2018-22
POWERLINK QUEENSLAND REVENUE PROPOSAL

Supporting Document - PUBLIC

Powerlink Queensland
Asset Management - Strategy

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Delivering better value

Powerlink – Asset Management – Strategy

Policy stream	Asset Management	
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Approved by	Executive Manager Investment & Planning	[redacted]

Version history

Version	Date	Section(s)	Summary of amendment
1	30/05/11	New	New AM Document Format
2	30/05/11	Title only	Title Updated
3	30/05/11	Whole document	Minor Grammatical errors fixed
4	3/12/12	References	Added AM-STR-0011 as previous document.
5	7/10/14	Whole document	Update with 2014 Business Strategy
6	30/09/15	Whole document	Update with 2015 Business Strategy, stakeholder feedback and new document format

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1. Introduction

The role of Powerlink's asset management system is to ensure the organisation's assets are managed in a manner consistent with its mission of responsibly delivering electricity transmission services that are valued by its shareholders, consumers, customers and the market. The practices seek to drive efficiency whilst effectively managing safety, reliability and other risks across Powerlink's portfolio of assets.

1.1 Purpose

Powerlink Queensland is a Transmission Network Service Provider (TNSP) in the Australian National Electricity Market (NEM) that owns, develops, operates and maintains Queensland's high voltage electricity transmission network.

As a TNSP, Powerlink has specific mandatory obligations under its Transmission Authority, the National Electricity Rules and the Electricity Act 1994 (Qld). In addition Powerlink is also committed to delivering electricity transmission services that are valued by our shareholders, consumers, customers and the market.

The Queensland Government has also appointed Powerlink as the Jurisdictional Planning Body for Queensland to assess the capability of the State's transmission network to meet forecast electricity demand, in accordance with the reliability standards for electricity transmission.

In order to effectively discharge these obligations, Powerlink has implemented a series of strategies to manage the development, operation and maintenance of its high voltage network assets and digital technologies.

This Asset Management Strategy discusses the key business drivers and risks for delivery of safe, reliable and cost effective transmission services by Powerlink and sets out the strategic framework for asset management in Powerlink.

1.2 Scope

This document covers the asset management strategy applied to the life cycle of network assets, including management of spares.

1.3 Objectives

The Asset Management Strategy considers a range of matters, including:

- statutory, economic and stakeholder obligations that drive the performance of our business and the network;
- life cycle of an asset;
- asset related risks;
- principal strategies associated with Powerlink's management of network assets;
- efficient allocation of resources; and
- mechanisms to monitor performance and achieve continuous improvement in the management of plant and assets over time.

A performance review is undertaken routinely as part of an environment for continuous improvement. Areas with particular focus are the operation of Powerlink's assets, efficient and prudent expenditure in the creation of new assets, and the efficient operation, maintenance of and reinvestment in existing assets. The ongoing refinement of the strategy is in itself a continual improvement process.

The key elements of the asset management can be summarised in Figure 1 below, which is described in Powerlink's Asset Management Framework (ASM-I&P-FRA-A2300019):

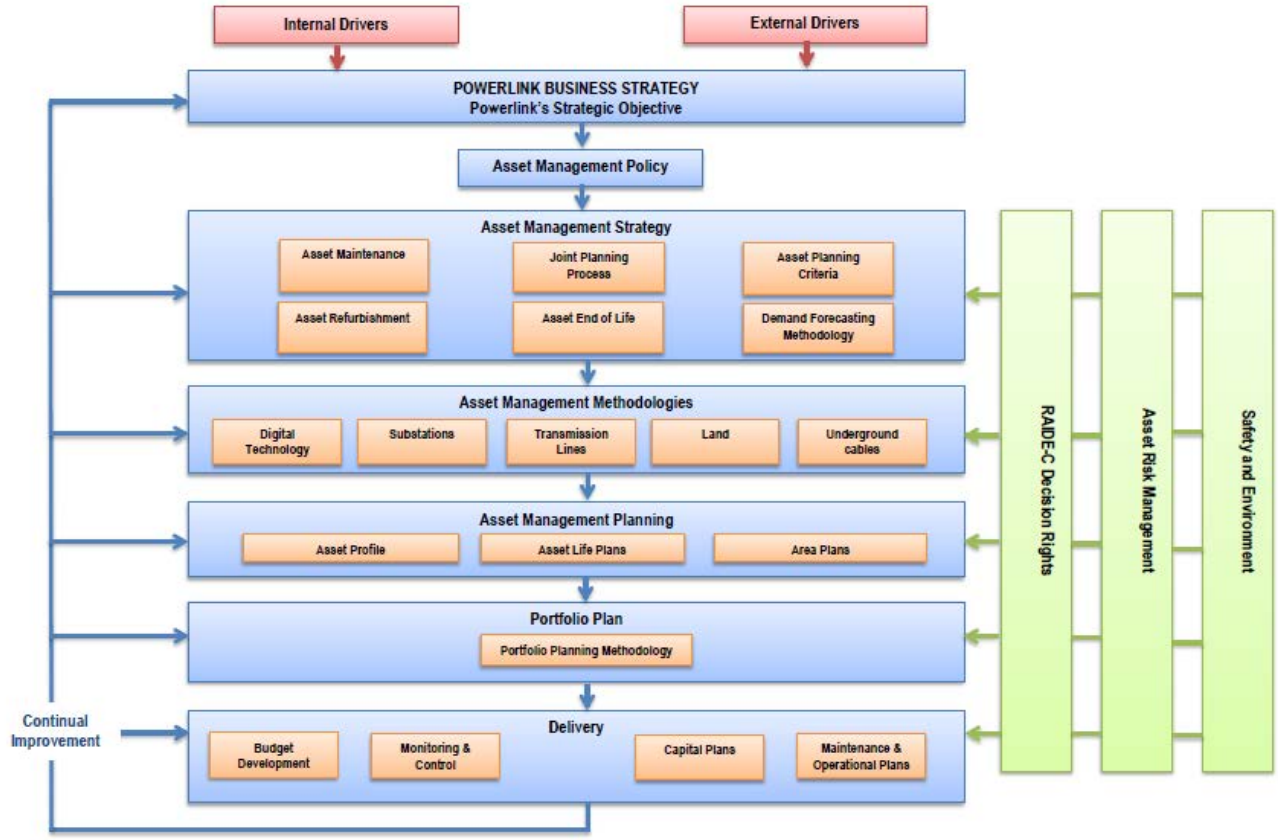

Figure 1. Asset Management Framework

1.4 References

Document code	Document title
ASM-IP-FRA-A2300019	Asset Management Framework
AM-POL-1035	Asset Management Policy
AM-POL-0880	Asset End of Life Policy
AM-POL-1068	Asset Maintenance Policy
AM-POL-0091	Asset Refurbishment Policy
ASM-IP-FRA-A968358	Land Asset Methodology Framework
ASM-IP-FRA-A537590	Line Asset Methodology Framework
ASM-IP-FRA-A542372	Substation Asset Methodology Framework
ASM-IP-FRA-A968388	Underground Cable Plant Methodology Framework
ASM-IP-FRA-A2287198	Digital Asset Management Framework

1.5 Roles and responsibilities

Who	What
Executive Manager Investment & Planning	Setting strategy and investment decisions for assets
Executive Manager Operations & Field Services	Deliver asset management strategy as part of operations and field services
Executive Manager Infrastructure Delivery and Technical Services	Deliver asset management strategy as part of infrastructure delivery and technical services
Executive Manager People & Culture	Ensure alignment with corporate safety strategy
Executive Manager Stakeholder Relations & Corporate Services	Ensure alignment with corporate environmental strategy and stakeholder engagement expectations
Executive Manager Finance & Business Performance	Ensure alignment with corporate financial, legal and shareholder requirements

2. Requirements

The asset life cycle is a critical and commonly applied element of asset management. This asset life cycle deals with three primary timeframes in the life of an asset and the interaction of these phases with each other. Powerlink's practices consider the whole life cycle of the asset in its decision making processes.

The three primary timeframes are as follows:

(i) ***Planning and Investment*** – deciding when new assets are needed, what assets are appropriate and economic to meet that need and what form those assets should take given the later stages of the asset life cycle.

(ii) ***Operation, Maintenance and Refurbishment*** – ensuring each asset remains fit for purpose over its life (sometimes as long as 50 years), including appropriate operating and maintenance strategies, refurbishment and ongoing assessment of the condition of the assets.

