NEED/OPPORTUNITY STATEMENT (NOS)

Coleambally Secondary Systems Renewal

NOS- 000000001196 revision 2.0

Ellipse project no.: P0005247
TRIM file: [TRIM No]

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

Approvals

Author	Adam Hoare	Secondary Systems Senior Analyst
Endorsed	Mark Jones	Secondary Systems and Communications Asset Manager
Approved	Lance Wee	M/Asset Strategy
Date submitted for approval	10 November 2016	

Change history

Revision	Date	Amendment
0	28 April 2016	Initial issue
1	11 October 2016	Update to 2016/17 dollars
2	10 November 2016	Update to format

1. Background

Coleambally 132/33kV Substation comprises of both TransGrid and Essential Energy assets. The TransGrid owned HV assets comprise of 2x 132kV feeders, whist the remainder belong to Essential Energy. The site was established in 1993, and the secondary systems assets have procurement dates between 1979 and 2012.

Coleambally Substation is a customer connection point supplying the Essential Energy 33kV network in the area inclusive of Coleambally, Egansford and Darlington Point. The site will remain a connection point to Essential Energy into the foreseeable future as outlined in the load forecasts of the 2015 Transmission Annual Planning Report.

2. Need/opportunity

In accordance with TransGrid's Renewal and Maintenance Strategies for Automation[1] and Metering Systems[2], Table 1 shows the assets at Coleambally Substation that have been identified for replacement by 2023.

Table 1 – Identified asset replacements at Coleambally Substation from 2014-2023

Need Description	Quantity of Assets to be addressed	% of Services at Site	Need Driver
Need ID 610 – Replacement of EDMI MK3 Energy Meters	2	50% of all market meters on site	> Microprocessor Energy Meters failing as they approach 15 years of life > Component obsolescence resulting in a lack of spares and no manufacturer support
Need ID 1356 – Replacement of Reyrolle OHx Protection Relays	2	50% of all line/feeder protection relays on site	> Component obsolescence resulting in a lack of spares and no manufacturer support > End of asset life
Need ID 1364 – Replacement of Gyr ZMD Energy Meters	2	50% of all market meters on site	> Microprocessor Energy Meters failing as they approach 15 years of life > Component obsolescence resulting in a lack of spares and no manufacturer support
Need ID 1376 – Replacement of Alstom Pxxx Protection Relays	2	50% of all line/feeder protection relays on site	> Component obsolescence resulting in a lack of spares and no manufacturer support > End of asset life

Additionally, condition assessments for all these individual asset types have been completed[3].

[1] Refer SSA Strategy - Renewal and Maintenance - Automation Systems

[2] Refer SSA Strategy - Renewal and Maintenance - Metering Systems

[3] Refer NACA-SSAP - Protection, NACA-SSAC - Control, NACA-SSAM - Metering

The risk cost associated with all secondary systems at Coleambally is $0.387m per annum. The most significant elements of concern are the financial consequence of an LV AC distribution system failure. There is a mixed customer load at the site with a forecast 10MW as the average of the summer and winter loads in the Transmission Annual Planning Report and an estimated 16 hours to recover the site and load after a hazardous event. The risk costs are based on 2015/16 probabilities of failure taken as a trend of existing defect rates of applicable asset types derived from the condition assessments. These probabilities are forecast to continue increasing over the coming years, with the consequence of failure also likely to escalate due to TransGrid's means of mitigating and repairing these failures being almost exhausted.

There is additional risk identified from market meters (which considers repair and potential litigation costs).

In accordance with TransGrid's Renewal and Maintenance Strategy for Secondary Systems Site Installations[4], an opportunity exists to address these risks by performing a full secondary system replacement at Coleambally (as listed in the risk summary in Attachment 1). This opportunity is expected to provide an additional benefit for the organisation through optimising the current investment in TransGrid's High Capacity Telecommunications to the site. This can be achieved by upgrading all ancillary systems to TransGrid's latest design standard which provides the greatest amount of real time operational and condition data to better support the planning, operation and maintenance of the Network

3. Related Needs/opportunities

The following related Needs contain works for Coleambally that could be fulfilled by completing a Secondary Systems Replacement:

- Need ID 610 – Replacement of EDMI MK3 Energy Meters
- Need ID 1356 – Replacement of Reyrolle OHx Protection Relays
- Need ID 1364 – Replacement of Gyr ZMD Energy Meters
- Need ID 1376 – Replacement of Alstom Pxxx Protection Relays

4. Recommendation

It is recommended that options be considered to address the identified Need/opportunity.

[4] Refer SSA Strategy - Renewal and Maintenance - Secondary Systems Site Installations

Attachment 1 – Risk costs summary

Summary of results is attached below. Refer to supporting document in PDGS for full risk assessment.

