Business Case – Capital Expenditure

Battery Charger Upgrades

Business Case Number BC212 AA23-27

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

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Project resubmitted – ongoing program of work

TABLE 2: BUSINESS CASE – PROJECT OVERVIEW

Description of Issue/Project	Battery chargers and batteries are used as an UPS (uninterruptable power supply) that protects sensitive electronic control and monitoring electronic equipment from grid voltage fluctuations and also provides safe and reliable performance during grid power outages. Periodically the batteries and chargers require replacement to ensure the ongoing protection of the electronic equipment and safe reliable operation and monitoring of the site. The aim of this business case is to ensure the batteries and chargers continue to provide stable reliable power by replacing batteries and chargers at the following stations:	
	Replaced • Brooklyn CS & CG • Gooding CS (scheduled Dec 22) • Longford • Morwell • Pakenham • Tyers • Wollert CS & CG	CY23-CY27 • Euroa CS • Iona CS • Newport • Springhurst CS • Wandong PRS • Winchelsea CS
Options Considered	The following options have been considered: Option 1: Do Nothing Option Option 2: Replace battery and charging systems	
Estimated Cost	$1,000,000	
Relevant Standard	Australian Standards AS3000 Wiring Rules and AS4044 Battery chargers for stationary batteries.	
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	Assists to maintain reliability of supply for customers and consumers during grid power outages. Reduces the likelihood of site comms failures as if these components fail the control and monitoring functionality is lost until the failed components can be replaced (regardless of grid power availability).

1 Background

Stations with control functionality require a stable 24VDC power supply to operate safely and reliably. This power supply is provided from 24VC battery banks which are maintained in a fully charged state by mains connected battery chargers. This enables safe and reliable control and monitoring during mains outages but also protects the control and monitoring system from mains voltage fluctuations.

24VDC systems tend to fail due to the following:

- Failure of batteries or battery chargers to sustain adequate power.
- Failing batteries will not sustain backup power during power outages.

The consequence of a 24VDC failure are that the site/station control and monitoring systems shut down until the 24VDC power can be restored (usually >24hours).

Typical replacement rates for batteries are 8 to 10 years and approximately 20 years for battery chargers however older designs do not have the battery life extending or failsafe features now available in newer designs. Therefore, APA policy is to replace older chargers to maximise battery life while reducing the risk of power outages and battery/charger fires etc.

Battery chargers within the VTS are in various levels of integrity and age, refer to table 6 for condition and replacement details for each location.

2 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. Potential for electrical fire.
3. 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.

3 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

3.1 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.

3.1.1 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.

3.2 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 (scheduled Dec 22)
- Iona
- Longford
- Morwell
- Pakenham
- Tyers
- Wollert CS & CG

CY23-CY27

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

3.2.1 Why are we proposing this solution?

Battery chargers are an important component of the control and monitoring systems of the Victorian Transmission System, if batteries or battery chargers fail the affected sites cannot be remotely monitored or controlled and in some cases gas flow will also be interrupted.

Table 6 lists battery charger condition and replacement status at each site. 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.

3.2.2 Forecast Cost Breakdown

The costs for this work are well known as multiple battery charger installations have occurred recently on new compressor stations and upgrades have been completed for other sites in this ongoing program of work. The cost estimate is based on the actual costs of similar 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**

3.2.3 Battery and Charger Age

A summary of the age and replacement status is provided in Table 6. Currently of the 17 sites targeted in this program of upgrades, 10 have been upgraded, 2 are in progress and 5 are scheduled for upgrade.

TABLE 6: BATTERY & CHARGER DETAILS

Location	Type	Installed	Replace	Status
Springhurst CS	Eaton	2010	2023	Pending
Winchelsea CS	Eaton	2014	2024	Pending
Newport	Unknown	2006	2025	Pending
Euroa CS	Eaton	2012	2025	Pending
Wandong PRS	Unknown	Pre 2007	2025	Pending
Iona CS	Unknown	Pre 2007	2023	Inflight
Gooding CS	Eaton	2014	2022	Inflight
Dandenong CG	Eaton	2015	TBC	Complete
Brooklyn CS	Eaton	Stage 1 & 2 Building 2013	TBC	Complete
Pakenham	Unknown	Unknown	2019	Complete
Lara	Unknown	Unknown	2020	Complete
Longford	Unknown	Pre 2007	2020	Complete
Morwell CG	Unknown	Pre 2007	2020	Complete
Tyers PL	Unknown	Pre 2007	2020	Complete
Brooklyn CG	Eaton	2008	2020	Complete
Wollert CG	Eaton	2008	2022	Complete
Wollert CS	Eaton	2007	2022	Complete

4 Acronyms

TABLE 7: 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
UPS	Uninterruptable Power Supply