(iii) ***End of Life*** – considering an asset's ongoing fitness for purpose, enduring need and whether an asset should be disposed of or replaced. Any decision to reinvest in assets forms part of the planning and investment phase to ensure optimal economic outcomes.

These timeframes and the interaction between them over the life cycle of assets are shown in Figure 2. Due to the progressive nature inherent in the development of a transmission system, assets of various types exist in all phases of the asset life cycle at all times. This results in some particular challenges that need to be considered in the asset management practices.

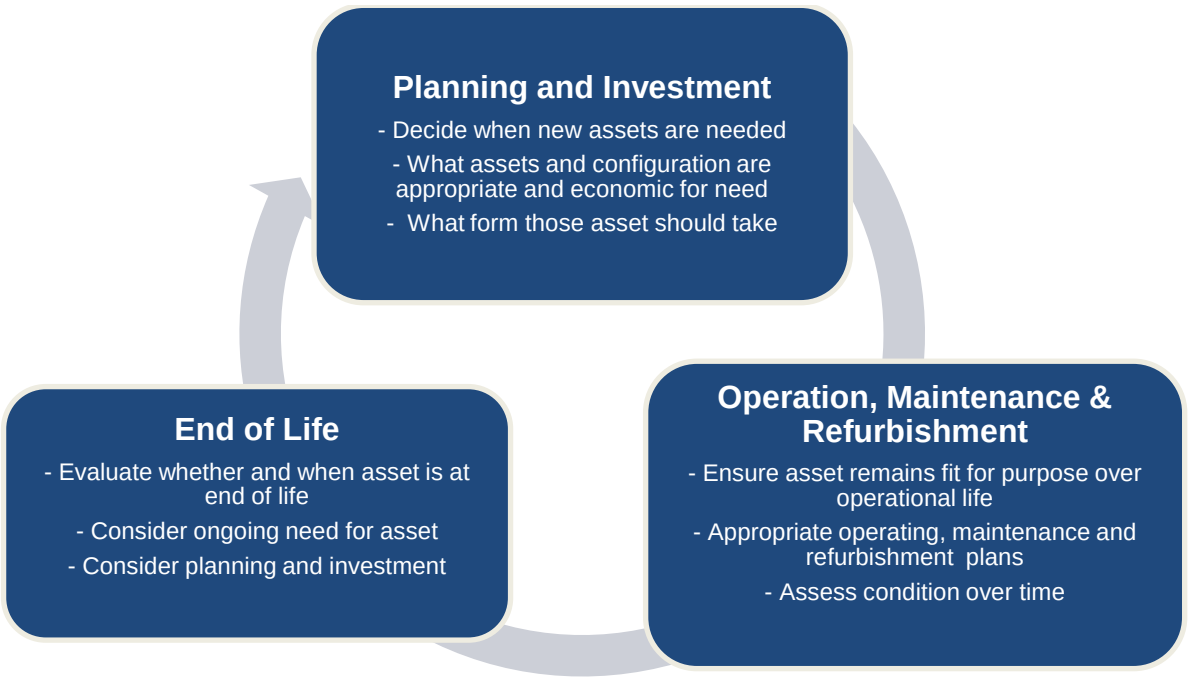

Figure 2. Asset Life Cycle

2.1 Asset Management Cycle

In addition to considering the Asset Life Cycle, good asset management practices also need to consider the broader business environment in which it is operating such as regulatory arrangements and stakeholder input as well as overarching business requirements such as safety and environmental management. Powerlink manages these aspects through its Asset Management Cycle which is essentially a continuous improvement cycle taking into account evolving factors from both the internal and external environments. This cycle is shown in Figure 3.

(1) The Asset Management Cycle starts with **Strategic Alignment** that involves defining obligations and ascertaining the expectations of stakeholders.

(2) The next step in the Asset Management cycle involves determining how Powerlink is going to respond to those obligations and expectations and developing risk based **Asset Management Strategies** to meet or manage those obligations and expectations depending on the nature of them. The commonly applied Asset Life Cycle is particularly important in determining the manner in which Powerlink will meet or manage these obligations and expectations.

(3) The third step in the Asset Management cycle involves **Resource Alignment** to agreed Asset Management Strategies. Effective Asset Management requires consideration of the resources needed to implement each strategy, and reconciliation of the priority of each strategy with the cost and availability of the various types of resources required for their implementation.

(4) The first three steps ensure that the strategies adopted take a risk based approach to meeting Powerlink's obligations and managing stakeholder expectations and are able to be effectively and efficiently resourced. However, it is also appropriate to monitor whether this is occurring through **Continuous Review** so that any necessary adjustments can be made around the first three steps through the identification and adoption of improvement opportunities.

Adopting this process continuously in the application of Asset Management practices within Powerlink ensures that Powerlink consciously determines action plans to be adopted over various timeframes and understands the extent to which those actions will result in meeting those obligations and expectations.

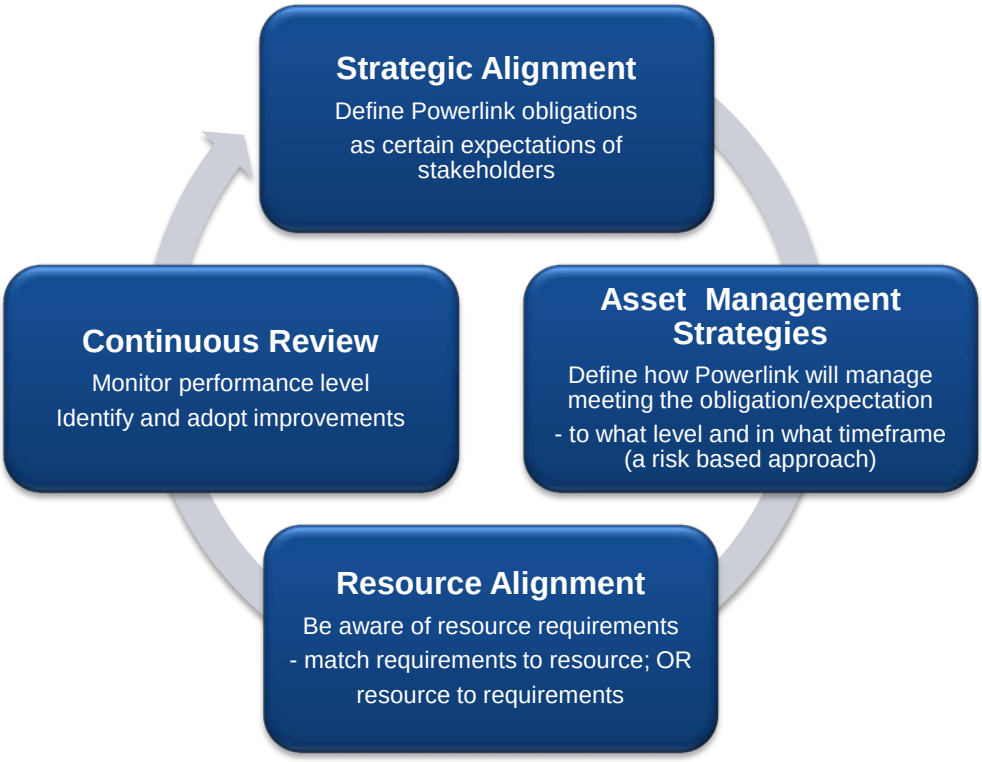

Figure 3. Asset Management Cycle

2.2 Levels of Service

In terms of managing the development and ongoing operation of the high voltage transmission network, Powerlink has a number of service levels derived from our strategic drivers, statutory authorities and our transmission licence and associated operating obligations, which are considered below.

Safety

- Powerlink's target with respect to safety is for zero accidents, and integration of safe working practices in all Powerlink activities.
- Comply with the Electrical Safety Act, associated regulations & Procedures for Safe Access to HV Electrical Apparatus High Voltage Isolation and Access requirements.
- Comply with Workplace Health and Safety Act and requirements.
- Comply with all workplace, health and safety legislation, translated into Powerlink's Safety Management Plans.
- Align and comply with Powerlink's Safety Management System with regular reporting to the Safety Steering Committee.

Network Operation & Maintenance

- Maintain plant to provide safe, reliable and cost effective electricity supply.
- Manage the risk of and actual loss of supply events.
- Conform with National Electricity Rules.
- Monitor performance against the Service Targets Performance Incentive Scheme (STPIS).
- Meet the needs of our customers and electricity consumers.
- Meet the requirements of the Power Systems Data Communications Standard.
- Withstand credible contingencies (N-1-50MW).

