Investment Evaluation Summary (IES)

Project Details:

Project Name:	Address Safety and Environmental issues at HV Regulator Sites
Project ID:	00510
Thread:	HV Regulators
CAPEX/OPEX:	CAPEX
Service Classification:	Standard Control
Scope Type:	A
Work Category Code:	SIREG
Work Category Description:	Safety and Environmental Issues in Regulators
Preferred Option Description:	Option 1: Relocate regulator site to address proximity issues, and/or replace regulator(s) (and site) to address risks present due to deteriorating condition. Replace ground mounted regulator sites with a new fully compliant site consisting of 2x or 3x single phase regulators (Cooper Regulator or equivalent), unless the site needs relocating to address proximity issues. Advantages • Addresses safety issues Disadvantages • CAPEX required This is the only option to reduce the business risks to a manageable level.
Preferred Option Estimate (Nominal Dollars):	$1,750,000

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Unit ($)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Volume	1	0	1	0	1	0	1	0	1	0
Estimate ($)										
Total ($)	$350,000	$0	$350,000	$0	$350,000	$0	$350,000	$0	$350,000	$0

Governance:

Project Initiator:	James Goodger	**Date:**	20/03/2015
Thread Approved:	David Ellis	**Date:**	02/11/2015
Project Approver:	David Ellis	**Date:**	02/11/2015

Document Details:

Version Number:	1

Related Documents:

Description	URL
Address Safety and Environmental issues at HV Regulator Sites - IES	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/High%20Voltage%20Regulators/DRAFT%20IES%20SIREG%20Address%20Safety%20and%20Environmental%20Issues%20at%20HV%20Regulator%20Sites.docx

Section 1 (Gated Investment Step 1)

1. Background

High voltage (HV) regulators are installed at various locations along high voltage feeders to maintain voltage levels within the distribution network to industry acceptable standards.

HV regulators are generally located on rural 11 kV and 22 kV feeders according to the load and length of these feeders, with several installed in rural zone substations to provide on load tapping.

HV regulators can be split into two groups:

- Single phase units - usually pole mounted in an open-delta configuration (two tanks), but may also be ground mounted; and
- Three phase units - typically older units that are ground mounted within a fenced enclosure.

There are 83 high voltage regulator sites on the distribution network, with install dates ranging from 1966 to 2015.

1.1 Investment Need

High voltage (HV) regulators are installed at various locations along high voltage feeders to maintain voltage levels within the distribution network to industry acceptable standards.

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1. **Investment Need**

Many units will be approaching 50 years of age at the conclusion of the upcoming 10 year

period as can be seen in Figure 2, and it is both expected, and prudent to plan for their replacement, the condition of these assets will further deteriorate to the point where major asset or component replacements are necessary. It is forecast that one unit will be replaced every 2 years at a cost of $350k each.

Figure 1: HV regulator installed adjacent to tidal flood plain

1.2 Customer Needs or Impact

TasNetworks continues to undertake a consumer engagement as part of business as usual and through the voice of the customer program. This engagement seeks in depth feedback on specific issues relating to:

• how it prices impact on its services

• current and future consumer energy use

• outage experiences (frequency and duration) and expectations

• communication expectations

• STPIS expectations (reliability standards and incentive payments)

• Increase understanding of the electricity industry and TasNetworks

Consumers have identified safety, restoration of faults/emergencies and supply reliability as the highest performing services offered by TasNetworks.

Consumers also identified that into the future they believe that affordability, green, communicative, innovative, efficient and reliable services must be provided by TasNetworks.

This project specifically addresses the requirements of consumers in the areas of;

• safety, restoration of faults/emergencies and supply reliability

• affordability, green, communicative, innovative, efficient and reliable services

Customers will continue to be consulted through routine TasNetworks processes, including the Voice of the customer program, the Annual Planning Review and ongoing regular customer liaison meetings.

1.3 Regulatory Considerations

This project is required to achieve the following capital and operational expenditure objectives as described by the National Electricity Rules section 6.5.7(a) and 6.5.6(a).

6.5.7 (a) Forecast capital expenditure:

(1) meet or manage the expected demand for standard control services over that period;

(2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;

(3) to the extent that there is no applicable regulatory obligation or requirement in relation to:

(i) the quality, reliability or security of supply of standard control services; or

(ii) the reliability or security of the distribution system through the supply of standard control services, to the relevant extent:

(iii) maintain the quality, reliability and security of supply of standard control services; and

(iv) maintain the reliability and security of the distribution system through the supply of standard control services; and

(4) maintain the safety of the distribution system through the supply of standard control services.

