

NEED/OPPORTUNITY STATEMENT (NOS)



Substation Lighting Replacement

NOS- 000000001455 revision 2.0

Ellipse project no.: P0008475

TRIM file: [TRIM No]

Project reason: Capability - Improved Asset Management

Project category: Prescribed - Security/Compliance

Approvals

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Date submitted for approval	29 November 2016	

Change history

Revision	Date	Amendment
0	13 May 2016	Initial issue
1	29 November 2016	Update to format

1. Background

TransGrid is subject to security risks emanating from a number of threat sources, all with variable likelihood and consequences. Incidents may range from unauthorised access, vandalism and criminal acts through to sabotage and terrorist acts. It is an inherent obligation of owners and operators of critical infrastructure to effectively manage the security risks to its assets under their control.

The Work Health and Safety (WHS) Regulation 2011 considers TransGrid as a PCBU (person conducting a business or undertaking) and imposes multiple obligations on it in managing risk to the health and safety¹. This regulation is based on The Work Health and Safety (WHS) Act 2011 and is considered legally binding.

Under the WHS Regulation, TransGrid as a PCBU has an obligation to ensure that the risk to the health and safety of its workers and members of the public is managed So Far As Is Reasonably Practicable (SFAIRP). This implies that TransGrid must:

- > Identify all reasonably foreseeable risks to the health and safety of its workers and members of the public
- > Identify all control measures which eliminate or minimise the risks
- > Then decide which of the controls are 'reasonably practicable' to be implemented.
- > This 'reasonableness of acting' infers that cost solely by itself is unlikely to be a sufficient justification in the court of law for not implementing or lowering a control measure unless the cost is grossly disproportionate to the risk.

TransGrid's Network Security Standard (TRIM No: D2004/2634, Rev 3) outlines the minimum standard for security at TransGrid network sites and Regional Centres/Depots². The Network Security Standard is based heavily on "National Guidelines for Prevention of Unauthorised Access to Electricity Infrastructure" (ENA DOC 015-2006). This is a guideline produced by Energy Network Association to be used as a tool that promotes an understanding of safety and security issues and outlines a number of control measures in order to achieve protection against security threats and public safety incidents around electricity infrastructure. While adopting the ENA guideline, the Network Security Standard remains mindful that the imposed health and safety obligations by the WHS Regulation are covered reasonably by it.

Network Security Standard performs site specific security risk assessment for all of TransGrid's substation sites. The risk assessment results into categorisation of each substation sites into "low", "medium", "high" or "critical" risk groupings. The standard then mandates the minimum security treatment required at each sites belonging to these risk groupings.

TransGrid substation sites have multiple security controls/treatments currently in place which include [REDACTED]

2. Need/opportunity

Movement activated lighting is designed to switch on the light circuits when it detects an encroachment to the perimeter fence. It is designed to work [REDACTED]

¹ *Work Health and Safety Regulation 2011, part 3.1*. New South Wales. Available at: <http://www.legislation.nsw.gov.au/maintop/view/inforce/subordleg+674+2011+cd+0+N>. [Accessed 20 January 16].

² TransGrid Network Security Standard, Rev 3, Section 5.6.

[REDACTED] This also assists the CCTV camera system to achieve clear recording via providing sufficient lighting.

A gap analysis of TransGrid's existing substation sites against the Network Security Standard has revealed that:

- > [REDACTED]
- > [REDACTED] unauthorised entry to a substation site can potentially lead to the following consequences:
 - Safety incident such as, personal injury or fatality arising from electrocution, electric shock or arc burns. On 15 June 2001, a 12-year-old boy was electrocuted when he came into contact with live bus bars and died as a result after he has entered into Ausgrid Cronulla Substation³.
 - Trip of substation equipment(s) resulting from a safety incident or unauthorised operation of equipment. It may cause interruption of electricity supply to the customers. On 31 August 2006, an intruder gained entry through a hole in the switchyard perimeter fence at Ingleburn substation and operated a 330kV circuit breaker based on TransGrid Incident Notification System (INS) report.
 - The risk cost is \$0.47m per annum if nothing is done at 10 substation sites with regards to installing movement activated lighting (see Attachment 1).
- > Due to inadequate substation lighting, TransGrid's employees and its contractors are exposed to an elevated level of safety risk (slips, trips and falls). It is expected that investing in installing movement activated and upgrading of substation lighting would reduce the risk of safety incidents by \$3k per year across 10 substation sites (see Attachment 2 for list of sites).
- > Potential pairing with projects to upgrade existing lighting at substations can improve the cost effectiveness of installation of movement activated lighting at the substation sites.

3. Related needs/opportunities

Some of the substation rebuild projects include the security treatment movement activated lighting as part of their scope of work however some of these did not. Potential pairing with projects to upgrade existing lighting system at substations can improve the cost effectiveness. Table 1 shows the substation rebuild project with related need:

Table 1 - Related Needs

Need Name	Need No.	Comments
Vales Point 330/132 Substation Rebuild	DCN231	Excludes movement activated lighting
Canberra Substation Rebuild	DCN238	Includes Movement Activated Lighting
Munmorah 330kV Substation Condition	DCN269	Excludes movement activated lighting
Newcastle Substation Condition	DCN74	Excludes movement activated lighting
Orange 132/66kV Substation Rebuild	DCN208	Includes Movement Activated Lighting

³ [www.smh.com.au. 2003. Electrocuted boy invited friends to play in cubby he built next to substation.](http://www.smh.com.au/articles/2003/02/24/1046063962028.html) [ONLINE] Available at: <http://www.smh.com.au/articles/2003/02/24/1046063962028.html>. [Accessed 20 January 16].

Need Name	Need No.	Comments
Yanco 132kV Substation Rebuild	DCN138	Excludes movement activated lighting
Forbes Substation Condition	DCN196	Excludes movement activated lighting
Burrinjuck 132/11 Substation Rebuild	DCN128	Excludes movement activated lighting

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: Substation Lighting Replacement

Option Name: 1455 - Base Case

Option Assessment Name: 1455 - 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 (Vr 1)	Total Risk (\$M)	Risk (\$M) (Rel)	Risk (\$M) (Op)	Risk (\$M) (Fin)	Risk (\$M) (Peo)	Risk (\$M) (Env)	Risk (\$M) (Rep)
Movement Activated Lighting	10	Detection	Unauthorized Entry (Movement Activated Lighting)	\$0.05	Failure	\$0.47	100.00%	\$0.47	\$0.08	\$0.08	\$0.20	\$0.20		\$0.00
				\$0.05		\$0.47		\$0.47	\$0.08	\$0.08	\$0.20	\$0.20		\$0.00

The following assumptions are considered to identify the risk cost using Risk Tool Analysis:

> Probability of Failure (POF):

- Probability of failure of movement activated lighting per year is assumed [REDACTED] used in base case. No data is available to determine the failure rate of movement activated lighting system as this will be the first instance of the system in TransGrid network

> Consequences:

- Personal Injury: The likelihood of consequence (LoC) for personal injury [REDACTED] based on rate of unauthorised entry in TransGrid substation sites.
- Repair cost (Criminal damage): It is considered that damage to TransGrid asset caused by intruder would cost \$20k per annum in corrective repair.
- Service Interruption: The LoC for service interruption (electricity) is assumed to be [REDACTED] This is based on the fact that both a high voltage electrocution/arc flash and an unauthorised operation of equipment by an intruder will cause a service interruption.
- Other: Compensation cost of \$1.5k for each site per year due to safety incident is included based on TransGrid safety incident statistics.

Attachment 2 - List of substation sites

Table 2 lists the substation sites identified for substation lighting replacement:

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