# Asset Management Strategy and Objectives

| Summary | |
|---|---|
| To define the strategic actions, objectives and approach to the management of the electricity transmission network and property assets. | |

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|---|---|---|---|---|---|
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# Contents

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TransGrid

# Figures

# Tables

# 1. Purpose

This document forms the Asset Management Strategy and Objectives for TransGrid. It is the aim of the Asset Management Strategy set out in this document to:

> Outline the key stakeholders of the asset management system and incorporate their needs and expectations into the asset management system strategies, objectives, decision criterion and reporting requirements

> Execute the Business Plan and achieve the corporate objectives by promoting optimised and sustainable asset management activities throughout the asset lifecycle

> Summarise the high-level asset management objectives and targets

> Set out the asset management strategies to achieve the asset management objectives and targets

> Set out what needs to be done to improve asset management and the asset management system.

This document is intended to define the objectives, strategic actions and approach to the management of TransGrid's physical assets in a manner which:

> Aligns with the Business Plan and objectives

> Considers all stages in the asset lifecycle (i.e. planning, design, construction, operation, maintenance, renewal and disposal)

> Optimises the performance, cost and risks of the physical assets

> Focuses on service outcomes as seen by customers and end use electricity consumers

> Maintains compliance with relevant legislative, regulatory and licence requirements (e.g. National Electricity Rules, safety obligations, environmental obligations)

> Informs the continual improvement of asset management and the asset management system.

In developing the asset management strategies, TransGrid's Asset Managers will appropriately consider:

> The current and future needs and expectations of key stakeholders

> The effective mitigation of TransGrid's key risks

> How current and future requirements will be met via the management of the condition and performance of the asset base

> The requisite current and future asset management resources (funding, people, capabilities, processes, information systems, equipment and data etc.) that will be required to enable the Asset Management System (AMS) to achieve the required asset outputs and asset management objectives.

# 2. Scope

The physical assets covered by the asset management strategies set out this document are:

– Electricity transmission network assets

– Property portfolio assets

– Office and depot facilities assets.

Currently, TransGrid's other physical assets are outside the scope of this document. As part of continual improvement to the Asset Management System, in future the scope of this document will be expanded to include:

– Non-network solution assets (e.g. iDemand assets)

– IT and communication assets (e.g. phones, servers, etc.)

– Motor vehicle and mobile plant assets

– Logistics and other assets

– Non-prescribed assets (e.g. Deer Park).

# 3.    Document Hierarchy

This document should be read in conjunction with the Asset Management Policy, and the Asset Management System Description which together summarise TransGrid's Asset Management System (AMS). This document is one of the key components of the AMS, which provides the link between the higher level corporate objectives and the detailed asset management plans.

This document's role within TransGrid's overall AMS is shown in Figure 1.

**Figure 1: Asset Management System (AMS) Document Hierarchy**
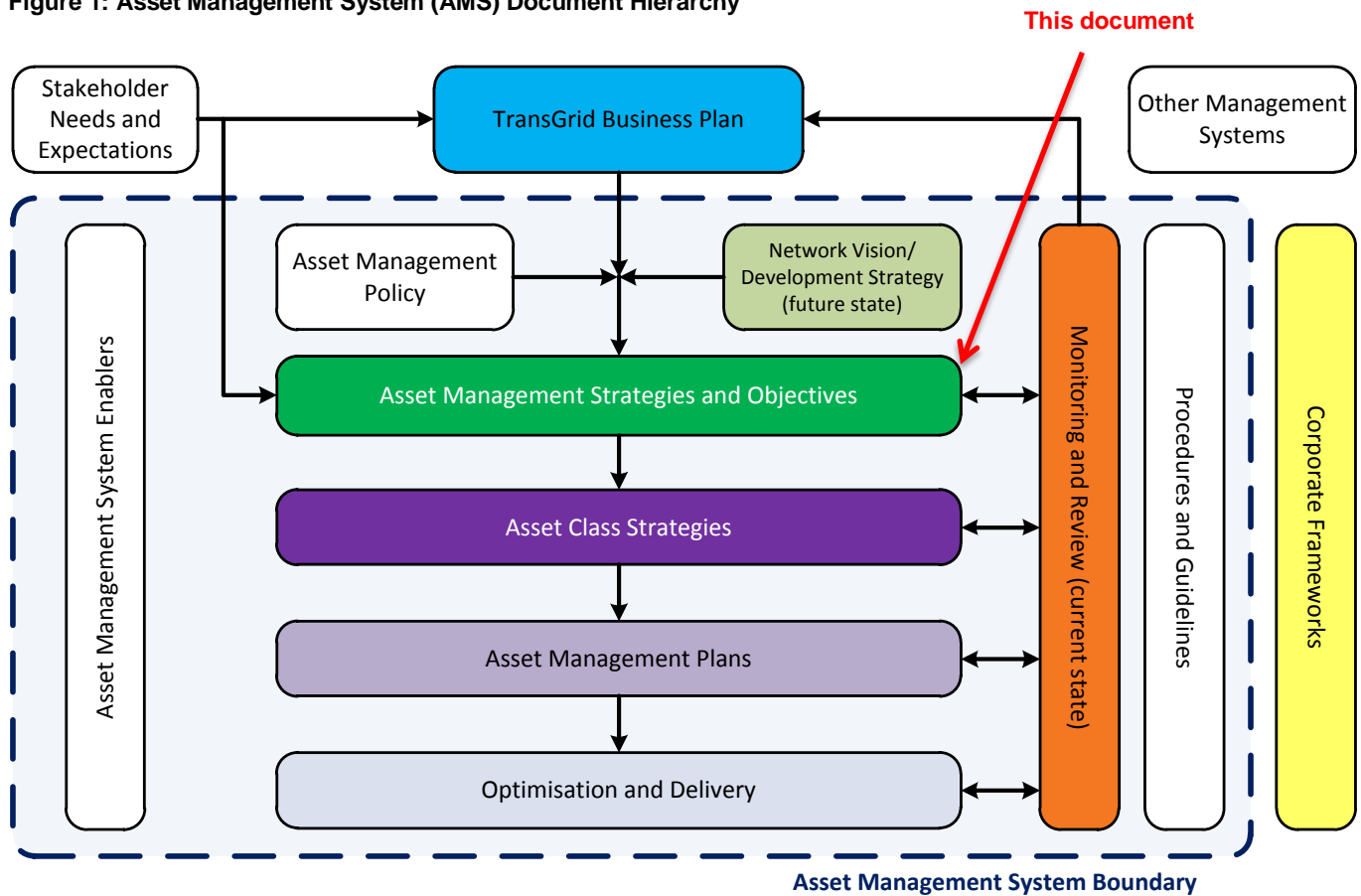


These core asset management documents provide direction for the optimal combination of lifecycle activities to be applied across TransGrid's portfolio of physical assets and asset systems. The top-down thread from the Business Plan is a key feature of the asset management system, where the structure provides a clear "line of sight" from organisational direction and goals, down to the individual day-to-day operations and maintenance activities performed on the assets.

These documents, together with the Business (previously Quality) Management System, Environment Management System, Health and Safety Management System, Risk Management System and Electricity Network Safety Management System form an integrated suite of management systems for TransGrid.

A copy of these core asset management system documents is available on *The Wire*.

# 4. Asset Management Strategies and Objectives

This section outlines TransGrid's asset management objectives and overarching strategies. It provides oversight on how the physical assets will be managed to deliver TransGrid's:

> Medium to shorter term objectives as set out in the Business Plan

> Initiatives from the Asset Management Business Unit Plan

> Stakeholder needs and expectations, including regulatory, jurisdictional and licence compliance requirements, together with customer and consumer obligations.

The asset management objectives and strategies also informed by the long term themes of flexible planning, scalable operations and efficient asset management that are described in the Network Vision.

## 4.1 Stakeholder Engagement Strategies

TransGrid is committed to effective stakeholder engagement with respect to asset management. This includes actively identifying and engaging with stakeholders, understanding their needs and expectations with respect to asset management, and incorporating stakeholder feedback into the criteria applied to asset management decision making and information reporting.

TransGrid recognises that in order to effectively engage with its stakeholders in relation to the management of assets, it is essential to deliver best practice stakeholder engagement. TransGrid's Stakeholder Management Framework[1] outlines these strategies and practices, which include:

> Being open and consultative with consumers and local communities in order to protect its licence to operate

> Positioning itself as a trusted advisor to Government and regulatory bodies

> Valuing input from stakeholders as part of the asset management decision making process

> Testing the alignment of proposed services to the needs and expectations of customers and other stakeholders on a regular basis.

TransGrid obtains feedback through stakeholder engagement meetings and forums, such as the Large Energy User Roundtable and Consumer Advisory Panel. Further information on TransGrid's Stakeholder Engagement activities, outcomes and plans is available in the document 'Connecting with you: TransGrid Stakeholder Engagement' available on *The Wire*.

The People, Strategy and Stakeholders business unit maintains a master list of all identified stakeholders of TransGrid.

Applying the principles outlined in TransGrid's Stakeholder Management Framework and through analysis of findings from TransGrid's stakeholder engagement activities, the key stakeholders identified for TransGrid's asset management system, together with their needs and expectations are outlined in Table 1 below.

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[1] The Stakeholder Management Framework is available on *The Wire.*

**Table 1: TransGrid asset management system stakeholders, needs and expectations**

| Stakeholder | Needs and Expectations |
|---|---|
| Shareholders | • Outlined in TransGrid Business Plan objectives and targets (Refer Section 4.2) |
| Government and Regulators (including the NSW State Government, AEMC, AER, AEMO, IPART) | • National Electricity Rules, policy reform and compliance, including safety and environmental<br>• Electricity Network Safety Outcomes (ENSMS Regulation)<br>• Revenue determination and benchmarking<br>• System security and market operations<br>• Reliability standards and pricing<br>• Prudent network decisions with a strong business case |
| Consumer, industry and business groups | • Cost of electricity<br>• Reliable source of electricity<br>• Public safety<br>• Environmental stewardship<br>• Economically efficient transmission service<br>• Future of the grid, including renewable energy |
| Residential and small business consumers | • Consumer equity, access and satisfaction<br>• Cost of electricity<br>• Reliable source of electricity |
| Generators, transmission utilities, distributors, and retailers | • Market operations and pricing<br>• Network development and access<br>• Future of the grid, including renewable energy |
| Large energy users and direct loads | • Network access<br>• Security of supply<br>• Pricing |

The ultimate objective of TransGrid's asset management is to enable the safe, reliable and secure supply of electrical power to its customers and electrical end-use consumers – the delivery of this service is the minimum standard that customers and consumers will accept. There is strong expectation from stakeholders for TransGrid to deliver these services more efficiently in order to lower the end electricity cost to consumers. In recent years consumer electricity bills in NSW have risen much faster than the rate of inflation, resulting in significant consumer backlash and political pressure for the power industry as a whole to improve efficiency and to lower electricity prices. For all but large customers, the transmission price is a small proportion of their energy bill.

Nevertheless, TransGrid faces increasing scrutiny of its expenditure. As a result, there is a key stakeholder need for TransGrid to demonstrate improved efficiency and prudent spending to minimise electricity prices while maintaining the same level of safe, reliable, secure and sustainable transmission service to customers and consumers.

TransGrid considers stakeholder needs and expectations as a key component of its asset management decision making and in developing its asset management strategies. These stakeholder needs and expectations are reflected in the principles of TransGrid's Asset Management Policy, the specific asset management strategies and objectives (refer Section 4.2), decision criteria applied for asset management decisions (refer Appendix B) and performance indicators, both financial and non-financial information, that are recorded and reported to internal and external stakeholders as appropriate (refer Appendix C).

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## 4.2    Asset Management Strategies

TransGrid's Asset Manager reviews and refreshes the asset management strategies and objectives on an annual basis as part of the corporate planning processes based on analysis of the:

> Effectiveness of the asset management strategies in achieving the asset management objectives and the corporate objectives

> Impacts of significant changes in the health, condition, performance and risks of the assets

> Impacts of significant changes:

  − To the business objectives

  − To available funding as a result of the outcomes from the Australian Energy Regulators (AER) Revenue Determination

  − In stakeholder needs and expectations

  − In Legislative, Regulatory and Licence requirements.

> Effectiveness of asset management and the asset management system.

The asset management objectives and overarching strategies, together with their alignment with the Business Plan and objectives, are detailed in:

  − Table 2: Asset Outcomes

  − Table 3: Financial Outcomes

**Table 2: Asset Outcomes**

| Strategic Theme | Business Plan Objectives | Asset Management Objectives | Asset Management Performance Indicators | Asset Management Strategies |
|---|---|---|---|---|
| Operational Excellence | Health and Safety | ▪ Manage network related public and staff safety risks to As Low As Reasonably Practicable (ALARP)/So Far As Is Reasonably Practicable (SFAIRP)<br>▪ Manage network related bushfire risks (people safety) to ALARP/SFAIRP | ▪ Zero network related LTIs<br>▪ Zero network related fire starts<br>▪ Maintain 5 year average level of Key Hazardous Events (catastrophic failure, conductor drop, structure failure, uncontrolled discharge/contact with electricity, and unauthorised entry)<br>▪ Maintain average age of asset class population to a sustainable level | ▪ Asset Class Strategies<br>▪ Design Strategy<br>▪ Operating Strategy |
| | Environment | Minimise environmental harm and property damage | ▪ Maintain 5 year average level of network related environmental incidents<br>▪ Maintain 5 year average level of environment related Key Hazardous Events (contaminant or pollutant release)<br>▪ Maintain average age of asset class population to a sustainable level | ▪ Asset Class Strategies<br>▪ Design Strategy<br>▪ Operating Strategy |
| | Reliability | Maintain network reliability | ▪ Maintain 5 year average level of loss of supply events<br>▪ Maintain 5 year average level of unplanned outage related Key Hazardous Event<br>▪ Maintain system reliability (achieve 99.9997%)<br>▪ Maintain average age of asset class population to a sustainable level | ▪ Asset Class Strategies<br>▪ Operating Strategy<br>▪ Planning Strategy |
| | | Maintain network capability | ▪ Zero instances of operating outside network transient limits as notified by AEMO | ▪ Planning Strategy<br>▪ Operating Strategy |

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**Table 3: Financial Outcomes**

| Strategic Theme | Business Plan Objectives | Asset Management Objectives | Asset Management Performance Indicators | Asset Management Strategies |
|---|---|---|---|---|
| Operational Excellence/ Customer Oriented Growth | Efficiency and Productivity/Core Prescribed Revenue Growth | Improve CAPEX performance | ▪ Improve capital project performance<br>▪ CAPEX cash flow adherence (88%)<br>▪ Perform within +/- 5% of the CAPEX budget | ▪ Asset Class Strategies<br>▪ Design Strategy<br>▪ Build Strategy<br>▪ Continual Improvement Strategy |
| | | Improve OPEX performance | ▪ Perform within -5/+10% of the Asset Management Program of Works budget<br>▪ Reduce standard maintenance job costs (refer to Business Unit plans for targets) | ▪ Asset Class Strategies<br>▪ Maintain Strategy<br>▪ Continual Improvement Strategy<br>▪ Field Services Business Unit Plans |
| | | Maximise delivery of STPIS benefits where commercially justifiable | ▪ Better than average performance of the STPIS measures (fault and forced outage rates, average outage duration, incorrect isolations, protection system failures)<br>▪ MITC reduced by 25% of AER target | ▪ Asset Class Strategies<br>▪ Operating Strategy<br>▪ Planning Strategy |

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## 4.3 Asset Management System Strategy

Objectives and strategies relating to the management system implemented for TransGrid's asset management activities are outlined in Table 4 below:

**Table 4: Asset Management System Outcomes**

| Strategic Theme | Business Plan Objectives | Asset Management Objectives | Asset Management Performance Indicators | Asset Management Strategies |
|---|---|---|---|---|
| Operational Excellence | Asset Management | ▪ ISO 55001 compliant<br>▪ Continually improve the Asset Management System | ▪ ISO 55001 certification audit NCRs closed-off (75%)<br>▪ Reach excellent maturity level in the risk (clause 6.1), strategy (clause 6.2) awareness (clause 7.3) and asset information (clause 7.5)  Asset Management System elements<br>▪ Internal audits carried out as per audit program | ▪ Continual Improvement Strategy<br>▪ Asset Information Strategy |
| | | ▪ AS 5577 compliant<br>▪ Continually improve the Electricity Network Management System | ▪ Zero AS 5577 non-compliances | ▪ Continual Improvement Strategy |
| | | ▪ Reliability Standard compliant<br>▪ National Electricity Rules compliant | ▪ Zero reliability standard non-compliances<br>▪ Zero NER non-compliances | ▪ Planning Strategy<br>▪ Area Plans<br>▪ Asset Class Strategies |

## 4.4    Lifecycle strategies

The Lifecycle strategies provide the framework for delivering the overall asset management strategies consistent with the principles of the Asset Management Policy to achieve TransGrid's longer term and shorter term objectives as set out in the Network Vision and Business Plan respectively.

