

Investment Evaluation Summary (IES)



Project Details:

Project Name:	Replace Regulator Ground Mtd Three Phase - Faults / Issues / End of life
Project ID:	00637
Thread:	HV Regulators
CAPEX/OPEX:	CAPEX
Service Classification:	Standard Control
Scope Type:	D
Work Category Code:	REGMR
Work Category Description:	Replace Regulator Ground Mtd Three Phase
Preferred Option Description:	Option 1: Replace Regulators [Preferred Option]
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:	25/03/2015
Thread Approved:	David Ellis	Date:	02/11/2015
Project Approver:	David Ellis	Date:	02/11/2015

Document Details:

Version Number:	1
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Related Documents:

Description	URL
NPV	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/High%20Voltage%20Regulators/HV%20regulator%20NPV.xlsm

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 34 ground mounted regulator sites on the distribution network, with install dates ranging from 1966 to 1999.



Figure 1 - Typical ground mounted regulator

1.1 Investment Need

Many of the units will be approaching 50 years of age at the conclusion of the upcoming 10 year period. Even though routine maintenance is undertaken it is expected that the condition of these assets will further deteriorate to the point where major asset or component replacements will be necessary. It is forecast that one unit will require replacement every two years at a cost of \$350k.

Three phase volatge regulator age profile at 2017/18

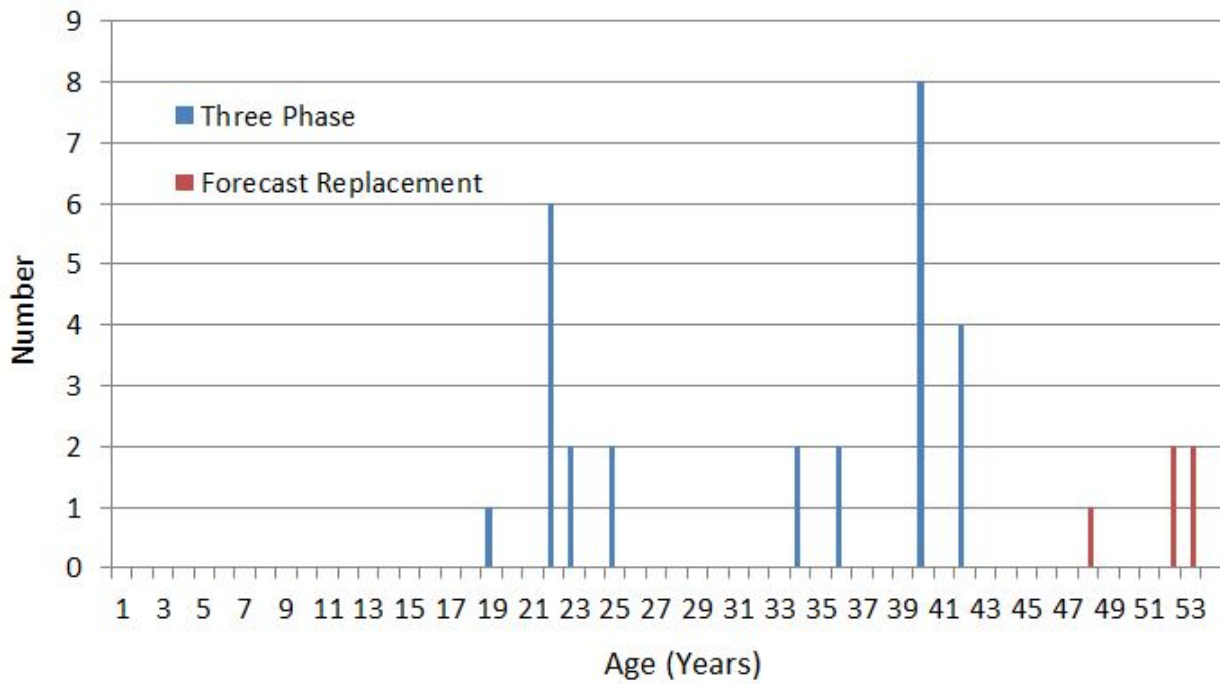


Figure 2 - Projected forecast replacement of three phase ground mounted regulators at the end of the 10 year period with 5 replacements [Preferred option]

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

To provide major (life extending) repair or replacement of ground mounted HV regulators and site components.

