N/A	N/A	N/A	N/A
A	2	41	N/A	288	3,611	N/A

Table 4 – Reasonably practicable test ($ thousand)

Option	Total Network Safety Risk Reduction[1]	Total Annualised CAPEX	Reasonably practicable[2]?
A	1,226	354	Refer to Attachment 1

Note 1: The Network Safety Risk Reduction is calculated as 6 x Bushfire Risk Reduction + 3 x Safety Risk Reduction + 0.1 x Reliability Risk Reduction

Note 2: Reasonably practicable is defined as whether the annualised CAPEX is less than the Network Safety Risk Reduction

The SFAIRP/ALARP evaluation has been completed for each individual asset. A summary of the results of the test included in Table 4 and the result for each individual asset is provided in Attachment 1.

4.3 Preferred option

The outcome of the SFAIRP/ALARP evaluation is that Option A is the preferred option for the relevant assets as it is reasonably practicable and is therefore required to satisfy the organisation's SFAIRP/ALARP obligations.

The outcome of the economic evaluation is also to implement Option A for the particular assets which have a positive NPV.

Capital and operating expenditure

The operational savings associated with decreased defect costs of the new assets has been included. There are no other ongoing capital expenditure considerations beyond the initial asset replacement 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 recommended that Project Approval Documents be prepared to implement Option A for the replacement of the CTs identified in Attachment 1 (which includes assets justified under SFAIRP/ALARP or economic evaluations), with a total Capex of $19.6m.

Attachment 1

Table 5 provides a summary of the single phase CTs requiring replacement and Table 6 shows the result of the economic and SFAIRP/ALARP evaluations for each individual assets. The quantities and units listed on an individual asset basis (single phase).

Table 5 – Summary of CT quantities

Voltage (kV)	Number of replacements
11	3
66	54
132	150
220	18
330	80
Grand Total	**305**

Table 6 should be read in conjunction with the following notes:

1. The “Replace based on evaluation” column confirms whether or not replacement is required based on either SFAIRP/ALARP or economic NPV evaluations. Items with “No” are not recommended for replacement (and therefore the associated Capex has not been included in this OER), but are included for reference.
2. Some CTs are nominated for replacement based on the combined NPV of all phases within a bay, for example if two phases are positive and one is negative and the total for that project is positive.
3. The CTs which are nominated for replacement as DTCB are excluded.

Table 6 – Evaluation of Individual Assets

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
1	COSBER2G	94M MT PIPER TEE ILFORD 132KV FEEDER BAY	B01305/3	132	Yes - SFAIRP/ALARP and Economic	3,234,397
2	NNSTOM1A	NO1 TRANSFORMER 330KV CB BAY	EC00003389	330	Yes - SFAIRP/ALARP and Economic	2,274,241
3	NNSTOM1A	NO1 TRANSFORMER 330KV CB BAY	EC00003388	330	Yes - SFAIRP/ALARP and Economic	2,274,241
4	NNSTOM1A	NO1 TRANSFORMER 330KV CB BAY	EC00003391	330	Yes - SFAIRP/ALARP and Economic	2,274,241
5	SWSBKH3C1	X2 BURONGA 220KV FEEDER BAY	EC00014781	220	Yes - SFAIRP/ALARP and Economic	1,773,822
6	COSBER2C1	NO3 TRANSFORMER 132KV CB BAY	B01306/1	132	Yes - SFAIRP/ALARP and Economic	1,732,019
7	COSBER2C1	NO3 TRANSFORMER 132KV CB BAY	B01306/2	132	Yes - SFAIRP/ALARP and Economic	1,732,019
8	COSBER2C1	NO3 TRANSFORMER 132KV CB BAY	B01306/3	132	Yes - SFAIRP/ALARP and Economic	1,732,019
9	COSBER2J	94B WELLINGTON 132KV FEEDER BAY	B01305/4	132	Yes - SFAIRP/ALARP and Economic	1,703,948
10	COSBER2J	94B WELLINGTON 132KV FEEDER BAY	B01305/5	132	Yes - SFAIRP/ALARP and Economic	1,703,948

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
11	COSBER2J	94B WELLINGTON 132KV FEEDER BAY	B01305/6	132	Yes - SFAIRP/ALARP and Economic	1,703,948
12	COSBER2G	94M MT PIPER TEE ILFORD 132KV FEEDER BAY	B01305/1	132	Yes - SFAIRP/ALARP and Economic	1,700,743
13	COSBER2G	94M MT PIPER TEE ILFORD 132KV FEEDER BAY	B01305/2	132	Yes - SFAIRP/ALARP and Economic	1,700,743
14	SWSDN24L2	844 BARHAM 66KV FEEDER BAY	A07191/7	66	Yes - SFAIRP/ALARP and Economic	1,678,715
15	SWSDN24L2	844 BARHAM 66KV FEEDER BAY	A07191/9	66	Yes - SFAIRP/ALARP and Economic	1,678,715
16	SWSBKH3C1	X2 BURONGA 220KV FEEDER BAY	EC00014778	220	Yes - SFAIRP/ALARP and Economic	1,134,668
17	CMSSYW2T	93A BLACKTOWN 132KV FEEDER BAY	A03055/5	132	Yes - SFAIRP/ALARP and Economic	940,416
18	CMSSYW2T	93A BLACKTOWN 132KV FEEDER BAY	A03055/4	132	Yes - SFAIRP/ALARP and Economic	940,416
19	CMSSYW2T	93A BLACKTOWN 132KV FEEDER BAY	A03055/6	132	Yes - SFAIRP/ALARP and Economic	940,416
20	SWSBKH3C1	X2 BURONGA 220KV FEEDER BAY	EC00014800	220	Yes - SFAIRP/ALARP and Economic	900,904
21	SWSBRG3C1	X2 BROKEN HILL 220KV FEEDER BAY	EC00014788	220	Yes - SFAIRP/ALARP and Economic	892,661
22	SWSBRG3C1	X2 BROKEN HILL 220KV FEEDER BAY	EC00014789	220	Yes - SFAIRP/ALARP and Economic	892,661
23	SWSBRG3C1	X2 BROKEN HILL 220KV FEEDER BAY	EC00014794	220	Yes - SFAIRP/ALARP and Economic	892,661
24	NTSTA11G1	85 ARMIDALE 330KV FEEDER BAY	EC00003785	330	Yes - SFAIRP/ALARP and Economic	811,209
25	NTSTA11G1	85 ARMIDALE 330KV FEEDER BAY	EC00003792	330	Yes - SFAIRP/ALARP and Economic	811,209
26	SWSBKH3E1	X4 BROKEN HILL MINES 220KV FEEDER BAY	EC00014780	220	Yes - SFAIRP/ALARP and Economic	725,727
27	SWSGRF2A1	NO1 TRANSFORMER 132KV CB BAY	EC00013875	132	Yes - SFAIRP/ALARP and Economic	715,785
28	SWSGRF2A1	NO1 TRANSFORMER 132KV CB BAY	EC00013879	132	Yes - SFAIRP/ALARP and Economic	715,785
29	SWSGRF2A1	NO1 TRANSFORMER 132KV CB BAY	EC00013883	132	Yes - SFAIRP/ALARP and Economic	715,785
30	SWSGRF2B1	NO2 TRANSFORMER 132KV CB BAY	EC00013869	132	Yes - SFAIRP/ALARP and Economic	715,785
31	SWSGRF2B1	NO2 TRANSFORMER 132KV CB BAY	EC00013881	132	Yes - SFAIRP/ALARP and Economic	715,785
32	SWSGRF2B1	NO2 TRANSFORMER 132KV CB BAY	EC00013884	132	Yes - SFAIRP/ALARP and Economic	715,785
33	COSBER2B1	NO2 TRANSFORMER 132KV CB BAY disconnected equipment	EC00010052	132	Yes - SFAIRP/ALARP and Economic	655,099
34	SWSDN24K2	845 DENILIQUIN 66 - 66KV FEEDER BAY	A07191/5	66	Yes - SFAIRP/ALARP and Economic	645,865
35	SWSDN24K2	845 DENILIQUIN 66 - 66KV FEEDER BAY	A07191/6	66	Yes - SFAIRP/ALARP and Economic	645,865
36	SWSDN24K2	845 DENILIQUIN 66 - 66KV FEEDER BAY	A07191/4	66	Yes - SFAIRP/ALARP and Economic	645,865
37	SWSDNT2F	99K GRIFFITH 132KV FEEDER	EC00005854	132	Yes - SFAIRP/ALARP and Economic	596,802
38	CMSSYW2Y	939 MAMRE 132KV FEEDER BAY	EC00010149	132	Yes - SFAIRP/ALARP and Economic	537,601
39	NTSGN22H	9U3 BOGGABRI EAST - 132KV FEEDER	EC00022768	132	Yes - SFAIRP/ALARP and Economic	537,435
40	NTSGN22H	9U3 BOGGABRI EAST - 132KV FEEDER	EC00022769	132	Yes - SFAIRP/ALARP and Economic	537,435
41	SWSDNT2G	NO1 CAPACITOR 132KV	EC00005851	132	Yes - SFAIRP/ALARP and Economic	536,682
42	SWSDN24L2	844 BARHAM 66KV FEEDER BAY	EC00004131	66	Yes - SFAIRP/ALARP and Economic	494,360

