Asset Management Strategy

Powerlink QUEENSLAND

vision *To be the leading transmission network service provider in Australia, and one of the best in the world.*

mission *Powerlink Queensland is committed to delivering transmission network and related services at world-class levels of safety, reliability and cost-effectiveness.*

values *We value:*

> Reasonable returns for the owners
> Value for money services to our customers
> The well-being of our employees
> Community recognition as a good corporate citizen
> Fair and courteous dealings with our suppliers

contents

ASSET MANAGEMENT IN POWERLINK

Powerlink Queensland is a Transmission Network Service Provider (TNSP) in the 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 committed to meeting its obligations to a range of stakeholders, including shareholders, NEM participants, grid customers and the broader community.

In meeting these obligations, Powerlink must implement strategies to effectively manage the development, operation and maintenance of its high-voltage network and information technology assets. This *Asset Management Strategy* provides an overview of current asset management strategies, and in conjunction with an analysis of the key business drivers and risks in Powerlink's operating environment, details the primary strategic objectives of asset management in Powerlink.

Asset management deals in three primary timeframes in the life cycle of an asset:

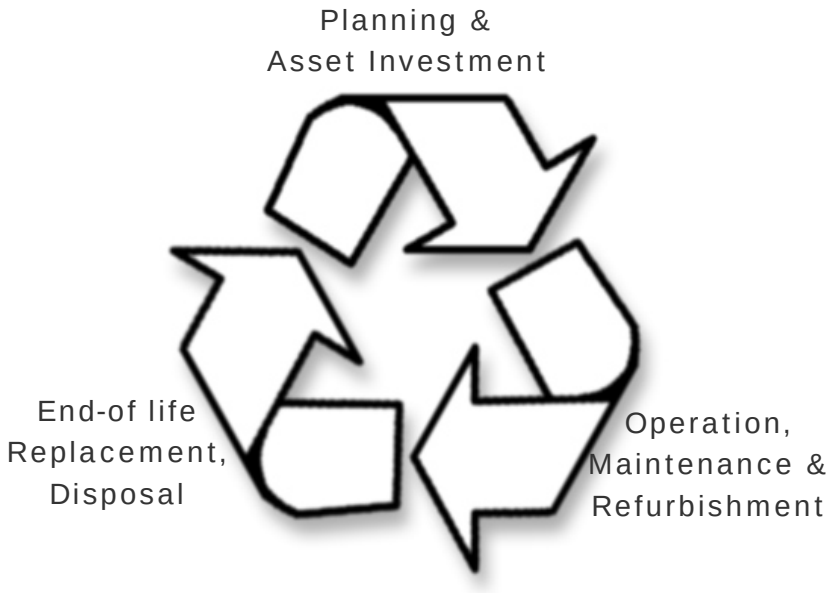


Figure 1. Asset Lifecyle

(i) Planning and Asset Investment – This stage involves deciding when new assets are needed, what assets are appropriate and economic for that need, and what form those assets should take.

(ii) Operation, Maintenance and Refurbishment – Transmission assets typically have a long life (sometimes around 50 years). This stage involves ensuring each asset remains fit for purpose, including appropriate operating and maintenance strategies, refurbishment, and ongoing assessment of the condition of the assets

(iii) End of Life, Replacement & Disposal - Towards the end of the economic & technical life of the asset (which is determined by the condition and age of the asset, and its ongoing fitness for

purpose) consideration needs to be given to whether an asset should be disposed of or replaced. The replacement decision may be a “standalone” decision, or it may, depending on the circumstances, need to be made in conjunction with the planning stage for new assets to ensure optimal economic outcomes.

Because the electricity transmission system is progressively developed over time to meet ongoing load growth,, Powerlink has assets at all stages of the lifecycle.

In mid-2005, Powerlink restructured its business into 2 broad groups - a service delivery group (under the leadership of the Chief Operating Officer) and a corporate group. The aim of the restructure was to provide the necessary focus on the end-to-end delivery of network services (from conception through development, operations and maintenance, to disposal/replacement) through a Network Service Delivery model. This restructure has triggered a review of the Asset Management Strategy to ensure alignment with the focus on Network Service Delivery.

The asset management process adopted by Powerlink is shown below.

Figure 2 – Powerlink Asset Management Process

The Asset Management process is one of continuous improvement, focused on four primary elements of the asset management cycle: strategic alignment, asset management strategies, resource planning and performance review. In Powerlink, asset management philosophies are applied at every stage of an asset's life.

Strategic alignment

This aspect of the asset management process involves consideration of stakeholder requirements, corporate strategies and levels of service that drive the strategic objectives of the asset management function.

Asset management strategies

Asset management strategies are in place for the full cycle of an asset's life. The strategies set the broad framework for how Powerlink:

- Plans for, and invests in, new assets to meet the long term needs of grid users
- Manages the operations and maintenance of existing assets to ensure they deliver safe, reliable and cost-effective services
- Makes decisions regarding asset refurbishment, replacement & disposal.

Safety, Community and Environmental issues are considered to be intrinsic factors in the operation of Powerlink's business, and are hence considered an integral part of the overarching asset management strategy.

Resource planning

Resource planning is a key part of asset management in Powerlink. Powerlink manages a range of different work related to delivering projects, operating the network and maintaining our assets. In achieving this broad range of deliverables, there is a significant requirement for human resources, both from within the business and from a range of construction, commissioning and maintenance contractors. In addition, forecasts of future material requirements are essential in the delivery of work programs. With Powerlink's increasing capital and operational project workload, there is a growing need to more closely align and plan the portfolio of project work to optimise resource utilisation.

Performance review

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 and maintenance of existing assets.

STRATEGIC ALIGNMENT

The first step in the formulation of the asset management strategy involves an assessment of the range of factors that contribute to Powerlink's strategic objectives, including stakeholder requirements, corporate strategies and the levels of service to which Powerlink must conform.

Recent years have seen high growth in electricity demand and well-publicised reliability shortcomings (primarily in distribution networks) have focussed consumers on the primacy of reliability of supply. The overwhelming consumer expectation in Queensland for reliable electricity supply is illustrated by recent media coverage such as *"Electricity suppliers have a duty to their customers to explain what they are doing to try to guarantee electricity supplies"* The Courier-Mail, February 2004.

The Queensland Competition Authority acknowledged the consumer expectation for high reliability in their final determination regarding Regulation of Electricity Distribution, April 2005:

"...the community is not prepared to risk falling service quality and potential system failure in return for lower prices...service quality should increase and system security should be paramount".