The primary purpose of the Lifecycle Strategies is to define a consistent and integrated approach for the management of TransGrid's assets across each stage of the asset lifecycle to deliver the overall asset management strategies. It also ensures that decisions aren't made at one stage in the asset lifecycle which could have a detrimental outcome on the cost, risk and performance of the asset across the complete lifecycle, or, at another lifecycle stage.

Throughout the asset lifecycle, the function of the transmission network as a whole to meet the requirements of stakeholders is the primary consideration, and guides asset management decisions.

TransGrid's lifecycle strategies for each stage in the asset lifecycle are described below.

### 4.4.1    Plan

TransGrid considers the planning stage of the asset lifecycle with respect to the network as a whole and the overall property portfolio. The outcomes of the planning process are aimed at delivering the longer term asset management strategies.

It should be noted that the detailed planning for individual projects to construct/acquire the individual assets is considered as part of the build lifecycle stage.

TransGrid's main planning challenge is the uncertainty surrounding the key asset management drivers and stakeholder requirements, such as uncertainty in demand forecasts and renewable energy generation connections. As such, TransGrid's planning strategy is to:

> Undertake macro and regional research to understand and anticipate:
  - The variables surrounding network demand, and customer and generation connections
  - Regulatory requirements.

> Undertake network and property portfolio asset modelling and options analysis to:
  - Understand the emerging constraints and limitations of the network
  - Identify both network and non-network solutions, leveraging off new technologies and innovation where possible
  - Ensure that impacts on the community and environment are appropriately considered

> Develop long term plans, which are refined and developed in greater detail:
  - As the key planning variables become more certain
  - When the time for implementation of the plans draws nearer.

> Plan the network based upon the best possible understanding of the key drivers, stakeholder requirements and network capability. Undertake planning so that the assets will:
  - Meet the expected short-term outcomes and most likely long-term outcomes
  - Have the flexibility to adapt to credible sensitivities and changes that may unfold in the future
  - Meet forecast demand at defined reliability planning standards.

TransGrid's long term scenario analysis for the network assets is detailed within the Network Development Strategy (NDS), which is currently under review. The NDS is owned by TransGrid's Asset Management Business Unit, by the Manager/Investment Strategy and Solutions and the Manager/Power Systems Analysis.

TransGrid's shorter-to-medium term planning strategies for the network are detailed within the Area Plan documents, considering inputs from generators, other transmission network service providers, load customers and the Asset Management Business Unit to provide a consolidated view of the medium term network requirements.

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The Area Plans are owned by TransGrid's Asset Management Business Unit, and the Manager/Power System Analysis. Copies of the Area Plan documents are available on *The Wire*.

### 4.4.2 Design

At all times the design process is managed to facilitate the timely, complete and integrated delivery of the required designs from the appropriate design teams. All design activities are planned, controlled and conducted in a systematic manner. Designs must comply with all relevant functional requirements (as provided by the Asset Manager), Standard Design Manuals, and Safety in Design (SiD) requirements.

TransGrid's main design challenge is in maximising the versatility of designs to ensure the efficiencies and optimisation can be realised throughout the remaining asset lifecycle stages, without losing the benefits that can be gained from design standardisation. As such, TransGrid's design strategy is to:

> Undertake requirements and options analysis to identify:

- Incorporate Asset Manager requirements in the Standard Design Manual

- Possibilities for leveraging new technologies and innovation where possible

- Designs that minimise impacts on the community and the environment across the asset lifecycle

> Utilise standard designs that maximise the efficiency of design processes and:

- Ensure that the regulatory compliance requirements are captured, and continue to be captured as they evolve

- Do not compromise the flexibility to make the above considerations

- Are continually refined, incorporating new technologies and innovation where appropriate

- Allow TransGrid to outsource design processes where there is an economic benefit to do so, considering:
  - Efficiencies in design and other lifecycle costs
  - Knowledge and skills available.

The processes and procedures for detailed design of the network assets are documented within the Standard Design Manual and the relevant design drawings. The Standard Design Manual is owned by TransGrid's Project Services Business Unit, and the Manager/Engineering. A copy of the Standard Design Manual is available on *The Wire*.

### 4.4.3 Build

The build stage includes project construction and the commissioning of assets. All works must be carried out in accordance with the relevant Work Instructions, Work Health and Safety (WH&S) requirements, environmental requirements and Standards.

TransGrid's main build challenge is in managing its suppliers, contractors and the community to ensure the efficient delivery of projects to the specified standards, on-time and within budget, and without compromising safety or the environment.  As such, TransGrid's build strategy is to:

> Develop and continually refine detailed and methodical systems/processes for project delivery, including project management

> Develop stringent criteria for suppliers and contractors, and maintain a register of preferred suppliers and contractors based on performance

> Outsource elements of the build process where there is an economic benefit to do so, considering efficiencies in project delivery and the skills and experience available

> Promote the delivery of all projects to the highest safety and environmental standards, leveraging of new technologies and innovation where possible

> Build assets based upon the best possible understanding of the key drivers, stakeholder requirements and network capability. Build to efficiently deliver projects while:

- Minimising impacts on the community and the environment

- Without compromising on safety.

The processes and procedures for construction and commissioning of network assets are detailed within the Project Delivery Manual and Standard Construction Manuals, with reference to the relevant Work Instructions. The Project Delivery Manual is owned by TransGrid's Project Services Business Unit, and the Manager/Project Delivery. The Standard Construction Manual is owned by TransGrid's Project Services Business Unit, and the Manager/Engineering. A copy of these is available on *The Wire*.

### 4.4.4 Operate

TransGrid's main network system operation challenge is due to the dynamic nature of the electricity transmission network and the need to control the flows of electricity on a real-time basis. This requires real-time information of the network status, and effective cooperation between the control room and operational staff in the field. TransGrid's network assets operation strategy is to:

> Operate assets based upon the best possible understanding of the key drivers, stakeholder requirements and network capability. Operate the network to:
  - Maximise the availability of network elements, through:
    o Minimising and efficiently managing the scheduling and duration of planned outages
    o Efficiently enabling the restoration of power following unplanned outages
    o Maintaining, testing and reviewing operations plans for up-to-date contingency operating scenarios.
  - Maintain the integrity and lifespan of individual network assets
  - Maximise Service Target Performance Incentive Scheme revenue where commercially justified.

> Ensure system performance is optimised without compromising safety or the environment

> Leverage new technologies and innovation for improved real-time network information and coordination between control room and operational staff in the field

> Enable efficient operation of the National Energy Market (NEM)

> Reduce the number of outages due to mal-operation and other preventable causes

> Respond to system incidents in real-time to ensure network security and reliability, and safety of staff.

TransGrid's operating strategy for network assets is detailed in the relevant Operating Manuals. The Operating Manuals are owned by TransGrid's Asset Management Business Unit, and the Manager/Network Operations.

### 4.4.5 Maintain

TransGrid's main maintenance challenge is the optimisation of risks against the direct costs of undertaking maintenance work. As such, TransGrid's maintenance strategy is to:

> Maintain assets based upon the best possible understanding of the key drivers, stakeholder requirements and network capability. Develop maintenance plans based on:
  - Specific knowledge of asset condition and health, including condition assessments, environment, utilisation, defect rates, and frequency of exposure to abnormal conditions such as fault currents
  - Analysis of developing trends across subsets of the asset populations, such as defect histories with respect to specific asset types and models

> Deliver asset maintenance works in the most efficient manner, considering efficiencies in program delivery, lifecycle costs, and the skills and experience of available workforce

> Establish initial maintenance regimes for new asset types based upon manufacturer recommendations, and refine these based on TransGrid's accumulated experience in managing the assets

> Consider options for leveraging new technologies and innovation where possible

> Consider scenarios for:
  - Efficiency gains by the optimal bundling of asset maintenance into programs

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– Minimising system impact by coordinating with planned outages where appropriate.

TransGrid's maintenance strategies for each asset class are detailed within the Renewal and Maintenance Strategy documents. The Renewal and Maintenance Strategies are owned and controlled by TransGrid's Asset Management Business Unit, and the Manager/Asset Strategy. Maintenance is delivered by the Field Services Business Unit. Copies of the Renewal and Maintenance Strategy documents are available on *The Wire*.

### 4.4.6    Renew

TransGrid's main renewal challenge is the optimisation of increasing maintenance costs and risks, against the direct costs and risks of taking intervening action. As such, TransGrid's renewal strategy is to:

> Renew assets based upon the best possible understanding of the key drivers, stakeholder requirements and network capability. Optimise renewal based on:

– Specific knowledge of asset condition and health, including condition assessments, environment, utilisation, defect rates frequency of exposure to abnormal conditions such as fault currents

– Analysis of the most appropriate time for undertaking intervening action, optimising the balance between maximising the asset lifespan, and the risks associated with continued operation and different intervening action scenarios

– Specific consequences of failure for the asset in respect of the reliability, safety, environmental and financial impacts.

> Undertake requirements and options analysis to identify:

– The asset performance versus asset management objectives

– Scope for incorporating non-network solutions

– Possibilities for leveraging new technologies and innovation where possible

– Options for considering continued maintenance against renewal scenarios, including life extension, refurbishment, plant modifications or and/or replacement

– Opportunities for considering network changes and property portfolio changes that provide a more optimal network outcome with a renewed asset of a different capability, or potentially removed altogether

– Optimal solutions that balance risks associated with TransGrid's broad areas of consequence, and the direct costs associated with undertaking continued maintenance against the costs of intervening action.

> Ensure that assets which are high risk or don't meet statutory obligations are renewed at the optimal time

> Consideration of scenarios for efficiency gains by the optimal bundling of asset renewals into programs

The individual renewal strategies are detailed for each of TransGrid's asset classes in the Renewal and Maintenance Strategy documents. The Renewal and Maintenance Strategies are owned and controlled by TransGrid's Asset Management Business Unit, and the Manager/Asset Strategy. Asset renewals are delivered by Project Services. Copies of the Renewal and Maintenance Strategy documents are available on *The Wire.*

### 4.4.7    Dispose

The disposal of assets is typically carried out after the commissioning of a new or renewed asset, and in accordance with all relevant compliance regulations and Work Instructions, Work Health and Safety (WH&S) requirements, environmental requirements and Standards.

TransGrid's main disposal challenge is in identifying options for realising the residual value of the assets, while maintaining safety standards and minimising the environmental impacts. As such, TransGrid's disposal strategy is to:

> Dispose of assets based upon the best possible understanding of the key drivers, stakeholder requirements and network capability. optimise asset disposal to:

– Maximise the benefits of the asset residual value, by identifying:

- Scenarios for redeploying, reusing assets, or asset parts, when no longer required for performing its specific function
- Scope for selling the assets to a third party, either for reuse or for scrap
- Retention for possible future use or spares holding.

  - Efficiently manage the immediate and ongoing costs while:
    - Minimising the environmental impacts
    - Ensuring safety to workers and the community.

> If the asset is no longer required for network capacity, reliability or security purposes (i.e. surplus to requirements) consider disposing of or reusing the asset.

> Dispose property assets through identifying opportunities for maximising asset disposal value taking into account:

  - The total and relative economic advantage compared to other options.

  - The net financial disposal benefits having regard to the net book asset value of the surplus property and the current market conditions

  - The strategic value of the property, in terms of realising residual or optimised value on disposal. The strategic value is based on key corporate drivers and stakeholder requirements, balanced against long term future planning needs, wider policies and objectives, or environmental outcomes (e.g. carbon or biodiversity offsets).

  - Secondary service obligations which may dictate its retention

  - The impact on the environment.

Disposal strategies are incorporated in each of TransGrid's asset classes in the Renewal and Maintenance Strategy documents, available on *The Wire*.

## 4.5    Asset Information Strategy

Asset Information relates to the technical and commercial information collected from asset data that form part of asset management system. TransGrid's Asset Information Strategy supports the asset management strategies and objectives by enabling the Asset Managers to make optimal decisions while keeping the opportunity costs to a minimum. The Asset Information Strategy links the Asset Management objectives with the five Asset Information Strategy Groups:

> Data Quality

> Business Processes

> Systems

> Governance

> Operation Technology Strategies

Effective asset information management requires several different parts of the organisation to work together, and, in particular, the Asset Management and the Information Technology functions (i.e. for the delivery of appropriate information systems). Similarly, the governance and utilisation of asset information requires effective business processes to be established, and competent people to work within those processes.

TransGrid recognises that its Asset Managers can only make better and more informed asset management decisions if they have better and improved asset data. Accordingly, TransGrid sees the ongoing development of its asset information as a key component of its asset management activities.

A copy of TransGrid's Asset Information Strategy is available on *The Wire*.

# 5. Performance Indicators (PI)

Performance Indicators (PI) are used to monitor the effectiveness of the asset management strategies in managing the performance of the assets and achieving the asset management objectives. The PIs are monitored and reviewed at the appropriate forum, and utilised to inform future revisions of the asset management strategies and objectives. Table 5 below details the PIs the Asset Management System relies upon, and the forum these are monitored and reviewed through.

**Table 5: Asset Management PIs**

| PI's | Reporting forum |
|------|-----------------|
| Zero network related LTIs | <ul><li>Company Dashboard</li><li>Board Health, Safety and Environment Committee</li><li>Asset Management Strategy and Objectives</li></ul> |
| Zero network related fire starts | <ul><li>Board Health, Safety and Environment Committee</li><li>Operations and Maintenance Steering Committee</li><li>Network Performance Review Committee</li><li>Asset Management Strategy and Objectives</li></ul> |
| Maintain 5 year average level of network related environmental incidents | <ul><li>Operations and Maintenance Steering Committee</li><li>Network Performance Review Committee</li><li>Asset Management Strategy and Objectives</li></ul> |
| Maintain 5 year average level of Key Hazardous Events:<ul><li>Conductor drop</li><li>Catastrophic failure</li><li>Structure fall over</li><li>Uncontrolled discharge/contact with electricity</li><li>Unauthorised entry</li><li>Contaminant or pollutant release</li><li>Unplanned outage</li></ul> | <ul><li>Operations and Maintenance Steering Committee</li><li>Network Performance Review Committee</li><li>Asset Management Strategy and Objectives</li></ul> |
| Maintain 5 year average level of loss of supply events | <ul><li>Operations and Maintenance Steering Committee</li><li>Network Performance Review Committee</li><li>Asset Management Strategy and Objectives</li></ul> |
| Maintain system reliability (99.9997%) | <ul><li>Asset Management Strategy and Objectives</li></ul> |
| Zero instances of operating outside network transient limits as notified by AEMO | <ul><li>System Planning Working Group</li><li>Network Performance Review Committee</li></ul> |
| Maintain average age of asset class to a sustainable level | <ul><li>Asset class Renewal and Maintenance Strategies</li></ul> |
| MITC reduced by 25% of AER target | <ul><li>Operations and Maintenance Steering Committee</li><li>Network Performance Review Committee</li><li>Executive Network Performance Report</li><li>Asset Management Strategy and Objectives</li></ul> |

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| PI's | Reporting forum |
|---|---|
| Better than average performance of the STPIS measures:<br>■ Fault and forced outage rates for:<br>   o  Transmission lines<br>   o  Transformers<br>   o  Reactive plant<br>■ Incorrect operational isolation of primary or secondary equipment<br>■ Failure of protection system<br>■ Average outage duration | ■ Operations and Maintenance Steering Committee<br>■ Network Performance Review Committee<br>■ Executive Network Performance Report<br>■ Asset Management Strategy and Objectives |
| Perform within -5/+10% of the Asset Management Program of Work budget | ■ Monthly Service Level Agreement Meeting |
| Reduce standard maintenance job costs | ■ Monthly Service Level Agreement Meeting |
| Improve capital project performance | ■ Major Capital Project Review Meeting |
| CAPEX cash flow adherence (88%) | ■ Executive Investment Committee<br>■ Company Dashboard |
| Perform within +/-5% of the CAPEX budget | ■ Executive Investment Committee<br>■ Company Dashboard |
| ISO 55001 certification audit NCRs closed-off (75%) | ■ Executive Asset Strategy Committee |
| Reach excellent maturity level in the risk, strategy and asset information Asset Management System elements | ■ Asset Management Strategy and Objectives<br>■ Executive Asset Strategy Committee |
| Internal audits carried out as per audit program | ■ Executive Asset Strategy Committee |
| Zero AS 5577 non-compliances | ■ Executive Asset Strategy Committee |
| Zero reliability standard non-compliances | ■ Area Plans |
| Zero NER non-compliances | ■ System Planning Working Group<br>■ Operations and Maintenance Steering Committee |

The historical performance of a number of these measures is shown in Appendix A.