2. Project Objectives

Address safety and environmental issues at HV regulator sites.

3. Strategic Alignment

3.1 Business Objectives

Strategic and operational performance objectives relevant to this project are derived from TasNetworks 2014 Corporate Plan, approved by the board in 2014. This project is relevant to the following areas of the corporate plan:

• We understand our customers by making them central to all we do.

• We enable our people to deliver value.

• We care for our assets, delivering safe and reliable networks services while transforming our business.

3.2 Business Initiatives

The business initiatives that relate to this project are as follows:

• Safety of our people and the community, while reliably providing network services, is fundamental to the TasNetworks business and remains our immediate priority

• We care for our assets to ensure they deliver safe and reliable network services

• We will transform our business with a focus on:

- an appropriate approach to the management and allocation of risk

- a well run, efficient business, that delivers sustainable returns to the Tasmanian community and is resilient to future challenges.

The strategic key performance indicators that will be impacted through undertaking this project are as follows:

• Price for customers – lowest sustainable prices

• Zero harm – significant and reportable incidents

• Network service performance – outcomes under service target performance incentive schemes

• Sustainable cost reduction – efficient operating and capital expenditure

4. Current Risk Evaluation

If TasNetworks does not address the safety risks associated with some HV regulators there is potential for serious safety concerns that may lead to serious injury or fatality.

The business risk associated with these assets has been evaluated using the TasNetworks risk framework.

4.1 5x5 Risk Matrix

TasNetworks business risks are analysed utilising the 5x5 corporate risk matrix, as outlined in TasNetworks Risk Management Framework.

Relevant strategic business risk factors that apply are follows:

Risk Category	Risk	Likelihood	Consequence	Risk Rating
Environment and Community	Oil leaking into a high risk unbunded regulator site (i.e. near a waterway, road or other sensitive area)	Possible	Moderate	Medium
Safety and People	Vehicle coming into contact with a regulator site at high speed (i.e. site right on the edge of a highway).	Unlikely	Major	Medium
Safety and People	Fatality or flashover risk due to Inappropriate clearances, hazard to operators and personnel on site.	Rare	Severe	Medium

Section 1 Approvals (Gated Investment Step 1)

Project Initiator:	James Goodger	**Date:**	20/03/2015
Line Manager:		**Date:**	
Manager (Network Projects) or Group/Business Manager (Non-network projects):		**Date:**	
[Send this signed and endorsed summary to the Capital Works Program Coordinator.]			

Actions			
CWP Project Manager commenced initiation:		**Assigned CW Project Manager:**	
PI notified project initiation commenced:		**Actioned by:**	

Section 2 (Gated Investment Step 2)

5. Preferred Option:

Replace ground mounted regulator sites with a new fully compliant site consisting of 2x or 3x single phase regulators (Cooper Regulator or equivalent).

5.1 Scope

This program allows for replacement of HV regulator and site components, which are deemed an environmental or safety risk. These include:

- Oil leakages into sensitive areas
- Close proximity to vehicle accident prone areas
- Low clearance sections which pose the threat of flashover to the public

1 site will be replaced nominally every two years.

5.2 Expected outcomes and benefits

TasNetworks has 34 ground mounted regulator sites with install dates ranging from 1966 to 1999. Many of these sites do not have adequate oil containment in accordance with the requirements of AS2067 and AS1940.

Sites have been risk assessed taking into account a number of possible factors, including inadequate HV clearances, bunding, proximity to waterways or roadways, condition of the site and assets, layout (whether at least 2 escape gates exist), and bushfire risk.

This program has historically addressed many of the very high risk sites, and the remaining population is assessed on a year to year basis to ensure risks are not accelerating to due deteriorating condition. For example, oil leaking at unbunded sites due to accelerated rust issues. Where risk assessment deems replacement is prudent, sites will be replaced.

This program will also address newer sites (installed in the past 10 years) which have been installed at very close proximity to busy motorways, with the intent of relocating them further from the road.

5.3 Regulatory Test

Not applicable.