Powerlink's Asset Management Strategy reflects this need to deliver high reliability at a reasonable price .

Stakeholders

In considering Powerlink's strategic position, the requirements of a range of stakeholders must be taken into account. In this regard, Powerlink believes there are four primary stakeholders that contribute to our asset management strategies in some way: shareholders, market participants, customers & community, and our employees.

Shareholders	➲ Meet our statutory and regulatory obligations ➲ Achieve adequate return on investments ➲ Maintain our reputation as a good corporate citizen
Market Participants	➲ Provide safe, reliable and cost-effective transmission services to users of the grid ➲ Maximise the available network capacity from the existing and committed network. ➲ Develop and operate a transmission network that reduces constraints within the NEM where it delivers net market benefits ➲ Conform with the terms of Connection and Access agreements ➲ Mitigate or reduce the impact of planned and forced outages on NEM participants ➲ Engage NEM participants with effective and timely communication on issues that affect them

Customers & Community	➲ Provide electricity supply in accordance with our reliability of supply obligations with high quality of service ➲ Provide electricity transmission services efficiently ➲ Take a responsible approach to the management of land and the broader environment ➲ Minimise the impact on the community of transmission infrastructure ➲ Engage in effective community consultation when building new transmission infrastructure or working on existing assets.
Our Employees	➲ Provide a safe working environment. ➲ Achieve a work life balance. ➲ Develop our employees to possess the competence and motivation necessary to excel in an environment of high achievement.

Corporate Strategy

Powerlink has a number of corporate strategies with which the asset management strategies must align. The corporate strategies are reviewed annually to ensure they align with stakeholder needs and Powerlink obligations.

1	***Develop the Networks We Own And Manage*** ➲ Develop the Queensland transmission grid to meet customer needs. ➲ Leverage Powerlink's core competency in managing transmission networks by providing asset management and related services to other network owners.
2	***Achieve Operational Excellence*** ➲ Safety – provide a safe environment for employees and the public. ➲ Environment – demonstrate regard for the environment by complying with all relevant legislation. ➲ Cost-efficiency – be the most cost effective transmission business in the NEM, and achieve improved results across the whole business each year. ➲ Network performance – exceed the service standards.

3	**Grow non-regulated profits** ➲ Selectively grow non-regulated business by leveraging core competencies where we have a sustainable competitive advantage.

Technology Vision and Strategic Framework

Powerlink has a *Technology Vision and Strategic Framework* that is also reviewed and updated annually. The technology vision supports the development of strategies and plans for decision support systems, business technologies, network technologies, and communications infrastructure to meet business and technology needs. The technology vision recognises the high rate of change of technology and considers how Powerlink can take advantage of changes while balancing the potential downside of being an early adopter of new technologies.

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.

Network Investment	➲ Meet mandated reliability of supply obligations in Powerlink's Transmission Authority. ➲ Plan network development in accordance with the transmission authority, the Electricity Act and the NEM Rules. ➲ Meet the needs of our customers ➲ Support the efficient operation of the NEM through consideration of investments that deliver net market benefits. ➲ Ensure reliability and quality of supply ➲ Ensure plant is replaced in an orderly manner to maintain reliable supply to consumers ➲ Maintain and upgrade security as necessary to appropriate levels for critical infrastructure
Network Operation & Maintenance	➲ Maintain plant to provide safe, reliable electricity supply ➲ Minimise the risk of and actual loss of supply events ➲ Conform with National Electricity Rules ➲ Conform with the requirements of our TNSP Operating Agreement with NEMMCO

	➲ Monitor performance against the AER service standards ➲ Meet the needs of our customers ➲ Meet the requirements within the Power Systems Data Communications Standard ➲ Withstand credible contingencies (N-1)
Market Participants & Customers	➲ Meet the terms of Connection and Access agreements ➲ Conform with the National Electricity Rules ➲ Maintain effective NEM participant and customer relationships
Environment	➲ Have no reportable environmental incidents ➲ Comply with environmental, planning and cultural heritage legislation, translated into Powerlink's environmental strategy plans ➲ Maintain an Environmental Management System with regular reporting to the Environmental Steering Committee.
Safety	➲ Powerlink's target with respect to safety is for zero accidents, and integration of safe working practices in all PLQ activities. ➲ Comply with the Electrical Safety Act, associated regulations & High Voltage Isolation and Access requirements ➲ Comply with Workplace Health and Safety Act and requirements ➲ Comply with all safety legislation, translated into Powerlink's Safety Management Plans

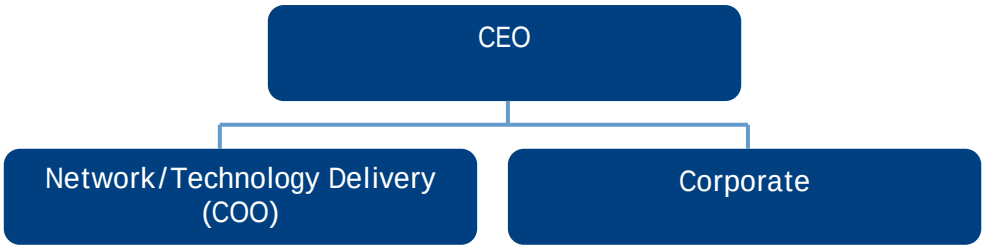
Service Delivery Models

Network Service Delivery Model

Powerlink considers that we face an increasingly complex world of ongoing high load growth, increasing stakeholder and community expectations, and a tightening outlook for the availability of resources.

In addition, Powerlink's capital expenditure forecast indicates a significant and ongoing increase in work required to meet the demands placed on our network. The key to delivering the increased

program of work is a series of initiatives across all areas of the business involved in planning, constructing, operating and maintaining assets. In recognition of the importance of delivering the high capital program Powerlink has made significant changes to the management structure so as to bring together the key parts of our business focused on network service delivery. A position of Chief Operating Officer (COO) has been established, reporting directly to the CEO and having all business units involved in Network Service Delivery reporting to the COO.