Network Investment

- Meet reliability of supply obligations in Powerlink's Transmission Authority.
- Plan network development in accordance with the Transmission Authority, the Electricity Act and the National Electricity Rules.
- Meet the needs of our customers and consumers.
- Support the efficient operation of the NEM through consideration of investments that deliver net market benefits.
- Ensure ongoing reliability and quality of supply.
- Plan reinvestment in assets in a prudent and efficient manner in order to maintain a safe and reliable supply to our customers and consumers.
- Maintain and upgrade security as necessary to appropriate levels for critical infrastructure.

Market Participants & Customers

- Meet the terms of Connection and Access agreements.
- Conform with the National Electricity Rules.
- Maintain effective NEM participant and customer relationships.
- Provide timely and commercially viable connection arrangements for our direct connect customers.

Environment

- Have no reportable environmental incidents.
- Comply with environmental, planning and cultural heritage legislation, translated into Powerlink's Environmental Strategy/Management Plans.
- Maintain an Environmental Management System with regular reporting to the Environmental Steering Committee.

2.3 Asset Information

Powerlink maintains a detailed asset information system (currently SAP) that among other things permits:

- unique identification of plant and equipment that in combination forms part of the overall asset base;
- management of asset value and depreciation;
- categorisation of assets into appropriate technical classes;
- profiling of asset age, condition, defects and performance;
- recording of the relevant physical characteristics of the asset (e.g. Plant ratings);
- management of work, resources and costs associated with assets; and
- management of materials, inventory and spares associated with assets.

Through SAP, Powerlink also ensures that both technical and financial information is available and intrinsically linked, in order to allow ongoing monitoring and response to a range of issues including, but not limited to, optimisation of maintenance strategy and life cycle cost analysis.

2.4 Powerlink Business Model

Powerlink undertakes the management of its assets through implementation of an Asset Ownership/Asset Management/Service Provision business model (AO/AM/SP). Powerlink considers this business model and philosophy associated with it to be an essential element in managing the complex, and sometimes conflicting, environment in which Powerlink provides its transmission services. Through this model an integrated and responsive management structure is provided, capable of reconciling complex issues through areas of expert knowledge coupled with collaboration to ensure all relevant information is available.

The Investment and Planning division consists of groups that drive strategies that support the full life cycle of Powerlink assets, from planning and asset investment, through operation and maintenance, to asset reinvestment and disposal. This affords a strong focus on optimisation of asset investment and other work by achieving a balance between factors such as safety, electricity price, environment, stakeholder expectations, and the reliability, maintainability and supportability of the assets over their life.

A powerful aspect of Powerlink's Asset Management philosophy is the tight integration between the development of strategies and the initiation and oversight of work to support those strategies. The Investment and Planning Division responsible for asset management consists of teams responsible for initiation, approval and sponsorship of all capital investment, maintenance and refurbishment work.

The infrastructure Delivery & Technical Services and Operations & Field Services divisions are responsible for delivery asset management. That is the divisions best positioned to make delivery focused decisions are empowered to do so. The sponsorship of work by the Investment and Planning division helps ensure efficient implementation, with the appropriate overall priorities, and provides a feedback loop between strategy and implementation phases.

2.5 Powerlink Structure

Powerlink is structured into Divisions around delivery of network services and corporate strategies. The organisational structure is shown in Figure 4.

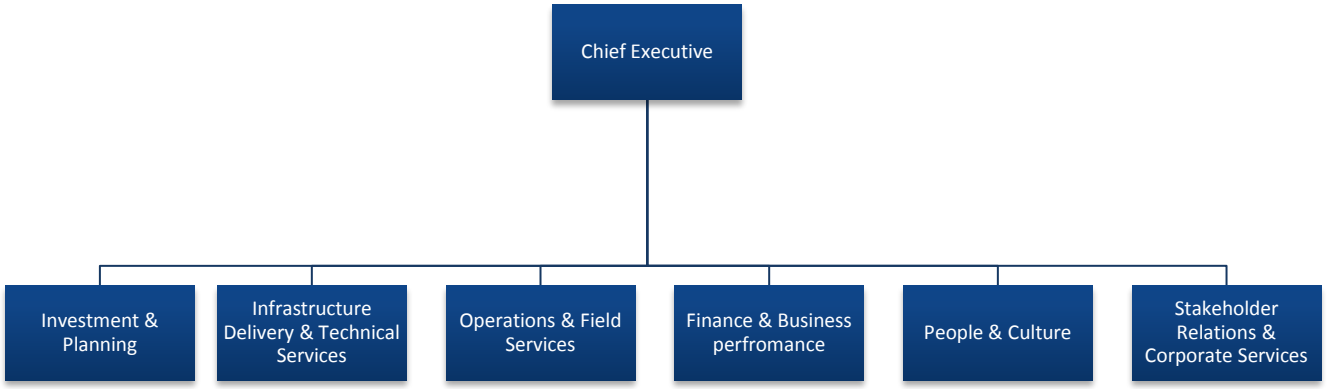

Figure 4. Powerlink Organisational Structure

2.6 Safety Strategy

Safety is an intrinsic component of working at Powerlink and is a top priority for Powerlink employees. Powerlink drives safety improvements and initiatives through a Safety Steering Committee, and a Safety Management System that consists of centrally stored policies, procedures and incident reporting systems.

Powerlink Queensland endeavours to ensure that all activities are conducted so as to be free from accidents and incidents, whilst providing customers with services that are valued. To achieve this Powerlink has adopted a proactive approach to the management of Workplace Health and Safety and Electrical Safety.

Strategies used include:

- complying with relevant Workplace Health and Safety and Electrical Safety Legislation and Standards, including use of an audit regime to monitor compliance with WH&S and electrical safety legislation, for specific projects, and routinely on the remainder of Powerlink's existing assets;
- integrating Workplace Health and Safety responsibilities into all activities of all employees to promote ownership and control of their continual wellbeing;
- maintaining a structured approach to managing our safety aspects through a Safety Management System;
- actively promoting the importance of safety, including adoption of safety as one of Powerlink's five workplace values;
- openly consulting with employees and relevant stakeholders about all matters that may affect their health and safety;

- providing training and support to enable its employees to perform their duties with a minimum of risk, regardless of their work location, whether local, interstate or overseas; and
- seeking continual improvement in the safety performance of our operations maintaining records and statistics to enable monitoring of Powerlink and contractor safety performance and trends.

Powerlink's business carries with it inherent risks that must be carefully managed. Foremost are Powerlink's obligations with regard to Workplace Health and Safety and Electrical Safety. Changes occur frequently in this area, which requires Powerlink to be particularly vigilant of the legislation and also the design, maintenance and operation practices of our personnel. Powerlink has also implemented specialised live line and substation work practices that must be carefully planned, implemented and monitored.

More generally, Powerlink operates a high voltage transmission network spanning an extremely large geographical area. The nature of our business requires increased focus on the ongoing safety of the community and our staff, particularly with regard to managing the risks of remote working and fatigue.

2.7 Environment Strategy

Good environmental stewardship is also a priority for Powerlink employees. Powerlink drives environmental improvements and initiatives through an Environmental Steering Committee, and an Environmental Management System that consists of centrally stored policies, procedures and incident reporting systems.

Powerlink performs training and auditing to ensure that employees are aware of their obligations with respect to the environment and that Powerlink's obligations are appropriately managed through the contracting arrangements that Powerlink uses to deliver transmission services.

This Asset Management Strategy supports responsible environmental management as an integral part of our business activities. That commitment is demonstrated by:

- complying with relevant environmental legislation including use of an audit regime to monitor compliance;
- incorporating environmental factors such as land use, noise and visual impact, protection of flora and fauna, pollution prevention and waste management into the fundamental business processes and procedures;
- maintaining a structured approach to managing our environmental aspects through an Environmental Management System;
- consulting openly, honestly and proactively with the community and statutory authorities on the potential environmental impacts of our plans and activities. Powerlink is responsive to constructive suggestions to eliminate or minimise potentially adverse impacts;
- seeking continual improvement in the environmental performance of our operations maintaining records and statistics to enable monitoring of Powerlink and contractor environmental performance and trends; and
- building and encouraging ownership of environmental care among our people by providing training and support.

In addition, all of Powerlink's major construction activities are undertaken in accordance with specific Environmental Management Plans (EMPs), to effectively manage the impacts of construction activities.