*These performance measures are based upon the AER's Electricity TNSP Service Target Performance Incentive Scheme (STPIS) version 4 - 19 December 2012. The targets were set in the 2014-2019 Revenue determination.

# 6. Continual Improvement

As part of its ongoing commitment to continual improvement, TransGrid has identified a number of continual improvement initiatives to support the achievement of its asset management objectives and the associated business plan objectives. These continual improvement initiatives are summarised in Table 6 below.

Broader consideration was also given to the improvement initiatives currently being undertaken across all of TransGrid's business units that interact with the AMS. Appendix D details the alignment of the aforementioned improvement initiatives to the Asset Management System.

**Table 6: Continual Improvement Initiatives**

| Strategic Theme | Business Plan Objectives | Asset Management Objectives | Asset Management Actions | Supporting Documents |
|---|---|---|---|---|
| Customer Oriented Growth | Stakeholder Engagement | Deliver a successful revenue determination | ▪ Assurance review of the 2019-23 Regulatory Control Period (RP2) network expenditure complete<br>▪ Top-down and bottom-up view of RP2 replacement expenditure developed<br>▪ Documentation required for RP2 submitted<br>▪ Narrative developed for RP2 network expenditure complete | ▪ Revenue Proposal |
| Operational Excellence | Asset Management | ▪ ISO 55001 Compliant<br>▪ Continually improve the Asset Management System | ▪ Asset information improvements (governance, data, reporting and systems) implemented<br>▪ Asset replacement life optimised<br>▪ Asset maintenance scope and frequency optimised, including balancing proactive and reactive maintenance<br>▪ Asset lifecycle costs optimised<br>▪ Asset management competency enhanced<br>▪ Plant and design standards optimised<br>▪ Improve the options screening process to optimise the balance between network augmentation, renewal, maintenance and non-network/other solutions<br>▪ Enhance and formalise the Asset Management Communication Strategy | ▪ Asset Information Strategy<br>▪ Network Asset Risk Assessment Methodology<br>▪ Asset Health Framework<br>▪ Asset Criticality Framework<br>▪ RCM Framework (under development)<br>▪ Continual Improvement Strategy<br>▪ Asset Management Competency Framework<br>▪ Design Strategy<br>▪ Asset Management Business Unit Plan<br>▪ Project Services Business Unit Plan<br>▪ Prescribed Capital Investment Procedure<br>▪ Asset Management Communication Strategy (under development) |
| | | ▪ AS 5577 compliant<br>▪ Continually improve the Electricity Network Management System | ▪ Formal Safety Assessments complete and externally audited | ▪ Bushfire Risk Management Plan<br>▪ Public Electricity Safety Awareness Plan |
| | | ▪ Reliability Standard compliant<br>▪ National Electricity Rules compliant | ▪ Changes arising from IPART Reliability Standard incorporated in planning procedures | ▪ Planning Strategy<br>▪ Area Plans |

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| Strategic Theme | Business Plan Objectives | Asset Management Objectives | Asset Management Actions | Supporting Documents |
|---|---|---|---|---|
| Operational Excellence/ Customer Oriented Growth | Efficiency and Productivity/Core Prescribed Revenue Growth | Improve CAPEX performance | ▪ REPEX and risk scenarios understood<br>▪ Investment governance/prioritisation/optimisation process enhanced | ▪ Prescribed investment process<br>▪ REPEX and risk models<br>▪ Revenue Proposal<br>▪ Continual Improvement Strategy |
| Operational Excellence | Reliability | Maintain network capability | ▪ Annual planning review current | ▪ Planning Strategy<br>▪ Area Plans |

TransGrid

# 7. Implementation

This section details the monitoring and review of the Asset Management Strategy and Objectives, and document governance mechanisms.

## 7.1 Approval and Accountability

This document has been approved by the Executive General Manager Asset Management.

The Manager/Asset Strategy is accountable for the communication, implementation and continual improvement of TransGrid's Asset Management Strategy and Objectives.

## 7.2 Communication

The signed copy of this Asset Management Strategy and Objectives document is retained in the corporate document repository TRIM, and on *The Wire*.

Communication to relevant stakeholders, service providers and other relevant parties who require knowledge of the Asset Management Strategy and Objectives is via *The Wire*.

## 7.3 Review

Accountability for the continuous review and improvement of this Asset Management Strategy and Objectives document sits with the Manager/Asset Strategy.

The Manager/Asset Strategy shall be accountable for arranging a high level review at least once every year, and undergo a detailed review every three years. Each review shall include due consideration:

> That the document remains relevant, suitable, consistent and appropriate for the implementation of the Asset Management Policy, Business Plan, and the objectives of TransGrid

> Of any significant change to the organisation or Asset Management System

> Of opportunities for continual improvement in terms of Asset Management activities

> Of opportunities for improvements in the format, communication and implementation of the Asset Management Strategy and Objectives itself.

The document review should consider the strategies in detail, and include:

> An assessment of the benefits in respect of risk and performance, against the planned investment

> Consideration of all relevant AMS audit and review findings

> A revision of the strategies in accordance with the above assessments and findings.

# 8. Change history

| Revision no | Approved by | Amendment |
|---|---|---|
| 3 | Gerard Reiter, EGM/Asset Management | Refresh the asset management strategy and objectives to align to the 2016-2017 Business Plan and inclusion of stakeholder engagement information. |
| 2 | Gerard Reiter, EGM/Asset Management | Refresh the asset management strategy and objectives to align to the 2015-2016 Corporate Plan and Asset Management Business Unit Plan. |
| 1 | Stephen Clarke, EGM/Network Planning & Performance | Enhancements to reflect the adoption of the 'top down' line of sight approach. |
| 0 | Stephen Clarke, EGM/Network Planning & Performance | Initial issue. |

**TransGrid**

# Appendix A  Performance Indicator Trends

The Performance Indicators (PIs) are used to monitor the effectiveness of the asset management strategies in managing the performance of the assets and achieving the asset management objectives. The trends of a number of these PIs are presented in the figures below.

## A.1  Network related LTIs:

TransGrid has had zero network related LTIs in the past 5 years

## A.2  Network related fire starts

**Figure 2: Network related fire starts**
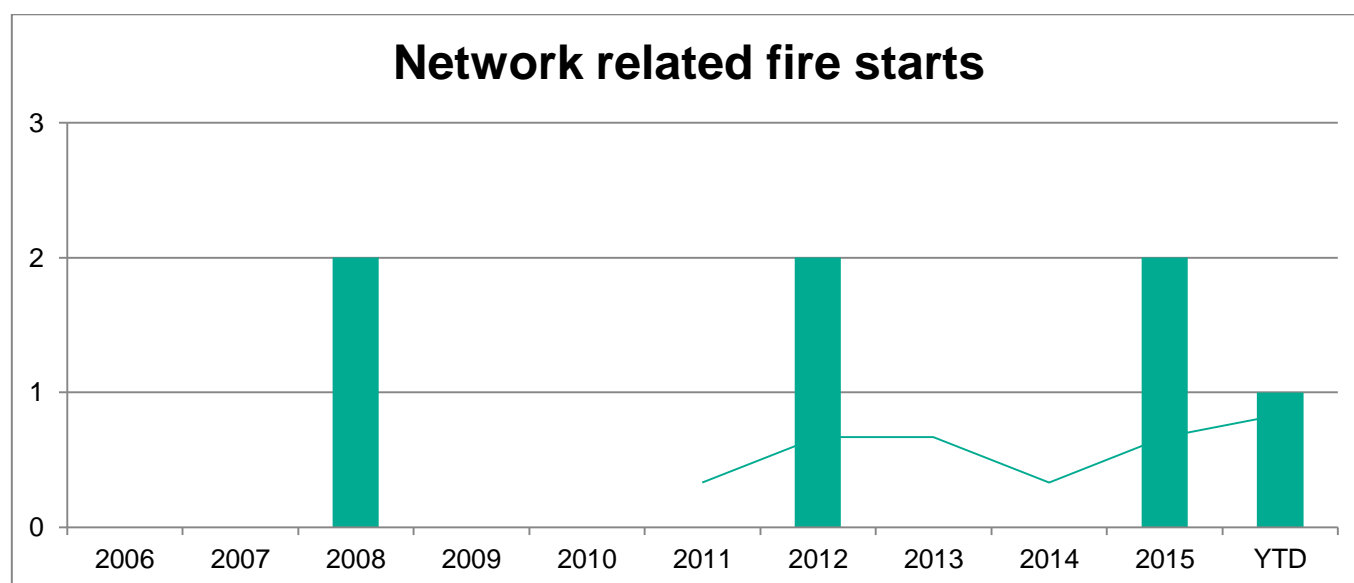


## A.3  Network related environmental incidents

TransGrid has had zero network related environmental incidents in the past 5 years