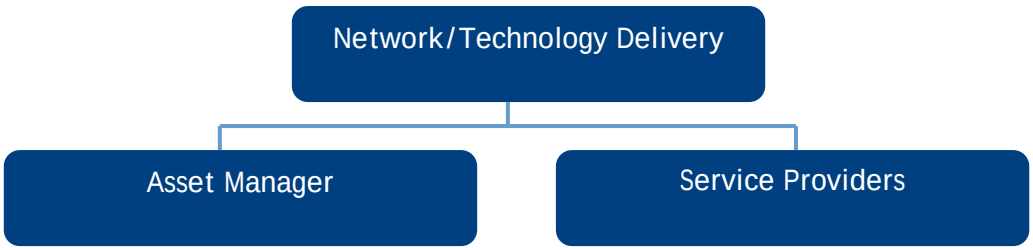
This restructure is aimed at delivering more streamlined end-to-end processes and decision making for network delivery (including supporting technology) and greater co-operation between parts of the business involved in network delivery activities. The Network Service Delivery team, consisting of the Powerlink business units responsible for network development, maintenance and operation, has initiated a streamlined delivery process, focused on the following key areas:

- • Planning and approval
- • Easement and site acquisition
- • Project drawings
- • Outages
- • Procurement
- • Portfolio program and project management
- • Commissioning resources

Powerlink also faces many corporate challenges, including the management of community expectations, relationships with government and statutory authorities, revenue regulation and the review of National Electricity Market operation and transmission regulations. Specific focus is given to these strategic objectives through the Corporate group reporting to the CEO . The Corporate group also manages administration, finance and HR.

Asset Owner /Asset Manager /Service Provider Model

Powerlink undertakes the management of its assets through implementation of an Asset Owner / Asset Manager / Service Provider business model for strategically managing the delivery of network services to the required standards.



Powerlink considers that the AO/AM/SP model remains an essential element in managing the complex, and sometime conflicting, environment in which we operate. The model delivers an integrative and responsive management structure, capable of reconciling complex issues through well-defined responsibilities coupled with collaboration between the various parts of the model to ensure all relevant information is available. The segregation of the internal purchasers of goods and services (asset manager) from the providers of those services (both internal and external service providers) provides for increased accountability and contestability (where appropriate) in the service provider function.

The asset management function consists of teams that drive strategies that support the full life cycle of Powerlink assets, from planning and asset investment, through operation and maintenance, to asset replacement and disposal. This model affords a strong focus on optimisation of asset investment and other work by achieving a balance between factors such as investment cost, community and stakeholder expectations, environment, safety, and the reliability, maintainability and supportability of assets over their life.

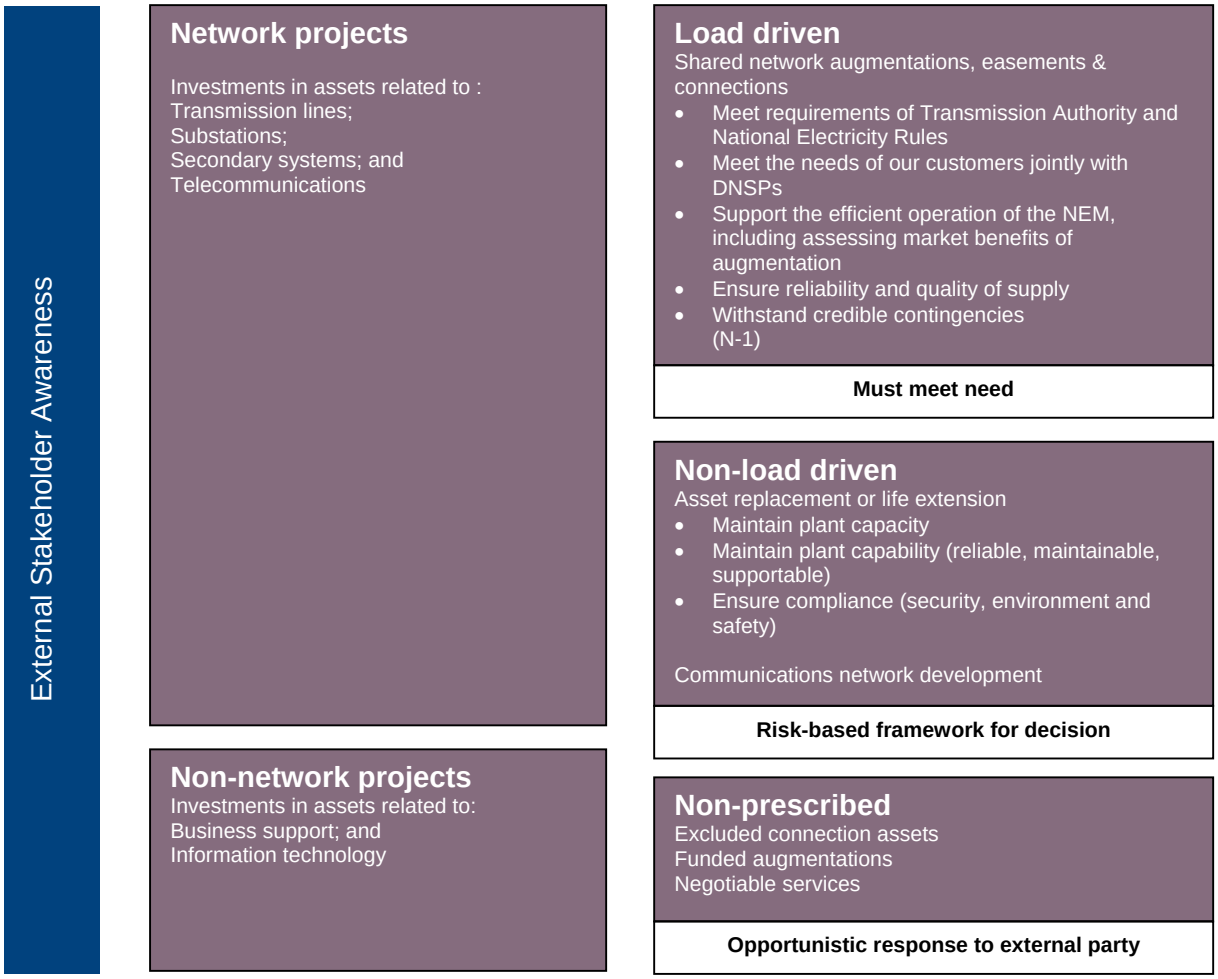
A powerful aspect of this model also involves the tight integration between the development of strategies and the initiation and oversight of work to support those strategies, as the asset manager consists of teams responsible for initiation, approval and sponsorship of all capital investment, maintenance and refurbishment work. In this respect, the model helps to ensure the efficient implementation of projects and work, and provides for a feedback loop between strategy and implementation phases. This has prompted the grouping of network projects into synergistic packages that promote efficient project implementation, and the optimisation of maintenance strategies through monitoring of ongoing asset performance and costs.

Consideration of the broader influences on Powerlink has led to the development of a range of strategic objectives for the asset management function, which have been separated into the three logical phases of the asset life cycle as presented below.