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
43	CMSSYW2B1	NO2 TRANSFORMER 132KV A BUS CB BAY CB 4422A	EC00022757	132	Yes - SFAIRP/ALARP and Economic	473,200
44	CMSSYW2B1	NO2 TRANSFORMER 132KV A BUS CB BAY CB 4422A	EC00022755	132	Yes - SFAIRP/ALARP and Economic	473,200
45	CMSSYW2K	93M WEST WETHERILL PARK 132KV FEEDER BAY	A03057/4	132	Yes - SFAIRP/ALARP and Economic	454,541
46	CMSSYW2K	93M WEST WETHERILL PARK 132KV FEEDER BAY	A03057/5	132	Yes - SFAIRP/ALARP and Economic	454,541
47	CMSSYW2K	93M WEST WETHERILL PARK 132KV FEEDER BAY	A03057/6	132	Yes - SFAIRP/ALARP and Economic	454,541
48	SWSBKH3E1	X4 BROKEN HILL MINES 220KV FEEDER BAY	EC00014777	220	Yes - SFAIRP/ALARP and Economic	453,102
49	SWSBKH3E1	X4 BROKEN HILL MINES 220KV FEEDER BAY	EC00014779	220	Yes - SFAIRP/ALARP and Economic	453,102
50	SWSDNT2F	99K GRIFFITH 132KV FEEDER	EC00005857	132	Yes - SFAIRP/ALARP and Economic	423,140
51	SWSDNT2F	99K GRIFFITH 132KV FEEDER	EC00005858	132	Yes - SFAIRP/ALARP and Economic	423,140
52	COSORG2N	No.1 TRANSFORMER 132kV TIE ORANGE NORTH FORMERLY 948 PANORAMA	EC00003210	132	Yes - SFAIRP/ALARP and Economic	391,253
53	SWSDNT2G	NO1 CAPACITOR 132KV	EC00005863	132	Yes - SFAIRP/ALARP and Economic	379,139
54	CMSSE12HT	925 WILLOUGHBY TEE 132KV FEEDER BAY	A02011/8	132	Yes - SFAIRP/ALARP and Economic	378,506
55	CMSSE12HT	925 WILLOUGHBY TEE 132KV FEEDER BAY	A02011/9	132	Yes - SFAIRP/ALARP and Economic	378,506
56	CMSSE12HT	925 WILLOUGHBY TEE 132KV FEEDER BAY	A02011/7	132	Yes - SFAIRP/ALARP and Economic	378,506
57	CMSSYW2S	93Z BLACKTOWN 132KV FEEDER BAY	A03055/7	132	Yes - SFAIRP/ALARP and Economic	351,849
58	CMSSYW2S	93Z BLACKTOWN 132KV FEEDER BAY	A03055/8	132	Yes - SFAIRP/ALARP and Economic	351,849
59	CMSSYW2S	93Z BLACKTOWN 132KV FEEDER BAY	A03058/9	132	Yes - SFAIRP/ALARP and Economic	351,849
60	SYSMRU4H2	847 BOOROWA 66KV FEEDER BAY	ETA2144	66	Yes - SFAIRP/ALARP and Economic	326,460
61	NTSNB22J	9UH BOGGABRI NORTH - 132KV FEEDER	A08085/1	132	Yes - SFAIRP/ALARP and Economic	282,824
62	NTSNB22J	9UH BOGGABRI NORTH - 132KV FEEDER	A08085/2	132	Yes - SFAIRP/ALARP and Economic	282,824
63	NTSNB22J	9UH BOGGABRI NORTH - 132KV FEEDER	A08085/3	132	Yes - SFAIRP/ALARP and Economic	282,824
64	SWSWG11L1	63 DARLINGTON POINT 330KV FEEDER BAY	EC00018705	330	Yes - SFAIRP/ALARP and Economic	279,889
65	SWSWG11L1	63 DARLINGTON POINT 330KV FEEDER BAY	EC00018706	330	Yes - SFAIRP/ALARP and Economic	279,889
66	SWSWG11L1	63 DARLINGTON POINT 330KV FEEDER BAY	EC00018704	330	Yes - SFAIRP/ALARP and Economic	279,889
67	SWSDN22E	99L COLEAMBALLY 132 - 132KV FEEDER	EC00013874	132	Yes - SFAIRP/ALARP and Economic	279,216
68	SWSDN22E	99L COLEAMBALLY 132 - 132KV FEEDER	EC00013927	132	Yes - SFAIRP/ALARP and Economic	279,216
69	SWSDN22E	99L COLEAMBALLY 132 - 132KV FEEDER	EC00013926	132	Yes - SFAIRP/ALARP and Economic	279,216
70	SWSDNT1G1	63 WAGGA 330 - 330KV FEEDER BAY	EC00018699	330	Yes - SFAIRP/ALARP and Economic	274,973
71	SWSDNT1G1	63 WAGGA 330 - 330KV FEEDER BAY	EC00018697	330	Yes - SFAIRP/ALARP and Economic	274,973
72	SWSDNT1G1	63 WAGGA 330 - 330KV FEEDER BAY	EC00018702	330	Yes - SFAIRP/ALARP and Economic	274,973
73	SWSWG11F1	62 JINDERA 330KV FEEDER BAY	A07107/3	330	Yes - SFAIRP/ALARP and Economic	271,848
74	COSORG2N	No.1 TRANSFORMER 132kV TIE ORANGE NORTH FORMERLY 948 PANORAMA	EC00002979	132	Yes - SFAIRP/ALARP and Economic	263,251