TransGrid

## A.4    Loss of supply events/Unplanned outage

**Figure 3: Loss of supply events/Unplanned outage**
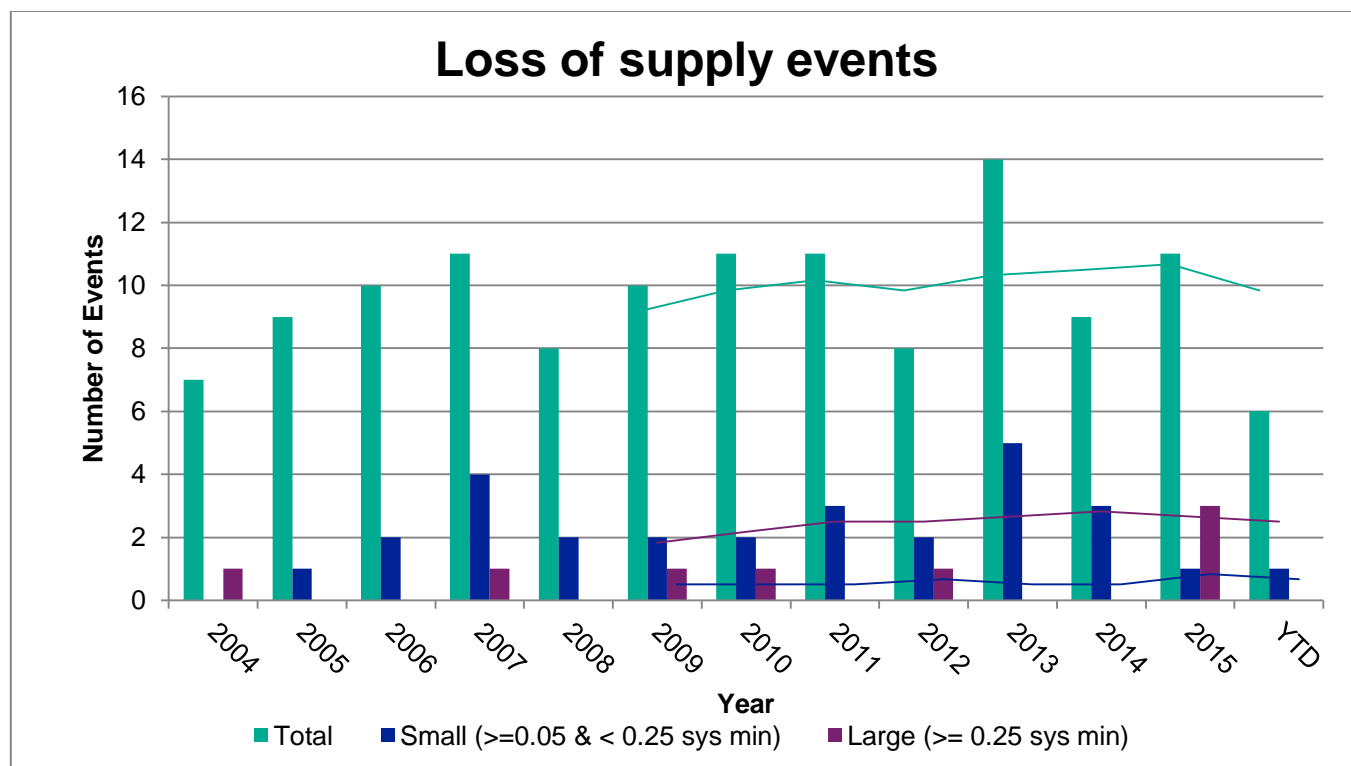


## A.5    System reliability

**Figure 4: System reliability**
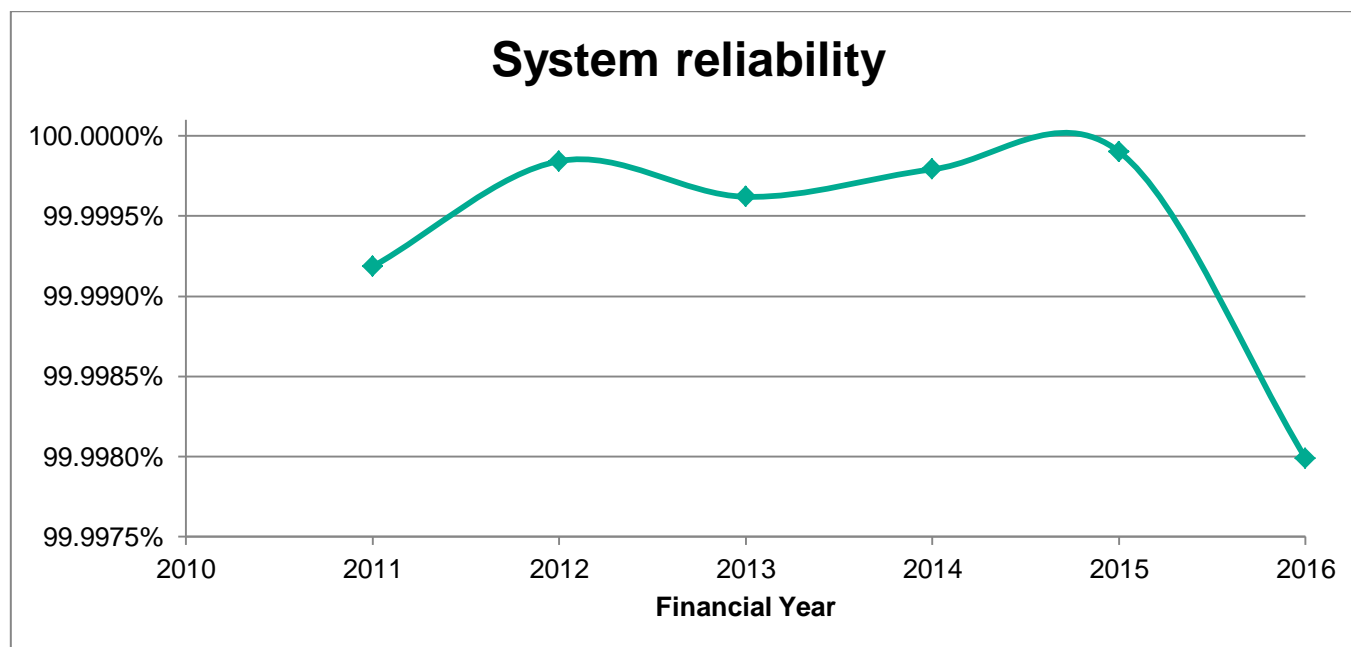
## A.6    Key Hazardous Events

**Figure 5: Conductor drop**

**Conductor drop**

_Bar chart showing conductor drop events by year:_
- 2006: 1
- 2007: 0
- 2008: 3
- 2009: 4
- 2010: 3
- 2011: 1
- 2012: 5
- 2013: 3
- 2014: 4
- 2015: 4
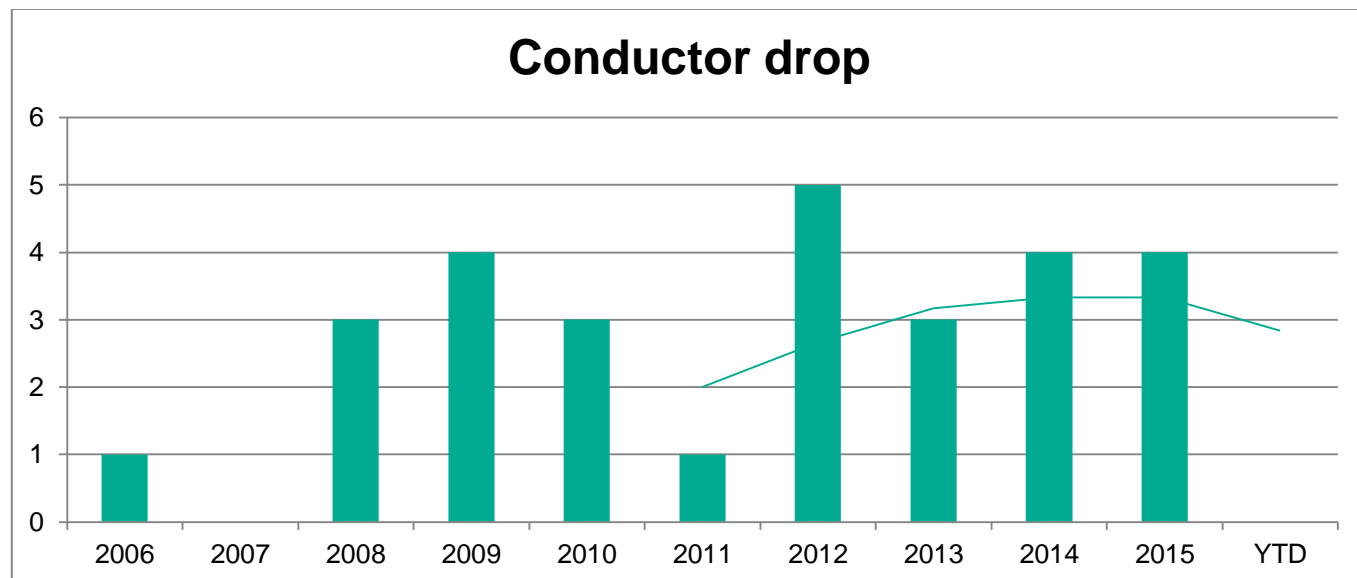
**Figure 6: Catastrophic failure**

**Catastrophic failures**

_Bar chart showing catastrophic failure events by year:_
- 2006: 0
- 2007: 0
- 2008: 0
- 2009: 2
- 2010: 3
- 2011: 2
- 2012: 1
- 2013: 3
- 2014: 2
- 2015: 2

**TransGrid**
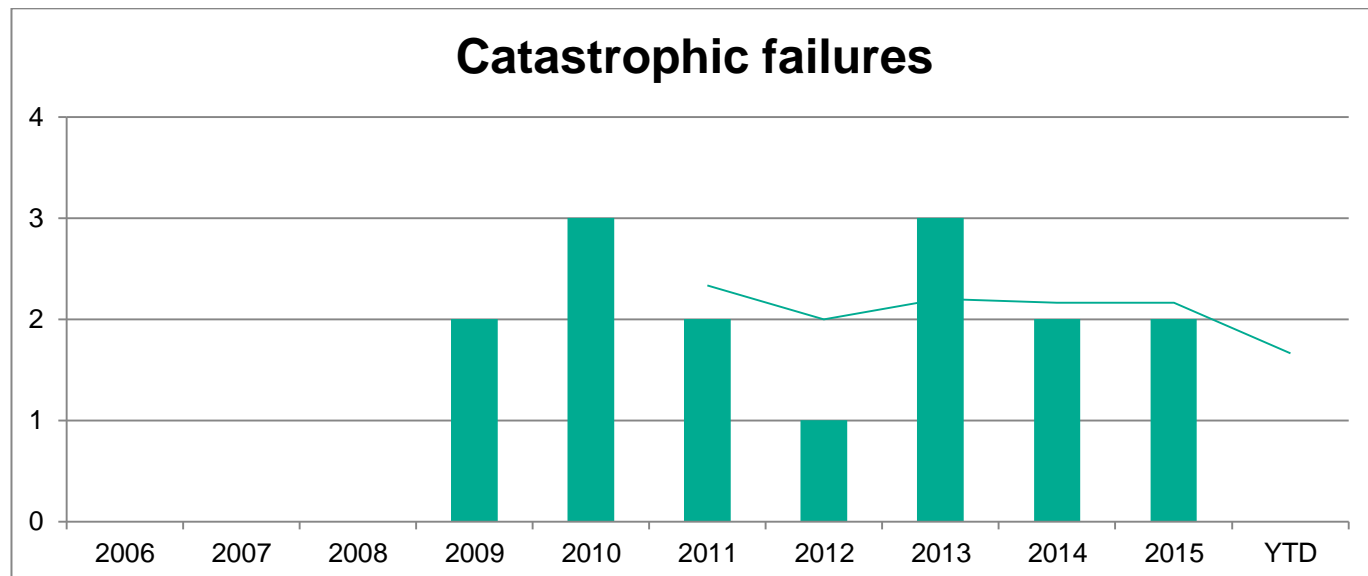
**Figure 7: Structure fall over**



Structure fall over
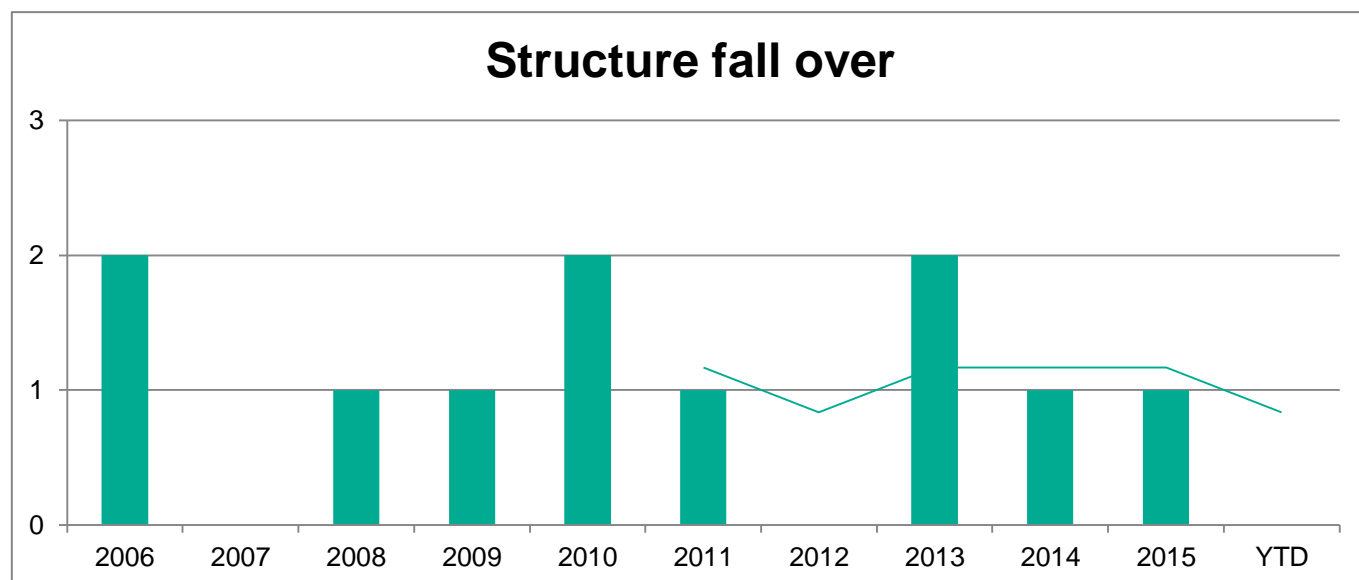
**Figure 8: Uncontrolled discharge/contact with electricity**

None in additon to those noted in the fire start, conductor drop and structure fail PIs.

**Figure 9: Unauthorised entry**



Unauthorised entry

TransGrid
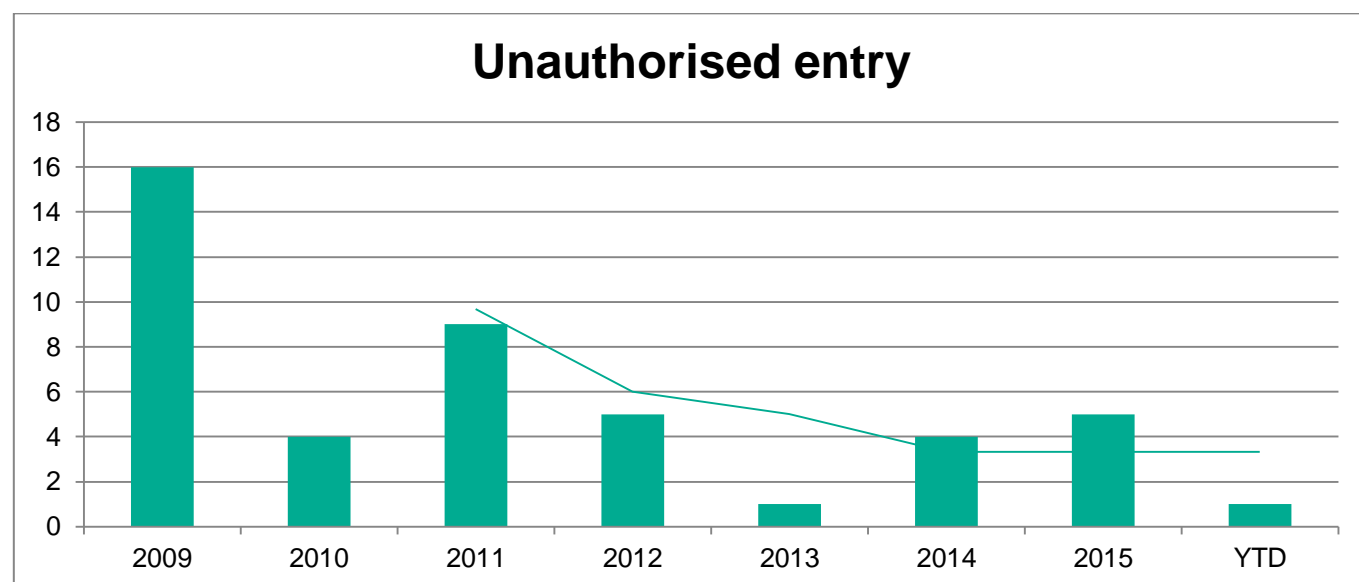
**Figure 10: Contaminant or pollutant release**
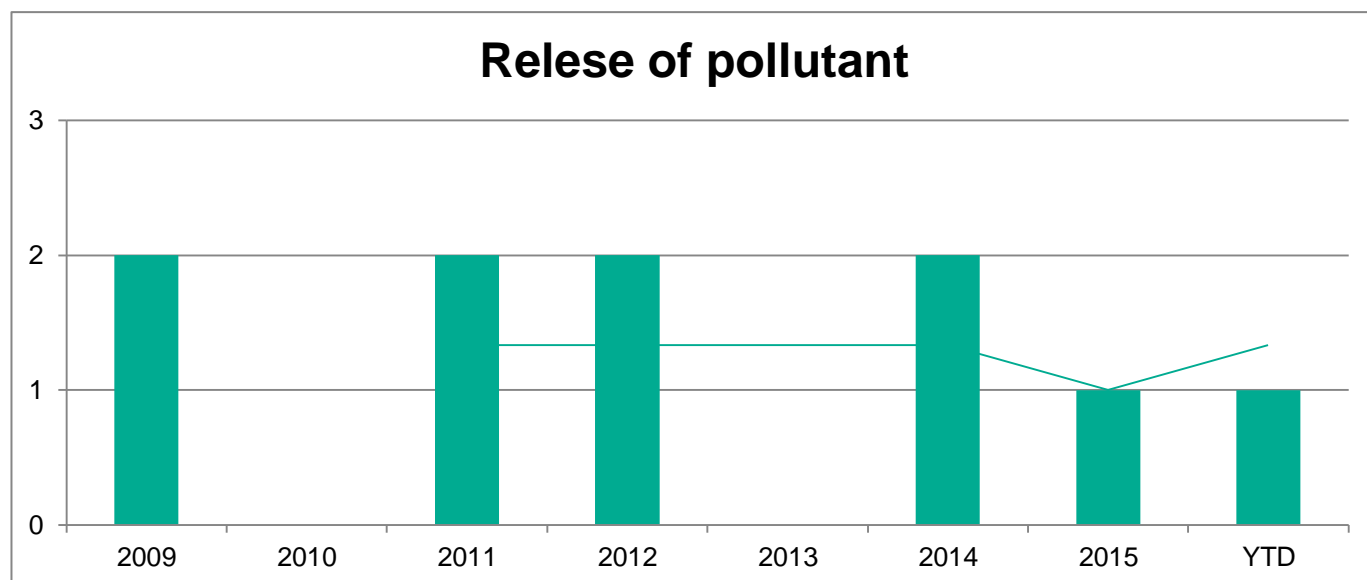


## A.7    Market Impact Transmission Constraint (MITC)

**Figure 11: Market Impact Transmission Constraint (penalty periods)**
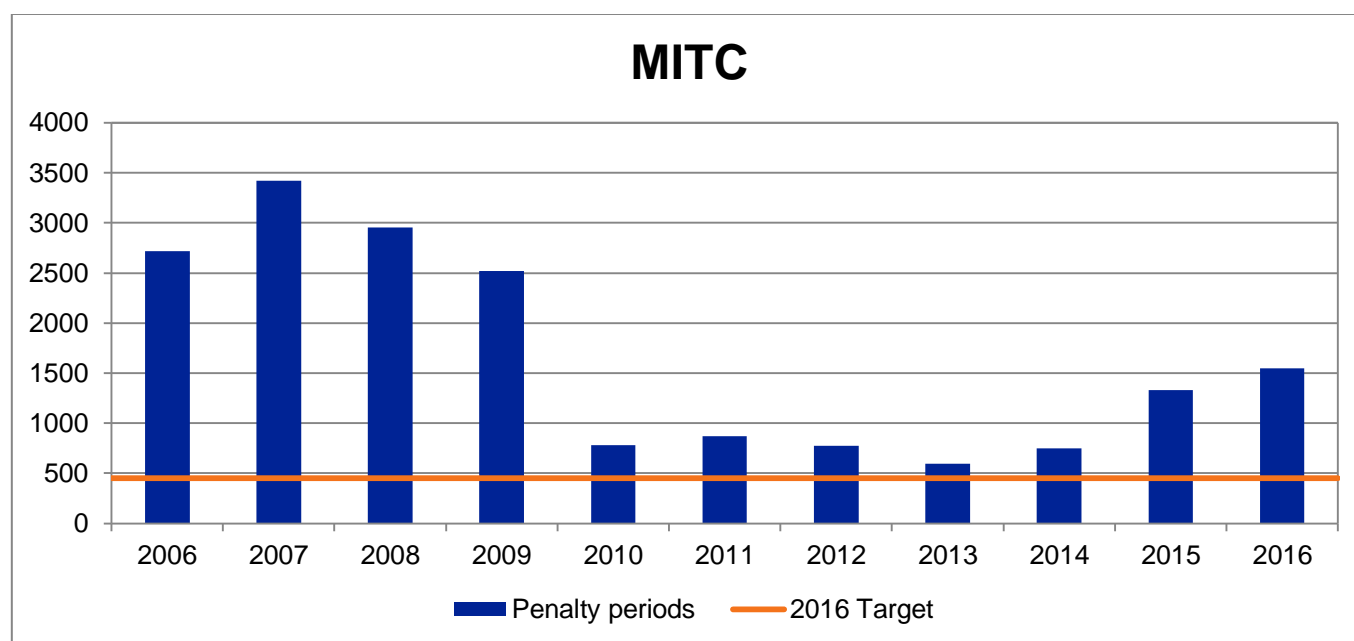
## A.8 STPIS Measures