Asset Investment & Planning	➲ Apply effective processes for network planning and investment to ensure projects are able to be implemented in an orderly manner and that Powerlink will receive return on the investments made: • Forward planning of augmentations to the transmission system to meet reliability of supply standards updated annually and based on the 10 year demand forecast. • Joint planning with DNSPs in accordance with the NER updated at least annually. • Planning of new connections for generators and opportunistic loads (generally provided on a non regulated basis). • Planning of augmentations which have a net market benefit (such as interconnector augmentations). • Planning capital investments which are not driven by demand growth – including asset replacements, investments to satisfy security/compliance obligations, communications assets, etc • Integrate the various plans to ensure economies of scale are maximised and risks of loss of supply are minimised. Integration to involve planners, regulatory personnel, plant strategists and engineering. ➲ Ensure compliance with project approval governance requirements including any obligations in the NER. ➲ Apply a robust and integrated framework for easement and land acquisition requirements based on forecast requirements identified during the planning process. ➲ Maintain awareness of external stakeholders including local and state government representatives and communities affected by Powerlink's future projects ➲ Implement technology and network architecture that serves to support an appropriate level of network availability and plant/equipment reliability ➲ Adopt standardisation of assets where appropriate. ➲ Maintain systems and processes for the sponsorship of capital/operational projects and maintenance work that optimises project delivery in terms of time, cost and quality
Operations, Maintenance & Refurbishment	➲ Implement maintenance strategies for all Powerlink assets – routine (time based), condition based and preventive/corrective maintenance where necessary. ➲ Monitor the condition of Powerlink's assets or sub-components of an asset, and trigger the refurbishment of assets where appropriate.

	➲ Implement strategies relating to equipment, spares and training to support the operations of Powerlink's assets. ➲ Plan and manage operating budgets & undertake performance monitoring of our service providers. ➲ Implement strategies for mitigating the impact of planned and forced outages or reducing system restoration times. ➲ Provide strategies and procedures that ensure Powerlink's assets and people are secure, business continuity can be maintained and ensure an effective framework exists for responding to corporate emergencies.
End of Life, Replacement & Disposal	➲ Identify assets which are reaching the end of their technical and economic life or that are unreliable, obsolete or unsupported by manufacturer or vendor. ➲ Trigger consideration of the replacement, decommissioning or life extension of assets at the end of life. ➲ Identify options for replacement of assets as necessary, including available time windows if assets are to be out of service for a considerable time during replacement. ➲ Investment in replacement assets is considered in the asset investment and planning phase.

ASSET INVESTMENT STRATEGY



Powerlink takes an integrated and coordinated approach to the process of investing in new assets. Capital projects to invest in new assets are 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 network assets are triggered from load or non-load drivers, with load-driven projects involving shared network augmentations, connections between the transmission and distribution networks or land/easement acquisition. While the capital forecasting model for load driven network projects is considered probabilistic (discussed within *Planning and Investment*), the need for network augmentation at the point of investment is well defined. Powerlink's obligations under its Transmission Authority, Electricity Act and the National Electricity Rules, coupled with strong community expectations for reliable electricity supply, create an imperative for Powerlink to meet the growing need for electricity supply via transmission or non-transmission solutions. Due to legislative obligations to meet the standards of service these are considered as prescribed services.

Non-load driven network projects are predominantly associated with the replacement 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 replacement against the risks of the aged asset remaining in service.

The environment in which capital investments are made requires coordinated decision-making processes that reconcile a range of complex issues associated with investment cost, community and stakeholder expectations, environment, safety, and the reliability, maintainability and supportability of assets over their life. Renewed focus has been given to the delivery of network services through the restructuring of Powerlink's business to provide a consolidated Network Service Delivery group, which is focused on the optimisation of network delivery processes.

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 and contestable services depending on the arrangement and the point of connection to the transmission network.

Planning and Investment

Powerlink's future planning and capital forecasting process for investments driven by load growth recognises the inherent uncertainty of the Queensland electricity market's transmission requirements by utilising a scenario based approach. In broad terms, Powerlink considers that 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; and
- Take due consideration of environmental impacts and balance environmental and development needs in a manner acceptable to the community.

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 scenario based approach to grid planning to cover a wide range of alternatives for transmission system development. Inputs to this planning approach include the load forecasts and information available on possible generation developments, proposed power imports and other possible market developments. The scenario based planning process results in the development of a probability weighted capital work forecast, which is used within Powerlink to plan resource requirements.

At the point of each individual investment, however, the planning environment is not probabilistic, and the asset manager must engage in the exploration of feasible transmission and non-transmission options to meet a specific and well-understood need. During the investment decision-making process, Powerlink needs to ensure the investment is efficient and that regulated revenue will be provided for the investment during any review by the regulator. 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 to address the need is chosen via economic comparison of options and compliance with any NER obligations such as the Regulatory Test
- Engage in effective project sponsorship to ensure efficient cost of implementation

The asset management strategy requires the centralised coordination and alignment of load and non-load driven projects in conjunction with the provision of project portfolios to network service providers for optimised delivery. This is achieved through a range of routine workshops that coordinate the asset investment program. Coordination with distributors and market participants in this area is achieved through joint planning initiatives.

The strength of Powerlink's asset management strategy comes into focus when deciding what assets are required and the form that the assets should take, which involves the reconciliation of a range of complex issues associated with:

- Investment decision - life extension, replacement or decommissioning
- Architecture and topology - substations, transmission lines or other system
- Asset life cycle factors - plant maintenance, reliability, maintainability and support
- Community and environmental impacts
- Statutory compliance obligations
- Revenue considerations

Coordination is achieved through routine workshops and planning activities that seek contribution from the various teams within Powerlink who have responsibility for and skills in each of the areas discussed above.

Asset Replacement

Asset replacement makes up most of the projects that are not driven by load growth. 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 replacement 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 replacement action, such as poor performance, new standards, rising fault levels & obsolescence.

For Powerlink, capacity (as related to a specific asset) is a term that considers the ability of an asset to handle the load placed on it by operational service, while asset capability gives consideration to the condition, performance, availability, reliability and supportability of assets.

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.

Powerlink's asset management strategy requires the integration of the asset replacement requirements into the broader capital works program that is primarily driven by load growth. This ensures that the portfolio of projects delivered to our network service delivery teams is optimised. In this way, Powerlink capitalises on opportunities to coordinate a range of similar projects (through work type, geographical location or timing) to achieve economies of scale and optimised delivery.