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
75	CMSSE12MU	NO8 TRANSFORMER 132KV CB BAY CB 4482	A02014/6	132	Yes - SFAIRP/ALARP and Economic	262,547
76	CMSSE12MU	NO8 TRANSFORMER 132KV CB BAY CB 4482	A02014/4	132	Yes - SFAIRP/ALARP and Economic	262,547
77	CMSSE12MU	NO8 TRANSFORMER 132KV CB BAY CB 4482	A02014/5	132	Yes - SFAIRP/ALARP and Economic	262,547
78	NTSGN22B1	NO2 TRANSFORMER 132KV CB BAY	EC00010063	132	Yes - SFAIRP/ALARP and Economic	257,090
79	NTSGN22H	9U3 BOGGABRI EAST - 132KV FEEDER	EC00010040	132	Yes - SFAIRP/ALARP and Economic	256,442
80	SWSDNT2G	NO1 CAPACITOR 132KV	EC00002644	132	Yes - SFAIRP/ALARP and Economic	230,684
81	CMSSYW2Y	939 MAMRE 132KV FEEDER BAY	EC00010150	132	Yes - SFAIRP/ALARP and Economic	203,502
82	CMSSYW2Y	939 MAMRE 132KV FEEDER BAY	EC00010147	132	Yes - SFAIRP/ALARP and Economic	203,502
83	CMSSYW2N	A1-2 132KV BUS SECTION CB 4102	EC00010130	132	Yes - SFAIRP/ALARP and Economic	201,170
84	SWSWG11F1	62 JINDERA 330KV FEEDER BAY	A07107/2	330	Yes - SFAIRP/ALARP and Economic	183,495
85	SWSWG11F1	62 JINDERA 330KV FEEDER BAY	A07107/1	330	Yes - SFAIRP/ALARP and Economic	183,495
86	NTSNB24BB4	NO4 66KV BUS SECTION	A08082/8	66	Yes - SFAIRP/ALARP and Economic	178,670
87	CMSSYW2B1	NO2 TRANSFORMER 132KV A BUS CB BAY CB 4422A	EC00022756	132	Yes - SFAIRP/ALARP and Economic	175,663
88	CMSSYW2J	93J GRANVILLE TEE 132KV FEEDER BAY	A03054/2	132	Yes - SFAIRP/ALARP and Economic	166,632
89	CMSSYW2J	93J GRANVILLE TEE 132KV FEEDER BAY	A03056/7	132	Yes - SFAIRP/ALARP and Economic	166,632
90	CMSSYW2J	93J GRANVILLE TEE 132KV FEEDER BAY	A03056/9	132	Yes - SFAIRP/ALARP and Economic	166,632
91	NTSAR11A1	NO6 TRANSFORMER 330KV CB BAY	BESS32/3	330	Yes - SFAIRP/ALARP and Economic	162,621
92	NTSAR11A1	NO6 TRANSFORMER 330KV CB BAY	EC00008759	330	Yes - SFAIRP/ALARP and Economic	162,621
93	NTSAR11A1	NO6 TRANSFORMER 330KV CB BAY	BESS32/2	330	Yes - SFAIRP/ALARP and Economic	162,621
94	CMSSE12KR	9E2 KURINGAI 132KV FEEDER	A02011/1	132	Yes - SFAIRP/ALARP and Economic	151,476
95	CMSSE12KR	9E2 KURINGAI 132KV FEEDER	A02011/2	132	Yes - SFAIRP/ALARP and Economic	151,476
96	CMSSE12KR	9E2 KURINGAI 132KV FEEDER	A02011/3	132	Yes - SFAIRP/ALARP and Economic	151,476
97	NTSAR11BB4	NO4 330KV BUS SECTION	EC00008760	330	Yes - SFAIRP/ALARP and Economic	141,913
98	NTSAR11BB4	NO4 330KV BUS SECTION	BESS34/2	330	Yes - SFAIRP/ALARP and Economic	141,913
99	NTSAR11BB4	NO4 330KV BUS SECTION	EC00014214	330	Yes - SFAIRP/ALARP and Economic	141,913
100	NNSER06B	NO2 33KV REACTOR	EC00014817	66	Yes - SFAIRP/ALARP and Economic	139,638
101	CMSSYN1C1	NO3 TRANSFORMER 330KV CB BAY CB 5432	H71406/1	330	Yes - SFAIRP/ALARP and Economic	137,111
102	CMSSYW1J	A1-2 330KV BUS SECTION CB 5102	EC00003891	330	Yes - SFAIRP/ALARP and Economic	133,311
103	CMSSYW1J	A1-2 330KV BUS SECTION CB 5102	EC00003895	330	Yes - SFAIRP/ALARP and Economic	133,311
104	CMSSYW1J	A1-2 330KV BUS SECTION CB 5102	EC00003899	330	Yes - SFAIRP/ALARP and Economic	133,311
105	SWSWG11E1	051 LOWER TUMUT 330KV FEEDER BAY	BESS40/3	330	Yes - SFAIRP/ALARP and Economic	124,779
106	SWSWG11E1	051 LOWER TUMUT 330KV FEEDER BAY	BESS40/2	330	Yes - SFAIRP/ALARP and Economic	124,779

