December 2025

Powerlink 2027-32 Revenue Proposal

Secondary Systems Asset Strategy 2020-2027

Powerlink Secondary Systems Asset Strategy 2020-2027– Strategy

Policy stream	Asset Management	
Authored by	Team Leader Secondary Systems & Telecom Strategies	
Reviewed by	Senior Secondary System Strategies Engineer	
	Manager Asset Strategies	
	Manager Secondary Systems Field Engineering	
Approved by	General Manager Asset Strategies and Planning	

Version history

Version	Date	Section(s)	Summary of amendment
AM-STR-1047	21/02/2011	Superseded	This previous Secondary System Strategy has been superseded
1.0	04/11/2015	New	Original version
2.0	10/11/2017	Update	Minor changes, Metering Strategy now included in this document
3.0	04/09/2020	Whole document	Major updates
3.1	30/10/2020	1.5	Non-material change. Roles updated
3.2	02/11/2023	All	Updates
3.3	08/12/2025	All	Reviewed and updated to reflect current practice

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1. Introduction

1.1 Purpose

This strategy provides the strategic asset management for Powerlink's secondary systems assets, which are responsible for protection, control, metering, supervision and monitoring functions of Queensland transmission systems.

The principal asset management drivers for existing (and therefore replacement of secondary systems assets are:

- Safety - maintaining site safe work practices and a safe work environment.
- Compliance – complying with all relevant laws and regulations.
- Operational, Obsolescence and Reliability – maintaining the secondary systems functions with supported assets ensuring the HV network is operating correctly in line with the Digital Asset Management Framework.

1.2 Scope

This document relates to all operational secondary systems include protection, control, automation data network and power system monitoring systems.

1.3 References

Document code	Document title
A6095446	Strategic Asset Management Plan (SAMP)
A2287198	Powerlink - Digital Asset Management Framework
A1955239	Powerlink – Electrical Safety Management System - Standard
A1019283	Telecommunication Asset Strategy 2020-2027
A2331811	Secondary Systems Business Strategy 2020-2027

1.4 Defined terms

Terms	Definition
SDM	Substation Design Manual
IED	Intelligent Electronic Device
CMS	Configuration Management System
SCADA	Supervisory control and data acquisition
NOC	Network Operations Centre
HMI	Human Machine Interface
OLTC	On-load Tap Change
NER	National Electricity Rules
SVC	Static VAR Compensator
EVR	Emergency Voltage Regulation
RCM	Reliability Centered Maintenance
HSM	High Speed Monitoring
PQM	Power Quality Monitoring

Terms	Definition
WAMPAC	Wide Area Monitoring Protection and Control

1.5 Roles and responsibilities

Who	What
Team Leader SS&TS	Author. Responsible for period review and subsequent iterations
Senior Secondary System Asset Strategies Engineer	Reviewer. Ensure alignment across Secondary System Strategies
Manager Asset Strategies	Reviewer. Ensure alignment across Asset Strategies
General Manager Asset Management	Reviewer. Ensure alignment across Asset Management

1.6 Monitoring and compliance

This secondary systems asset strategy will be reviewed and updated every three years to ensure that associated development plan with secondary system business strategy has been progressed and new strategic initiatives have been added to adapt to the business change.

1.7 Risk management

Any risks associated with this asset strategy are mitigated via consulting thoroughly with associated stakeholders.

2. Secondary Systems Asset Strategy

2.1 Secondary System Protection systems

A range of protection systems are at end of life or will shortly reach a point where they are not supported by the manufacturer. Operating protection systems beyond their end of technical life may result in failure of the device and spurious trips causing possible network outages. Replacement of protection systems will be carried out in a manner that minimizes the lifecycle costs while providing required reliability, availability and security

Powerlink will review SDM9.2 and SDM7/8 design standard to optimise options for in-situ or in-panel replacements where it is feasible to do so to minimise the overall whole of asset life cycle costs while still meeting the required reliability and performance requirements.

Further improvements to current design standards will be investigated for reviewing and simplifying the existing network infrastructure with a long term aim of moving to a process bus based Digital Substation. It is anticipated that

Operations of conventional current transformers have potential safety issues and technical limits (such as saturation) for protection systems. The trend in the power industry is to employ low power instrumentation current/voltage transformers. In addition, the non-conventional technology will enable secondary systems to minimize copper cabling and benefit business utilities. As such a feasibility study of low power instrumentation current/voltage transformers is to be undertaken

2.2 Secondary System Control systems

Powerlink will continue to develop its integrated control systems based on IEC61850 to minimize the lifecycle cost of secondary systems assets.