Land Requirements

In order to provide for the construction of new 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. This is particularly so 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 has developed a process for coordinating easement and land requirements through an integrated easement strategy, which involves a regular assessment of land or easement requirements that may be triggered by existing or emerging needs of the transmission network. The easement strategy and the associated regular workshops are used to identify when acquisition action needs to be initiated as well as the need for communication strategies for communities in regions that are impacted by network development.

Powerlink's powers of easement acquisition can be exercised in accordance with Land Acquisition Act 1967 or the Land Act 1994 (Easement Acquisitions). 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 Integrated Planning Act.

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 environmental management and compliance systems.

Technology and Architecture

When investing in new assets, Powerlink endeavours to consult with external stakeholders such as market participants, regulatory bodies, landholders, community interest groups and local and state government. Although Powerlink tries to maximise the level of standardisation, stakeholder considerations often impact on line route selection, land available for substation construction, and on the design of transmission lines and substations.

Powerlink manages this degree of variability through the use of integrative and rigorous project planning and investigation processes, developing solutions to technology challenges as they arise. Technology and architecture solutions are achieved through consultation with community

stakeholders, statutory authorities and Powerlink's engineering, operations and maintenance service providers. When appraising the type and form of assets to invest in, a decision framework is applied that addresses:

- Efficiency of capital investment;
- Whole of life cost of asset ownership;
- Impact on network customers, the NEM and the wider community; and
- Impact on transmission network reliability and availability.

External Stakeholder Communications

External stakeholder communications are an integrated aspect of Powerlink's asset investment program. Long term communication strategies are developed to support Powerlink's plans for future network augmentation and easement acquisition, and specific communication strategies are developed for easement acquisition and construction projects that engage landowners, network participants, statutory authorities and the government.

More broadly, Powerlink uses stakeholder communications to develop and maintain relationships with the participants in the National Electricity Market, and on providing feedback into issues such as market and revenue regulation, NEM operation and planning.

Project work

Significant growth in demand on Powerlink's transmission network has triggered an increase in load-driven network projects, which is reflected by substantial increases in Powerlink's long-term capital investment forecasts. In addition, asset replacement programs are required to offset the rate of ageing of our network assets, and to ensure that our assets are reliable, maintainable and supportable.

A significant factor is the delivery of the additional projects. In recognition of this increase in project work, Powerlink has restructured its business to support improved network service delivery and drive improvements in the delivery of new assets. This change is aimed at streamlining decision making and coordination between the various parts of the business involved in the delivery of capital projects.

MAINTENANCE & REFURBISHMENT STRATEGIES

Powerlink has a responsibility to provide reliable and secure electricity supply to customers and effective transmission services to other NEM participants. In seeking to achieve this goal, Powerlink has implemented a range of strategies related to the ongoing maintenance and refurbishment of assets. These strategies are developed in order for our assets to meet targets for reliability, availability and quality of supply at a minimum life cycle cost (termed "optimum capability"). The Plant and Work strategies govern Powerlink's approach to maintenance and refurbishment, and drive three primary sub-streams of strategy related to high level design, equipment selection, asset maintenance and monitoring & refurbishment.

Reliability Centred Maintenance

Plant Strategy

- Implement systems and processes that ensure Powerlink's assets meet targets for reliability, availability & quality of supply
- Minimise total life cycle cost over the continuum of an assets life across the full population of assets
- Ensure that plant is supportable and maintainable throughout its life cycle
- Maximise the use of remote asset monitoring capabilities
- Maintain a complete and integrated systems that supports the plant strategy

"Doing the right thing"

Work Strategy

Work strategy involves the use of best work practices in achieving the intent of the Plant strategy.

- Implement work strategies to maximise the efficiency of implementation of plant strategy
- Develop work strategies that optimise controllable operating costs
- Implement performance based service level agreements to drive performance improvements (internal and external to Powerlink)
- Seek to induce competition in the provision of work where appropriate
- Constantly seek innovative work practices that help Powerlink achieve operational excellence
- Benchmark Powerlink's performance

"Doing the thing right"

Design & Equipment Selection Strategy

- Optimise life cycle cost in acquisition phase of an assets life
- Provide guidelines for what assets to acquire and how to put the together

Asset Maintenance & Monitoring

- Defines how we maintain our plant & equipment
- Defines strategies for advancing the remote monitoring of our assets

Refurbishment Strategies

- Provides a framework for monitoring plant condition
- Defines the triggers and process for undertaking the refurbishment of an asset

Powerlink's plant strategies call for focus on the maintainability, supportability and compliance of assets and the consideration of life cycle factors in the process of acquiring new assets. The plant strategy sets out the requirement to develop strategies that influence equipment purchase and system design, maintenance practices (routine inspections, remote monitoring etc) and asset refurbishment, replacement and decommissioning

Powerlink's application of Reliability Centred Maintenance (RCM) has been successful in providing a framework for analysing plant maintenance requirements to maximise plant reliability and availability whilst optimising ongoing maintenance costs. RCM offers a framework for logically analysing the potential failure modes of plant, equipment and systems, and to determine the potential effects and consequences of these failures.

Effectively, the plant strategy is focused on "doing the right thing" which is supplemented by the work strategy, which concentrates on "doing the thing right". This means having optimal maintenance and

operating policies (for “doing the right thing”) as well as the best work practices for implementing them (for “doing the thing right”). For Powerlink, work strategies are focused on the following objectives:

- Optimise controllable operating costs

  Powerlink maintains a strong focus on the control of direct operating costs, ensuring the implementation of maintenance and refurbishment strategies is efficient and the maintenance services are provided efficiently. This feedback loop helps to ensure that maintenance and refurbishment strategies are optimised by analysing broad trends in maintenance expenditure.