Powerlink aims to have no reportable environmental incidents from its operations and expects staff and contractors to comply with all EMPs associated with particular assets. Monitoring of compliance with EMP conditions occurs for all major construction projects through regular auditing of specific projects, as well as audits which are concerned with Powerlink's operations more generally.

2.8 Stakeholder Engagement Framework

Powerlink aims to share effective, timely and transparent information with our stakeholders using a range of engagement methods. Two key stakeholder groups for Powerlink are customers and consumers. Customers are defined as those who are directly connected to Powerlink's network, while consumers are electricity end-users, such as households and businesses, who primarily receive electricity from the distribution networks.

Powerlink proactively engages with stakeholders and seeks their input to Powerlink's business processes and objectives. All engagement activities are undertaken in line with the Stakeholder Engagement Framework that sets out the principles, objectives and outcomes that are being sought in the interactions with stakeholders. The framework aims to achieve greater stakeholder trust and social licence to operate, better business decision making and improved management of corporate risks and reputation.

A number of key performance indicators are used to monitor progress towards achieving Powerlink's stakeholder engagement performance goals, including social licence to operate and reputation measures. Powerlink undertakes a comprehensive biennial survey, the most recent in 2014, to gain insights about stakeholder perceptions of Powerlink, its social licence to operate and reputation. The surveys provide an evidence base to support the Stakeholder Engagement Framework and inform engagement with individual stakeholders.

2.9 Strategic Alignment

The first step in the Asset Management Cycle involves an assessment of Powerlink's obligations across a wide range of legislation and market requirements and ascertaining the expectations of relevant stakeholders. Alignment with these drivers ensures Powerlink responsibly delivers electricity transmission services that are valued by stakeholders, consumers, customers and the market.

2.9.1 Statutory Requirements

As a Queensland-based Transmission Network Service Provider (TNSP) operating in the National Electricity Market (NEM), Powerlink is required to meet a number of statutory obligations at both the national and state level. The most significant of these obligations can be summarised as follows:

- Compliance with all statutory workplace health and safety requirements including the Electricity Safety Act and the Workplace Health and Safety Act and Regulations.
- Provision of safe, reliable and cost effective transmission services to users of the grid in accordance with the National Electricity Rules and Powerlink's Transmission Authority.
- Compliance with all relevant State and Federal environmental, planning and cultural heritage legislation.
- Performing the role of Jurisdictional Planning Body for Queensland.

2.9.2 Shareholders

Powerlink is aware that electricity supply is effectively an essential service which community members rely on heavily. As such community and customer expectations also drive for improved reliability and quality of supply at the lowest long run cost to electricity consumers. This is particularly relevant in situations of natural disasters which are prevalent in the Queensland operating environment as the availability of electricity supply is an essential element in the ability of communities to rebuild. This requires Powerlink to not only consider the reliability of supply in meeting demand but also the resilience of its network to natural disasters and risk mitigation mechanisms against multiple contingencies to return and maintain some electricity supply as quickly as possible following natural disasters.

In 2015 Powerlink held its first Customer and Consumer Panel meeting. This panel meets quarterly to provide a face-to-face forum for to allow stakeholders to give input and feedback on Powerlink processes and methodologies to improve business decision making. It will also provide Powerlink with another avenue to keep stakeholders better informed about operational and strategic topics of relevance.

Powerlink is also aware that its infrastructure is linear in nature and that it has many community members as 'neighbours' with its infrastructure being located on an easement. Maintenance of good community relations requires the organisation to be aware of its obligations and expectations, to ensure it is operating safely and appropriately and to treat landowners respectfully in its ongoing dealings over the life of the relevant assets, including adhering to its *Land Access Protocol*. Powerlink therefore aims to communicate its intentions in a clear and transparent manner when building new transmission infrastructure or working on existing assets. Powerlink also takes a responsible approach to the management of land and broader environment in undertaking its activities in order to maintain its social license to operate.

2.9.3 Market Participants

Participants in the NEM place a high reliance on the ability of the transmission networks to facilitate successful operation of the electricity market. Powerlink has obligations under the National Electricity Rules regarding the provision and operation of its network to provide safe, reliable and cost effective transmission services to the NEM participants. There are also expectations that Powerlink will seek to maximise the operational capability of its network that is made available to the NEM, mitigate or reduce the impact of planned and forced outages on the NEM and engage NEM participants to balance the impacts on Powerlink against the broader impacts on the market.

Powerlink is also required to provide open access to its transmission network under the National Electricity Rules and conform with the terms and conditions of Connection and Access Agreements with network users.

2.9.4 Employees

First and foremost Powerlink seeks to provide a safe working environment for its employees. Safety is a key focus for the business and Powerlink has invested heavily in the Safe for Life program to help all employees make the behavioural changes required to improve performance and develop an interdependent safety culture.

Powerlink continues to recognise that its employees are essential to the success of delivering a cost effective and reliable electricity transmission service. To support this Powerlink strives to have an agile and performance focussed culture underpinned by employee engagement and individual accountability.

Powerlink's performance management framework has been designed to support the achievement of business objectives and to better integrate with related initiatives including our leadership strategy. Level-specific leadership accountabilities and standard performance agreement templates will enhance the consistency and understanding of performance. The new framework focuses on building greater alignment between individual and organisational objectives, clarity of position accountabilities, and achievement of stretch targets through the effective differentiation of performance.

2.10 Asset Management Strategies

The second step in the Asset Management Cycle considers the obligations and expectations identified under the strategic alignment phase and determines how Powerlink is going to respond in meeting or managing those obligations and expectations.

In meeting or managing these obligations and expectations, Powerlink manages its assets in accordance with "good electricity industry practice". Powerlink ensures all asset management strategies meet the relevant Australian/International Standards or in the absence of such standards, strategies must be consistent with modern industry standards and practices.

2.10.1 Powerlink's Mission, Vision and Values

Mission

We responsibly deliver electricity transmission services that are valued by our shareholders, consumers, customers and the market.

Vision

Powerlink is a safe, commercial and performance focused organisation that creates and delivers valued outcomes

Values

- Respectful
- Ethical
- Safe
- Proactive
- Cooperative

In fulfilling these strategic objectives Powerlink must also ensure its assets are managed in a manner that meets its statutory obligations, while considering good industry practice, stakeholder requirements and community expectations.

2.10.2 Powerlink's Strategic Themes

Powerlink has four strategic themes with which the Asset Management strategies must align. The strategic themes are reviewed annually to ensure they align with stakeholder needs and Powerlink obligations.

Safe for Life – keep everyone safe from harm

- Providing a safe environment for employees, contractors and the public.

Efficient Performance and Delivery – improving our business practices to deliver greater value

- Improving utilisation of the transmission network and productivity in all our business operations.
- Linking performance outcomes to those aspects which are within the control of the business to achieve agreed targets through continuous improvement.
- Continuing to focus on prudency and efficiency in all aspects of delivering regulated transmission services, and to live within or outperform regulatory targets, while maintaining sound and viable long term business operations.

Agile People and Processes – ensuring our people and processes adapt to a changing business environment

- Adopting flexible arrangements and contemporary business practices with a focus on innovation and learning.
- Attracting and retaining the necessary skills and capabilities.
- Achieving clarity of accountability across and throughout the business.

Stakeholder Value Proposition – providing valued outcomes for all stakeholders

- Engaging with our stakeholders to deliver mutually valued outcomes.
- Fit for purpose requirements for the land to meet business standards.
- Optimisation of total lifecycle costs, including impacts on construction and maintenance.
- Compliance with statutory and other planning requirements.

2.10.3 Powerlink's Values

Powerlink has established a Powerlink way of working. These are values associated with how we do work at Powerlink and the way in which each person working at Powerlink is striving to achieve Powerlink's overall goals. The Powerlink way of working is as follows:

Safe

We are responsible for the safety of ourselves, our colleagues, our contractors and the community and the safety of all is essential.

Cooperative

We work together as one team, show flexibility regarding individual and group outcomes to achieve the best overall results for Powerlink, customers and stakeholders. We resolve conflicts constructively through communication and discussion.

Respectful

We show courtesy and respect towards others at all times. We seek first to listen and understand other people's points of view, and then to be understood. We are fair, considerate and acknowledge the efforts of others.

Ethical

We are honest, professional, conscientious and accountable for our actions and behaviour. The trust of others is important to us.

Proactive

We take prompt action and shared responsibility for problem solving and overcoming challenges. We are open to new ideas and are prepared to take considered risks for Powerlink's benefit.

