Business Case – Capital Expenditure

Battery Charger Upgrades

Business Case Number BC212 AA23-27

1 Project Approvals

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

Updated By	Adam Newbury	Asset Lifecycle Specialist, Asset Management
Costed By	Prasoon Premachandran	Victorian Team Lead Project Delivery, Engineering & Planning
Reviewed By	Adam Newbury	Asset Lifecycle Specialist, Asset Management
Approved By	Daniel Tucci	Victorian Asset Manager, Asset Management

2 Project Overview

Project resubmitted – ongoing program of work

TABLE 2: BUSINESS CASE – PROJECT OVERVIEW

Description of Issue/Project	Battery Charger replacement for backup power control for the following stations:	
	Replaced • Longford • Pakenham • Iona • Wollert CS & CG • Brooklyn CS & CG • Gooding CS	CY23-CY27 • Springhurst CS • Euroa CS • Winchelsea CS • Wandong PRS • Newport
Options Considered	The following options have been considered: Option 1: Do Nothing Option Option 2: Replace battery charging systems	
Estimated Cost	$1,000,000	
Relevant Standard		
Consistency with the National Gas Rules (NGR)	The replacement of these assets complies with the new capital expenditure criteria in Rule 79 of the NGR because: • it is necessary to maintain and improve the safety of services and maintain the integrity of services (Rules 79(2)(c)(i) and (ii)); and • it is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (Rule 79(1)(a)).	

Key Stakeholders	Stakeholders affected by this project are: • Gas Market • Landowners • Energy Safe Victoria • AEMO
Benefits to Customers and Consumers	Battery charges will enable safe and efficient performance during electricity power outages. This maintains reliability of supply for customers and consumers during electrical power outages.

3 Background and Project Need

Stations with control functionality require electricity to operate safely and efficiently. This power supply is provided from 24VC battery banks which are maintained in a fully charged state by battery chargers. This enables safe and efficient performance during intermittent electricity provider shutdowns.

The batteries are maintained by operations personnel and monitored by battery chargers so as to provide a reliable and fully charged supply of DC power for the station control and safety systems. Total failure of battery chargers may result in shutdown of the station control and monitoring systems even though mains electricity may still be available. Alternatively, the batteries will not be able to supply backup power when required as they are not charged sufficiently.

The fleets of battery chargers within the VTS are in various levels of integrity and age, refer to the table in section 5.3.2. In addition the older models have less intrinsic redundancy than the newer designs available.

The batteries themselves usually require replacement more frequently than battery chargers. Typical replacement rates for batteries are 8 to 10 years and 20+ years for battery chargers.

There is a need maintain battery charges to prevent failures that could result in a loss of system capacity.

4 Risk Assessment

TABLE 3: RISK RATING

Risk Area	Risk Level
Health and Safety	**Moderate**
Environment	**Low**
Operational	**Moderate**
Customers	**Moderate**
Reputation	**Low**
Compliance	**Low**
Financial	**Low**
Final Untreated Risk Rating	**Moderate**

The effect of a failed battery charger can lead to the following:

1. Possible explosion of batteries or loss of chemical contents that could harm maintenance staff.
2. Loss of control and monitoring of the site, potentially leading to a failure to supply incident, failure to measure critical metering information such as gas pressure, flow, quality etc.

5 Options Considered

TABLE 4: SUMMARY

Option	Benefits (Risk Reduction)	Costs
Option 1	Do Nothing	Cost is loss of system security and is not quantifiable
Option 2	Replace superseded charger designs	$1,000,000

5.1 Option 1 – Do Nothing

The Do Nothing option is to wait for battery charger failure. The result of failure will result in loss of monitoring and control of the affected site and possible loss of supply to customers and parts of the Victorian Gas Transmission Network. The affect will last until replacement battery chargers and batteries can be sourced and installed which could be up to 2 months.

5.1.1 Assessment

- The benefits are delayed capex.
- The costs / detriment are wasted capability in that the otherwise serviceable batteries are not able to deliver any power as they are not adequately charged. This can result in loss of control and monitoring of the site until replaced. The failures listed in the risks category (risk of explosion, potential loss of control and monitoring of the site) may materialise.

5.2 Option 2 - Proposed Solution – Replace Battery Chargers Prior to Failure

There are multiple battery chargers within the VTS of various designs. The proposed solution is to replace the older, poor integrity chargers with the latest design that has inbuilt redundancy. The following locations have been selected for replacement:

Replaced

- Brooklyn CS & CG
- Gooding CS
- Iona
- Longford
- Pakenham
- Wollert CS & CG

CY23-CY27

- Euroa CS
- Springhurst CS
- Winchelsea CS
- Wandong PRS
- Newport

5.2.1 Why are we proposing this solution?

The battery chargers are an important component of the control and monitoring systems of the Victorian Transmission System, without functioning battery chargers the affected sites cannot be remotely monitored or controlled. In some cases gas flow will be interrupted.

Failure to maintain adequate batteries and battery charging solutions will result in a loss of system capacity if/when failure occurs.

The following table lists all the stations and their battery models. Charger models are not listed specifically however the older battery installations will have superseded battery chargers installed. When new battery chargers are installed the batteries are also replaced.

The likely replacement year is driven by age and the station criticality. Some stations, such as Longford, has a backup generator and backup batteries and thus is less critical than others.

Consistent with the requirements of Rule 79 of the National Gas Rules, APA considers that the capital expenditure is:

- Prudent – The expenditure is necessary in order to maintain and improve the safety of services and maintain the integrity of services to customers and personnel and is of a nature that a prudent service provider would incur.
- Efficient – The purpose of the equipment is to maintain efficiency. The selected design has demonstrated performance. The expenditure will be undertaken consistent with the APA procurement policy. The expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur
- Consistent with accepted and good industry practice – Addressing the risks associated with the poor charging of batteries and replacing assets that have reached the end of their useful life is accepted as good industry practice. In addition the reduction of risk to as low as reasonably practicable in a manner that balances cost and risk is consistent with Australian Standard AS2885.
- To achieve the lowest sustainable cost of delivering pipeline services – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply.

5.2.2 Forecast Cost Breakdown

The costs for this work are well known as multiple battery charger installations have occurred recently on new compressor stations. The cost is based on the actual costs of In-Flight and completed projects.

TABLE 5: PROJECT COST ESTIMATE,

	Total
Internal Labour	$200,000
Materials	$600,000
Contracted Labour	$200,000
Other Costs	$0
Total	$1,000,000

6 Acronyms

Acronym	Definition/Description
AEMO	Australian Energy Market Operator
AGA	Australian gas association – Type B compliance governing body
API	American Petroleum Institute – publisher of standards
CHAZOP	Control system HAZOP – study of the control system functions to identify logic vulnerabilities
ESD	Emergency shutdown – control system-initiated shutdown designed to prevent incident escalation if operating parameters are breached
ESV	Energy Safe Victoria
HAZOP	Hazard and operability study
HMI	Human machine interface
ILI	Inline inspection – pipeline internal inspection
OEM	Original Equipment Manufacturer
RA	Risk Assessment
RBI	Risk Based Inspection – a process used to prioritise maintenance or inspection activities based on risk of failure.
SIL	Safety Integrity Level – an assessment used to rank control systems by their ability to fail safely
SMS	Safety Management Study
VTS	Victorian Transmission System