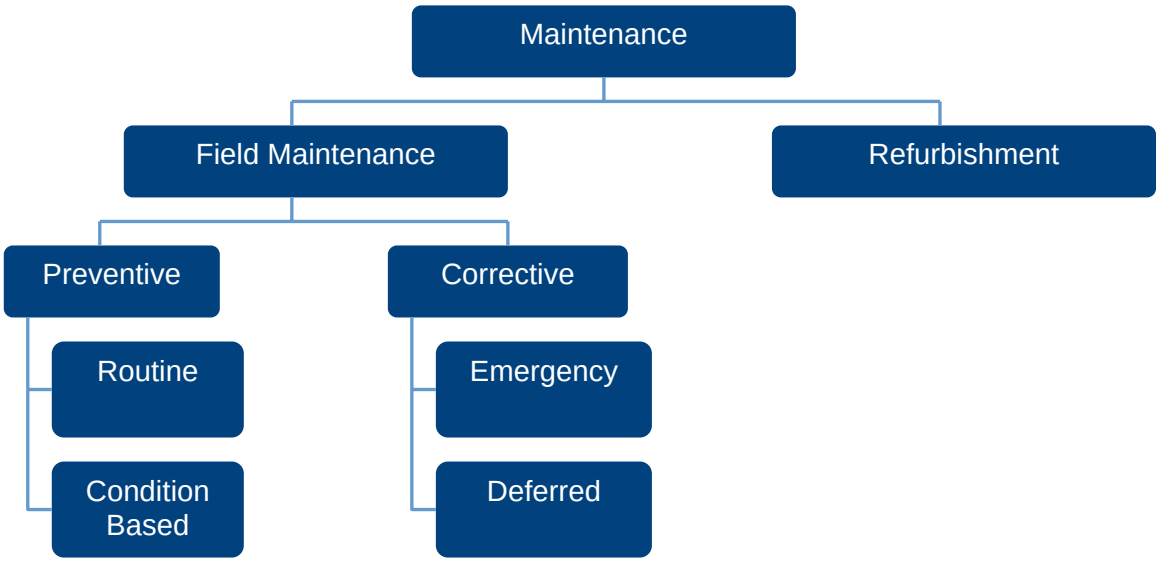
- Implement performance based service level agreements to drive performance improvements internal and external to Powerlink.
- Induce competition in the provision of work where appropriate.
- Seek innovative work practices that help Powerlink achieve operational excellence.

  A number of business drivers, including reduction in network outages and exploitation of remote monitoring technologies has result in world class innovation in work practices, exemplified by Powerlink’s asset monitoring team, live work practices, and the use of helicopter services for maintenance and project work.

- Benchmark Powerlink’s performance.

Maintenance Strategies

The decision to undertake routine maintenance on an asset is subject to extensive analysis within the RCM framework. RCM analysis often points to the requirement for no routine maintenance or to more innovative forms of maintenance such as routine checks undertaken via Powerlink’s remote monitoring systems. Powerlink classifies its maintenance strategies in accordance with the flowchart below, with field maintenance activities classified as either corrective or preventive.



Preventive Routine maintenance is undertaken when hidden failures exist in plant or equipment that must be addressed through some form 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 aligned with other work in the future in the course of optimising maintenance cost and effort.

Maintenance strategies are developed out of Reliability Centred Maintenance for every major item of plant and equipment in the Powerlink network. The strategies are translated into maintenance policies, that define the broad responsibilities, requirements and frequency for maintenance activities, and maintenance procedures define the nature of work to be performed that accounts for the range of RCM failure modes derived from the analysis process.

The implementation of maintenance policy occurs through the use of Powerlink's integrated asset management system SAP through routine maintenance plans. Maintenance plans are the primary vehicle for the implementation of routine maintenance programs, and are effectively an aspect of the asset management system that calls for different types of work to be conducted on Powerlink's assets at different intervals – all based on the respective maintenance strategy.

In order to successfully undertake any form of asset management, maintenance activity or to record the history of Powerlink's assets, Powerlink must maintain an asset register that provides relevant information about plant and equipment. This register is linked to maintenance planning, recording of plant history through defect notifications and work orders, and financial asset management (asset valuation, depreciation). The tight integration of Powerlink's asset management system ensures that Powerlink is capable of:

- Developing profiles of Powerlink assets with respect to quantity, type and age
- Maintaining a central repository for plant history (routine works, defect reporting, work orders)
- Optimising maintenance strategies by having a close linkage between maintenance plans and reporting and the financial management systems

For non-routine forms of plant maintenance, such as corrective or condition-based work, Powerlink maintains policies for defect notification and reporting that require our service providers to create notifications and work orders within the asset hierarchy that provide advice on the nature of faults, the likely cause, the restoration works required and the cost of the maintenance activity.

The implementation of Powerlink's routine maintenance policies and recording of non-routine work within the asset hierarchy allows the analysis of maintenance cost and effort, and the optimisation of maintenance strategies going forward.

Refurbishment

Assets within the transmission network might at times be refurbished in order to maintain the capability of an asset for the provision of network services. Refurbishment can be triggered by a range of factors and is typically considered when the cost and effort to repair the plant or equipment is more than normal maintenance expenditure or when a systematic problem in need of repair has been identified. Refurbishment is considered an expense to the business, and is different from Powerlink's

definition of asset replacement. In contrast, 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. 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. 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 conditions assessments, maintenance service provider feedback and the root cause analysis of plant and equipment failures.

Asset Monitoring

Powerlink is taking advantage of advancements in technology to implement and support a range of remote monitoring solutions that allow Powerlink to remotely monitor its assets to achieve fault management, configuration management and condition/performance monitoring.

Powerlink's use of remote asset monitoring for fault management is consistent with our corporate objectives for operational excellence, providing for fault restoration intervals lower than would otherwise occur and an attendant reduction in the impact of forced outages on NEM participants. This is particularly important given that Powerlink's increased work program would lead to an increase in network outages .

Condition & performance monitoring is another significant component of the asset monitoring strategy that involves using remote monitoring capability to routinely check the performance of assets. This strategy has allowed Powerlink to automatically monitor asset performance in a way that can be fed back into maintenance, refurbishment or replacement strategies. In addition, remote condition monitoring has in some cases reduced the requirement for intrusive local maintenance activities.

Our asset monitoring strategy also applies to the management of settings applied to the high voltage transmission network and software configurations applied to digital technologies. This ensures that Powerlink has consistent data available for the restoration of the network in the event of plant or equipment failures.

Technology Support & Equipment strategies

Technology and equipment strategies are developed for every major item of equipment that Powerlink purchases. This ensures that the functional specification for equipment meets Powerlink's requirements for reliability, maintainability and product support. Powerlink will also undertake more extensive investigations into the development of new technology that we believe will complement our business objectives, particularly technologies that will simplify and optimise project delivery.

Powerlink is also concerned with ensuring that technology implemented is adequately supported through its life, and has developed strategies associated with spares provisioning and staff competency, which is also considered critical in the ongoing support of technology.

Work strategies

Powerlink's work strategy is targeted at the efficient implementation of work associated with network operation, refurbishment, project delivery and field maintenance. These outcomes are achieved

through the establishment of performance based service level agreements with internal and external service providers.