2.10.4 Asset Management Activities

Powerlink's Asset Management activities can be considered in line with the three key stages in the asset lifecycle. For each stage the corresponding strategic objectives, levels of service and process for achieving the strategic objectives is outlined.

Planning and Investment (Network Augmentation, Easements and Connections)

- Load Driven (Prescribed Services).
- Third Party Request (Non-Prescribed).

Operation, Maintenance and Refurbishment

- Network Operations - System Operating Parameters, Outage Management.
- Corporate Emergency and Security - Corporate Emergency Response, Asset Security.
- Maintenance and Refurbishment - Preventative & Corrective Maintenance, Refurbishment, Insurance Spares and Asset Monitoring.

End of Life (Asset Reinvestment and Disposal)

- Non-Load Driven (risk assessed investment).
- Disposal (retirement or network reconfiguration).

2.10.5 Planning and Investment

Powerlink takes an integrated and coordinated approach to the process of investing in new assets or reinvesting in assets that have reached the end of economic or technical life to ensure that network investments cost effectively meet the needs of customers and consumers. Capital investment in new assets is classed as either

network projects (the infrastructure that supports the high voltage transmission network) or non-network projects (that involve capital investments for business support and information technology).

Investments in the shared network, easements & connections must:

- Meet the needs of our customers and consumers;
- Meet requirements of Transmission Authority and National Electricity Rules;
- Meet the needs of our customers jointly with DNSPs;
- Support the efficient operation of the NEM, including assessing market benefits of augmentation;
- Ensure reliability and quality of supply; and
- Withstand credible contingencies**.**

2.10.5.1 Prescribed Services

Through its planning activities Powerlink seeks to meet its obligations under its Transmission Authority, Electricity Act and the National Electricity Rules, as well as community expectations for cost effective and reliable electricity supply. Due to legislative obligations to meet the standards of service these are considered as prescribed services.

Investments in network assets are triggered from load or non-load drivers. Given the current demand forecast the majority of Powerlink's network investments over the next five years are non-load driven resulting from assets reaching end of life (refer to Section 2.10.7). This results in reinvestments which are planned taking into account the demand forecast, the reliability of supply obligations and the configuration of the network[1]. Load-driven investments may involve network augmentations, connections between the transmission and distribution networks or land/easement acquisition.

Load Driven

In its planning activities Powerlink considers future network development must:

- meet the required levels of reliability of supply to consumers in an efficient manner;
- meet the needs of the market and support the efficient operation of electricity generation and supply system as a whole;
- comply with licence conditions and planning criteria;
- preserve options (including land access arrangements) which provide for future provision of infrastructure efficiently and comply with the state government requirements for future identification and planning of infrastructure;
- take due consideration of environmental impacts and balance environmental and development needs in a manner acceptable to the community;
- utilise technology and network architecture that serves to support an appropriate level of network availability and plant/equipment reliability; and
- adopt standardisation of assets as appropriate.

[1] The transmission network develops over time, which means there may be opportunities for reinvestment to occur in a configuration which is different to the original configuration.

To take account of the uncertainty inherent in demand forecasts and the even greater uncertainty in the location and size of future generation under the deregulated electricity market, Powerlink has adopted a comprehensive planning approach including the load forecasts and information available on possible generation developments, proposed power imports and other possible market developments.

At the point of each individual investment an exploration of feasible transmission and non-network options to meet a specific and well-understood need is undertaken.

During the investment decision-making process, Powerlink needs to ensure the investment is efficient and that the required processes are followed so that regulated revenue will be provided for the investment. In general, the following three basic steps should be followed while ensuring governance arrangements are followed throughout the project identification, selection and implementation:

- Ensure there is a clear or demonstrable need;
- Ensure that the right option (network and non-network) to address the need is chosen via economic comparison of options and compliance with any NER obligations such as the Regulatory Investment Test – Transmission; and
- Engage in effective project sponsorship to ensure efficient cost of implementation. The investment process involves definition of project deliverables to ensure that the criteria for the augmentation are well defined and commensurate with relevant network investment decision, equipment strategies, and configuration and design standards.

Details of the planning process are contained within Powerlink's Asset Planning Criteria policy document.

Powerlink has a well-established integrated process for network investment decision making and coordination that takes into account regulatory, customer, network planning, reliability and performance outcomes of the proposed investment.

In deciding what assets are required and the form that the assets should take, the following shall be considered:

- Statutory compliance obligations;
- Reinvestment decision - life extension, replacement or decommissioning;
- Architecture and topology - equipment, configuration and design standards applied to substations, transmission lines and other systems;
- Asset life cycle factors - plant maintenance, reliability, maintainability and support;
- Community and environmental impacts; and
- Revenue considerations.

Easements

In order to provide for the construction of new or refit existing network assets, Powerlink must at times purchase property, extend existing easements or acquire new easements. Detailed planning for future land requirements is carried out in conjunction with knowledge of development occurring around the State, which might impact on the availability of suitable land or easements for the construction of transmission infrastructure.

Consideration of future development is also necessary to ensure infrastructure is available to meet supply obligations on Powerlink. The Queensland Government has an increased focus on infrastructure requirements and coordinated development. For example, in the South East Queensland area where the SEQ Regional Infrastructure Plan has been developed to manage development activities and ensure infrastructure is planned well in advance (typically 20 – 25 years).

Such long term jurisdictional land use planning is a key driver for Powerlink to identify and secure easements and substation sites well in advance.

Powerlink's powers of easement acquisition can be exercised in accordance with Acquisition and Land Act. To construct electricity infrastructure on easements or land Powerlink must comply with all relevant legislation, including the ministerial designation of the relevant land for community infrastructure under the Sustainable

Planning Act. Powerlink also undertakes an extensive consultation process to seek community, stakeholder and landholder input on the acquisition of new land and easements, including engagement at the corridor selection stage.

Powerlink must comply with a wide array of planning, environmental and cultural heritage legislation when seeking designation. Legislation that dictates these compliance issues is actively reviewed and registered within Powerlink's compliance systems.

2.10.5.2 Third Party Request – Non Prescribed

Provision of non-prescribed transmission services can be carried out on an opportunistic basis. Powerlink has a legal obligation to provide access to our transmission network to third parties who wish to connect. The provision of connection services could be contestable or it could be a combination of negotiable/negotiated and contestable services depending on the arrangement and the point of connection to the transmission network.

Powerlink adopts the same approach to the asset management of its prescribed and non-prescribed assets.

2.10.6 Operation, Maintenance and Refurbishment

Powerlink's operating, maintenance and refurbishment process is driven by the need to provide safe, reliable and cost effective transmission services that are valued by customers and consumers whilst facilitating the effective operation of the competitive electricity market. To this end Powerlink carefully balances each of these activities in conjunction with consideration of the life cycle of assets through a risk assessment process.

Maintaining effective operating strategies is essential for ensuring Powerlink is able to:

- Operate the network within NER requirements;
- Minimise impact of planned and forced network outages on NEM participants;
- Engage in efficient practices for fault management and restoration, through remote access and condition monitoring;
- Ensure that the security management framework for Powerlink's assets is consistent with Guidelines for Protecting Critical Infrastructure Against Terrorism;
- Conduct an annual program of emergency response exercises to make Powerlink ready and able to respond to network emergencies; and
- Ensure continuity of the transmission network and business through the implementation of disaster recovery facilities.

2.10.6.1 Network Operations

System Operating Parameters

In terms of system operating parameters, Powerlink maintains a range of strategies that ensure compliance with our three primary operating guidelines:

- Responsibilities under the TNSP instrument of delegation with AEMO;
- National Electricity Rules – providing guidelines on high voltage network reliability, security, system operating parameters and network resiliency to outages; and
- Power Systems Data Communications Standard – providing reliability and availability guidelines on data requirements for the operation of the transmission network.

A centralised operations group implements system operating parameters through a range of functions described below:

- System setting coordination;
- Network support agreement management;
- Operating agreements with market participants;
- Network constraint equations;
- Network operating ratings;
- Assisting AEMO with network black start arrangements;
- Power quality; and
- Operational contingency plans.

Outage Management

Outage management is pivotal in Powerlink achieving the following outcomes:

- Ensuring compliance with the National Electricity Rules;
- Effective work progress against the maintenance plan and capital works program; and
- Managing outages for projects and maintenance, providing decision support for scheduling and reducing system restoration time.