An asset strategy, Management of Obsolescence of C50RUs and SCD5200 RTUs has been developed to manage the C50 and SCD5200 RTUs' obsolescence risks based on lowest long run cost solutions, including:-

- Utilise Schneider / Foxboro SCD6000 RTU, SCD6000-SVX RTU and IOX modules, as the primary solution for long-term support and upgrade options of C50 and SCD5200 RTUs associated with secondary systems assets that have not reached end-of-life or the optimal replacement timeframe.
- Replace end-of-life secondary systems by Powerlink's current standard secondary systems based on IEC61850 technology. Currently, Powerlink replaces approximately 60 units of C50 RTUs associated with end-of-life secondary systems on a yearly basis.
- Recover all C50 RTUs removed from sites under secondary systems refurbishment projects for operational spares.

The SCADA systems are used to interface with the EMS to provide data to the Network Operations Centre (NOC) for network switching, initial fault management, network analysis and real-time asset monitoring. They have been implemented via the Powerlink PDH network. The Telecommunications Asset Strategy indicates that the PDH network equipment will reach end-of-life and will be phased out by 2022. As such, the SCADA systems need to be migrated to the IP network from the serial (DNP/CONITEL) protocols.

HMI equipment such as Sun Workstation devices provides local control and monitoring of substation plant. These devices are now out of production and Powerlink has only limited spares available. Powerlink has a virtual solution to replace this obsolete equipment permanently. To minimise the whole cost of asset life, no replacement will be carried out until the equipment fails. An interim solution with minimum operational requirements needs to be investigated and applied before a permanent solution is in place.

Cooling control and monitoring of a transformer are conducted by PLC (Programmable Logic Controller) equipment at some sites. These PLC devices have passed their end-of-life and become obsolete. Some of the component modules have run out of spares. These obsolete equipment need to be replaced to maintain reliable cooling control and OLTC functionality in the 2020-2027 period.

2.3 Substation Automation data network

Powerlink has implemented the SDM9.2 secondary system design standard based on IEC61850 Station Bus. Continuous improvement and optimisation of SDM9.2 automation data network will be carried out through cost saving initiatives, especially the optimisation of design, procurement, contract management, construction,

testing and training. Improvements in the design standards will be progressively implemented as part of secondary system replacements and where warranted as standalone projects to mitigate the risk of obsolescence and to improve security. In addition, associated secondary system asset principles and procedures will be reviewed to enhance these improvements as well as to ensure ongoing compliance with NER and AEMO's requirements.

2.4 Secondary systems for shunt compensation plant

Shunt compensation plants including SVC and SVC Plus are utilised to maximize transfer capability of transmission networks. Powerlink's SVC devices affect transmission constraints across the Australian interconnected network. Failure of these SVCs can lead to abnormal system operating conditions and non-compliance with power system standards prescribed within the National Electricity Rules or cause power quality issues. As such, the continued availability of transmission SVCs is very important. Secondary systems for SVCs will reach their end-of-life between 2020 and 2027. As such replacement works needs to be carried out on SVC secondary systems to ensure reliable and secure operations in the period of 2020-2027. SVC Plus devices have been commissioned since 2012 and it is expected that only minimal works will be required to maintain these assets in the period of 2020-2027.

A range of secondary systems for shunt capacitors and reactors will reach their end of life in 2020-2027. Replacement works will be aligned with protection and control systems in the period of 2020-2027.

Emergency Voltage Regulation (EVR) is used to control capacitor banks and reactors to maintain the network voltage. EVR settings need to be reviewed and revised to ensure reliable operation of shunt compensation plants in the period of 2020 and 2027.

2.5 Secondary systems for synchronous condenser

Powerlink is planning to install synchronous condensers to remedy or avoid an adverse system strength impact arising from establishing renewable connections according to National Electricity Rules. RCM analysis will be planned to be conducted to determine maintenance procedure on associated secondary systems such that protection and control systems provide safe and reliable performance at minimised cost of whole asset life.

2.6 Power system monitoring system

Power system monitoring systems, such as High Speed Monitoring (HSM), Power Quality Monitoring (PQM), Travelling wave-based fault locator and Phasor Measurement System have been deployed across Powerlink substations. Some equipment such as the Local Storage Unit (LSU) for HSM will reach their technical economic life. As such associated replacements will be required in the period of 2020-2027.

Powerlink is rolling out WAMPAC schemes as part of secondary system replacement and renewable connections to increase the system capacity and improve the utilisation of the network.

AEMO has requested Powerlink to implement PMUs and stream associated phasors to AEMO and a solution is currently being implemented

2.7 Revenue Metering

A programme of works to replace metering equipment based on its condition will be required to maintain assets in 2020-2027. These works will be undertaken as part of two programmes:

- The secondary systems replacement programme (covered in Asset Management Plan) will replace any meters installed as part of a secondary systems installation; and
- A dedicated programme to replace metering assets based on their condition.

3. Distribution list

Divisional Distribution	Contact details
Chief Executive	N/A
Delivery and Technical Solutions	General Manager Design Solutions Manager Secondary Systems Design
Finance and Governance	N/A
Energy Futures	N/A
Field & Asset Management	General Manager Asset Strategies General Manager Operational Engineering
People and Corporate Services	N/A
Network & Business Development	General Manager Asset Strategies and Planning