Current Option Assessment - Risk Summary

Project Name: Coleambally Secondary Systems Renewal

Option Name: 1196 - Base Case

Option Assessment Name: 1196 - Base Case - Assessment 1

Rev Reset Period: Next (2018-23)

Major Component	No.	Minor Component	Sel. Hazardous Event	LoC x CoF ($M)	Failure Mechanism	NoxLoC xCoF ($M)	PoF (Yr 1)	Total Risk ($M)	Risk ($M) (Rel)	Risk ($M) (Op)	Risk ($M) (Fin)	Risk ($M) (Peo)	Risk ($M) (Env)	Risk ($M) (Rep)
Battery and Charger System	2	Battery	Uncontrolled Electrical Contact / Discharge (Battery and Charger System)	$0.07	Failure	$0.14	9.20%	$0.01	$0.01		$0.00	$0.00		$0.00
Battery and Charger System	2	Battery	Unplanned Outage - HV (Battery and Charger System)	$0.07	Failure	$0.13	9.20%	$0.01	$0.01		$0.00			$0.00
Battery and Charger System	2	Charger	Uncontrolled Electrical Contact / Discharge (Battery and Charger System)	$0.07	Failure	$0.14	9.20%	$0.01	$0.01		$0.00	$0.00		$0.00
Battery and Charger System	2	Charger	Unplanned Outage - HV (Battery and Charger System)	$0.07	Failure	$0.13	9.20%	$0.01	$0.01		$0.00			$0.00
Controls	4	Bay Controller	Unplanned Outage - HV (Controls)	$0.12	Failure	$0.48	2.48%	$0.01	$0.01		$0.01			$0.00
Controls	4	Control Cabling	Unplanned Outage - HV (Controls)	$0.12	Failure	$0.48	2.48%	$0.01	$0.01		$0.01			$0.00
Low Voltage AC Supply	1	AC Low Voltage Board/Panel/Box	Uncontrolled Electrical Contact / Discharge (Low Voltage AC Supply)	$0.33	Failure	$0.33	31.00%	$0.10	$0.02		$0.08	$0.00		$0.00
Low Voltage AC Supply	1	AC Low Voltage Board/Panel/Box	Unplanned Outage - HV (Low Voltage AC Supply)	$0.39	Failure	$0.39	31.00%	$0.12	$0.04		$0.08			$0.00
Low Voltage AC Supply	1	AC Low Voltage Cable	Uncontrolled Electrical Contact / Discharge (Low Voltage AC Supply)	$0.33	Failure	$0.33	3.20%	$0.01	$0.00		$0.01	$0.00		$0.00
Low Voltage AC Supply	1	AC Low Voltage Cable	Unplanned Outage - HV (Low Voltage AC Supply)	$0.39	Failure	$0.39	3.20%	$0.01	$0.00		$0.01			$0.00
Low Voltage DC Supply	2	DC Low Voltage Board/Panel/Box	Uncontrolled Electrical Contact / Discharge (Low Voltage DC Supply)	$0.07	Failure	$0.14	2.00%	$0.00	$0.00		$0.00	$0.00		$0.00
Low Voltage DC Supply	2	DC Low Voltage Board/Panel/Box	Unplanned Outage - HV (Low Voltage DC Supply)	$0.07	Failure	$0.13	2.00%	$0.00	$0.00		$0.00			$0.00
Low Voltage DC Supply	2	DC Low Voltage Cable	Uncontrolled Electrical Contact / Discharge (Low Voltage DC Supply)	$0.07	Failure	$0.14	2.00%	$0.00	$0.00		$0.00	$0.00		$0.00

Major Component	No.	Minor Component	Sel. Hazardous Event	LoC x CoF ($M)	Failure Mechanism	NoxLoC xCoF ($M)	PoF (Yr 1)	Total Risk ($M)	Risk ($M) (Rel)	Risk ($M) (Op)	Risk ($M) (Fin)	Risk ($M) (Peo)	Risk ($M) (Env)	Risk ($M) (Rep)
Low Voltage DC Supply	2	DC Low Voltage Cable	Unplanned Outage - HV (Low Voltage DC Supply)	$0.07	Failure	$0.13	2.00%	$0.00	$0.00		$0.00			$0.00
Metering	4	Meter	Failed Compliance Obligations (Metering)	$0.11	Failure	$0.45	3.50%	$0.02			$0.02			
Protection	3	Protection	Unplanned Outage - HV (Protection)	$0.16	Failure	$0.48	2.43%	$0.01	$0.00		$0.01			$0.00
Protection	3	Protection Relay	Explosive Failure of Asset (Protection)	$0.40	Failure	$1.20	2.43%	$0.03	$0.00		$0.00	$0.00	$0.01	$0.02
				$2.89		$5.61		$0.39	$0.12		$0.23	$0.00	$0.01	$0.02

Total VCR Risk: $0.08

Total ENS Risk: $0.02