In keeping with these objectives, Powerlink has developed a range of systems for works and outage management that allow for the forward projection of future work requirements and the coordination and optimisation of outages on the transmission network. Long term outage plans are provided to AEMO in accordance with outage notification requirements.

2.10.6.2 Corporate Emergency Response and Security

Corporate Emergency Response

With respect to Corporate Emergency Response, Powerlink Queensland is committed to:

- in order of priority: human life, safety and welfare, environment, property, security of supply, responsible corporate governance;
- open communication with all stakeholders, including the public and the media;
- ensuring contingency and emergency management plans exist for all of the key elements of the Corporation's risk profile, with plans being regularly reviewed and updated;
- ensuring the physical and emotional welfare of staff and their relatives in emergency situations; and
- providing regular training, exercises and reviews.

In achieving these objectives, Powerlink has developed emergency response procedures for different levels of incidents, as applied to different types of plant, equipment and systems. Emergency management plans exist for the transmission network; business continuity; environmental/cultural heritage emergency; and work health and safety.

Each of the different emergency management plans involve three levels of corporate emergency, ranging from a standard event that can be handled by Powerlink using existing resources, to a major jurisdictional event managed by external emergency authorities where Powerlink manages its own network response in co-ordination with the greater response.

Roles and accountabilities for Powerlink staff vary depending on the significance of the emergency. The CEMH sets in place procedures for emergency response and event escalation where appropriate, and defines accountabilities and roles for each type of emergency condition. For transmission network emergencies Powerlink's corporate emergency escalation framework is matched with AEMO's arrangements.

Corporate Emergency Response strategies also take account of network disaster recovery facilities, coordination of major system event investigations and liability management frameworks.

Security

Powerlink has established strategies to manage its obligations as a Critical Infrastructure operator and is intended to progressively improve the security of transmission infrastructure to:

- ensure the safety of the public and our employees;
- protect our business against security-related disruptive acts;
- protect confidential data within a secure framework; and
- minimise loss and theft of assets and information.

Powerlink is also committed to the following objectives:

- Identification of vulnerabilities;
- Risk mitigation strategies;
- Prevention;
- Detection;
- Delay; and
- Response.

A corporate model for security has been implemented that places focus on the following two primary security aspects:

- Physical Security – denoting the physical measures applied to buildings, control centres, communications facilities and transmission infrastructure (transmission lines and substations) and the personal security of employees.
- Information Security – applies to security implemented in digital technology areas to prevent unwarranted external or internal access (firewalls, intrusion detection, and secure access gateways) and the dissemination of viruses. Also applies to the secure administration of data, with respect to access privileges, documentation classification frameworks, and user profiles.
- Personnel security – applies to the reliability, trustworthiness and integrity of Powerlink employees and authorised persons.

2.10.6.3 Maintenance and Refurbishment

Powerlink has a responsibility to provide cost effective and efficient transmission services to customers and other NEM participants. To do this Powerlink needs to ensure network assets deliver the required reliability, availability and quality of supply while doing so at minimum whole of life cost. The maintenance and refurbishment arrangements are critical elements of achieving these outcomes.

The overall Asset Management system must therefore, effectively coordinate and integrate the high level design and selection of equipment with the ongoing requirements for asset monitoring, maintenance and refurbishment. Selection and configuration of plant making up assets must focus on maintainability, supportability and compliance as well as consideration of life cycle factors. In addition to providing for optimal design, maintenance and operating procedures, the selection process needs to coordinate with the capability and availability of resources.

In line with the **Asset Maintenance Policy**, Powerlink has utilised a Reliability Centred Maintenance (RCM) approach since 2004 to establish plant maintenance requirements which provides a framework for logically analysing the potential failure modes of plant, equipment and systems, as well as their likely effects and consequences. This analysis is used to review and update the responsibilities for, and frequency of, maintenance activities, including the levels of spares to be carried and any training required so as to maximise plant reliability and availability whilst optimising ongoing maintenance costs.

Key to this model is the systematic investigation of:

- what functions and performance standards the asset must meet;
- the possible causes of failure;
- the consequences of any failure(s); and
- the formulation of actions to ensure the asset continues to do what it is designed to do.

Correct application of the RCM approach will yield:

- detailed maintenance schedules for each major item of plant and part thereof;
- revised operating procedures; and
- design corrections to address those situations where the asset cannot deliver the desired performance in its current configuration.

Central to the application of the RCM model is the timely collection of information on the condition and performance of the asset.

Powerlink classifies maintenance as shown and described below in Figure 5.

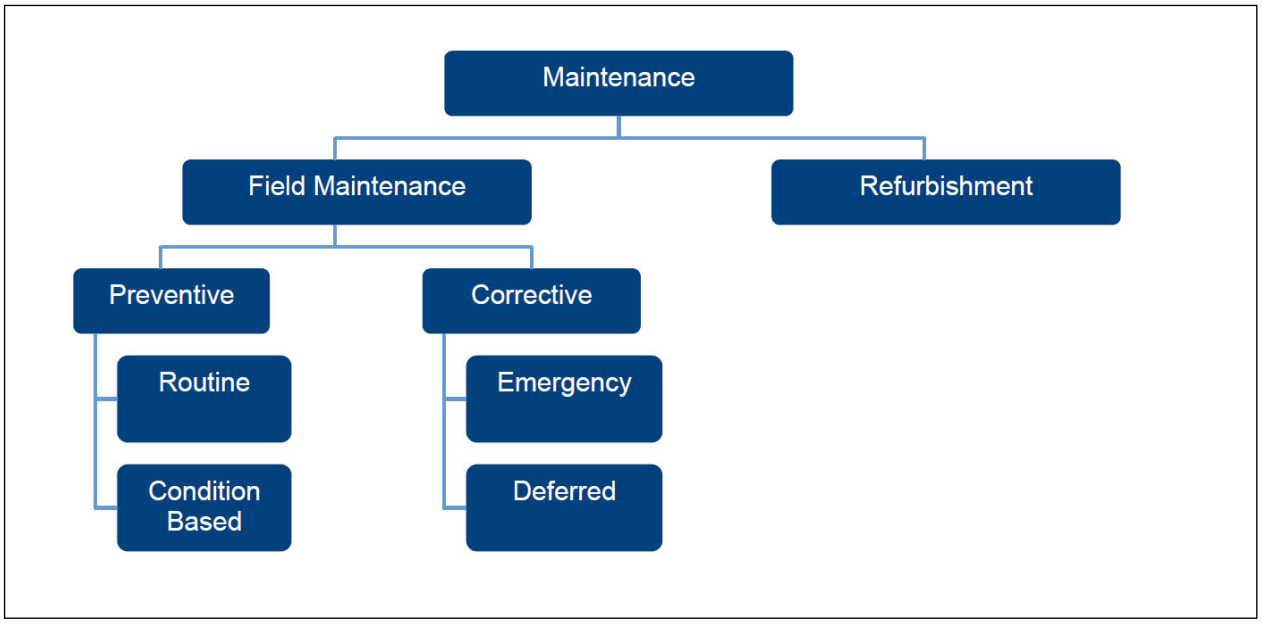

Figure 5. Types of Maintenance

Preventive and Corrective Maintenance

Preventive Routine maintenance is undertaken when hidden failures exist in plant or equipment that must be addressed through various forms of routine activity – although this activity can be sometimes performed remotely by leveraging off Powerlink's innovations in remote interrogation.

Preventive Condition Based maintenance usually evolves out of routine maintenance or inspection, where a technician notes that an item of plant or equipment is operating out of tolerance and requires attention at some point in the future.

Corrective Emergency maintenance can occur at any time, and involves faults that must be attended to immediately to preserve human safety, manage environmental issues or return plant to service to reduce the impacts of network outages on our customers.

Corrective Deferred maintenance involves faults on plant and equipment that are not urgent and can be prioritised and aligned with other work in the future to optimise maintenance costs and effort.

Powerlink's integrated asset management system SAP allows for the recording of:

- routine field maintenance schedules;
- notifications relating to condition based and corrective activities;
- any faults and their likely cause;
- restoration works required; and
- costs.

This integrated approach ensures Powerlink can:

- develop profiles of its plant items with respect to quantity, type, age and maintenance costs;
- designate assets as regulated or non-regulated;
- maintain a central repository for plant history (routine works, defect reporting, work orders); and
- optimise maintenance strategies by having a close linkage between maintenance plans, reporting and the financial management systems.