**Figure 12: Incorrect operational isolation of primary or secondary equipment**

### Incorrect operational isolation of primary or secondary equipment
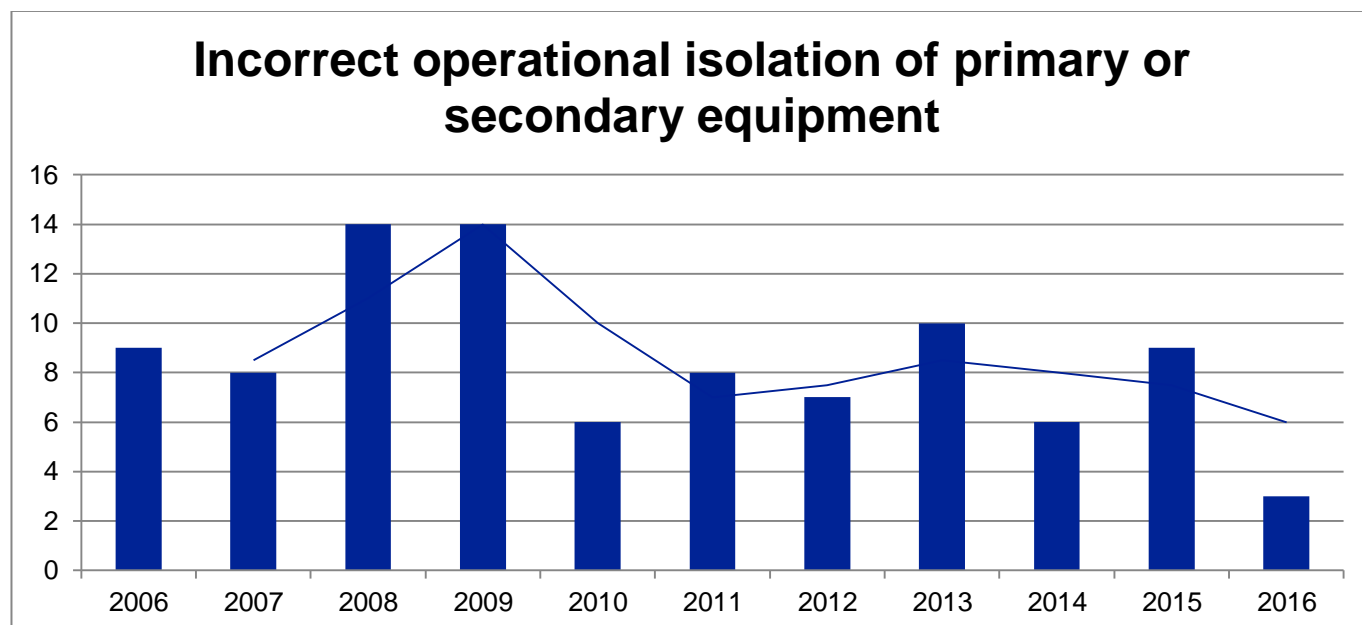


**Figure 13: Failure of protection system**

### Failure of protection system

TransGrid
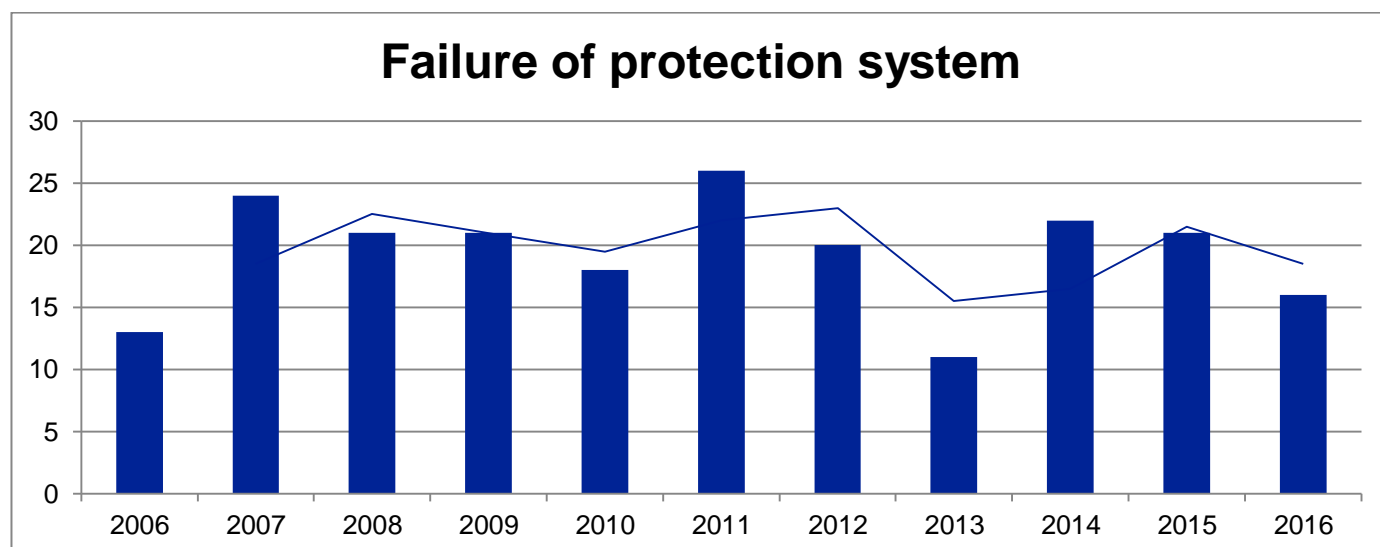
**Figure 14: Average outage duration**



**Average outage duration**
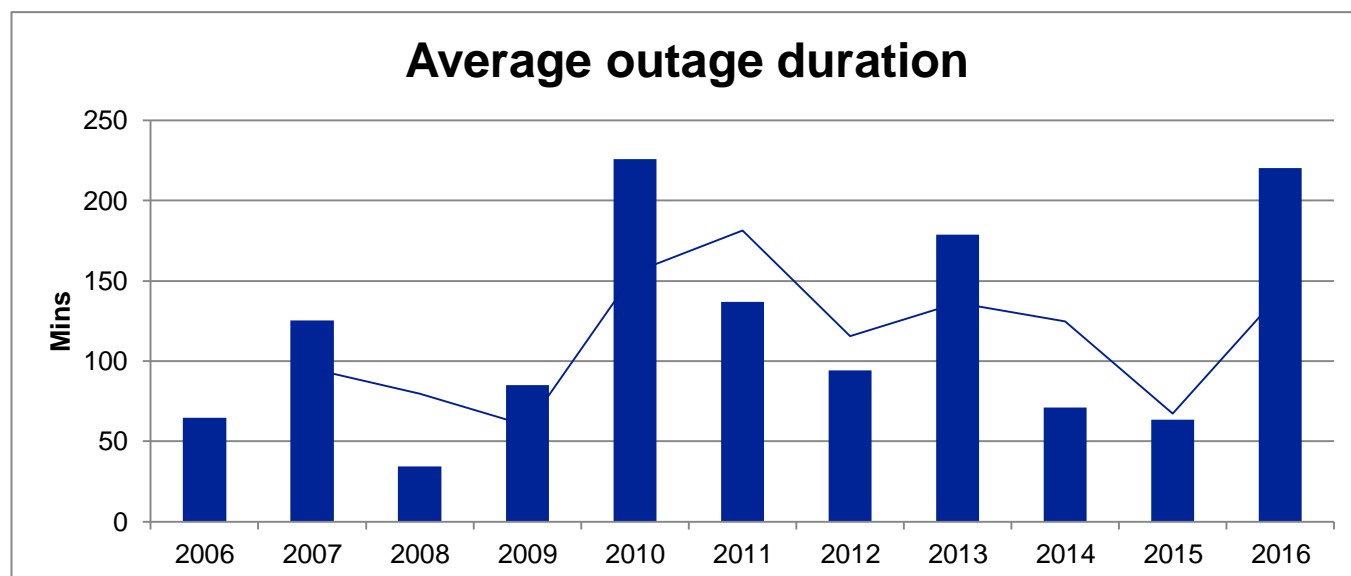
**Figure 15: Transmission line forced outage rate**



**Lines outage rate – forced outage (< 24 hour notice)**
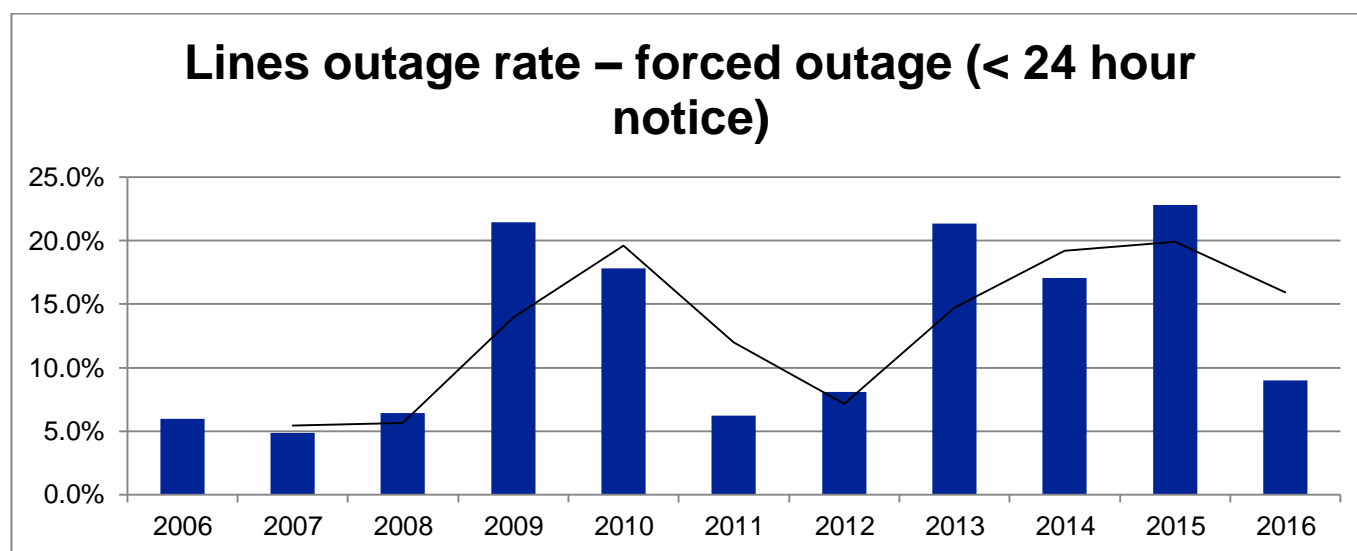
**Figure 16: Transmission line fault outage rate**



**Transmission line fault outage rate**
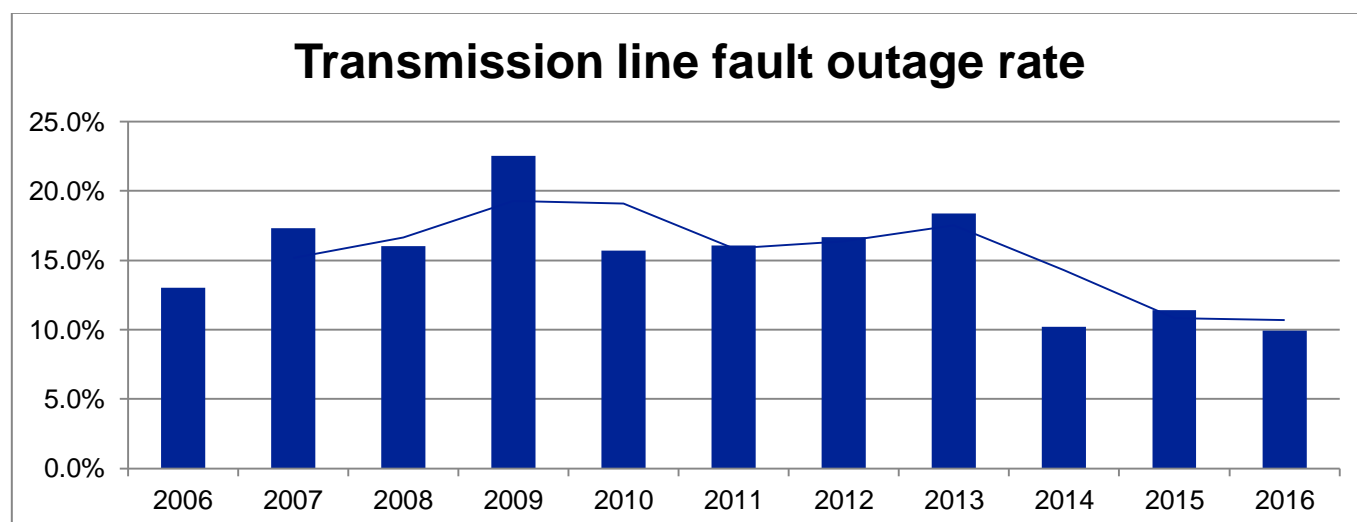
**Figure 17: Transformer forced outage rate**