The core of field maintenance work involves a program of routine maintenance activities carried out in accordance with maintenance strategies and executed via our integrated asset management system. A key role of the work strategy implementation involves forecasting and management of the routine maintenance workload, in conjunction with the ongoing management of non-routine maintenance tasks that are required to attend to defects or degraded condition of plant and equipment.

The delivery of refurbishment projects is another key aspect of the work strategy that involves annual planning of Powerlink's refurbishment requirements and the execution of that program in a manner that coordinates with Powerlink's capital project program for the full range of network projects.

Finally, the work strategy targets operational activities that support the operation of the high voltage network, which in this case applies to network control centre operation and support and asset monitoring strategies.

Operational expenditure budgets are developed that reflect the planned work in the categories of field maintenance, refurbishment projects, maintenance support and network operation, which are subject to review that ensures 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 focus of Powerlink's work strategy is to employ innovative working techniques that optimise maintenance or operating costs, reduce risk to personal safety, reduce the requirement for planned outages on the network or allow Powerlink to respond faster in restoring the network after faults.

Powerlink has implemented a range of work strategies to achieve these outcomes, including:

- Asset Monitoring Team – established by leveraging off Powerlink's deployment of advanced digital technologies and high capacity telecommunications, the asset monitoring team 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 of a large majority of maintenance throughout the state has assisted in achieving more competitive outcomes in the field maintenance environment. Powerlink has established relationships with a number of service providers, including Ergon, Aeropower and Marconi, who all contribute to the maintenance of Powerlink's assets.

Operating cost management

Maintenance work is managed and controlled using Powerlink's integrated asset management system and is categorised to allow for monitoring and analysis of maintenance expenditure.

Powerlink's model for operating cost management is highly effective in the monitoring and control of operating costs and in ensuring that maintenance strategies are optimised through the analysis of maintenance expenditure in their respective categories.

Division of maintenance costs into categories allows for the proportion of work in each area to be monitored and corrective action taken when problems are identified. For example, if the ratio of

corrective maintenance to routine maintenance increases significantly, it may indicate that the type or level of routine maintenance is not adequate. The maintenance policies would then be reviewed to determine if policy changes are required. This ensures continuous improvement is delivered to the operation and maintenance of Powerlink's assets.

Powerlink's integrated asset management system is also structured in a way that permits for the appropriate allocation of costs to both regulated and non-regulated financial assets. The system automatically designates the class of the asset upon its creation, and all expenditure associated with undertaking maintenance or work on the asset is automatically aggregated back to an appropriate cost centre in the regulated or non-regulated class. In this way, Powerlink's approach to managing its assets is consistent irrespective of their class, which avoids the ongoing issues associated with having to retrospectively allocate expenses incurred in maintaining and operating its assets through deciding on the level of non-regulated and regulated utilisation.

Performance Management & Audit

For Powerlink, auditing provides confidence that work is being done in accordance with its defined requirements by our providers of engineering and maintenance services. A wide range of audit criteria set the measurable goals of an audit, and audits seek to ensure compliance with:

- Performance or delivery requirements set out in Service Level Agreements or contracts;
- 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 routine 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.

NETWORK OPERATING STRATEGY

Network Operations Strategy

System Operating Parameters
- System setting coordination
- Network support agreement management
- Operating agreements with market participants
- Network constraint equations
- Network operating ratings
- Network black start strategy
- Power quality
- Operational contingency plans

Outage Management
- Manage market impacts of outages
- Assessment of market constraints and outages
- Code compliance for outage management

Corporate Emergency & Security Strategy

Corporate Emergency Response
- Management of Corporate Emergency Response procedures
- Network disaster recovery facilities
- Coordination of major system event investigations
- Liability management frameworks

Security
- Physical security plan
- Technology security plan
- Information security plan

Maintaining effective operating strategies is essential for Powerlink to maintain a balance between the requirements of NEM participants, NER requirements & regulatory authorities, whilst achieving a range of strategic outcomes, including:

- Operate the network within NER requirements
- Minimise impact of planned and forced network outages on NEM participants
- Engage in effective practices for fault management and restoration, through innovations in remote condition monitoring and the Asset Monitoring Team
- 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
- Ensure continuity of the transmission network and business through the implementation of disaster recovery facilities

Powerlink advocates the centralised coordination of operations strategies in order to develop consistent frameworks for network and business operation and to ensure consolidated stakeholder management for NEMMCO, NEM participants and our customers.

System Operating Parameters

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

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

In response to these drivers, Powerlink has established a range of systems including the Energy Management System, State Estimator, Psymetrix, Operations Guide and Power Operations Web that provide for system setting coordination, network constraint monitoring, network operating ratings & power quality analysis

In order to mitigate risks associated with major events on the network, Powerlink has also established operational contingency plans and strategies for black starts.

Outage Management

Outage management is pivotal in Powerlink achieving the following outcomes:

- Effective work progress against the maintenance plan and capital works program
- Achieving Operational excellence, by minimising outages for projects and maintenance, providing decision support for scheduling and managing outages and reducing system restoration time.
- Ensuring compliance with the National Electricity Rules

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 NEMMCO in accordance with outage notification requirements.

In the shorter term, Powerlink uses shorter term planning tools such as the Operations Guide and Power Operations Web to coordinate outages on a day-to-day basis, permitting for short term scheduling of outages

Powerlink is seeking to further integrate our approach to outage and work management, and has established digital technology strategies that support the deployment of decision support systems that manage work execution, resourcing commitments and network outages. Significant changes in outage management are anticipated with the introduction of improved decision making tools and the ongoing desire for information on outages and their impacts from market participants.

Corporate Emergency Response

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

- Priorities of (in order) 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;
- Providing regular training, exercises and reviews.

In achieving these objectives, Powerlink has developed the *Corporate Emergency Management Handbook* (CEMH), which explains Powerlink's emergency response procedures for different levels of network incidents, as applied to different types of plant, equipment and systems. Emergency management plans exist for the transmission network; business continuity; state disaster/emergency; environmental/cultural heritage emergency; workplace safety; and terrorist/criminal act.

Each of the different emergency management plans involve five levels of corporate emergency, ranging from a standard network event that can be handled by Powerlink using existing resources, to a major jurisdictional event managed by external emergency authorities.

Roles and accountabilities for Powerlink staff vary depending on the significance of the emergency, and 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. Powerlink has elected to ensure that our corporate emergency escalation framework is matched with the model proposed by NEMMCO.