Insurance Spares

Powerlink holds network insurance spares in order to provide the level of network and plant availability to comply with the National Electricity Rules. Insurance spares enable critical system elements to be returned to service without excessive delays restoring the network to its former condition and reducing the risk of interruption to supply. The significant lead times to obtain replacement items of major primary plant can be in excess of 12 months. Operating the network without critical elements for extended periods of time restricts maintenance access and leads to unacceptable level of probability of loss of supply in the event of further failures.

Powerlink will hold network spares as appropriate as a form of insurance so as to ensure the required level of system and plant availability as well as reliability standards laid out by the National Electricity Rules are met. The numbers of spares are determined such that the network can be returned to service in line with reliability standards while not compromising the remaining network until the appropriate replacements can be sourced.

Refurbishment

Assets within the transmission network may need to be refurbished in order to maintain the capability of an asset during its life for the provision of network services, and is governed by the **Asset Refurbishment Policy**. Refurbishment can be triggered by a range of factors and is typically considered when the cost and effort to maintain the plant or equipment is more than normal maintenance expenditure, or when a systematic problem in need of repair has been identified. Refurbishment is an operating expense to the business, as opposed to reinvestment at end of life which is a capital expense.

Asset refurbishment involves activities that return an asset to its pre-existing condition or function, or activities undertaken on part of an asset to return that specific component to its pre-existing condition or function. In contrast, asset replacement is an activity that involves the complete replacement of a financial asset to achieve an improvement or increase in the capacity, capability or compliance of the pre-existing asset or involves extending the life of the asset beyond the financial life it would otherwise have. Asset replacement is undertaken via a capital project.

Refurbishment plans are developed on an ongoing basis and budgeted for annually. Base data for the refurbishment program is derived from plant condition assessments, maintenance service provider feedback and the root cause analysis of plant and equipment failures.

Asset Monitoring

Powerlink has adopted a range of technologies that allow it to remotely monitor its assets for the purposes of fault and configuration management as well as condition/performance monitoring.

The use of remote monitoring technologies for fault management helps improve response times and decrease the impact of forced outages, while remote condition and performance monitoring can reduce the need for

intrusive local maintenance activities and provide direct performance feedback that can be used to modify or refine scheduled maintenance activities.

Tracking settings applied to the high voltage transmission network, and those software configurations applied to digital technologies, also ensures Powerlink has consistent data available for the restoration of the network in the event of plant or equipment failures.

2.10.7 End of Life

The end of life phase of the asset involves considering an asset's ongoing fitness for purpose and whether an asset should be disposed of or reinvestment should occur. Any reinvestment decision needs to also consider the requirements associated with planning and investment to ensure optimal economic outcomes.

Asset end of life investment, governed by Powerlink's **Asset End of Life Policy** makes up most of the projects that are not driven by load growth.

Asset replacement, life extension or disposal includes:

- Considers current and future network needs;
- Ability to maintain plant capacity;
- Ability to maintain plant capability (reliable, maintainable, and supportable); and
- Compliance (security, environment and safety).

2.10.7.1 Non Load Driven Asset Replacement

Non-load driven network projects are predominantly associated with the reinvestment of assets to maintain the capacity or capability of the transmission network or to ensure security of our infrastructure or compliance with legislation and statutes. Unlike load-driven projects, investment decisions in this environment are taken against risk management frameworks, to optimise the timing and type of reinvestment against the risks of the asset remaining in service.

Powerlink considers that the age of an asset does not provide for automatic justification of its replacement, but is a trigger for condition assessment or other analysis that then determines whether the asset requires reinvestment due to issues with capacity, capability or compliance. The terms capacity, capability and compliance are used to broadly describe a number of specific issues that may lead to asset reinvestment action, such as poor performance, new standards, rising fault levels and obsolescence.

Planning of the network optimises the network topology as assets reach the end of their technical life so that the network is best configured to meet current and future capacity needs. Individual asset investment decisions are not determined in isolation. Powerlink's integrated planning process takes account of both future changes in demand and the condition based risks of related assets in the network. The integration of condition and demand based limitations delivers cost effective solutions that manage both reliability of supply obligations and the risks associated in allowing assets to remain in- service. Risk assessments are carried out for asset replacement projects that focus on the likelihood of failure (including assessment of dominant failure modes; characteristic age and shape factor for the dominant failure mode and failure rates) and the consequence of failure.

In response to these risks, a range of options are considered as asset reinvestments, including removing assets without replacement, non-network alternatives, line refits to extend technical life or replacing assets with assets of a different type, configuration or capacity. Each of these options is considered in the context of the future capacity needs accounting for forecast demand.

Where possible, asset reinvestment requirements are to be integrated into the load-driven capital works program. In this way, Powerlink can capitalise on opportunities to coordinate a range of similar projects (through work type, geographical location or timing) to achieve economies of scale and optimised delivery.

Risk Assessment

Risk assessment plays a significant role in the management of Powerlink assets. It provides the means for understanding the potential cause, effect and likelihood of adverse events, as well as the mechanism for managing such risks.

Powerlink's process of risk management from an asset management perspective involves:

- identifying the potential risks (including possible failures and consequence of failures) associated with the network's critical assets;
- determining the most suitable asset management activity to control the risk(s). Although primarily undertaken towards the end of an assets technical life, such risk assessments are considered all through the life of the asset and the asset management activities resulting will vary depending on the outcomes of the assessment. Activities could include maintenance, refurbishment or asset reinvestment; and
- prioritising the allocation of resources to any identified activities based on timing and level of risk(s).

Each asset group uses a risk assessment framework in line with AS/NZS ISO31000:2009 Risk Management and the Powerlink Risk Management Standard.

To assess risk Powerlink undertakes a periodic review of the network assets to assess a range of factors influencing the capacity, capability or compliance of the asset, including, but not limited to:

- physical condition;
- capacity constraints;
- fault levels;
- spares levels;
- performance and functionality;
- reliability and availability;
- training and supplier support;
- maintenance history and costs;
- outage performance; and
- statutory compliance.

2.10.7.2 Disposal

Asset disposal is considered where the asset is deemed to be not required in the current and future network topology in conjunction with factors including significant performance or reliability deterioration and/or significant ongoing costs for maintenance and refurbishment.

Disposal includes strategies to disconnect, decommission and/or demolish an asset and is considered in cases where load driven needs have diminished or can be deferred in order to achieve long-term economic benefits. However, these economic savings can come at a trade-off: loss in headroom and potential loss of easements, amongst others. There are three broad themes that Powerlink considers:

Network Resilience to change or uncertainties

- Future network capability – lowest long run cost option may have the effect of reducing network capability to support growth.
- Forecasting uncertainty – various views on demand forecast growth and impact of potential technology changes.
- Operational flexibility – more load at risk during planned outages, or more constraints on obtaining outages.
- Future access to easements – preserving flexibility for emergence of new load centres.

Strategic value of land & easements

- The “option value” of access to land and easements over the very long term which is particularly important in urban areas.
- The potential impact of not retaining an easement or assets to provide access to future new load centres.

Stakeholder impact

- Under retirement, Powerlink considers a number of options to deal with ‘surplus’ assets
  - Disposal and removal;
  - Disconnect and make safe; and
  - Retain under maintenance.

Such options will impact landholders and community to different degrees.

2.11 Resource Alignment

Resource alignment needs to consider:

- Planning;
- Implementation; and
- Cost and Resource Management.

2.11.1 Resource Planning

It is important that resources are available to achieve the strategies which are to be implemented and that the resource needs are taken into account in the development of the Asset Management strategies.

Powerlink uses a range of tools to develop resource plans over different forward planning horizons.

In the medium to long term, scenario and asset desktop analysis is used to develop capital forecasts that provide macro level indications of longer term future asset investment requirements. This high level forecast is provided in the Asset Management Plan and factored into analysis that forecasts the combination of capital and operational project workload. Further modelling is used to devise forecasts for operations and maintenance workload and expenditure and are captured in the Portfolio Plan.

In the shorter term, when Powerlink develops more confidence in the future requirements for load driven network projects (network augmentation, customer connections and easements) and non-load driven network projects (capital reinvestment, etc.), an integrated capital works plan is developed that provides a short term indication of future project workload.

Operational expenditure in the short term is based on an annual budgeting cycle, which includes the delivery of maintenance plans and activities, operational support and anticipated expenditure on the refurbishment program.