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 proactively replace HV regulators when the assets are showing signs of poor health there will be a decrease in network performance. The performance decrease will be due to unacceptably low voltages downstream of failed regulators and disruption to customers.

The business risk associated with these assets has been evaluated by using the TasNetworks Risk Framework..

The level of risk identified was such that a treatment plan is required to reduce the risk down to a manageable level.

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
Customer	Regulator failure or equivalent asset issue may result in significant customer disruption, in terms of voltage compliance, downstream of the regulator.	Possible	Moderate	Medium
Network Performance	Regulator failure or equivalent asset issue may result in significant customer disruption, in terms of voltage compliance,	Possible	Moderate	Medium

downstream of the regulator.

Section 1 Approvals (Gated Investment Step 1)

Project Initiator:	James Goodger	Date:	25/03/2015
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:

The preferred solution is to replace major site components or HV regulators when approaching end of life or showing signs of failure.

5.1 Scope

This program allows for replacement of HV regulator and site components such as AVRs, tap changer repairs or civil works, as required by condition assessment. It only covers sites which contain ground mounted three phase (single tank) regulators.

It also allows for the replacement of HV regulators because they have reached end of life or failure.

5.2 Expected outcomes and benefits

TasNetworks has 34 ground mounted regulator sites with install dates ranging from 1966 to 1999. Many units will be approaching 50 years of age at the conclusion of the upcoming 10 year period, and it is both expected, and prudent to plan for such, that the condition of these assets will further deteriorate to the point where major asset or component replacements are necessary. The expected outcomes from the preferred option is a reduction of the identified risks, being safety, environmental and network performance. Proactive replacement of regulators when identified as poor condition will reduce the likelihood of failure modes that present a negative or dangerous impact to personnel or the public.

5.3 Regulatory Test

Not applicable.

6. Options Analysis

6.1 Option Summary

Option description	
Option 0	Option 0: Do Nothing
Option 1 (preferred)	Option 1: Replace Regulators [Preferred Option]

6.2 Summary of Drivers

Option	
Option 0	Does not address the risk to power quality / customer impact The regulators would run to failure and be replaced under fault.

	<p>Advantages:</p> <ul style="list-style-type: none"> • Deferral of CAPEX • Lowest cost solution <p>Disadvantages:</p> <ul style="list-style-type: none"> • Supply issues downstream from failures • Voltage drops downstream from failures • Increase in OPEX <p>This option does not address the risks previously identified in Section 4.</p>
Option 1 (preferred)	<p>Replace regulators when reaching end of life and are showing signs of poor condition/signs of failure</p> <p>Ensure regulator site continues to be serviceable and does not present an unacceptable risk of failure (power quality / customer impact).</p> <p>Advantages:</p> <ul style="list-style-type: none"> • Less unplanned failures • Maintain system performance <p>Disadvantages:</p> <ul style="list-style-type: none"> • CAPEX required <p>This is the lowest cost option to reduce the business risks to a manageable level.</p>

6.3 Summary of Costs

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

6.4 Summary of Risk

Option 0: Do Nothing

Customer and performance risks will remain at 'Medium', but will increase with time as the regulators condition deteriorates.

Option 1: Replace HV regulator site or major components.

Customer and performance risks will remain constant at a 'Medium' risk.

6.5 Economic analysis

Option	Description	NPV
Option 0	Option 0: Do Nothing	\$0
Option 1 (preferred)	Option 1: Replace Regulators [Preferred Option]	\$3,651,181

6.5.1 Quantitative Risk Analysis

Not applicable.

6.5.2 Benchmarking

Planned asset replacement to prevent significant customer disruption and noncompliance with regard to power quality is a strategy that has also been adopted by other utilities across Australia.

6.5.3 Expert findings

Not applicable.

6.5.4 Assumptions

That the only regulators requiring replacement prior to the end of the 20525/26 financial year will be the oldest 5 until.

It is assumed that the oldest 5 units will also be the ones in the poorest condition.

Section 2 Approvals (Gated Investment Step 2)

Project Initiator:	James Goodger	Date:	25/03/2015
Project Manager:		Date:	

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