## Transformer forced outage rate (< 24 hour notice)
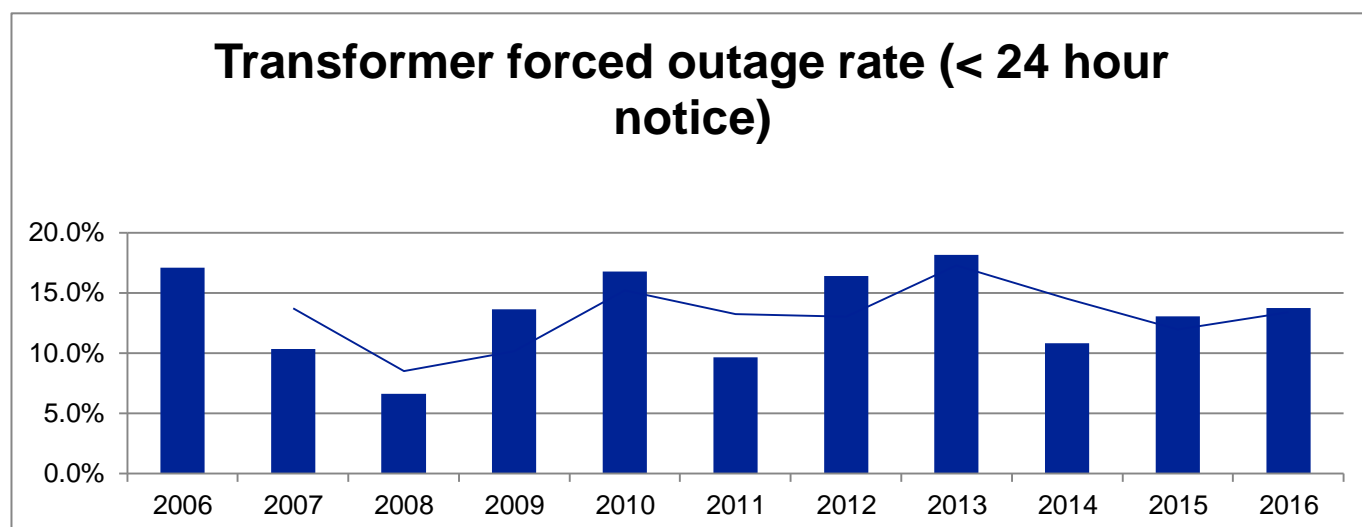


**Figure 18: Transformer fault outage rate**

## Transformer fault outage rate

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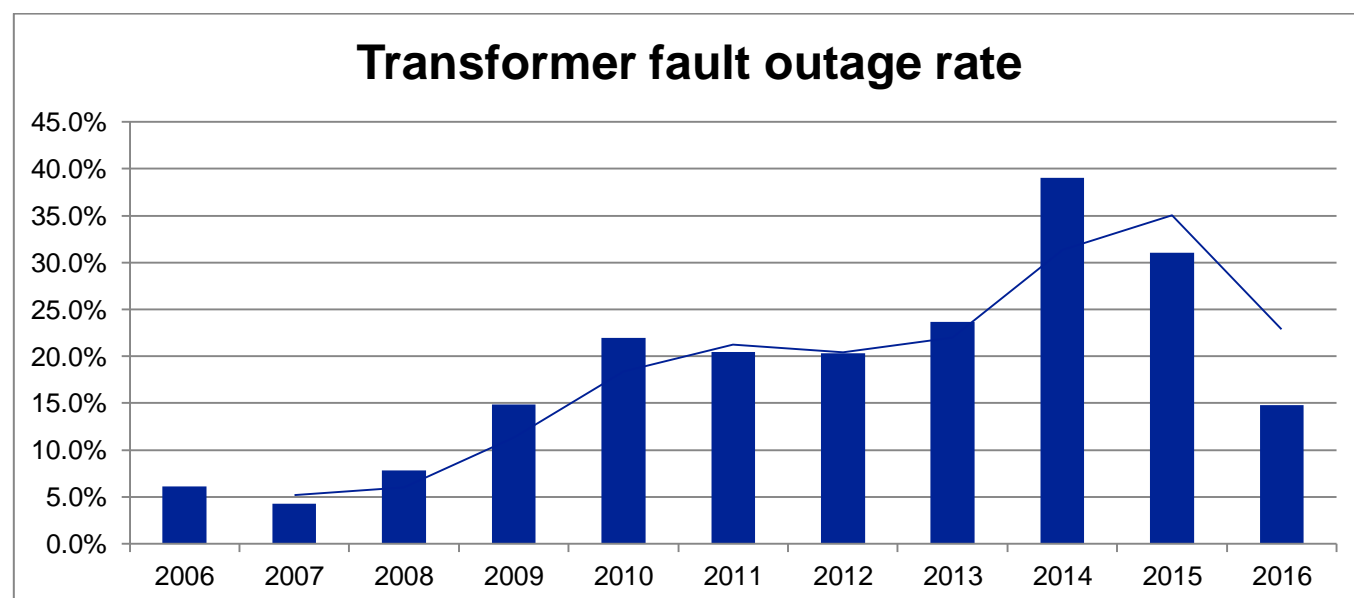
**Figure 19: Reactive plant forced outage rate**
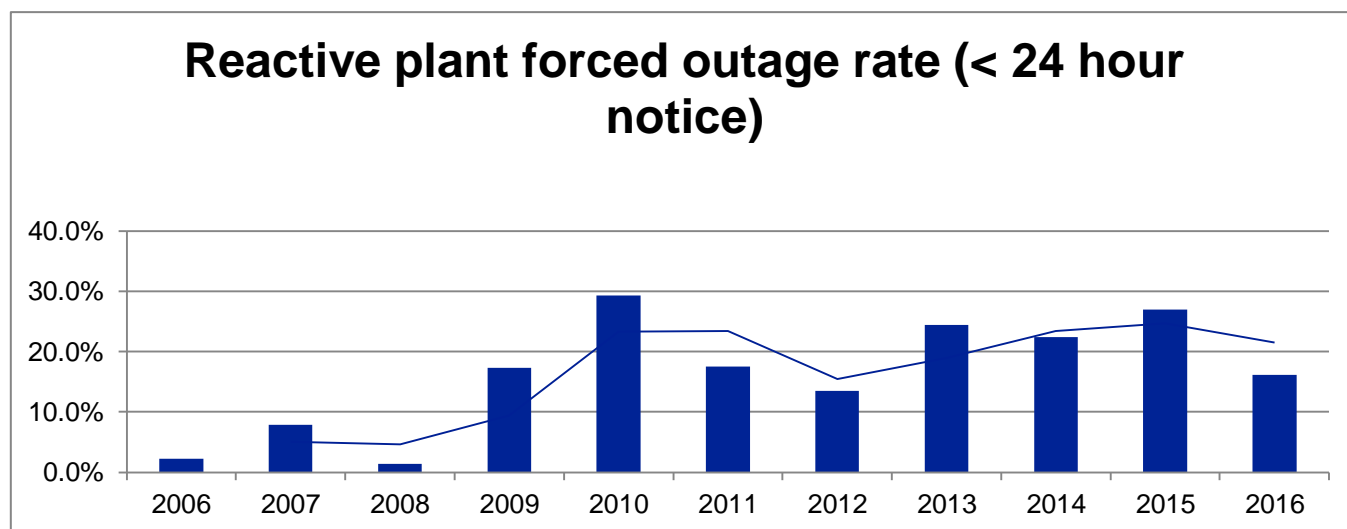


**Figure 20: Reactive plant fault outage rate**
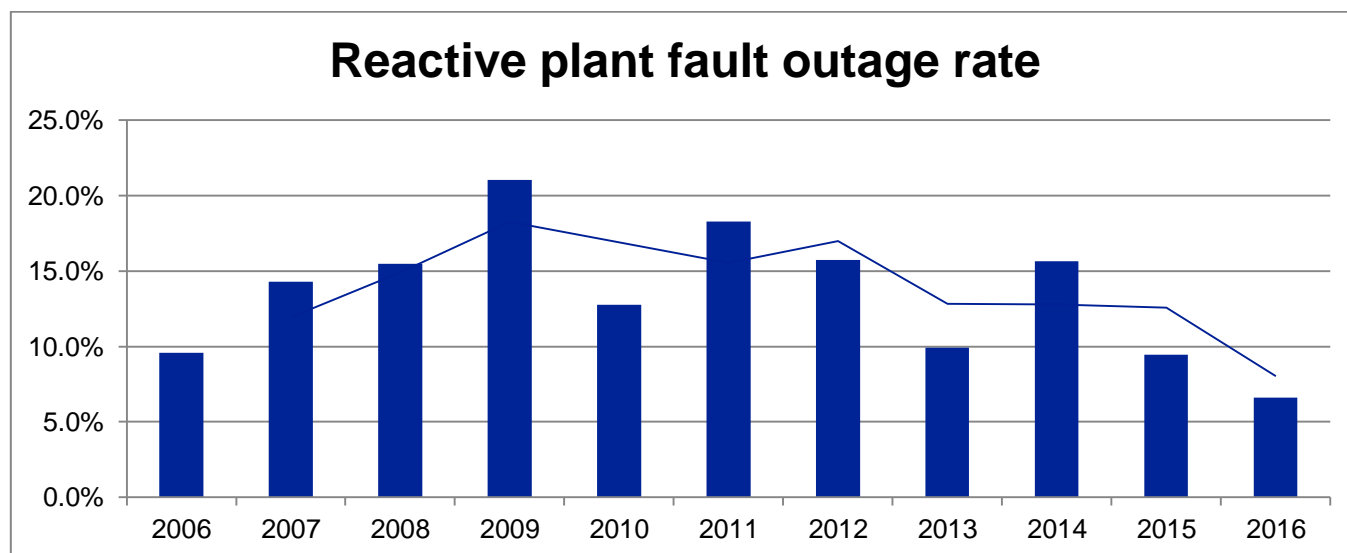
## A.9 Asset Management System Maturity

**Figure 21: Asset Management System Maturity (as at November 2014)**



Key

——— Transgrid ISO 55001 Score
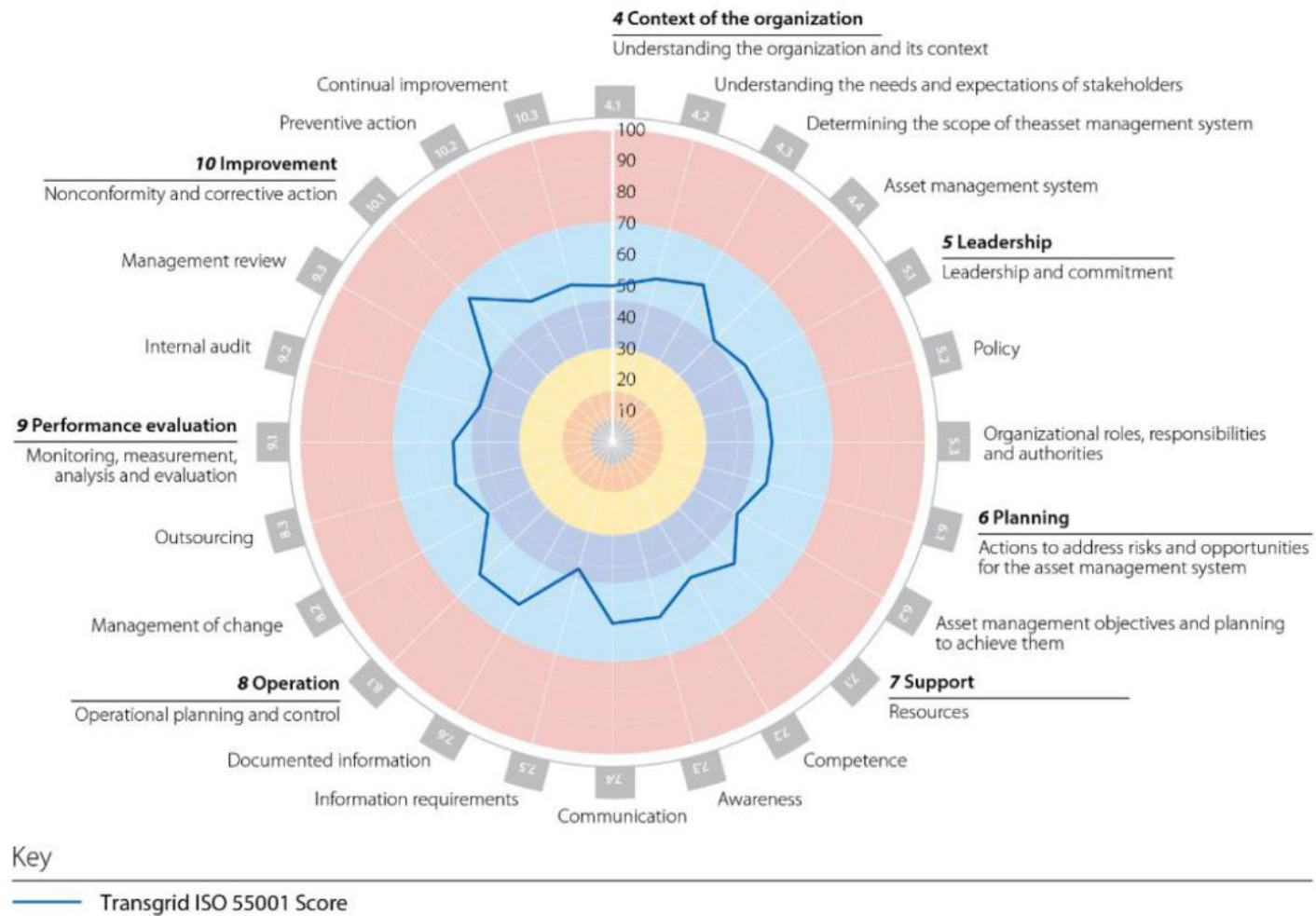
# Appendix B   Decision Criterion

At each stage in the development of the asset management strategy, lifecycle strategies and asset Renewal and Maintenance Strategies asset management decisions are required. In making these asset management decisions TransGrid applies decision criterion which focus on delivering on the asset management objectives at efficient costs, and while maintaining acceptable risks at the asset level.

The following decision criterion are considered in all asset management decisions, whether it be an informal assessment or within a more formal structure such as the Prescribed Capital Investment Procedure. In the application of its decision criterion TransGrid undertakes a range of analyses to ensure that the decisions are made based upon the best understanding of actual business outcomes. Such analyses consider the application of risk management against the performance indicators.

Stakeholder requirements play a role in defining the parameters of TransGrid's decision criterion. While different stakeholders will often have competing requirements, TransGrid's Stakeholder Management Framework ensures that the relevant stakeholder needs and expectations are captured, as detailed in Section 4.1. These stakeholder requirements are then considered during options development and analysis processes as well as in the weighting and calibration applied to specific risks and achievement of PIs.

## B.1      Network Planning and Analysis Process

The network planning and analysis process applies to the plan lifecycle stage. TransGrid plans its network to minimise the risk of the network not being able to meet forecast demand, connection of Distribution Network Service Providers (DNSP) and other directly connected industrial customers to its network, and interconnection with transmission networks in other states, in accordance with the NSW government regulated Design and Reliability Standards and the National Electricity Rules (NER). This reflects stakeholder needs and expectations identified in Section 4.1.

TransGrid also has obligations to meet community expectations in the supply of electricity, including ensuring that developments are undertaken in a socially and environmentally responsible manner. TransGrid plans the network to achieve supply at least community cost, without being constrained by State borders or ownership considerations.

TransGrid's approach to network planning includes consideration of non-network options such as demand side response, and demand management and/or embedded generation, as an integral part of the planning process. Joint planning with DNSPs, directly connected industrial customers, generators and interstate TNSPs is also carried out to ensure that the most economic options, whether network or non-network options, consistent with customer and community requirements are identified and implemented.

The network planning and analysis process is described in the Transmission Annual Planning Report (TAPR). A copy of the TAPR is available on *The Wire*.

## B.2      Renewal, Maintenance and Disposal Decision Process

A key element in the development of the Renewal and Maintenance Strategy is the process used by the Asset Manager to determine the specific renewal and maintenance interventions required for each asset to address the key hazardous events. This process is described below.

The Asset Manager becomes aware of current and emerging issues with assets through a number of mechanisms, including:

> Advice from maintenance staff

> Advice from operations staff

> Condition monitoring equipment

> Routine maintenance and testing information

> Corrective maintenance information

> Asset health indices for major asset classes.

The Asset Manager continually monitors their assets and trends, and follows the decision process outlined below when an issue requires further attention.

The decision process is comprised of a range of both formal and informal elements. The general decision process that is applied by the Asset Managers is as follows:

> Step 1: Gather asset information and conduct analysis to identify current and emerging issues.

TransGrid undertakes a variety of performance, cost, risk and compliance analyses to capture the range of current and emerging issues that are apparent with respect to individual assets and asset groups. This analysis considers the inputs provided in Table 7 as appropriate.

**Table 7: Current and emerging issues analyses**

| Health | Criticality | Key Risks |
|---|---|---|
| <ul><li>Population age profiling against nominal asset lifespan.</li><li>Asset inspection and condition assessments.</li><li>Diagnostic testing – such as electrical, structural and oil testing.</li><li>Failure mode and root cause analysis.</li><li>Failure and defect rates.</li><li>Failure investigations.</li><li>Maintenance program outcomes.</li><li>Advice from maintenance staff</li></ul> | <ul><li>Severity of failure is respect of people, environment, system impact, financial and compliance consequence.</li><li>Likelihood of consequence for the people, environment and system impact areas.</li></ul> | <ul><li>Safety of people</li><li>Strategic asset management</li><li>Compliance obligation</li><li>Critical IT/OT and communications</li><li>Environmental management</li><li>Key hazardous events outlined in Appendix C</li><li>Lifecycle cost</li></ul> |

> Step 2: Risk analysis.

After issues have been identified, the Network Asset Risk Assessment Methodology[2] is applied to analyse and evaluate the network asset risks. This includes:

- Identification of Key Hazardous Events, that prevent the achievement of the corporate and asset management objectives

- Identification and modelling of terminal asset failures that could lead to the occurrence of a Key Hazardous Event, and their asset components, failure modes and associated root causes

- Assessing the consequences of a failure and the resulting Key Hazardous Event, in respect of safety, environment, financial, compliance, reputation and reliability consequence, and the likelihood of the consequence eventuating

- Mapping of the threats (asset components, failure modes and root causes) that could lead to the occurrence of a Key Hazardous Event, to its consequences, and the mitigating and preventative controls

- Quantification of asset risk to provide input to the asset management investment decisions.

> Step 3: Determine the most appropriate course of action.

Once the entire scope of issues are captured and the associated risks have been assessed the Asset Manager will determine the most appropriate course of action to address the risks.

Strategic initiatives are implemented based on the "appropriate courses of action" and could include those outlined in Table 8.

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[2] A copy of the Network Asset Risk Assessment Methodology is available on *The Wire*.