6. Options Analysis

6.1 Option Summary

Option description	
Option 0	Option 0: Do Nothing The HV regulators posing serious safety risks will remain as they are. Advantages • Lowest cost Disadvantages • Does not rectify safety issues This option does not address the risks previously identified in Section 4.
Option 1 (preferred)	Option 1: Relocate regulator site to address proximity issues, and/or replace regulator(s) (and site) to address risks present due to deteriorating condition. Replace ground mounted regulator sites with a new fully compliant site consisting of 2x or 3x single phase regulators (Cooper Regulator or equivalent), unless the site needs relocating to address proximity issues. Advantages • Addresses safety issues Disadvantages • CAPEX required This is the only option to reduce the business risks to a manageable level.
Option 2	Option 2: Address environmental and safety issues through minor remedial actions

	Address environmental and safety issues through minor remedial actions which include repairing leaks, installation of insulated droppers, installation of temporary bunding Advantages • Addresses safety issues due to oil leakage and flashovers • Cost effective Disadvantages • Does not address proximity safety issue • CAPEX required This is the lowest cost option that reduces business risks.

6.2 Summary of Drivers

Option		
Option 0	Reduce the possibility of oil leaking into an unbunded area	No
	Reduce the possibility of vehicle proximity related incident	No
	Reduce the likelihood of fatality or flashover risk due to inappropriate clearances	No
Option 1 (preferred)	Reduce the possibility of oil leaking into an unbunded area	Yes
	Reduce the possibility of vehicle proximity related incident	Yes
	Reduce the likelihood of fatality or flashover risk due to inappropriate clearances	Yes
Option 2	Reduce the possibility of oil leaking into an unbunded area	Yes
	Reduce the possibility of vehicle proximity related incident	No
	Reduce the likelihood of fatality or flashover risk due to inappropriate clearances	Yes

6.3 Summary of Costs

Option	Total Cost ($)
Option 0	$0
Option 1 (preferred)	$1,750,000
Option 2	$300,000

6.4 Summary of Risk

Option 0: Do nothing

Oil leakage and bunding associated risks will remain at 'High'; the risk will increase with time as condition worsens. Vehicle proximity risks will remain at 'High'. Safety risks due to inappropriate clearances will remain at 'Low'.

Option 1: Relocate regulator site to address proximity issues, and/or replace regulator(s) (and site) to address risks present due to deteriorating condition. [Preferred Option]

All fore mentioned risks will decrease to 'Low'.

Option 2: Address environmental and safety issues through minor remedial actions

Oil leakage and bunding associated risks will be decreased to 'Medium' as the likelihood of a temporary bund failing to hold an oil leak could occur in years to decades of installation. Vehicle proximity risks will remain at 'High'. Safety risks due to inappropriate clearances will be remain at 'Low' economic analysis.

6.5 Economic analysis

Option	Description	NPV
Option 0	Option 0: Do Nothing The HV regulators posing serious safety risks will remain as they are. Advantages • Lowest cost Disadvantages • Does not rectify safety issues This option does not address the risks previously identified in Section 4.	$0
Option 1 (preferred)	Option 1: Relocate regulator site to address proximity issues, and/or replace regulator(s) (and site) to address risks present due to deteriorating condition.	$0

	Replace ground mounted regulator sites with a new fully compliant site consisting of 2x or 3x single phase regulators (Cooper Regulator or equivalent), unless the site needs relocating to address proximity issues. Advantages • Addresses safety issues Disadvantages • CAPEX required This is the only option to reduce the business risks to a manageable level.	
Option 2	Option 2: Address environmental and safety issues through minor remedial actions Address environmental and safety issues through minor remedial actions which include repairing leaks, installation of insulated droppers, installation of temporary bunding Advantages • Addresses safety issues due to oil leakage and flashovers • Cost effective Disadvantages • Does not address proximity safety issue • CAPEX required This is the lowest cost option that reduces business risks.	$0

6.5.1 Quantitative Risk Analysis

Not applicable.

6.5.2 Benchmarking

Not applicable.

6.5.3 Expert findings

Not applicable.

6.5.4 Assumptions

One site will be addressed every two years.

Section 2 Approvals (Gated Investment Step 2)

Project Initiator:	James Goodger	**Date:**	20/03/2015
Project Manager:		**Date:**	

Actions			
Submitted for CIRT review:		**Actioned by:**	
CIRT outcome:			