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
107	SWSWG12H2	9R5 WAGGA NORTH 132KV FEEDER BAY	A07108/7	132	Yes - SFAIRP/ALARP and Economic	122,775
108	SWSWG12H2	9R5 WAGGA NORTH 132KV FEEDER BAY	A07108/8	132	Yes - SFAIRP/ALARP and Economic	122,775
109	SWSWG12H2	9R5 WAGGA NORTH 132KV FEEDER BAY	A07108/9	132	Yes - SFAIRP/ALARP and Economic	122,775
110	NNSER06B	NO2 33KV REACTOR	EC00014818	66	Yes - SFAIRP/ALARP and Economic	122,744
111	CMSSYN1C1	NO3 TRANSFORMER 330KV CB BAY CB 5432	H71406/2	330	Yes - SFAIRP/ALARP and Economic	117,691
112	CMSSYN1C1	NO3 TRANSFORMER 330KV CB BAY CB 5432	H71406/3	330	Yes - SFAIRP/ALARP and Economic	117,691
113	CMSSE12G	A1-A2 132KV BUS SECTION CB 4102	A02006/7	132	Yes - SFAIRP/ALARP and Economic	117,598
114	CMSSE12G	A1-A2 132KV BUS SECTION CB 4102	A02006/9	132	Yes - SFAIRP/ALARP and Economic	117,598
115	CMSSE12G	A1-A2 132KV BUS SECTION CB 4102	A02006/8	132	Yes - SFAIRP/ALARP and Economic	117,598
116	CMSSYW2N	A1-2 132KV BUS SECTION CB 4102	EC00010136	132	Yes - SFAIRP/ALARP and Economic	113,021
117	CMSSYS1H1	11 DAPTO 330KV FEEDER BAY	BESS61/3	330	Yes - SFAIRP/ALARP and Economic	112,308
118	NNSMRK1AC	83 LIDDELL 330KV A CB BAY	EC00005384	330	Yes - SFAIRP/ALARP and Economic	108,832
119	NNSMRK1AC	83 LIDDELL 330KV A CB BAY	EC00005385	330	Yes - SFAIRP/ALARP and Economic	108,832
120	NNSMRK1AC	83 LIDDELL 330KV A CB BAY	EC00005386	330	Yes - SFAIRP/ALARP and Economic	108,832
121	SWSWG11E1	051 LOWER TUMUT 330KV FEEDER BAY	BESS40/1	330	Yes - SFAIRP/ALARP and Economic	106,572
122	NNSNEW1M1	95 TOMAGO 330 SS - 330KV FEEDER BAY	A09335/6	330	Yes - SFAIRP/ALARP and Economic	103,668
123	CMSSE12MS	959 SYDNEY NORTH 132KV FEEDER BAY	A02013/4	132	Yes - SFAIRP/ALARP and Economic	95,537
124	CMSSE12MS	959 SYDNEY NORTH 132KV FEEDER BAY	A02013/6	132	Yes - SFAIRP/ALARP and Economic	95,537
125	CMSSE12MS	959 SYDNEY NORTH 132KV FEEDER BAY	A02013/5	132	Yes - SFAIRP/ALARP and Economic	95,537
126	SWSDNT3E2	X5/1 BALRANALD 220KV FEEDER BAY	EC00014782	220	Yes - SFAIRP/ALARP and Economic	95,037
127	SWSDNT3E2	X5/1 BALRANALD 220KV FEEDER BAY	EC00014787	220	Yes - SFAIRP/ALARP and Economic	95,037
128	CMSSE12MR	9M3 WARRINGAH 132KV FEEDER BAY	A02010/6	132	Yes - SFAIRP/ALARP and Economic	94,995
129	CMSSE12MR	9M3 WARRINGAH 132KV FEEDER BAY	A02010/5	132	Yes - SFAIRP/ALARP and Economic	94,995
130	CMSSE12ES	9M2 WARRINGAH 132KV FEEDER BAY	A02012/4	132	Yes - SFAIRP/ALARP and Economic	94,995
131	CMSSE12ES	9M2 WARRINGAH 132KV FEEDER BAY	A02012/5	132	Yes - SFAIRP/ALARP and Economic	94,995
132	CMSSE12ES	9M2 WARRINGAH 132KV FEEDER BAY	A02012/6	132	Yes - SFAIRP/ALARP and Economic	94,995
133	NNSTGH1AC	21 SYDNEY NORTH 330KV A CB BAY	EC00003903	330	Yes - SFAIRP/ALARP and Economic	94,151
134	NNSTGH1AC	21 SYDNEY NORTH 330KV A CB BAY	EC00003905	330	Yes - SFAIRP/ALARP and Economic	94,151
135	NNSTGH1AC	21 SYDNEY NORTH 330KV A CB BAY	EC00003904	330	Yes - SFAIRP/ALARP and Economic	94,151
136	SWSLT11G1	L1 Tumut 3 330kV Feeder Bay (Units 1-2)	ETA6344	330	Yes - SFAIRP/ALARP and Economic	91,616
137	NTSNB24Z	NO3 66KV CAPACITOR	EC00008287	66	Yes - SFAIRP/ALARP and Economic	91,335
138	NTSNB24Z	NO3 66KV CAPACITOR	EC00008288	66	Yes - SFAIRP/ALARP and Economic	91,335

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
139	NTSNB24Z	NO3 66KV CAPACITOR	EC00008289	66	Yes - SFAIRP/ALARP and Economic	91,335
140	SWSJDA1AE	62 WAGGA 330 - 330KV A CB BAY	EC00003902	330	Yes - SFAIRP/ALARP and Economic	88,523
141	SWSJDA1AE	62 WAGGA 330 - 330KV A CB BAY	EC00003906	330	Yes - SFAIRP/ALARP and Economic	88,523
142	SWSJDA1AE	62 WAGGA 330 - 330KV A CB BAY	EC00003908	330	Yes - SFAIRP/ALARP and Economic	88,523
143	SWSJDA1AD	060 WODONGA 330KV B CB BAY	EC00003846	330	Yes - SFAIRP/ALARP and Economic	86,774
144	SWSJDA1AD	060 WODONGA 330KV B CB BAY	EC00003847	330	Yes - SFAIRP/ALARP and Economic	86,774
145	SWSJDA1AD	060 WODONGA 330KV B CB BAY	EC00003882	330	Yes - SFAIRP/ALARP and Economic	86,774
146	SYSCA12J	4X22 SPARE 132KV FEEDER	A02206/1	132	Yes - SFAIRP/ALARP and Economic	82,736
147	CMSSYS1H1	11 DAPTO 330KV FEEDER BAY	BESS61/6	330	Yes - SFAIRP/ALARP and Economic	80,085
148	CMSSYS1H1	11 DAPTO 330KV FEEDER BAY	H70734/1	330	Yes - SFAIRP/ALARP and Economic	80,085
149	NTSNB24F2	882 WEE WAA 66KV CB BAY	ETA1821	66	Yes - SFAIRP/ALARP and Economic	78,546
150	NTSNB24F2	882 WEE WAA 66KV CB BAY	ETA1822	66	Yes - SFAIRP/ALARP and Economic	78,546
151	NTSNB24G2	878 BOGGABRI 66KV CB BAY	ETA1818	66	Yes - SFAIRP/ALARP and Economic	78,546
152	NTSNB24G2	878 BOGGABRI 66KV CB BAY	ETA1819	66	Yes - SFAIRP/ALARP and Economic	78,546
153	SWSWG12J	99X WAGGA 132KV SS - 132KV FEEDER BAY	A07109/2	132	Yes - SFAIRP/ALARP and Economic	76,958
154	SWSWG12Q	99W WAGGA 132KV SS - 132KV FEEDER BAY	A07110/2	132	Yes - SFAIRP/ALARP and Economic	76,794
155	SWSLT11J1	L5 Tumut 3 330kV Feeder Bay (Units 5-6)	ETA6474	330	Yes - SFAIRP/ALARP and Economic	76,737
156	SWSLT11J1	L5 Tumut 3 330kV Feeder Bay (Units 5-6)	ETA6475	330	Yes - SFAIRP/ALARP and Economic	76,737
157	SWSLT11J1	L5 Tumut 3 330kV Feeder Bay (Units 5-6)	ETA6477	330	Yes - SFAIRP/ALARP and Economic	76,737
158	SWSLT11H1	L3 Tumut 3 330kV Feeder Bay (Units 3-4)	ETA6479	330	Yes - SFAIRP/ALARP and Economic	76,737
159	SWSLT11G1	L1 Tumut 3 330kV Feeder Bay (Units 1-2)	ETA6380	330	Yes - SFAIRP/ALARP and Economic	76,737
160	SWSLT11J1	L5 Tumut 3 330kV Feeder Bay (Units 5-6)	ETA6473	330	Yes - SFAIRP/ALARP and Economic	76,737
161	SWSLT11G1	L1 Tumut 3 330kV Feeder Bay (Units 1-2)	ETA6381	330	Yes - SFAIRP/ALARP and Economic	76,737
162	SWSLT11J1	L5 Tumut 3 330kV Feeder Bay (Units 5-6)	ETA6476	330	Yes - SFAIRP/ALARP and Economic	76,737
163	SWSLT11G1	L1 Tumut 3 330kV Feeder Bay (Units 1-2)	ETA6343	330	Yes - SFAIRP/ALARP and Economic	76,737
164	SWSLT11H1	L3 Tumut 3 330kV Feeder Bay (Units 3-4)	ETA6478	330	Yes - SFAIRP/ALARP and Economic	76,737
165	COSWL12E	94B BERYL 132KV FEEDER BAY	EC00002978	132	Yes - SFAIRP/ALARP and Economic	76,224
166	CMSSYS1J2	13 KEMPS CREEK 330KV A BUS CB BAY	BESS61/8	330	Yes - SFAIRP/ALARP and Economic	75,423
167	CMSSYS1J2	13 KEMPS CREEK 330KV A BUS CB BAY	BESS61/2	330	Yes - SFAIRP/ALARP and Economic	75,423
168	CMSSYS1J2	13 KEMPS CREEK 330KV A BUS CB BAY	H70735/1	330	Yes - SFAIRP/ALARP and Economic	75,423
169	NNSNEW1M1	95 TOMAGO 330 SS - 330KV FEEDER BAY	B01534/1	330	Yes - SFAIRP/ALARP and Economic	73,058
170	NNSNEW1M1	95 TOMAGO 330 SS - 330KV FEEDER BAY	A09335/5	330	Yes - SFAIRP/ALARP and Economic	73,058

