Investment Evaluation Summary (IES)

Project Details:

Project Name:	SCADA communications to ground-mounted regulators
Project ID:	00388
Thread:	Protection and Control
CAPEX/OPEX:	CAPEX
Service Classification:	Standard Control
Scope Type:	A
Work Category Code:	PRCOO
Work Category Description:	Install HV Fdr Control, DA & Comms Cooper Regs
Preferred Option Description:	Option 1: Install SCADA to 40% of ground-mounted regulators. Advantages: provides situational awareness under a range of contingency scenarios, provides unsolicited messaging in real time, improves data capability – loading and power quality information at remote feeder ends, as well as live asset condition data (valuable when assets reach their end-of-life), reduces OPEX associated with load checks in the field, reduces OPEX associated with field operations under contingencies, reducing customer disturbances. Disadvantages: additional capital cost in comparison with Option 2.
Preferred Option Estimate (Nominal Dollars):	$360,000

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
Unit ($)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Volume	1	1	1	1	1	1	1	1
Estimate ($)								
Total ($)	$45,000	$45,000	$45,000	$45,000	$45,000	$45,000	$45,000	$45,000

Governance:

Project Initiator:	Tim Sutton	**Date:**	11/03/2015
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
IES	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/Protection%20and%20Control/PRCOO%20SCADA%20Communications%20to%20Ground-Mounted%20Regulators.docx
NPV	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/Protection%20and%20Control/NPV%20PRCOO.xlsm

Section 1 (Gated Investment Step 1)

1. Background

TasNetworks' (TN) has a fleet of 32 ground-mounted (GM) voltage regulators in its distribution network. These devices are used to keep voltage levels at the remote ends of feeders within defined limits.

They are also used under both transmission and distribution contingency scenarios to facilitate load transfers. Under these circumstances Network Operations would benefit greatly by having remote visibility of GM regulator loading conditions in real time to ensure that contingencies are handled correctly. Furthermore, models suggest that significant OPEX savings could be realised by having remote motoring of voltage regulators, to obviate the need for regular "load checks" (including operations count, max/min tap position and a visual inspection).

This can be achieved by installing a modern Automatic Voltage Relay (AVR) in the voltage regulator, along with associated communications hardware such as a modem, power supply, aerial, and cabling to facilitate SCADA communications with the Master Station.

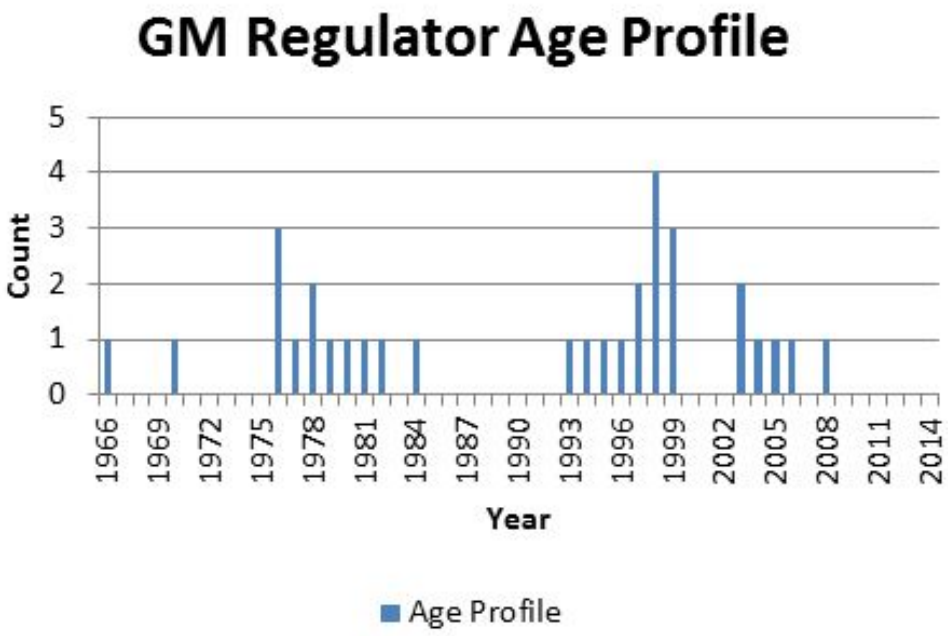

Figure 1: Age profile

1.1 Investment Need

Funding is requested to provide SCADA communications to a portion of TN's GM voltage regulator fleet for the following reasons:

- Provides situational awareness under a range of contingency scenarios;
- Provides unsolicited messaging in real time in the case of a regulator fault;

- Improves data capability – loading and power quality information at remote feeder ends, as well as live asset condition data (invaluable when assets reach their end-of-life);
- Reduces OPEX funding associated with load checks in the field; and
- Reduces OPEX associated with field operations under contingencies, reducing customer disturbances.

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); and
- 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.

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

2. Project Objectives

To provide SCADA communications to a portion of TN's GM voltage regulator fleet to improve asset management practices, reduce customer disruption times and assist with network operations.

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.

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.
- Sustainable cost reduction – efficient operating and capital expenditure.

