

NEED/OPPORTUNITY STATEMENT (NOS)



Telcommunications SDH Network Condition

NOS- 000000001365 revision 3.0

Ellipse project no.: P0007998

TRIM file: [TRIM No]

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

Project category: Prescribed - Asset Renewal Strategies

Approvals

Author	Mark Jones	Secondary Systems and Communications Asset Manager
Endorsed	Mark Jones	Secondary Systems and Communications Asset Manager
Approved	Lance Wee	M/Asset Strategy
Date submitted for approval	17 October 2016	

Change history

Revision	Date	Amendment
0	27 April 2016	Initial issue
1	11 October 2016	Update to 2016/17 dollars
2	10 November 2016	Update to format

1. Background

TransGrid currently utilises Synchronous Digital Hierarchy (SDH) technology across the optical fibre and microwave telecommunications networks as the main backbone for data transmission between TransGrid substations, offices and depots, network control rooms and data centres.

Since 2009, TransGrid has used Sagem ADR and FMX multiplexers for its SDH telecommunications network. TransGrid has been informed that all vendor support for these product lines will cease as of June 30th, 2016. This also applies to the Network Management System (NMS) that TransGrid uses to configure, monitor and remotely diagnose its telecommunications network. To prepare for the end of life of the Sagem products, TransGrid has procured sufficient spares for the network to manage equipment failures through to 2021, assuming the current failure rates remain steady.

As per the TransGrid policy at the time of installation, Sagem equipment is utilised for both the A and B communications paths to obtain the benefits of being able to utilise a single NMS for managing the entire Telecommunications Network.

TransGrid carries a small amount of non-prescribed customer traffic on the SDH network and is integral to the communications between AEMO and many wholesale generators in NSW for market operations and dispatch.

2. Need/opportunity

TransGrid needs to provide a fast, reliable communications network to operate the high voltage system safely, securely and reliably. The provision of this service forms part of TransGrid's obligations under the National Electricity Rules as well as enabling systems and initiatives that allow work to be executed efficiently. TransGrid also relies on this network to support its Corporate Data Network and enable business systems in regional offices, depots and remote substations.

The fleet of SDH multiplexers form a critical part of the communications network and the ongoing performance of the telecommunications network is required into the foreseeable future. The risk cost associated with the SDH multiplexers is \$1.7m per annum. The most significant element of concern is the reliability consequence associated with an unplanned outage due to the unavailability of adequate communications to safely protect and operate the network. The communications network carries data for substations at every voltage level including the 330kV and 500kV and a prolonged network failure carries a significant risk of impacting generation, load to customers and market operations. It is estimated that 16 hours will be required to recover any loss of load after an unplanned outage once spares become exhausted. The risk costs are based on 2015/16 probabilities of failure taken as a trend of existing defect rates of the assessed assets derived from the condition assessment. These probabilities are forecast to remain steady; however, the consequence of failure is forecast to increase as TransGrid's ability to monitor and recover from asset failures becomes compromised.

In addressing the condition of the SDH equipment, the opportunity also exists to redesign the architecture of the telecommunications network to utilise current technology that is native for Ethernet protocols, to further leverage TransGrid's investment in optical fibre and to align the communications network with the projected future requirements for data transfer with the deployment of IEC61850 across the high voltage system.

3. Related needs/opportunities

Nil

4. Recommendation

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

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: SDH Equipment

Option Name: 1365 - Base Case

Option Assessment Name: 1365 - 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)
ADR155C	70	Protection	Unplanned Outage - HV (ADR155C)	\$0.09	Failure	\$6.44	5.30%	\$0.34	\$0.10	\$0.24	\$0.00	\$0.00	\$0.00	\$0.00
ADR2500	86	Protection	Unplanned Outage - HV (ADR2500)	\$0.09	Failure	\$7.92	3.40%	\$0.27	\$0.08	\$0.19	\$0.00	\$0.00	\$0.00	\$0.00
FMX-12	198	Protection	Unplanned Outage - HV (FMX-12)	\$0.09	Failure	\$18.23	6.10%	\$1.11	\$0.34	\$0.78	\$0.00	\$0.00	\$0.00	\$0.00
								\$0.28	\$0.52	\$1.20	\$1.72	\$0.52	\$1.20	\$0.00

Total VCR Risk: \$0.24 Total ENS Risk: \$0.00