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
171	SYSCA11C1	NO3 TRANSFORMER 330KV CB BAY	EC00020855	330	Yes - SFAIRP/ALARP and Economic	71,925
172	SYSCA11C1	NO3 TRANSFORMER 330KV CB BAY	EC00007277	330	Yes - SFAIRP/ALARP and Economic	71,925
173	CMSSE12LS	92Z SYDNEY NORTH TEE 132KV FEEDER BAY	A02014/7	132	Yes - SFAIRP/ALARP and Economic	68,077
174	CMSSE12LS	92Z SYDNEY NORTH TEE 132KV FEEDER BAY	A02014/8	132	Yes - SFAIRP/ALARP and Economic	68,077
175	CMSSE12LS	92Z SYDNEY NORTH TEE 132KV FEEDER BAY	A02014/9	132	Yes - SFAIRP/ALARP and Economic	68,077
176	NTSKLK4A	NO1 TRANSFORMER 66KV CB BAY	A08657/1	66	Yes - SFAIRP/ALARP and Economic	67,835
177	NTSKLK4A	NO1 TRANSFORMER 66KV CB BAY	A08657/2	66	Yes - SFAIRP/ALARP and Economic	67,835
178	NTSKLK4A	NO1 TRANSFORMER 66KV CB BAY	A08657/3	66	Yes - SFAIRP/ALARP and Economic	67,835
179	CMSSE12H	B1-B2 132KV BUS SECTION CB 4112	A02005/9	132	Yes - SFAIRP/ALARP and Economic	67,535
180	CMSSE12H	B1-B2 132KV BUS SECTION CB 4112	A02005/7	132	Yes - SFAIRP/ALARP and Economic	67,535
181	CMSSE12H	B1-B2 132KV BUS SECTION CB 4112	A02005/8	132	Yes - SFAIRP/ALARP and Economic	67,535
182	CMSSE12B2	NO2 TRANSFORMER 132KV B BUS CB BAY CB 4422B	A02005/4	132	Yes - SFAIRP/ALARP and Economic	67,535
183	CMSSE12B2	NO2 TRANSFORMER 132KV B BUS CB BAY CB 4422B	A02005/5	132	Yes - SFAIRP/ALARP and Economic	67,535
184	CMSSE12B2	NO2 TRANSFORMER 132KV B BUS CB BAY CB 4422B	EC00024926	132	Yes - SFAIRP/ALARP and Economic	67,535
185	COSMTP1C4	NO3 TRANS. 330/132/11KV & 330 BUS CONN.	EC00015746	330	Yes - SFAIRP/ALARP and Economic	67,017
186	COSMTP1C4	NO3 TRANS. 330/132/11KV & 330 BUS CONN.	EC00015750	330	Yes - SFAIRP/ALARP and Economic	67,017
187	COSMTP1C4	NO3 TRANS. 330/132/11KV & 330 BUS CONN.	EC00015751	330	Yes - SFAIRP/ALARP and Economic	67,017
188	NTSNB24BB4	NO4 66KV BUS SECTION	ETA1939	66	Yes - SFAIRP/ALARP and Economic	66,992
189	NTSNB24BB4	NO4 66KV BUS SECTION	ETA1940	66	Yes - SFAIRP/ALARP and Economic	66,992
190	SWSWG12K	993 GADARA 132KV FEEDER	A07109/5	132	Yes - SFAIRP/ALARP and Economic	66,006
191	SWSWG12K	993 GADARA 132KV FEEDER	A07109/4	132	Yes - SFAIRP/ALARP and Economic	66,006
192	SWSWG12K	993 GADARA 132KV FEEDER	A07109/6	132	Yes - SFAIRP/ALARP and Economic	66,006
193	SWSWG12J	99X WAGGA 132KV SS - 132KV FEEDER BAY	A07109/1	132	Yes - SFAIRP/ALARP and Economic	64,380
194	SWSWG12J	99X WAGGA 132KV SS - 132KV FEEDER BAY	A07109/3	132	Yes - SFAIRP/ALARP and Economic	64,380
195	SWSWG12T	994 YANCO 132KV FEEDER	A07110/8	132	Yes - SFAIRP/ALARP and Economic	64,380
196	SWSWG12T	994 YANCO 132KV FEEDER	A07110/7	132	Yes - SFAIRP/ALARP and Economic	64,380
197	SWSWG12T	994 YANCO 132KV FEEDER	A07110/9	132	Yes - SFAIRP/ALARP and Economic	64,380
198	SWSWG12U	996 A.N.M. 132KV FEEDER BAY	A07111/3	132	Yes - SFAIRP/ALARP and Economic	64,232
199	SWSWG12U	996 A.N.M. 132KV FEEDER BAY	A07111/1	132	Yes - SFAIRP/ALARP and Economic	64,232
200	SWSWG12U	996 A.N.M. 132KV FEEDER BAY	A07111/2	132	Yes - SFAIRP/ALARP and Economic	64,232
201	SWSWG12Q	99W WAGGA 132KV SS - 132KV FEEDER BAY	A07110/1	132	Yes - SFAIRP/ALARP and Economic	64,232
202	SWSWG12Q	99W WAGGA 132KV SS - 132KV FEEDER BAY	A07110/3	132	Yes - SFAIRP/ALARP and Economic	64,232