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**Table 8: Appropriate courses of action**

| | |
|---|---|
| **Do nothing** | No further investigation required<br><br>(I.e. continue to carry out the routine maintenance plan and undertake defect maintenance as required). |
| **Asset Manager to undertake further analysis** | Continue to inspect and monitor the identified issues through defect management and defect maintenance. |
| | Undertake a formal condition assessment, including a detailed (Network Asset Condition Assessment) NACA. |
| | Technical Work Request (TWR) - initiate non-routine urgent testing or renewal work; usually arising from the emergence of an unforseen risk such as type faults etc. |
| | Request broader system investigation requiring input from other business functions such as network planning, operations or design. |
| **Routine maintenance initiative** | Identification of appropriate refinements to routine maintenance tasks and schedules to address the identified issues. |
| **Renewal Initiative** | Develop the Need and / or Opportunity (NOS) statement and initiate the Prescribed Capital Investment Framework (PCIF) to evaluate options that will address the current and emerging issues. The risk to be managed according to the ALARP/SFAIRP principle. A renewal initiative arises when the preferred option is an asset renewal project and forms part of the capital works program. |
| **Network augmentation** | Where augmentation solutions such as network reconfiguration exist, undertake this option to defer asset replacement and retire the asset |
| **Non-network solution** | Where non-network solutions such as demand side response exist, initiate the PCIF to defer asset replacement or retire the asset |
| **Disposal** | If the asset is no longer required it can be considered for decommissioning. Decommissioning's are also managed through the PCIP process. |

The process of evaluating the most appropriate course of action to proceed with includes consideration of the benefits (risk deferral, lifecycle costs, increased capability, etc.) and the cost of the initiative.

It should be noted that of the above courses of action only renewal and disposal initiatives feed into the capital works program, and routine maintenance initiatives feed into the Maintenance Plan. The other courses of action proceed to alternate asset management process paths within TransGrid's Asset Management System (AMS), and lead to further review, analysis and decision making by the Asset Managers. This may ultimately lead to a maintenance, renewal or disposal initiative, depending on the outcome of further investigations and new developments.

The decision process that is applied by the Asset Managers to arrive at the renewal, disposal and maintenance strategic initiatives is illustrated in Figure 22 below.

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**Figure 22: Renewal and maintenance decision process**
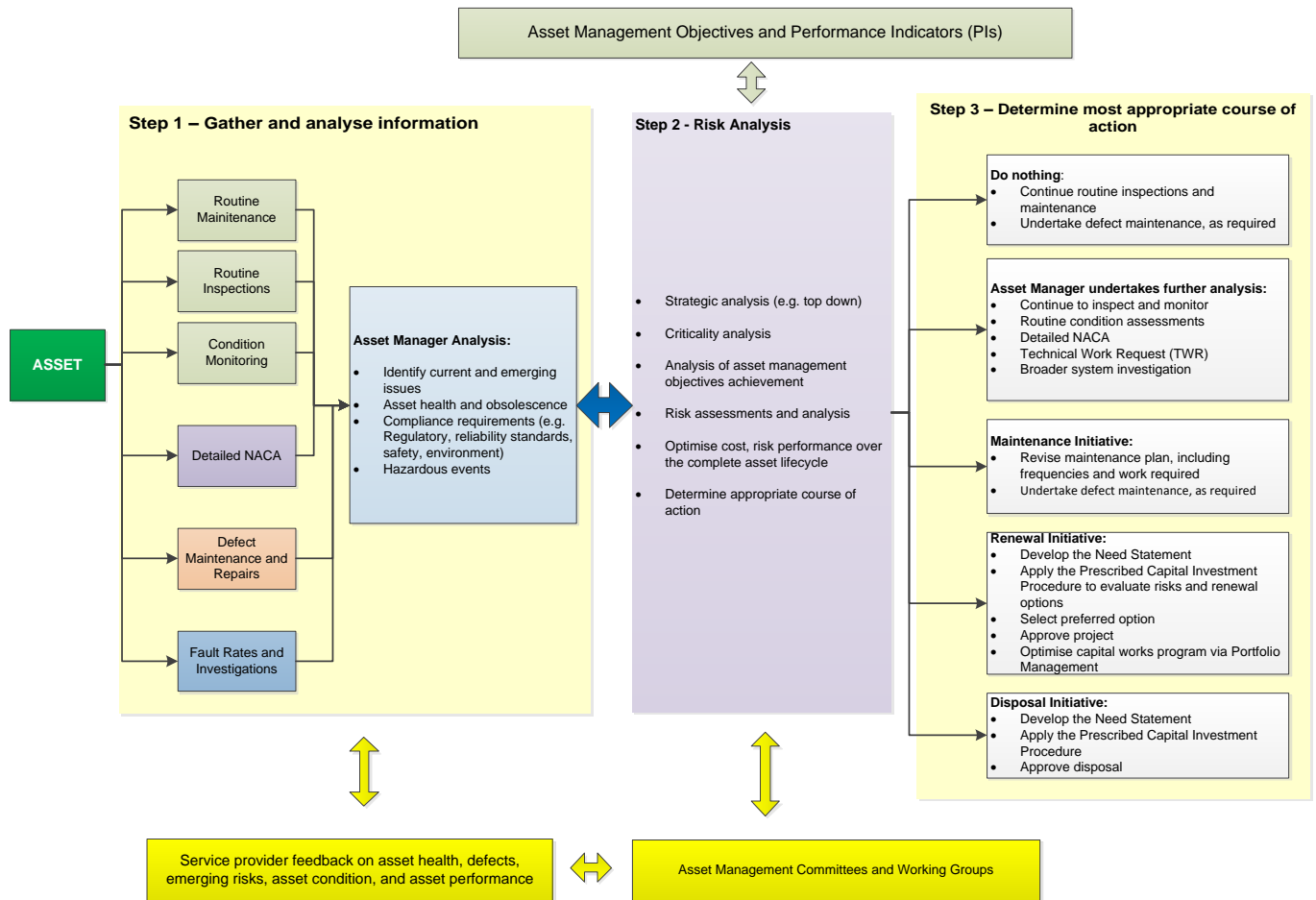


# B.3 Renewal and Disposal Initiatives

Renewal and disposal initiatives are developed through TransGrid's Prescribed Capital Investment Procedure (PCIP)[3]. Within the procedure a Need and/or Opportunity Statement (NOS) is first developed to capture the current and emerging issues and assess the risks associated with an asset, and/or the benefits that give rise to the opportunity. Following the identification of the need/opportunity, options are identified, investigated, and evaluated, and the optimal solution is selected.

The investment process considers the economic benefits of investment to electricity consumers, as well as the organisation's obligation to manage network safety risks to As Low As Reasonably Practicable/So Far As Is Reasonably Practicable (as defined in the Australian Standard 5577 - *Electricity Network Safety Management Systems)*. The options evaluation process is further detailed in the PCIP that is available on *The Wire*, and implemented within the investment governance documents (OER). This process reflects the needs and expectations of the various stakeholder groups identified in Section 4.1, including Government, Regulators, Consumer Groups and residential consumers.

Proposed renewal and disposal works are optimised through Portfolio Management (PM) in consideration of other network investments such as those addressing network planning needs. A renewal initiative arises when an approved asset renewal project results from this process.

A Project Approval Document (PAD) is required to action any proposed renewal investments.

A copy of the Prescribed Capital Investment Procedure is available on *The Wire.*

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[3] Details of the relevant project planning documents for these renewal initiatives can be obtained at
http://thewire/dc/planning/ProjectPlanningDocuments/Pages/default.aspx

## B.4 Routine Maintenance Initiatives

Routine maintenance regimes are typically first established based on manufacturer recommendations, and then refined as TransGrid's experience and familiarity with the asset type grows, as the asset ages, and as issues begin to emerge. In general terms, the primary maintenance approach will fall into one of two categories:

> High-value assets and assets with mechanical components: these assets typically require routine preventative maintenance, and reactive (defect) maintenance as required

> Low-value assets and assets with static components: these assets typically require routine inspection only (i.e. no routine maintenance), and reactive maintenance as required.

TransGrid's maintenance regimes for assets have been refined over a number of years, and with each re-evaluation further opportunities to refine the processes are considered. They are based on consideration of the specific asset failure modes, and seek to strike an optimised balance between preventative and reactive maintenance.

TransGrid's asset maintenance regimes are analysed in consideration of:

> Performance – compliance, condition, defects age and obsolescence etc

> Risks – safety, environment, reliability, compliance, cost and reputational

> Costs – operational costs and capital costs associated with implementing each solution.

> Asset health and criticality.

> The outcomes of last years' maintenance programs

> Any current or emerging issues that could potentially be addressed by an adjustment to the maintenance programs.

The Asset Management Committees are chaired by the Asset Manager, and attended by relevant stakeholders from Field Services and Project Services. The Asset Working Groups discuss routine maintenance requirements going forward in consideration of:

> Actual work performed against the previous maintenance plan

> Defect trends in relation to defects

> Any other emerging issues

> Review of maintenance tasks and frequencies

> Possible changes required from the previous maintenance plan

> Maintenance requirements for new assets, including training and competencies of staff and tools and equipment requirements.

These routine maintenance initiatives reflect the needs and expectations of stakeholder groups identified in Section 4.1, including consumer, industry and business groups.

## B.5    Review of Renewal and Maintenance Strategies

The Renewal and Maintenance Strategies set are regularly reviewed to:

> Confirm that the actual interventions undertaken are delivering the required asset outcomes

> Ensure consistency with the Business Plan. This review is undertaken as part of the annual corporate planning cycle.

Part of the review involves a reassessment and alignment due to changes in:

> Actual condition and performance of the assets

> TransGrid's asset base

> Corporate objectives

> Asset outcomes to be achieved over the upcoming regulatory period

> Stakeholder needs and expectations

> Regulatory requirements for the upcoming regulatory period

> Strategic and business context of the organisation, such as changes to the risk tolerance for the assets

> Financial constraints on the organisation.

## B.6    Renewal and Disposal Works Program and Maintenance Plan

After the Renewal and Maintenance Strategy has been reviewed and approved, the Asset Managers prepare:

> In conjunction with the Manager/Portfolio Management, the Capital Works Program for Renewal and Disposal projects

> The Maintenance Plan.

These plans set out the scope of the actual interventions to be undertaken by the service providers.

The Capital Works Program is maintained by the Portfolio Management Group and the Maintenance Plan is available on the Wire.

Service Level Agreements (SLA) have been developed that govern the relationship between the Asset Manager and Service Providers, and outline the scope of works, budget and the required quality and performance. The service providers report, on a monthly basis, their actual performance in achieving the planned work to the TransGrid's management team at the Service Level Agreement and Major Capital Project review forums.

Asset Managers review the actual performance of the service providers to deliver the Capital Works Program and the Maintenance Plan. Significant variances between planned performance and actual performance are analysed and discussed by the Asset Manager with the service provider. The outcomes of these discussions may result in the:

> Service provider undertaking additional work to address any backlogs in order to get back on track with the plan

> Asset Manager modifying the plans.

## B.7    Compliance Requirements

A core asset management principle is to capture the regulatory, jurisdictional and licence compliance requirements which TransGrid must meet. These compliance requirements are set by government/regulators on behalf of consumers to reflect their expectations in regards to performance requirements that cannot be compromised, such as legislation, NER, design and reliability standards, as well as safety and environmental obligations.

These are often critical areas where the consequences of non-compliance present significant risk to the organisation. The risks are such that their appropriate mitigation is deemed mandatory, and are thus typically not assessed on a case by case basis. Compliance should be considered independently to ensure that their requirements won't be "optimised out" in the event that the costs of achieving them outweigh the risks associated with their occurrence.

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The compliance requirements include:

> Regulatory and legal, such as the NER

> Operating licence requirements

> Safety

> Environmental;

> Electricity network safety management

> Jurisdictional planning requirements

> Jurisdictional requirements, such as design and reliability standards

> Customer and consumer obligations.

TransGrid's compliance requirements reflect the needs and expectations of the Government and Regulators stakeholder group identified in Section 4.1.

# Appendix C  Stakeholder needs and expectations mapping to Asset Management Objectives

Table 9 below maps the stakeholder needs and expectations of TransGrid's asset management system to specific asset management objectives and performance measures outlined in Section 4 and continual improvement initiatives outlined in Section 6. The associated reporting forums to each stakeholder group are also outlined in the table.

**Table 9: Stakeholder needs and expectations mapping to Asset Management Objectives**

| Stakeholder | Stakeholder Need / Expectation | Relevant Asset Management Objective | Performance Measure | Reporting Forums |
|---|---|---|---|---|
| Shareholders | Outlined in TransGrid Business Plan objectives and targets (Refer Section 4.2) | All | All | • Performance Dashboard<br>• Executive Asset Management Committee<br>• Business Unit reporting |
| Government and Regulators (including the NSW State Government, AEMC, AER, AEMO, IPART) | National Electricity Rules, policy reform and compliance, including safety and environmental | • National Electricity Rules compliant<br>• Reliability Standard compliant<br>• ISO 55001 compliant<br>• AS 5577 compliant | • Zero NER non-compliances<br>• Zero reliability standard non-compliances<br>• Zero AS 5577 non-compliances | • IPART Compliance reporting<br>• General Conditions of Licence |
| | Revenue determination and benchmarking | • Deliver a successful revenue determination | • Assurance review of the 2019-23 Regulatory Control Period (RP2) network expenditure complete<br>• Top-down and bottom-up view of RP2 replacement expenditure developed<br>• Documentation required for RP2 submitted<br>• Narrative developed for RP2 network expenditure complete | • Regulatory Information Notices<br>• Revenue Proposals |

| Stakeholder | Stakeholder Need / Expectation | Relevant Asset Management Objective | Performance Measure | Reporting Forums |
|---|---|---|---|---|
| | System security and market operations | • Maintain network reliability<br>• Maintain network capability | • Maintain 5 year average level of loss of supply events<br>• Maintain 5 year average level of unplanned outage related Key Hazardous Event<br>• Maintain system reliability (achieve 99.9997%)<br>• Maintain average age of asset class population to a sustainable level<br>• Zero instances of operating outside network transient limits as notified by AEMO | • Transmission Annual Planning Report (TAPR)<br>• AEMO incident reporting<br>• ENSMS reporting |
| | Reliability standards and pricing | • Maintain network reliability<br>• Deliver a successful revenue determination | • Maintain 5 year average level of loss of supply events<br>• Documentation required for RP2 submitted | • Area plans<br>• IPART Compliance reporting<br>• General Conditions of Licence<br>• Revenue Proposals<br>• AER STPIS Submissions |
| | Prudent network decisions with a strong business case | • Deliver a successful revenue determination | • Documentation required for RP2 submitted | • RIT-T submissions<br>• Revenue Proposals |
| Consumer, industry and business groups | Cost of electricity | • Deliver a successful revenue determination | • Documentation required for RP2 submitted | • Newsletters (online)<br>• Pricing methodology submissions to the AER |
| | Reliable source of electricity | • Maintain network reliability | • Maintain current 5 year average number loss of supply events<br>• Maintain the current level of unplanned outage related Key Hazardous Event<br>• Maintain system reliability (achieve 99.9997%) | • STPIS reporting to AER<br>• IPART Compliance reporting<br>• ENSMS Performance reporting |

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| Stakeholder | Stakeholder Need / Expectation | Relevant Asset Management Objective | Performance Measure | Reporting Forums |
|---|---|---|---|---|
| | Public safety | • Manage network related public and staff safety risks to As Low As Reasonably Practicable (ALARP)/So Far As Is Reasonably Practicable (SFAIRP)<br>• Manage network related bushfire risks (people safety) to ALARP/SFAIRP | • Zero network related LTIs<br>• Zero network related fire starts<br>• Maintain 5 year average level of Key Hazardous Events (catastrophic failure, conductor drop, structure failure, uncontrolled discharge/contact with electricity, and unauthorised entry) | • Safety Performance reporting<br>• IPART Compliance reporting<br>• ENSMS Performance reporting |
| | Environmental stewardship | • Minimise environmental harm and property damage | • Maintain 5 year average level of network related environmental incidents<br>• Maintain 5 year average level of environment related Key Hazardous Events (contaminant or pollutant release) | • IPART Compliance reporting<br>• ENSMS Performance reporting<br>• Environmental assessments and consultation |
| | Economically efficient transmission service | • Improve CAPEX performance<br>• Improve OPEX performance | • Improve capital project performance | • Revenue Proposals<br>• RIT-T submissions |
| | Future of the grid, including renewable energy | • Reliability Standard compliant<br>• National Electricity Rules compliant | • Zero reliability standard non-compliances<br>• Zero NER non-compliances | • Network Vision 2056<br>• Transmission Annual Planning Report (TAPR) |
| Residential and small business consumers | Consumer equity, access and satisfaction | • Maintain network reliability<br>• Maintain network capability | • Maintain 5 year average level of loss of supply event<br>• Maintain system reliability (achieve 99.9997%) | • Newsletters (online)<br>• Advisory Council and Large Energy User Roundtable |
| | Cost of electricity | • Deliver a successful revenue determination | • Documentation required for RP2 submitted | • Pricing methodology submissions to the AER<br>• Revenue Proposals |
| | Reliable source of electricity | • Better than average performance of the STPIS measures | • Better than average performance of the STPIS measures (fault and forced outage rates, average outage duration, incorrect isolations, protection system failures) | • STPIS reporting to AER |