4. Current Risk Evaluation

Do nothing is not an acceptable option to TN's risk appetite. The level of risk identified is such that a treatment plan is required to reduce the risks to a tolerable level, in line with TasNetworks' Risk Management 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
Customer	Outage effects on customer	Possible	Moderate	Medium
Environment and Community	Environmental damage	Unlikely	Major	Medium
Financial	Penalties resulting from reliability events	Possible	Minor	Low
Network Performance	Damage to plant and equipment	Unlikely	Minor	Low
Regulatory Compliance	Penalties resulting from reliability events in the high/low density areas	Possible	Minor	Low
Reputation	Outage effects on customer	Unlikely	Moderate	Medium
Safety and People	Damage to personnel and/or the general public	Unlikely	Moderate	Medium

Section 1 Approvals (Gated Investment Step 1)

Project Initiator:	Tim Sutton	**Date:**	11/03/2015
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 option is to provide SCADA communications to 40% of the ground-mounted regulator fleet.

5.1 Scope

Introduce new AVR and associated SCADA communications hardware to approximately 13 sites over a 7-year period.

5.2 Expected outcomes and benefits

Funding is requested to provide SCADA communications to a portion of TN's GM voltage regulator fleet for the following reasons:

- Provides situational awareness under a range of contingency scenarios.
- Provides unsolicited messaging in real time in the case of a regulator fault.
- Improves data capability – loading and power quality information at remote feeder ends, as well as live asset condition data (invaluable when assets reach their end-of-life).
- Reduces OPEX funding associated with load checks in the field.
- Reduces OPEX associated with field operations under contingencies, reducing customer disturbances.

5.3 Regulatory Test

Not applicable.

6. Options Analysis

6.1 Option Summary

Option description	
Option 0	Option 0: Do nothing – continue with existing maintenance regime involving load checks. Advantages: no new secondary equipment to introduce to the distribution network. Disadvantages: greater (negative) NPV over ten year period, lack of visibility under contingency scenarios, lack of asset condition data for this asset class.
Option 1 (preferred)	Option 1: Install SCADA to 40% of ground-mounted regulators.

	Advantages: provides situational awareness under a range of contingency scenarios, provides unsolicited messaging in real time, improves data capability – loading and power quality information at remote feeder ends, as well as live asset condition data (valuable when assets reach their end-of-life), reduces OPEX associated with load checks in the field, reduces OPEX associated with field operations under contingencies, reducing customer disturbances. Disadvantages: additional capital cost in comparison with Option 2.
Option 2	Option 2: Install SCADA to 20% of ground-mounted regulators. Advantages: Option 1 but with 20% SCADA communications – advantages are lessened, lowest sustainable cost. Disadvantages: customer disturbance durations more likely than Option 1, less visibility of the fleet.

6.2 Summary of Drivers

Option	
Option 0	OPEX reduction - does not address. Minimise customer disruption - does not address. Improves asset management capability - does not address.
Option 1 (preferred)	OPEX reduction - addresses. Minimise customer disruption - addresses. Improves asset management capability - addresses.
Option 2	OPEX reduction - partially addresses. Minimise customer disruption - partially addresses. Improves asset management capability - partially addresses.

6.3 Summary of Costs

Option	**Total Cost ($)**
Option 0	$0
Option 1 (preferred)	$360,000
Option 2	$315,000

6.4 Summary of Risk

This section outlines an overall *residual* asset risk level, for each of the options.

Option	Risk Assessment
Option 0	Medium
Option 1 (preferred)	Low
Option 2	Medium

6.5 Economic analysis

Option	Description	NPV
Option 0	Option 0: Do nothing – continue with existing maintenance regime involving load checks. Advantages: no new secondary equipment to introduce to the distribution network. Disadvantages: greater (negative) NPV over ten year period, lack of visibility under contingency scenarios, lack of asset condition data for this asset class.	$0
Option 1 (preferred)	Option 1: Install SCADA to 40% of ground-mounted regulators. Advantages: provides situational awareness under a range of contingency scenarios, provides unsolicited messaging in real time, improves data capability – loading and power quality information at remote feeder ends, as well as live asset condition data (valuable when assets reach their end-of-life), reduces OPEX associated with load checks in the field, reduces OPEX associated with field operations under contingencies, reducing customer disturbances. Disadvantages: additional capital cost in comparison with Option 2.	-$1,097,221
Option 2	Option 2: Install SCADA to 20% of ground-mounted regulators. Advantages: Option 1 but with 20% SCADA communications – advantages are lessened, lowest sustainable cost. Disadvantages: customer disturbance durations more likely than Option 1, less visibility of the fleet.	-$1,162,451

6.5.1 Quantitative Risk Analysis

Not applicable.

6.5.2 Benchmarking

Similar strategies have been adopted by mainland utilities for their regulatory submissions.

6.5.3 Expert findings

Not applicable.

6.5.4 Assumptions

- All costs are in 2014/15 dollars; and
- NPV includes OPEX to account for OPEX/CAPEX tradeoff.

Section 2 Approvals (Gated Investment Step 2)

Project Initiator:	Tim Sutton	**Date:**	11/03/2015
Project Manager:		**Date:**	

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