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
203	SWSWG12P	NO2 132KV BUS COUPLER CB	A07111/6	132	Yes - SFAIRP/ALARP and Economic	63,838
204	SWSWG12P	NO2 132KV BUS COUPLER CB	A07111/4	132	Yes - SFAIRP/ALARP and Economic	63,838
205	SWSWG12P	NO2 132KV BUS COUPLER CB	A07111/5	132	Yes - SFAIRP/ALARP and Economic	63,838
206	SWSLT11G1	L1 Tumut 3 330kV Feeder Bay (Units 1-2)	ETA6324	330	Yes - SFAIRP/ALARP and Economic	63,256
207	SWSLT11J1	L5 Tumut 3 330kV Feeder Bay (Units 5-6)	ETA6472	330	Yes - SFAIRP/ALARP and Economic	63,256
208	SWSLT11H1	L3 Tumut 3 330kV Feeder Bay (Units 3-4)	ETA6471	330	Yes - SFAIRP/ALARP and Economic	63,256
209	SWSLT11H1	L3 Tumut 3 330kV Feeder Bay (Units 3-4)	ETA6480	330	Yes - SFAIRP/ALARP and Economic	63,256
210	SWSLT11H1	L3 Tumut 3 330kV Feeder Bay (Units 3-4)	ETA6470	330	Yes - SFAIRP/ALARP and Economic	63,256
211	SWSLT11H1	L3 Tumut 3 330kV Feeder Bay (Units 3-4)	ETA6469	330	Yes - SFAIRP/ALARP and Economic	63,256
212	SWSLT11G1	L1 Tumut 3 330kV Feeder Bay (Units 1-2)	ETA6379	330	Yes - SFAIRP/ALARP and Economic	63,256
213	SWSDN28A1	NO1 11KV/415V AUX TRANSFORMER BAY	EC00016071	11	Yes - SFAIRP/ALARP and Economic	62,524
214	SWSDN28A1	NO1 11KV/415V AUX TRANSFORMER BAY	EC00016072	11	Yes - SFAIRP/ALARP and Economic	62,524
215	SWSDN28A1	NO1 11KV/415V AUX TRANSFORMER BAY	EC00016070	11	Yes - SFAIRP/ALARP and Economic	62,524
216	SYSCA12J	4X22 SPARE 132KV FEEDER	EC00001315	132	Yes - SFAIRP/ALARP and Economic	57,287
217	COSWL12J	NO1 SECTION 132KV BUS COUPLER CB BAY	EC00002977	132	Yes - SFAIRP/ALARP and Economic	49,823
218	CMSDPT2E1	NO4 TRANSFORMER 132KV A BUS CB BAY CB 4442A	EC00005309	132	Yes - SFAIRP/ALARP and Economic	48,469
219	CMSDPT2W	984 TALLAWARRA 132KV FEEDER	EC00005310	132	Yes - SFAIRP/ALARP and Economic	44,828
220	COSMTP1C2	330KV 35 MARULAN MAIN BUS CB BAY	EC00022833	330	Yes - SFAIRP/ALARP and Economic	42,590
221	COSMTP1C2	330KV 35 MARULAN MAIN BUS CB BAY	EC00022834	330	Yes - SFAIRP/ALARP and Economic	42,590
222	COSMTP1C2	330KV 35 MARULAN MAIN BUS CB BAY	EC00022835	330	Yes - SFAIRP/ALARP and Economic	42,590
223	NNSER06B	NO2 33KV REACTOR	EC00008268	66	Yes - SFAIRP/ALARP and Economic	41,372
224	SYSCA12H	4X12 SPARE 132KV FEEDER	EC00001310	132	Yes - SFAIRP/ALARP and Economic	39,267
225	SYSCA12H	4X12 SPARE 132KV FEEDER	EC00001312	132	Yes - SFAIRP/ALARP and Economic	39,267
226	COSWL12E	94B BERYL 132KV FEEDER BAY	EC00003205	132	Yes - SFAIRP/ALARP and Economic	32,340
227	COSWL12E	94B BERYL 132KV FEEDER BAY	EC00003206	132	Yes - SFAIRP/ALARP and Economic	32,340
228	CMSSYS2L	916 KURNELL T CRONULLA 132KV FEEDER BAY	EC00003341	132	Yes - SFAIRP/ALARP and Economic	32,206
229	CMSSYS2L	916 KURNELL T CRONULLA 132KV FEEDER BAY	EC00003342	132	Yes - SFAIRP/ALARP and Economic	32,206
230	CMSDPT2D2	NO3 TRANSFORMER 132KV B BUS CB BAY CB 4432B	EC00002780	132	Yes - SFAIRP/ALARP and Economic	26,299
231	CMSDPT2E2	NO4 TRANSFORMER 132KV B BUS CB BAY CB 4442B	EC00002776	132	Yes - SFAIRP/ALARP and Economic	26,299
232	COSWL12J	NO1 SECTION 132KV BUS COUPLER CB BAY	EC00003208	132	Yes - SFAIRP/ALARP and Economic	15,054
233	COSWL12J	NO1 SECTION 132KV BUS COUPLER CB BAY	EC00003207	132	Yes - SFAIRP/ALARP and Economic	15,054
234	CMSDPT2E2	NO4 TRANSFORMER 132KV B BUS CB BAY CB 4442B	EC00005306	132	Yes - SFAIRP/ALARP and Economic	11,199