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| Stakeholder | Stakeholder Need / Expectation | Relevant Asset Management Objective | Performance Measure | Reporting Forums |
|---|---|---|---|---|
| Generators, transmission utilities, distributors, and retailers | Market operations and pricing | • Maintain network reliability<br>• Deliver a successful revenue determination | • Maintain 5 year average level of loss of supply events<br>• MITC reduced by 25% or AER target | • AEMO incident reporting<br>• Revenue Proposals |
| | Network development and access | • Maintain network reliability<br>• Maintain network capability | • Maintain 5 year average level of loss of supply events<br>• Maintain 5 year average level of unplanned outage related Key Hazardous Event<br>• Maintain system reliability (achieve 99.9997%) | • Network Vision 2056<br>• Transmission Annual Planning Report (TAPR)<br>• ENSMS Reporting |
| | Future of the grid, including renewable energy | • Reliability Standard compliant<br>• National Electricity Rules compliant | • Zero reliability standard non-compliances<br>• Zero NER non-compliances | • Network Vision 2056<br>• Transmission Annual Planning Report (TAPR)<br>• IPART Compliance Reporting |
| Large energy users and direct loads | Network access | • Maintain network reliability<br>• Maintain network capability | • Maintain 5 year average level of loss of supply events<br>• Maintain 5 year average level of unplanned outage related Key Hazardous Event<br>• Maintain system reliability (achieve 99.9997%)<br>• Zero instances of operating outside network transient limits as notified by AEMO | • ENSMS Reporting<br>• AEMO incident reporting |
| | Security of supply | • Better than average performance of the STPIS measures<br>• Maintain network reliability | • Better than average performance of the STPIS measures (fault and forced outage rates, average outage duration, incorrect isolations, protection system failures)<br>• MITC reduced by 25% of AER target<br>• Maintain 5 year average level of loss of supply events<br>• Maintain system reliability (achieve 99.9997%) | • AER STIPS Reporting<br>• ENSMS Reporting |
| | Pricing | • Deliver a successful revenue determination | • Documentation required for RP2 submitted | • Pricing methodology submissions to the AER<br>• Revenue Proposals |

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**Table 10: Business Unit Performance Indicators alignment to Asset Management Objectives**

| Business Unit | Business Unit Performance Indicator | Asset Management Objective | AMS&O Performance Measure | Monitoring/Reporting Location |
|---|---|---|---|---|
| AM | 100% accuracy in AM program of works reporting | • Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented | Asset Management Business Unit Reporting |
| AM | 100% of Asset Renewal Strategies and Plans documents revised and issued | • Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented | Asset Management Business Unit Reporting |
| AM | 75% NCRs are corrected | • ISO 55001 Compliant | • ISO 55001 certification audit NCRs closed-off (75%) | ARMS |
| AM | At least 25% improvement on current Asset Information System data sets collected and Reliability Centred Maintenance (RCM) commenced | • Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented | Asset Management Business Unit Reporting |
| AM | 100% of functional specifications in place | • Continually improve the Asset Management System | • Plant and design standards optimised | Asset Management Business Unit Reporting |
| AM | Investment decision making process extended to TOTEX | Improve CAPEX performance | Investment governance/prioritisation/optimisation process enhanced | Asset Management Business Unit Reporting |
| AM | Benefits realisation as BAU | Improve CAPEX performance | Investment governance/prioritisation/optimisation process enhanced | Asset Management Business Unit Reporting |
| AM | Full compliance with AER Regulatory Information Notice (RIN) requirements | Deliver a successful revenue determination | • Documentation required for RP2 submitted | AER Reporting |
| AM | 100% of risk tool data loaded | Improve CAPEX performance | • REPEX and risk scenarios understood | Asset Management Business Unit Reporting |
| AM | Achieve better than 99.9997% network reliability | Maintain network reliability | Maintain system reliability (achieve 99.9997%) | Network Performance Reports |
| AM | Reduce Mean Time to Repair (MTTR) for high priority equipment impairment by 50% | Improve OPEX performance | Reduce standard maintenance job costs (refer to Business Unit plans for targets) | Asset Management Business Unit Reporting |
| AM | Achieve better than 99.98% SCADA availability | Maintain network reliability | • Maintain system reliability (achieve 99.9997%) | Asset Management Business Unit Reporting |
| AM | MITC reduced by 25% of AER target | Maximise delivery of STPIS benefits where commercially justifiable | • MITC reduced by 25% of AER target | AER Reporting |
| AM | Overdue (Backlog) Maintenance - measured by value – trending to zero | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget | Asset Management Business Unit Reporting |
| AM | Capex portfolio performance within +/-5% of budget | Improve CAPEX performance | • Perform within +/- 5%  of the CAPEX budget | Asset Management Business Unit Reporting |
| AM | Asset Management Program of Works performance within -10% to +5% of budget | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget | Asset Management Business Unit Reporting |
| AM | 95% of preferred option feasibility studies within +/- 25% of actual delivered costs | Improve CAPEX performance | • Perform within +/- 5%  of the CAPEX budget | Asset Management Business Unit Reporting |
| AM | All components of Portfolio Management programs are able to be accurately baselined and reported from TransGrid's corporate systems | Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented | Asset Management Business Unit Reporting |
| AM | Powering Sydney's Future completed by Nov 2016 | Maintain network reliability | • Maintain system reliability (achieve 99.9997%) | Network Performance Reports |
| AM | South Australian NSW Interconnector studies by Dec 2016 | Maintain network reliability | • Maintain system reliability (achieve 99.9997%) | Network Performance Reports |
| FS | Budget Performance (%) | Improve CAPEX performance Improve OPEX performance | • Perform within +/- 5%  of the CAPEX budget • Perform within -5/+10% of the Asset Management Program of Works budget | Field Services Business Unit Reporting |
| FS | Lines Project Delivery | Improve CAPEX performance | • Perform within +/- 5%  of the CAPEX budget | Asset Management Business Unit Reporting |
| FS | On-Time & On-Budget Project Delivery (%) | Improve CAPEX performance Improve OPEX performance | • Perform within +/- 5%  of the CAPEX budget • Perform within -5/+10% of the Asset Management Program of Works budget | Field Services Business Unit Reporting |
| FS | Routine Maintenance Planning Variance Index (%) | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget | Field Services Business Unit Reporting |
| FS | Routine Maintenance On-Time Completion (%) | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget | Field Services Business Unit Reporting |
| FS | Easements Program Risk Management (Scale) | Improve CAPEX performance | • Perform within +/- 5%  of the CAPEX budget | Asset Management Business Unit Reporting |
| FS | Routine Maintenance Standard Job Efficiency Improvement (%) | Improve OPEX performance | • Reduce standard maintenance job costs (refer to Business Unit plans for targets) | Field Services Business Unit Reporting |
| FS | STPIS Fault Outage Impact (%) | Maximise delivery of STPIS benefits where commercially justifiable | • Better than average performance of the STPIS measures (fault and forced outage rates, average outage duration, incorrect isolations, protection system failures) | Network Performance Reports |
| FS | Property Maintenance On-Time Completion (%) | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget | Field Services Business Unit Reporting |
| FS/PS/PS&S | • HCI, LTIFR for employees and contractors | • Manage network related public and staff safety risks to As Low As Reasonably Practicable (ALARP)/So Far As Is Reasonably Practicable (SFAIRP) | • Zero network related LTIs | Corporate Dashboard Reporting |

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| Business Unit | Business Unit Performance Indicator | Asset Management Objective | AMS&O Performance Measure | Monitoring/Reporting Location |
|---|---|---|---|---|
| FS/PS/PS&S | • Opex efficiency target | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget<br>• Reduce standard maintenance job costs (refer to Business Unit plans for targets) | ACE Reporting |
| FS/PS/PS&S | • Capex efficiency target | Improve CAPEX performance | • Improve capital project performance<br>• CAPEX cash flow adherence (88%)<br>• Perform within +/- 5% of the CAPEX budget | ACE Reporting |
| FS/PS/PS&S | • STPIS targets | Maximise delivery of STPIS benefits where commercially justifiable | • Better than average performance of the STPIS measures (fault and forced outage rates, average outage duration, incorrect isolations, protection system failures) | Network Performance Reports |
| FS/PS/PS&S | • Implementation of condition based asset management | • Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented<br>• Asset replacement life optimised<br>• Asset maintenance scope and frequency optimised | Asset Management Business Unit Reporting |
| FS/PS/PS&S | • ISO 55001 compliance | • ISO 55001 Compliant | • ISO 55001 certification audit NCRs closed-off (75%)<br>• Reach excellent maturity level in the risk, strategy and asset information Asset Management System elements<br>• Internal audits carried out as per audit program | ARMS |
| FS/PS/PS&S | • Loss of supply incidents | Maintain network reliability | • Maintain current 5 year average number loss of supply events<br>• Maintain the current level of unplanned outage related Key Hazardous Event | Network Performance Reports |
| FS/PS/PS&S | • Meet license conditions | • Reliability Standard compliant<br>• National Electricity Rules compliant | • Zero reliability standard non-compliances<br>• Zero NER non-compliances | ARMS |
| FS/PS/PS&S | • High Consequence Incidents | Minimise environmental harm and property damage | • Maintain 5 year average level of network related environmental incidents<br>• Maintain 5 year average level of environment related Key Hazardous Events (contaminant or pollutant release) | ARMS |
| FS/PS/PS&S | • Serious EPA breaches | Minimise environmental harm and property damage | • Maintain 5 year average level of network related environmental incidents<br>• Maintain 5 year average level of environment related Key Hazardous Events (contaminant or pollutant release) | ARMS |
| FS/PS/PS&S | • Prescribed capex outperformance (CESS) | Improve CAPEX performance | • Improve capital project performance<br>• CAPEX cash flow adherence (88%)<br>• Perform within +/- 5% of the CAPEX budget | AER Reporting |
| FS/PS/PS&S | • Successful RP2 determination | Deliver a successful revenue determination | • Assurance review of the 2019-23 Regulatory Control Period (RP2) network expenditure complete<br>• Top-down and bottom-up view of RP2 replacement expenditure developed<br>• Documentation required for RP2 submitted<br>• Narrative developed for RP2 network expenditure complete | People, Strategy & Stakeholders Business Unit Reporting |
| FS | Documents register – all documents within review date | • ISO 55001 Compliant | • ISO 55001 certification audit NCRs closed-off (75%) | ARMS / Field Services Business Unit Reporting |
| FS | RACI and Process flows for relevant processes | • ISO 55001 Compliant | • ISO 55001 certification audit NCRs closed-off (75%) | ARMS / Field Services Business Unit Reporting |
| FS | 12 site reviews per Team Leader / Manager to monitor compliance | • Continually improve the Asset Management System | Internal audits carried out as per audit program | Field Services Business Unit Reporting |
| FS | Supplier performance evaluated | Improve CAPEX performance<br>Improve OPEX performance | • Perform within +/- 5% of the CAPEX budget<br>• Perform within -5/+10% of the Asset Management Program of Works budget | Field Services Business Unit Reporting |
| FS | 90% compliance for construction work audits | • Manage network related public and staff safety risks to As Low As Reasonably Practicable (ALARP)/So Far As Is Reasonably Practicable (SFAIRP) | • Zero network related LTIs | Corporate Dashboard Reporting |
| FS | 100% of LIDAR encroachments /detections addressed | • Manage network related public and staff safety risks to As Low As Reasonably Practicable (ALARP)/So Far As Is Reasonably Practicable (SFAIRP)<br>• Minimise environmental harm and property damage<br>• Maintain network reliability | • Zero network related LTIs<br>• Maintain 5 year average level of network related environmental incidents<br>• Maintain system reliability (achieve 99.9997%) | Corporate Dashboard Reporting<br>Network Performance Reports |
| PS | Projects on-time and on-budget - >90% on time and budget for projects above $1million | Improve CAPEX performance | • Improve capital project performance<br>• CAPEX cash flow adherence (88%)<br>• Perform within +/- 5% of the CAPEX budget | Project Services Business Unit Reporting |
| PS | Client satisfaction - >80% As assessed through regular client catch-up meetings | • Continually improve the Asset Management System | • Enhance and formalise the Asset Management Communication Strategy | Project Services Business Unit Reporting |

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| Business Unit | Business Unit Performance Indicator | Asset Management Objective | AMS&O Performance Measure | Monitoring/Reporting Location |
|---|---|---|---|---|
| PS | Prescribed controllable OPEX - <3% variance between budget and actual for the financial year | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget | Project Services Business Unit Reporting |
| PS | HCI & LTI - As per corporate target | • Manage network related public and staff safety risks to As Low As Reasonably Practicable (ALARP)/So Far As Is Reasonably Practicable (SFAIRP) | • Zero network related LTIs | Corporate Dashboard Reporting |
| PS | Group managers and team leaders conduct quarterly site/process reviews | • Continually improve the Asset Management System | Internal audits carried out as per audit program | Project Services Business Unit Reporting |
| PS | Standard Equipment Manuals - Manuals (more specificity) agreed with AM and available on the wire | • Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented<br>• Plant and design standards optimised | Project Services Business Unit Reporting |
| PS | Lag: Conduct 4 stakeholder reviews p.a. on PS service provision | • Continually improve the Asset Management System | • Enhance and formalise the Asset Management Communication Strategy | Project Services Business Unit Reporting |
| PS | Lag: Completed surveys submitted (4) | • Continually improve the Asset Management System | • Enhance and formalise the Asset Management Communication Strategy | Project Services Business Unit Reporting |
| PS | Lag – Overall opex expenditure on/under budget (same as BAU KPI) | Improve OPEX performance | • Perform within -5/+10% of the Asset Management Program of Works budget<br>• Reduce standard maintenance job costs (refer to Business Unit plans for targets) | Project Services Business Unit Reporting |
| PS | 1. Design standards updated to reflect agreed (with AM) lower cost solutions (85%) | • Continually improve the Asset Management System | • Plant and design standards optimised | Project Services Business Unit Reporting |
| PS | 2. Agree outstanding ideas (15%) with Stakeholders and update design standards | • Continually improve the Asset Management System | • Plant and design standards optimised | Project Services Business Unit Reporting |
| PS | 2. Issue for Construction Design package to also include LRA's | • Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented | Project Services Business Unit Reporting |
| PS | 2. LRA's are up to date for all new system/network changes | • Continually improve the Asset Management System | • Asset information improvements (governance, data, reporting and systems) implemented | Project Services Business Unit Reporting |
| PS | Management conduct quarterly site/process/design outcome reviews | • Continually improve the Asset Management System | Internal audits carried out as per audit program | Project Services Business Unit Reporting |
| PS | incident rates including LTI, # reportable incidents, audit outcomes for staff and contractors (ARMs output) | • Manage network related public and staff safety risks to As Low As Reasonably Practicable (ALARP)/So Far As Is Reasonably Practicable (SFAIRP)<br>• Manage network related bushfire risks (people safety) to ALARP/SFAIRP<br>• Minimise environmental harm and property damage | • Zero network related LTIs<br>• Zero network related fire starts<br>• Maintain Key Hazardous Events (catastrophic failure, conductor drop, structure failure, uncontrolled discharge/contact with electricity, and unauthorised entry) at 5 year average levels<br>• Maintain 5 year average level of network related environmental incidents<br>• Maintain 5 year average level of environment related Key Hazardous Events (contaminant or pollutant release) | ARMS |
| PS | Safety in Design Audits to be undertaken every 6 months by Engineering Design Managers | • Continually improve the Asset Management System | Internal audits carried out as per audit program | Project Services Business Plan Reporting |

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