2.11.2 Implementation Strategies

Powerlink has adopted implementation strategies across its portfolio of projects and activities aimed at efficiently delivering the overall work program. Powerlink recognises that skilled resources are valuable and can be in short demand. Implementation strategies therefore continue to take into account management of resource requirements, particularly human resource requirements. The following strategies continue to be adopted:

- Design standardisation – using standard designs for major elements of substations and transmission lines to minimise the amount of customisation required and take advantage of economies of scale.
- Program management – grouping of projects into bundles of work that can be awarded to major contractors to allow them to plan ahead with certainty and secure their own resources.
- Supply chain management – the establishment of long term panels for design, construct and test contractors coupled with panels for the procurement of standard equipment support both the cost effective and timely delivery of projects.

- Streamlined easement and land acquisition – earlier identification of easement requirements to help ensure access can be provided at the time required by the contractor as the requirements of the processes to achieve planning approvals continue to extend.
- Outsourcing – outsourced companies can utilise already established standard designs and maintain Powerlink standards and consistency of plant type and installation.
- Internal staff – Powerlink continues to perform well as an employer of choice and seeks to maintain that position.

2.11.3 Cost and Resource Management

Powerlink is targeting the efficient implementation of work associated with network operation, field maintenance, refurbishment and project delivery. Wherever practical, performance based agreements are used for managing the relationship between Powerlink and its service providers.

Operational expenditure budgets are developed that reflect the planned and expected work in the categories of field maintenance, refurbishment projects, maintenance support and network operation. These budgets are subject to review to ensure expenditure is within targets and that the work is being conducted in a manner that maintains the reliability and security of the transmission network.

A key component of controlling costs and achieving efficiencies involves the forecasting and management of the routine maintenance workload and refurbishment projects, in conjunction with the ongoing management of non-routine maintenance and Powerlink's capital project program for the full range of network projects.

Powerlink also continues to pursue innovative work techniques that optimise maintenance or operating costs, reduce risk to personal safety, reduce the requirement for planned outages on the network or allow the organisation to respond faster in restoring the network after faults.

A range of initiatives have been put in place to achieve these outcomes, including:

- Asset Monitoring – established by leveraging off Powerlink's deployment of advanced digital technologies and high capacity telecommunications, the Operations & Field Services Division provides centralised fault management, configuration management and plant condition monitoring.
- Live line and substation work – Powerlink has pioneered the introduction of live line and substation work in Australia, and it has become an intrinsic part of Powerlink's strategies for reducing the impact of planned outages on NEM participants.
- Contracted maintenance service provision – outsourcing a large part of maintenance throughout the state has assisted in achieving cost effectiveness in delivering maintenance activities through synergies of local involvement or provision of specialised services from suppliers dedicated to that work type. Powerlink has established relationships with a number of service providers, including Ergon (ground based) and Aeropower (aerial), who contribute to the effective maintenance of Powerlink's assets.

Powerlink's management of field activities includes an audit provision that allows it to ensure compliance with:

- performance or delivery requirements;
- Powerlink policies or procedures;
- the Service Provider's own internal policies or procedures; and
- recognised standards of work, including safety and environmental requirements applicable to the area of work.

Powerlink undertakes regular auditing of maintenance service providers against technical and process based performance indicators, and also audits service providers for compliance with safety and environmental requirements. Auditing policies, procedures and checklists are maintained to support each of the auditing functions.

The outcome from these audits in conjunction with plant performance information also allows Powerlink to assess the outcomes of its overall maintenance and refurbishment strategies against the desired outcomes. This facilitates the continuous improvement part of the overall Asset Management Cycle.

Powerlink's financial systems are structured so that costs are allocated to financial assets based on the plant item being worked on. As all plant is associated with assets, which are assigned a regulated, negotiated or non-regulated status, the costs associated with the plant are automatically aggregated to the appropriate cost centre. In this way, Powerlink can apply the same strategies to managing its assets and costs will be allocated appropriately irrespective of whether prescribed or non-prescribed transmission services are being provided.

2.12 Continuous Review

Continuous review needs to consider:

- System performance;
- Business performance;
- Documentation; and
- Consultation and Communication.

2.12.1 System Performance

Powerlink undertakes a range of routine system performance reporting activities, with particular focus on compliance with:

- National Electricity Rules;
- AEMO Power Systems Data Communication Standard;
- AER Service Target Performance Incentive Scheme; and
- AER Market Impact of Transmission Congestion.

In order to support advanced system performance monitoring, Powerlink has developed the following range of tools for the collection and analysis of performance data.

- Integrated asset management system (SAP) – providing data on routine maintenance progress, defect reporting and plant history, enabling the development of broad trending in plant and equipment performance.
- Forced outage database (FOD) – database developed to provide details of forced outages on the network, including nature of outage, restoration timeframes and an appraisal of the root cause of the outage.
- OSI-PI – data-mining applications that provide automatic analysis (reliability, availability and equipment performance statistics) of real-time SCADA information and near-real time OpsWAN data.
- Energy Management System (EMS) – provides real-time monitoring of the high voltage network in a 24x7 control centre environment. The EMS also includes a range of applications designed to provide decision support in the operation of the HV network, including network utilisation forecasting and constraint analysis.
- Operational Wide Area Network (OpsWAN) – provides a wide area network connection between intelligent digital devices that monitor, control and protect the HV transmission network. This level of interrogation underpins the remote asset monitoring strategy and is used to accelerate fault management and undertake remote condition monitoring of our assets.

The specific application of these tools to the measurement of performance and condition across the network's assets is outlined in the Asset Methodologies.

2.12.2 Business Performance

Business performance includes:

- Capital investment; and
- Controllable operating costs.

2.12.2.1 Capital Investment

The performance of Powerlink's capital investments is managed through a range of business processes. In the asset investment phase, Powerlink conducts reviews of the project approval and selection process to ensure the planning and approval is carried out thoroughly and efficiently, including any consultation processes required under the National Electricity Rules and for application of the Regulatory Investment Test - Transmission.

Throughout the implementation phase of the project, the Investment & Planning Division retains project sponsorship responsibilities, including budget approval, variation control and the provision of direction on the technical outcomes of the project. This level of accountability ensures that project implementation is achieving the right outcomes at a cost that is still efficient.

2.12.2.2 Controllable Operating Costs

Management of controllable operating costs is achieved through annual budgeting, and ongoing review (monthly, quarterly and annual) of planned operational expenditure against actuals.

Each of Powerlink's contractual relationships with service providers is focused on managing performance via key performance indicators relating to timely delivery of work, cost-efficiency and quality outcomes. The outcomes of these Service Level Agreements are geared to the careful management of service provider costs, whilst ensuring that work is undertaken in a timeframe that ensures reliability and quality of supply and in a manner that achieves quality outcomes.

2.12.3 Documentation

As part of Powerlink's asset management process there is a requirement to maintain and communicate information in a systematic way in order to ensure that the broader organisation can understand and operate in accordance with the Asset Management Policy and Strategy.

To support this outcome, Powerlink has established a hierarchical documentation framework, known collectively as Asset Management (AM) documents, consisting of strategies, policies, procedures and checklists that are managed within corporate document management system, Objective. Procedures are in place for controlling, revising, approving and transmitting these documents to relevant stakeholders.

Each asset group expresses the specific information related to its assets through AM Documents, which are reviewed on a periodic basis.

2.12.4 Consultation and Communication

Powerlink's asset management process is inherently collaborative and at each stage in the asset lifecycle, consultation and communication is undertaken through a range of processes and forums.

In order to monitor and improve maintenance effectiveness and efficiency through the Operation, Maintenance and Refurbishment phase of the asset, issues affecting plant and network performance, plant reliability, maintenance effectiveness and work programming are discussed regularly at the following forums:

- Network Management Forum; and
- Maintenance Co-ordination Meetings.

The Network Management Forum involves representatives from across the business and Maintenance Service Providers' management. All events that have occurred on the system are reviewed along with any other issues that may affect asset performance (capital program, maintenance progress etc.).

Maintenance Co-ordination Meetings are held quarterly to discuss maintenance and design policy, and obtain quality feedback from the field maintenance experience.

3. Distribution list

Internal	Contact details
☒ Chief Executive	Chief Executive
☒ Finance and Business Performance	Executive Manager Finance & Business Performance
☒ Investment and Planning	Executive Manager Investment & Planning
☒ Infrastructure Delivery & Technical Services	Executive Manager Infrastructure Delivery and Technical Services
☒ Operations and Field Services	Executive Manager Operations & Field Services
☒ People and Culture	Executive Manager People & Culture
☒ Stakeholder Relations and Corporate Services	Executive Manager Stakeholder Relations & Corporate Services