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
235	SYSCA11C1	NO3 TRANSFORMER 330KV CB BAY	ETA3231	330	Yes - SFAIRP/ALARP and Economic	9,980
236	SYSCA12H	4X12 SPARE 132KV FEEDER	EC00001311	132	Yes - SFAIRP/ALARP and Economic	7,876
237	CMSSE12MR	9M3 WARRINGAH 132KV FEEDER BAY	EC00018748	132	Yes - SFAIRP/ALARP and Economic	6,920
238	SYSCA12J	4X22 SPARE 132KV FEEDER	EC00001314	132	Yes - SFAIRP/ALARP and Economic	6,382
239	CMSSYS2L	916 KURNELL T CRONULLA 132KV FEEDER BAY	EC00003343	132	Yes - SFAIRP/ALARP and Economic	3,011
240	COSORG2N	No.1 TRANSFORMER 132kV TIE ORANGE NORTH FORMERLY 948 PANORAMA	EC00003211	132	Yes - Economic	145,259
241	COSBER2B1	NO2 TRANSFORMER 132KV CB BAY	EC00006041	132	Yes - Economic	107,667
242	COSBER2B1	NO2 TRANSFORMER 132KV CB BAY	EC00006043	132	Yes - Economic	107,667
243	CMSAVS1A	17 MACARTHUR 330KV FEEDER	EC00003842	330	Yes - Economic	92,694
244	CMSAVS1A	17 MACARTHUR 330KV FEEDER	EC00003843	330	Yes - Economic	92,694
245	CMSAVS1A	17 MACARTHUR 330KV FEEDER	EC00003844	330	Yes - Economic	92,694
246	SWSBRG3D2	X5/3 BALRANALD 220KV FEEDER BAY	EC00014796	220	Yes - Economic	92,602
247	SWSBRG3D2	X5/3 BALRANALD 220KV FEEDER BAY	EC00014797	220	Yes - Economic	92,602
248	SWSBRG3D2	X5/3 BALRANALD 220KV FEEDER BAY	EC00014798	220	Yes - Economic	92,602
249	SYSMRU4H2	847 BOOROWA 66KV FEEDER BAY	EC00008020	66	Yes - Economic	67,843
250	SYSMRU4H2	847 BOOROWA 66KV FEEDER BAY	EC00008066	66	Yes - Economic	67,843
251	COSBER4K	NO2 66KV CAPACITOR BANK	EC00004568	66	Yes - Economic	67,331
252	COSBER4K	NO2 66KV CAPACITOR BANK	EC00004569	66	Yes - Economic	67,331
253	COSBER4K	NO2 66KV CAPACITOR BANK	EC00004570	66	Yes - Economic	67,331
254	SWSDNT3E2	X5/1 BALRANALD 220KV FEEDER BAY	EC00014790	220	Yes - Economic	65,407
255	SWSBRG3G2	OX1 RED CLIFFS 220KV FEEDER BAY	EC00014784	220	Yes - Economic	56,514
256	SWSBRG3G2	OX1 RED CLIFFS 220KV FEEDER BAY	EC00014791	220	Yes - Economic	56,514
257	SWSBRG3G2	OX1 RED CLIFFS 220KV FEEDER BAY	EC00014793	220	Yes - Economic	56,514
258	SWSDN24H	NO1 CAPACITOR 66KV BAY	ETA4691	66	Yes - Economic	48,582
259	NTSNB24A	NO1 TRANSFORMER 66KV CB BAY	EC00017015	66	Yes - Economic	39,611
260	NTSNB24A	NO1 TRANSFORMER 66KV CB BAY	EC00017019	66	Yes - Economic	39,611
261	NTSGN22B1	NO2 TRANSFORMER 132KV CB BAY	EC00006286	132	Yes - Economic	35,778
262	NTSGN22B1	NO2 TRANSFORMER 132KV CB BAY	EC00006287	132	Yes - Economic	35,778
263	CMSDPT2E1	NO4 TRANSFORMER 132KV A BUS CB BAY CB 4442A	EC00002854	132	Yes - Economic	28,813
264	NTSNB24C	NO3 TRANSFORMER 66KV CB BAY	EC00006853	66	Yes - Economic	12,540
265	NTSNB24A	NO1 TRANSFORMER 66KV CB BAY	EC00017018	66	Yes - Economic	12,540
266	NTSNB24C	NO3 TRANSFORMER 66KV CB BAY	EC00017034	66	Yes - Economic	12,540

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267	SWSDN24H	NO1 CAPACITOR 66KV BAY	EC00008062	66	Yes - Economic	12,255
268	NTSMRE4F1	881 GARAH TEE ASHLEY 66KV FEEDER BAY	EC00006161	66	Yes - Economic	12,125
269	NTSNB24M	834 NARRABRI 66KV SS - 66KV FEEDER	EC00006854	66	Yes - Economic	10,348
270	SWSFNY2A	NO1 TRANSFORMER 66KV CB BAY	EC00017025	66	Yes - Economic	10,112
271	SWSFNY2A	NO1 TRANSFORMER 66KV CB BAY	EC00017033	66	Yes - Economic	10,112
272	CMSDPT2E1	NO4 TRANSFORMER 132KV A BUS CB BAY CB 4442A	EC00002855	132	Yes - Economic	9,622
273	CMSDPT2D2	NO3 TRANSFORMER 132KV B BUS CB BAY CB 4432B	EC00002822	132	Yes - Economic	8,628
274	NTSNB24C	NO3 TRANSFORMER 66KV CB BAY	EC00017020	66	Yes - Economic	7,375
275	NTSMRE4F1	881 GARAH TEE ASHLEY 66KV FEEDER BAY	EC00008022	66	Yes - Economic	6,862
276	NTSMRE4F1	881 GARAH TEE ASHLEY 66KV FEEDER BAY	EC00008021	66	Yes - Economic	6,862
277	SWSALB2H1	997/1 COROWA 132KV FEEDER BAY	EC00006022	132	Yes - Economic	5,352
278	SWSALB2H1	997/1 COROWA 132KV FEEDER BAY	EC00006024	132	Yes - Economic	5,352
279	SWSFNY2G2	84A JERILDERIE 66KV FEEDER BAY	EC00017017	66	Yes - Economic	5,030
280	SWSFNY2G2	84A JERILDERIE 66KV FEEDER BAY	EC00017029	66	Yes - Economic	5,030
281	SWSFNY2G2	84A JERILDERIE 66KV FEEDER BAY	EC00017030	66	Yes - Economic	5,030
282	COSBER4S2	852 DUNEDOO 66KV FEEDER BAY	EC00006160	66	Yes - Economic	4,986
283	COSBER4S2	852 DUNEDOO 66KV FEEDER BAY	EC00004608	66	Yes - Economic	4,986
284	COSBER4S2	852 DUNEDOO 66KV FEEDER BAY	EC00008033	66	Yes - Economic	4,986
285	NTSNB24M	834 NARRABRI 66KV SS - 66KV FEEDER	EC00004576	66	Yes - Economic	3,754
286	CMSDPT2V1	988 FAIRFAX LANE TEE 132KV FEEDER	EC00006048	132	Yes - Economic	3,388
287	CMSDPT2V1	988 FAIRFAX LANE TEE 132KV FEEDER	EC00006054	132	Yes - Economic	3,388
288	CMSDPT2V1	988 FAIRFAX LANE TEE 132KV FEEDER	EC00006046	132	Yes - Economic	3,388
289	NTSNB24F2	882 WEE WAA 66KV CB BAY	EC00006855	66	Yes - Economic	2,631
290	SWSDN24H	NO1 CAPACITOR 66KV BAY	EC00008025	66	Yes - Economic	1,080
291	CMSLP12A	93B WEST LIVERPOOL 132KV FEEDER BAY	EC00013865	132	Yes - Economic	681
292	CMSLP12A	93B WEST LIVERPOOL 132KV FEEDER BAY	EC00013867	132	Yes - Economic	681
293	CMSLP12A	93B WEST LIVERPOOL 132KV FEEDER BAY	EC00013864	132	Yes - Economic	681
294	CMSLP12B	93N WEST LIVERPOOL 132KV FEEDER BAY	EC00013862	132	Yes - Economic	681
295	CMSLP12B	93N WEST LIVERPOOL 132KV FEEDER BAY	EC00013863	132	Yes - Economic	681
296	CMSLP12B	93N WEST LIVERPOOL 132KV FEEDER BAY	EC00013866	132	Yes - Economic	681
297	SWSALB2H1	997/1 COROWA 132KV FEEDER BAY	EC00006011	132	Yes - Economic	380
298	SWSFNY2A	NO1 TRANSFORMER 66KV CB BAY	EC00017035	66	Yes - Economic	379