Security

Powerlink has a commitment to the safety of the public, Powerlink staff, protection of the Powerlink network and ensuring business continuity. A *Policy for Managing Security* has been developed to manage Powerlink's obligations as National Critical Infrastructure. This policy is intended to progressively improve the security of transmission infrastructure to:

- Ensure the safety of the public and our employees
- Protect our business against acts of terrorism
- Mitigate the potential for attacks on Powerlink's property & information technology facilities
- Protect confidential data within a secure framework

Powerlink is committed to the following objectives:

- Identification of vulnerabilities
- Risk mitigation strategies

- Deterrence arrangements
- Detection
- Response
- Corporate communications in the event of a security breach

Powerlink has implemented a three tier corporate model for security that places focus on three primary security aspects:

- Physical – denoting the physical measures applied to buildings, control centres, communications facilities and transmission infrastructure (transmission lines and substations).
- Technology – applies to security implemented in digital technology areas to prevent unwarranted external or internal access (firewalls, intrusion detection, secure access gateways) and the dissemination of viruses.
- Information – consideration must be given to the secure administration of data, with respect to access privileges, documentation classification frameworks, user profiles.

SAFETY STRATEGY

Safety is considered an intrinsic component of working at Powerlink and is confirmed by staff as being the top priority. Powerlink endeavours to drive safety improvements and initiatives through a Safety Steering Committee, and a safety compliance framework 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 satisfy their needs.

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
- Integrating Workplace Health and Safety responsibilities into all activities of all employees to promote ownership and control of their continual wellbeing
- Openly consulting with employees and relevant stake holders about all matters that may affect their health and safety
- Ensuring that Continual Improvement Action Plans are developed and implemented
- 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
- Maintaining records and statistics to enable monitoring of performance and trends

Regular auditing is carried out to monitor Powerlink's compliance with WH&S and electrical safety legislation, for specific projects, and routinely on the remainder of Powerlink's existing assets.

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. While these work practices deliver benefits with regard to reduced network and market impact, the risks of undertaking such activities must be carefully managed.

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 our staff, particularly with regard to managing the risks of remote working and fatigue.

ENVIRONMENT STRATEGY

Powerlink maintains environmental management systems, that include policies, procedures, training and auditing to ensure that our personnel are aware of their obligations with respect to the environment.

The asset management strategy supports responsible environmental management as an integral part of our business activities. We demonstrate that commitment by:

- Consulting openly, honestly and proactively with the community and statutory authorities on the potential environmental impacts of our plans and activities. We are responsive to constructive suggestions to eliminate or minimise potentially adverse impacts.
- Recognising that environmental factors such as land use, public health and safety, noise and visual impact, protection of flora and fauna, environmentally hazardous materials management and waste management are all environmental aspects of our business.
- Maintaining a structured approach to managing our environmental aspects by implementing Environmental Management Systems.
- Seeking continual improvement in the environmental performance of our operations.
- Complying with relevant environmental legislation.
- 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 a specific Environmental Management Plans, to effectively manage the impact of construction activities.

Regular auditing is carried out to monitor Powerlink's environmental compliance, for specific projects, and routinely on the remainder of Powerlink's existing assets.

Powerlink aims to have no reportable environmental incidents from its operations and expects staff and contractors to comply with all Environmental Management Plans (EMPs) developed for particular projects. Monitoring of compliance with EMP conditions occurs for all major construction projects.

Environmental Strategy Plans have been developed in identified high-risk areas of the business, with objectives and targets set to identify improvement opportunities.

RESOURCE PLAN

Powerlink uses a range of tools to develop resource plans for the organisation.

In the long term, scenario based analysis is used to develop capital forecasts that provide macro level indications of future asset investment requirements. This high level forecast is factored into analysis that forecasts project workload, and historical ratios are used to devise forecasts for operations and maintenance workload and expenditure.

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 replacements, 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 reflects the execution of maintenance strategies, supports the operation of the HV network and includes the anticipated refurbishment program.

Recent initiatives to develop a portfolio management approach to project delivery have prompted the integration of capital and operational projects into a consolidated plan that provides a more concise indication of overall project workload.

In the near to medium term Powerlink has implemented arrangements which will allow more electricity transmission infrastructure to be constructed than previously. The key initiatives which will allow the increased capital program to be delivered while also providing for the additional maintenance work are:

- Design standardisation – increasingly using standard designs for major elements of substations and transmission lines to minimise the amount of customisation required.
- Program management – grouping together projects into programs that can be awarded to major contractors. This enables the contractors to plan with certainty and increase their own resources in response to the increased levels of work.
- Supply chain management – ordering materials well in advance to allow for manufacturing windows. This is facilitated by the increased use of standard designs and equipment.
- Streamlined easement and land acquisition – increasing the lead time for identification of easements and land as well as working with Queensland Government to make use of the Ministerial designation path in the Integrated Planning Act.
- Increased outsourcing – outsourced companies can utilise already established standard designs and maintain Powerlink standards and consistency of plant type and installation.
- Increased internal staffing – Powerlink has already commenced increasing internal staff resources both to undertake the additional work and to manage the additional outsourcing. Powerlink continues to perform well as an employer of choice and seeks to maintain that position.

PERFORMANCE REVIEW

System Performance

Powerlink undertakes a range of routine system performance reporting activities that are subject to review throughout the business, with particular focus on:

- National Electricity Rules
- Power Systems Data Communication Standard
- AER Service Standards

In order to support advanced system performance monitoring, Powerlink has developed asset-monitoring strategies and a range of tools used 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 & ACMS – data-mining applications that provide automatic analysis (reliability, availability, 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) – represents a major innovation for Powerlink, providing a wide area network connection between intelligent digital devices that monitor, control and protect the HV transmission network. This level of interrogation underpins our remote asset monitoring strategy and is used to accelerate fault management and undertake remote condition monitoring of our assets

Business Performance

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 phase to ensure the planning and approval is carried out thoroughly and efficiently, including any consultation processes required for application of the Regulatory Test.

Throughout the implementation phase of the project, the asset manager 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 considered efficient to the organisation.

The Board is informed monthly of the progress of all major projects .

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. Powerlink has enshrined targets regarding controllable operating costs into the strategy for *Achieving Operational Excellence* and there are corporate targets that must be achieved on an annual basis.

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.

In terms of Powerlink's efficiency in the maintenance and operation of the transmission network, international benchmarking exercises are also undertaken with *International Transmission Operations & Maintenance (ITOMS)* that have indicated Powerlink within the top quartile and a leading TNSP with respect to operating cost efficiency. Powerlink continues to engage in this benchmarking exercise as a useful framework for analysing our maintenance and operations performance.