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
299	CMSSYW2N	A1-2 132KV BUS SECTION CB 4102	EC00006065	132	Yes - Economic (3ph +ve)	(4,127)
300	NTSNB24G2	878 BOGGABRI 66KV CB BAY	EC00006871	66	Yes - Economic (3ph +ve)	(4,665)
301	NTSNB24M	834 NARRABRI 66KV SS - 66KV FEEDER	EC00004600	66	Yes - Economic (3ph +ve)	(8,502)
302	CMSDPT2D2	NO3 TRANSFORMER 132KV B BUS CB BAY CB 4432B	EC00002820	132	Yes - Economic (3ph +ve)	(9,434)
303	CMSDPT2E2	NO4 TRANSFORMER 132KV B BUS CB BAY CB 4442B	EC00002819	132	Yes - Economic (3ph +ve)	(9,434)
304	CMSDPT2W	984 TALLAWARRA 132KV FEEDER	EC00002817	132	Yes - Economic (3ph +ve)	(9,434)
305	CMSDPT2W	984 TALLAWARRA 132KV FEEDER	EC00002818	132	Yes - Economic (3ph +ve)	(9,434)
306	NNSTRE4E	861 WHITBREAD ST ZONE SS 66KV FEEDER	EC00006869	66	No	7,644
307	NNSWRH2M	96Y MAYFIELD WEST 132KV FEEDER	EC00020915	132	No	(10,282)
308	NNSWRH2M	96Y MAYFIELD WEST 132KV FEEDER	EC00020919	132	No	(10,282)
309	NNSWRH2M	96Y MAYFIELD WEST 132KV FEEDER	EC00013933	132	No	(10,282)
310	NNSKS26S	NO2 33KV BUS SECTION	EC00021996	33	No	(13,094)
311	NNSKS26U	7R2 SMITHTOWN 33KV FEEDER	EC00021993	33	No	(13,293)
312	NNSKS26U	7R2 SMITHTOWN 33KV FEEDER	EC00021994	33	No	(13,293)
313	NNSKS26U	7R2 SMITHTOWN 33KV FEEDER	EC00021995	33	No	(13,293)
314	SWSDNT3C	NO3 TRANSFORMER 220KV A BUS CB BAY	EC00014783	220	No	(15,456)
315	SWSDNT3C	NO3 TRANSFORMER 220KV A BUS CB BAY	EC00014786	220	No	(15,456)
316	SWSDNT3C	NO3 TRANSFORMER 220KV A BUS CB BAY	EC00014799	220	No	(15,456)
317	SWSDNT3D	NO4 TRANSFORMER 220KV B BUS CB BAY	EC00014785	220	No	(15,456)
318	SWSDNT3D	NO4 TRANSFORMER 220KV B BUS CB BAY	EC00014792	220	No	(15,456)
319	SWSDNT3D	NO4 TRANSFORMER 220KV B BUS CB BAY	EC00014795	220	No	(15,456)
320	SWSALB2B1	NO2 TRANSFORMER 132KV CB BAY	EC00010117	132	No	(17,962)
321	NNSTRE4E	861 WHITBREAD ST ZONE SS 66KV FEEDER	EC00006858	66	No	(17,974)
322	NNSTRE4E	861 WHITBREAD ST ZONE SS 66KV FEEDER	EC00006873	66	No	(17,974)
323	NTSINV4J	733 GLEN INNES 66 - 66KV FEEDER	EC00007931	66	No	(18,422)
324	NTSINV4J	733 GLEN INNES 66 - 66KV FEEDER	EC00007938	66	No	(18,422)
325	NNSKS26S	NO2 33KV BUS SECTION	EC00021998	33	No	(21,397)
326	NNSKS26S	NO2 33KV BUS SECTION	EC00021997	33	No	(21,397)
327	SWSDN24M2	NO6 MOAMA 66KV FEEDER BAY	EC00004132	66	No	(21,996)
328	SWSDN24M2	NO6 MOAMA 66KV FEEDER BAY	EC00007527	66	No	(21,996)
329	NTSINV4J	733 GLEN INNES 66 - 66KV FEEDER	EC00007944	66	No	(24,616)
330	NNSPMQ2B1	NO2 TRANSFORMER 132KV CB BAY	EC00013887	132	No	(26,588)

No.	Equipment Reference	Equipment Description	PIC Number	Voltage	Replacement Decision based on evaluation	NPV @ 10%, as at Jun'19
331	NNSPMQ2B1	NO2 TRANSFORMER 132KV CB BAY	EC00013888	132	No	(26,588)
332	NNSPMQ2B1	NO2 TRANSFORMER 132KV CB BAY	EC00013894	132	No	(26,588)
333	SYSCA12E	NO2 132KV CAPACITOR	EC00010106	132	No	(26,819)
334	SYSCA12E	NO2 132KV CAPACITOR	EC00010099	132	No	(26,819)
335	NNSTRE4Q	NO4 66KV CAPACITOR	EC00008031	66	No	(26,917)
336	SWSDN24M2	NO6 MOAMA 66KV FEEDER BAY	EC00004133	66	No	(27,090)
337	SWSALB2C1	NO3 TRANSFORMER 132KV CB BAY	EC00010070	132	No	(27,432)
338	COSMTP2F	NO3 TRANSFORMER 132KV CB BAY/94Y FDR	EC00013906	132	No	(29,971)
339	COSMTP2F	NO3 TRANSFORMER 132KV CB BAY/94Y FDR	EC00013909	132	No	(29,971)
340	COSMTP2F	NO3 TRANSFORMER 132KV CB BAY/94Y FDR	EC00013910	132	No	(29,971)
341	NNSTRE4Q	NO4 66KV CAPACITOR	EC00007914	66	No	(30,170)
342	NNSTRE4Q	NO4 66KV CAPACITOR	EC00008039	66	No	(30,170)
343	COSWL12R	945 MOLONG TEE WEL'TON TWN 132KV FDR BAY	EC00009100	132	No	(31,499)
344	COSWL12R	945 MOLONG TEE WEL'TON TWN 132KV FDR BAY	EC00009094	132	No	(33,604)
345	NNSWRH2Q	962 TOMAGO 132 SS - 132KV FEEDER	EC00013924	132	No	(36,888)
346	NNSWRH2Q	962 TOMAGO 132 SS - 132KV FEEDER	EC00020912	132	No	(36,888)
347	NNSWRH2Q	962 TOMAGO 132 SS - 132KV FEEDER	EC00020913	132	No	(36,888)
348	SWSALB2B1	NO2 TRANSFORMER 132KV CB BAY	EC00010100	132	No	(37,835)
349	COSWL12R	945 MOLONG TEE WEL'TON TWN 132KV FDR BAY	EC00009098	132	No	(38,726)
350	SYSCA12E	NO2 132KV CAPACITOR	EC00010101	132	No	(41,623)
351	SWSGRF2K	99J YANCO 132KV FEEDER	EC00006018	132	No	(42,701)
352	SWSGRF2K	99J YANCO 132KV FEEDER	EC00006036	132	No	(42,701)
353	SWSGRF2K	99J YANCO 132KV FEEDER	EC00009345	132	No	(42,701)
354	SWSALB2B1	NO2 TRANSFORMER 132KV CB BAY	EC00010059	132	No	(42,933)
355	SWSALB2C1	NO3 TRANSFORMER 132KV CB BAY	EC00005993	132	No	(42,933)
356	SWSALB2C1	NO3 TRANSFORMER 132KV CB BAY	EC00009349	132	No	(42,933)
357	COSMPP1B2	NO2 TRANSFORMER 132/66KV TRANSF BAY	EC00007426	66	No	(62,366)